



Report No.: SZ12020101S01



SAR TEST REPORT

Issued to

**XIAMEN PUXING ELECTRONICS SCIENCE &
TECHNOLOGY CO., LTD**

For

FM VHF/UHF Two Way Radio

Model Name : PX-888K
Trade Name : PUXING
Brand Name : PUXING
FCC ID : AUJPXDZ888K001
Standard : FCC Oet65 Supplement C Jun.2001
47CFR 2.1093
ANSI C95.1-1999
IEEE 1528-2003
MAX SAR : Head: 3.964W/kg (50% Duty cycle)
Body: 4.153W/kg (50% Duty cycle)
Test date : 2012-03-17
Issue date : 2012-04-18

Shenzhen MORLAB Communication Technology Co., Ltd.

Tested by Zhu Zhan

Zhu Zhan

Date 2012-4-18

Review by Samuel. Peng

Samuel. Peng

Date 2012-04-18

CTIA Authorized Test Lab

LAB CODE 20081223-00

IEEE 1725

OTA

OFTA

電訊管理局

**GCF**

Bluetooth

FCC

Reg. No.

741109

The report refers only to the sample tested and does not apply to the bulk. This report is issued in confidence to the client and it will be strictly treated as such by the Shenzhen MORLAB Communication Technology Co., Ltd. It may not be reproduced either in its entirety or in part and it may not be used for advertising. The client to whom the report is issued may, however, show or send it, or a certified copy thereof prepared by the Shenzhen MORLAB Telecommunication Co., Ltd to his GPRS provider or others persons directly concerned. Shenzhen MORLAB Telecommunication Co., Ltd will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report. In the event of the improper use of the report, Shenzhen MORLAB Telecommunication Co., Ltd reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

DIRECTORY

| | |
|---|-----------|
| 1. TESTING LABORATORY | 4 |
| 1.1. Identification of the Responsible Testing Laboratory | 4 |
| 1.2. Identification of the Responsible Testing Location | 4 |
| 1.3. Accreditation Certificate | 4 |
| 1.4. List of Test Equipments | 4 |
| 2. TECHNICAL INFORMATION | 5 |
| 2.1. Identification of Applicant | 5 |
| 2.2. Identification of Manufacturer | 5 |
| 2.3. Equipment Under Test (EUT)..... | 5 |
| 2.3.1. Photographs of the EUT | 5 |
| 2.3.2. Identification of all used EUT | 5 |
| 2.4. Applied Reference Documents | 6 |
| 2.5. Device Category and SAR Limits | 6 |
| 2.6. Test Environment/Conditions | 7 |
| 3. SPECIFIC ABSORPTION RATE (SAR) | 8 |
| 3.1. Introduction..... | 8 |
| 3.2. SAR Definition..... | 8 |
| 4. SAR MEASUREMENT SETUP | 9 |
| 4.1. The Measurement System | 9 |
| 4.2. Probe | 9 |
| 4.3. Probe Calibration Process..... | 11 |
| 4.3.1 Dosimetric Assessment Procedure | 11 |
| 4.3.2 Free Space Assessment Procedure | 11 |
| 4.3.2 Temperature Assessment Procedure..... | 11 |
| 4.4. Phantom | 12 |
| 4.5. Device Holder | 12 |
| 5. TISSUE SIMULATING LIQUIDS | 13 |
| 6. UNCERTAINTY ASSESSMENT | 15 |
| 6.1. UNCERTAINTY EVALUATION FOR HANDSET SAR TEST | 15 |
| 6.2. UNCERTAINTY FOR SYSTEM PERFORMANCE CHECK | 16 |
| 7. SAR MEASUREMENT EVALUATION | 18 |

| | |
|---|-----------|
| 7.1. System Setup..... | 18 |
| 7.2. Validation Results..... | 19 |
| 8. OPERATIONAL CONDITIONS DURING TEST | 20 |
| 8.1. Informations on the testing | 20 |
| 8.2. Body-worn Configurations..... | 21 |
| 8.3. Measurement procedure..... | 21 |
| 8.4. Description of interpolation/extrapolation scheme | 22 |
| 9. PTT MEASUREMENT PROCEDURES | 22 |
| 9.1. Measurement Of Conducted Peak Output Power..... | 23 |
| 10. 136MHZ ~ 174MHZ VHF BAND SAR EVALUATION | 24 |
| 11. 400MHZ ~ 470MHZ UHF BAND SAR TEST RESULTS LIST | 25 |
| ANNEX A EUT SETUP PHOTOS..... | 27 |
| ANNEX B GRAPH TEST RESULTS | 29 |

| Change History | | |
|----------------|---------------|---|
| Issue | Date | Reason for change |
| 1.0 | Mar. 31, 2012 | Original edition |
| 2.0 | Apr.18, 2012 | Correct temperature range, update the scaled SAR. |

1. Testing Laboratory

1.1. Identification of the Responsible Testing Laboratory

Company Name: Shenzhen Morlab Communications Technology Co., Ltd.
Department: Morlab Laboratory
Address: 3/F, Electronic Testing Building, Shahe Road, Nanshan District, Shenzhen, 518055 P. R. China
Responsible Test Lab Manager: Mr. Shu Luan
Telephone: +86 755 86130268
Facsimile: +86 755 86130218

1.2. Identification of the Responsible Testing Location

Name: Shenzhen Morlab Communications Technology Co., Ltd.
Morlab Laboratory
Address: 3/F, Electronic Testing Building, Shahe Road, Nanshan District, Shenzhen, 518055 P. R. China

1.3. Accreditation Certificate

Accredited Testing Laboratory: No. CNAS L3572

1.4. List of Test Equipments

| No. | Instrument | Type | Cal. Date | Cal. Due |
|-----|------------------|--|-----------|----------|
| 1 | PC | Dell (Pentium IV 2.4GHz, SN:X10-23533) | (n.a) | (n.a) |
| 2 | Network Emulator | Rohde&Schwarz (CMU200, SN:105894) | 2011-9-26 | 1year |
| 3 | Voltmeter | Keithley (2000, SN:1000572) | 2011-9-24 | 1year |
| 4 | Synthetizer | Rohde&Schwarz (SML_03, SN:101868) | 2011-9-24 | 1year |
| 5 | Amplifier | Nucl udes (ALB216, SN:10800) | 2011-9-24 | 1year |
| 6 | Power Meter | Rohde&Schwarz (NRVD, SN:101066) | 2011-9-24 | 1year |
| 7 | Probe | Satimo (SN:SN_3708_EP80) | 2011-9-24 | 1year |
| 8 | Phantom | Satimo (SN:SN_36_08_SAM62) | 2011-9-24 | 1year |
| 9 | Liquid | Satimo (Last Calibration: 2012-03-17) | N/A | N.A |
| 10 | Dipole 450MHz | Satimo (SN 36/08 DIPC 98) | 2011-9-24 | 1year |
| | | | | |
| | | | | |

2. Technical Information

Note: the following data is based on the information by the applicant.

2.1. Identification of Applicant

Company Name: XIAMEN PUXING ELECTRONICS SCIENCE & TECHNOLOGY CO.,LTD.
Address: NO.11 XIANGHONG ROAD XIANG'AN DISTRICT XIAMEN FUJIAN CHINA 361101

2.2. Identification of Manufacturer

Company Name: XIAMEN PUXING ELECTRONICS SCIENCE & TECHNOLOGY CO.,LTD.
Address: NO.11 XIANGHONG ROAD XIANG'AN DISTRICT XIAMEN FUJIAN CHINA 361101

2.3. Equipment Under Test (EUT)

Model Name: PX-888K
Trade Name: PUXING
Brand Name: PUXING
Hardware Version: FC-13501-04
Software Version: PX888_UV V1.0.3
Frequency Bands: 136MHz-174MHz(VHF);400MHz-470MHz (UHF)
Modulation Mode: FM (analog)
Bandwidth: 12.5KHz; 25KHz
Transmitting Power: High power mode: 5W
Low Power mode: 2W
Antenna type: External Antenna
Development Stage: Identical prototype
Battery Model: PB-72L
Battery specification: 1200mAh 7.4V

2.3.1. Photographs of the EUT

Please see for photographs of the EUT.

2.3.2. Identification of all used EUT

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the following two numerical characters indicate the software version of the test sample.

| EUT Identity | Hardware Version | Software Version |
|--------------|------------------|------------------|
| 1# | FC-13501-04 | PX888_UV V1.0.3 |

2.4. Applied Reference Documents

Leading reference documents for testing:

| No. | Identity | Document Title |
|-----|--|--|
| 1 | 47 CFR§2.1093 | Radiofrequency Radiation Exposure Evaluation: Portable Devices |
| 2 | FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01) | Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields |
| 3 | ANSI C95.1-1999 | IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 GHz |
| 4 | IEEE 1528-2003 | Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate(SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques. |

2.5. Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. According to FCC OET Bulletin 65 Limit for Occupational/Controlled Exposure should be applied for this device, it is 8.0 W/kg as averaged over any 1 gram of tissue.

FCC LIMITS FOR SPECIFIC ABSORPTION RATE (SAR)

(A) Limits for Occupational/Controlled Exposure (W/kg)

| Whole-Body | Partial-Body | Hands, Wrists, Feet and Ankles |
|------------|--------------|--------------------------------|
| 0.4 | 8.0 | 20.0 |

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

| Whole-Body | Partial-Body | Hands, Wrists, Feet and Ankles |
|------------|--------------|--------------------------------|
| 0.08 | 1.6 | 4.0 |

2.6. Test Environment/Conditions

| | |
|--------------------------|---|
| Normal Temperature (NT): | 20 ... 25 °C |
| Relative Humidity: | 30 ... 75 % |
| Air Pressure: | 980 ... 1020 hPa |
| Test frequency: | 400.025MHz; 435.025MHz; 469.950MHz; |
| Operation mode: | Transmitting |
| Power Level: | High power mode: maximum transmitting power Low Power mode: maximum transmitting power |

During SAR test, the EUT was transmitting at Maximum transmitting mode.

This push-to-talk (PPT) radio Device support 136MHz~174MHz VHF band, this band SAR evaluation has been subject to a KDB inquiry, and the tracking number is 488770. For 400MHz~470MHz, the SAR test was located on 400.025MHz; 435MHz and 469MHz. both 12.5KHz and 25KHz bandwidth mode are performed.

3. Specific Absorption Rate (SAR)

3.1. Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

3.2. SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density. ρ). The equation description is as below:

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

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be either related to the temperature elevation in tissue by

$$\text{SAR} = C \frac{\delta T}{\delta t}$$

, where C is the specific heat capacity, δT is the temperature rise and δt the exposure duration, or related to the electrical field in the tissue by

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

, where σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the rms electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

4. SAR Measurement Setup

4.1. The 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.



The EUT 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 10g mass.

4.2. Probe

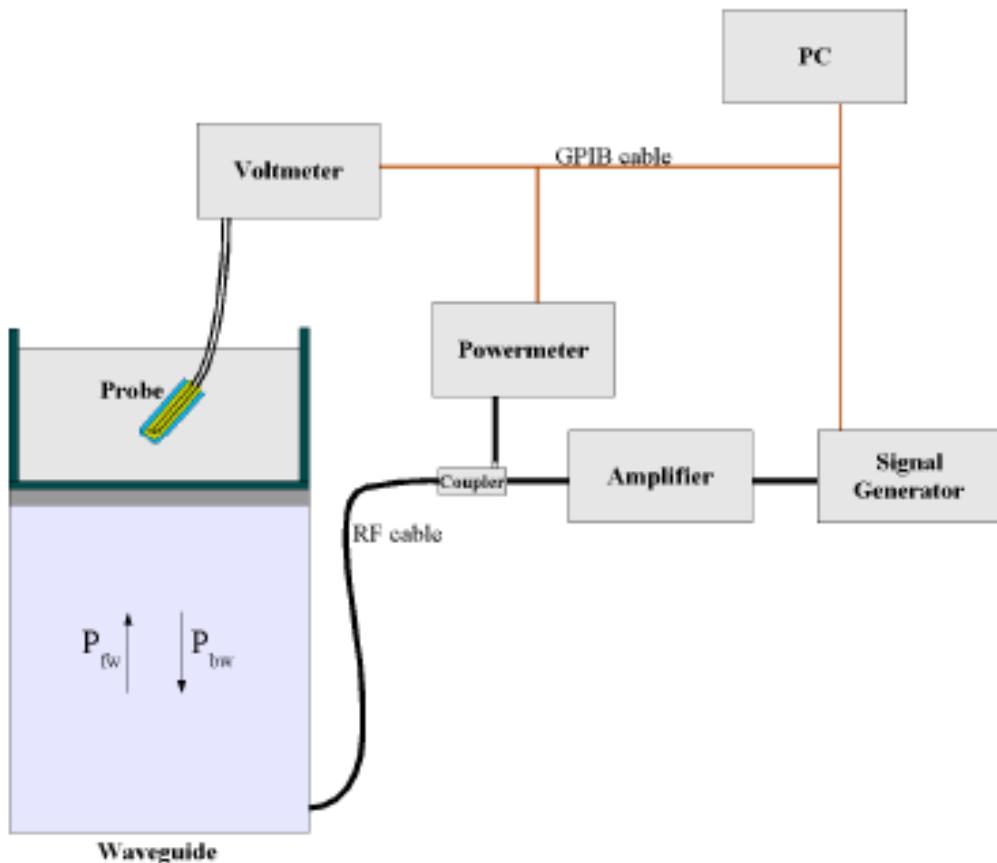
For the measurements the Specific Dosimetric E-Field Probe SN 37/08 EP80 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 6.5 mm
- Distance between probe tip and sensor center: 2.5mm
- 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: <0.25 dB
- Calibration range: 835 to 2500MHz for head & body simulating liquid.

Angle between probe axis (evaluation axis) and surface normal line: less than 30°

Probe calibration is realized, in compliance with CENELEC EN 62209 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the EN 622091 annexe technique using reference guide at the five frequencies.



$$SAR = \frac{4(P_{fw} - P_{bw})}{ab\delta} \cos^2\left(\pi \frac{y}{a}\right) e^{-(2z/\delta)}$$

Where :

Pfw = Forward Power
 Pbw = Backward Power
 a and b = Waveguide dimensions
 δ = Skin depth

Keithley configuration:

Rate = Medium; Filter =ON; RDGS=10; FILTER TYPE =MOVING AVERAGE; RANGE AUTO

After each calibration, a SAR measurement is performed on a validation dipole and compared with a NPL calibrated probe, to verify it.

The calibration factors, CF(N), for the 3 sensors corresponding to dipole 1, dipole 2 and dipole 3 are:

$$CF(N) = SAR(N) / V_{lin}(N) \quad (N=1,2,3)$$

The linearised output voltage $V_{lin}(N)$ is obtained from the displayed output voltage $V(N)$ using

$$V_{lin}(N) = V(N) * (1 + V(N) / DCP(N)) \quad (N=1,2,3)$$

where DCP is the diode compression point in mV.

4.3. Probe Calibration Process

4.3.1 Dosimetric Assessment Procedure

Each E-Probe/Probe Amplifier combination has unique calibration parameters. SATIMO Probe calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm²) using an with CALISAR, Antenna proprietary calibration system.

4.3.2 Free Space Assessment Procedure

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/cm².

4.3.2 Temperature Assessment Procedure

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated head tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

Where:

$$SAR = C \frac{\Delta T}{\Delta t}$$

Δt = exposure time (30 seconds),

C = heat capacity of tissue (brain or muscle),

ΔT = temperature increase due to RF exposure.

SAR is proportional to $\Delta T / \Delta t$, the initial rate of tissue heating, before thermal diffusion takes place. The electric field in the simulated tissue can be used to estimate SAR by equating the thermally derived SAR to that with the E- field component.

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

Where:

σ = simulated tissue conductivity,

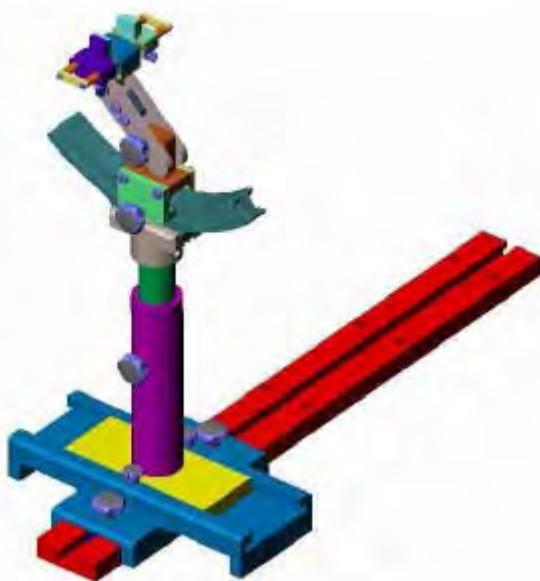
ρ = Tissue density (1.25 g/cm³ for brain tissue)

4.4. 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 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right 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.

4.5. Device Holder

The positioning system allows obtaining cheek and tilting position with a very good accuracy. In compliance with CENELEC, the tilt angle uncertainty is lower than 1°.



Device holder

| System Material | Permittivity | Loss Tangent |
|-----------------|--------------|--------------|
| Delrin | 3.7 | 0.005 |

5. Tissue Simulating Liquids

Simulant liquids that are used for testing at frequencies of 450MHz. which are made mainly of sugar, salt and water solutions may be left in the phantoms. Approximately 20litres are needed for an upright head compared to about 25 litres for a horizontal bath phantom. The liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is (head SAR) or from the flat phantom to the liquid top surface (body SAR) is 15cm.

Following are the recipes for one liter of head and body tissue simulating liquid for frequency band 450 MHz.

| Ingredients (% by weight) | Frequency Band | |
|-------------------------------|----------------|-------|
| | 450MHz | |
| Tissue Type | Head | Body |
| Water | 38.56 | 51.16 |
| Salt(NaCl) | 3.95 | 1.49 |
| Sugar | 56.32 | 46.78 |
| HEC | 0.98 | 0.52 |
| Bactericide | 0.19 | 0.05 |
| Triton | 0.0 | 0.0 |
| DGBE | 0.0 | 0.0 |
| Acticide SPX | 0.0 | 0.0 |
| Dielectric Constant | 43.5 | 56.7 |
| Conductivity (S/m) | 0.87 | 0.94 |

Recipes for Tissue Simulating Liquid

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an Agilent 85033E Dielectric Probe Kit and an Agilent Network Analyzer.

Table 1: Dielectric Performance of Head Tissue Simulating Liquid

| Temperature: 22.0~23.8°C, humidity: 54~60%. | | | |
|---|-----------|-------------------------|-----------------------------|
| / | Frequency | Permittivity ϵ | Conductivity σ (S/m) |
| Target value | 450 MHZ | 43.5 | 0.87 |
| Validation value (Mar. 17) | 450 MHZ | 43.464979 | 0.863409 |

For body-worn measurements, the device was tested against flat phantom representing the user body. Under measurement phone was put on in the phone holder.

Table 2: Dielectric Performance of Body Tissue Simulating Liquid

| Temperature: 21.8~23.8°C, humidity: 54~60%. | | | |
|--|------------------|---|---|
| / | Frequency | Permittivity ϵ | Conductivity σ (S/m) |
| Target value | 450 MHz | 56.7 | 0.94 |
| Validation value (Mar. 17) | 450 MHz | 56.842969 | 0.9317436 |

6. Uncertainty Assessment

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

6.1. 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 | 4.76 | N | 1 | 1 | 1 | 4.76 | 4.76 | ∞ |
| Axial Isotropy | E.2.2 | 2.5 | R | $\sqrt{3}$ | 0.7 | 0.7 | 1.01 | 1.01 | ∞ |
| Hemispherical Isotropy | E.2.2 | 4.0 | R | $\sqrt{3}$ | 0.7 | 0.7 | 1.62 | 1.62 | ∞ |
| Boundary effect | E.2.3 | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| Linearity | E.2.4 | 5.0 | R | $\sqrt{3}$ | 1 | 1 | 2.89 | 2.89 | ∞ |
| System detection limits | E.2.5 | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| Readout Electronics | E.2.6 | 0.02 | N | 1 | 1 | 1 | 0.02 | 0.02 | ∞ |
| Reponse Time | E.2.7 | 3.0 | R | $\sqrt{3}$ | 1 | 1 | 1.73 | 1.73 | ∞ |
| Integration Time | E.2.8 | 2.0 | R | $\sqrt{3}$ | 1 | 1 | 1.15 | 1.15 | ∞ |
| RF ambient Conditions | E.6.1 | 3.0 | R | $\sqrt{3}$ | 1 | 1 | 1.73 | 1.73 | ∞ |
| Probe positioner Mechanical Tolerance | E.6.2 | 2.0 | R | $\sqrt{3}$ | 1 | 1 | 1.15 | 1.15 | ∞ |
| Probe positioning with respect to Phantom Shell | E.6.3 | 0.05 | R | $\sqrt{3}$ | 1 | 1 | 0.03 | 0.03 | ∞ |
| Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation | E.5.2 | 5.0 | R | $\sqrt{3}$ | 1 | 1 | 2.89 | 2.89 | ∞ |
| Test sample Related | | | | | | | | | |
| Test sample positioning | E.4.2.1 | 0.03 | N | 1 | 1 | 1 | 0.03 | 0.03 | N-1 |
| Device Holder Uncertainty | E.4.1.1 | 5.00 | N | 1 | 1 | 1 | 5.00 | 5.00 | N-1 |
| Output power Power drift - SAR drift measurement | 6.6.2 | 4.04 | R | $\sqrt{3}$ | 1 | 1 | 2.33 | 2.33 | ∞ |
| Phantom and Tissue Parameters | | | | | | | | | |
| Phantom Uncertainty (Shape and thickness tolerances) | E.3.1 | 0.05 | R | $\sqrt{3}$ | 1 | 1 | 0.03 | 0.03 | ∞ |

| | | | | | | | | | |
|---|-------|-------|-----|------------|------|------|-------|------|----------|
| Liquid conductivity - deviation from target value | E.3.2 | 4.57 | R | $\sqrt{3}$ | 0.64 | 0.43 | 1.69 | 1.13 | ∞ |
| Liquid conductivity - measurement uncertainty | E.3.3 | 5.00 | N | 1 | 0.64 | 0.43 | 3.20 | 2.15 | M |
| Liquid permittivity - deviation from target value | E.3.2 | 3.69 | R | $\sqrt{3}$ | 0.6 | 0.49 | 1.28 | 1.04 | ∞ |
| Liquid permittivity - measurement uncertainty | E.3.3 | 10.00 | N | 1 | 0.6 | 0.49 | 6.00 | 4.90 | M |
| Combined Standard Uncertainty | | | RSS | | | | 11.55 | 10.6 | |
| Expanded Uncertainty (95% Confidence interval) | | | K=2 | | | | 23.11 | 21.3 | |
| | | | | | | | | 3 | |

6.2. 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 | 4.76 | N | 1 | 1 | 1 | 4.76 | 4.76 | ∞ |
| Axial Isotropy | E.2.2 | 2.5 | R | $\sqrt{3}$ | 0.7 | 0.7 | 1.01 | 1.01 | ∞ |
| Hemispherical Isotropy | E.2.2 | 4.0 | R | $\sqrt{3}$ | 0.7 | 0.7 | 1.62 | 1.62 | ∞ |
| Boundary effect | E.2.3 | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| Linearity | E.2.4 | 5.0 | R | $\sqrt{3}$ | 1 | 1 | 2.89 | 2.89 | ∞ |
| System detection limits | E.2.5 | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| Readout Electronics | E.2.6 | 0.02 | N | 1 | 1 | 1 | 0.02 | 0.02 | ∞ |
| Reponse Time | E.2.7 | 3.0 | R | $\sqrt{3}$ | 1 | 1 | 1.73 | 1.73 | ∞ |
| Integration Time | E.2.8 | 2.0 | R | $\sqrt{3}$ | 1 | 1 | 1.15 | 1.15 | ∞ |
| RF ambient Conditions | E.6.1 | 3.0 | R | $\sqrt{3}$ | 1 | 1 | 1.73 | 1.73 | ∞ |
| Probe positioner Mechanical Tolerance | E.6.2 | 2.0 | R | $\sqrt{3}$ | 1 | 1 | 1.15 | 1.15 | ∞ |
| Probe positioning with respect to Phantom Shell | E.6.3 | 0.05 | R | $\sqrt{3}$ | 1 | 1 | 0.03 | 0.03 | ∞ |
| Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation | E.5.2 | 5.0 | R | $\sqrt{3}$ | 1 | 1 | 2.89 | 2.89 | ∞ |
| Dipole | | | | | | | | | |
| Dipole axis to liquid Distance | 8,E.4.2 | 1.00 | N | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |

| | | | | | | | | | |
|--|---------|-------|-----|------------|------|------|-------|------|----------|
| Input power and SAR drift measurement | 8,6.6.2 | 4.04 | R | $\sqrt{3}$ | 1 | 1 | 2.33 | 2.33 | ∞ |
| Phantom and Tissue Parameters | | | | | | | | | |
| Phantom Uncertainty (Shape and thickness tolerances) | E.3.1 | 0.05 | R | $\sqrt{3}$ | 1 | 1 | 0.03 | 0.03 | ∞ |
| Liquid conductivity - deviation from target value | E.3.2 | 4.57 | R | $\sqrt{3}$ | 0.64 | 0.43 | 1.69 | 1.13 | ∞ |
| Liquid conductivity - measurement uncertainty | E.3.3 | 5.00 | N | $\sqrt{3}$ | 0.64 | 0.43 | 1.85 | 1.24 | M |
| Liquid permittivity - deviation from target value | E.3.2 | 3.69 | R | $\sqrt{3}$ | 0.6 | 0.49 | 1.28 | 1.04 | ∞ |
| Liquid permittivity - measurement uncertainty | E.3.3 | 10.00 | N | $\sqrt{3}$ | 0.6 | 0.49 | 3.46 | 2.83 | M |
| Combined Standard Uncertainty | | | RSS | | | | 8.83 | 8.37 | |
| Expanded Uncertainty (95% Confidence interval) | | | K=2 | | | | 17.66 | 16.7 | 3 |

7. SAR Measurement Evaluation

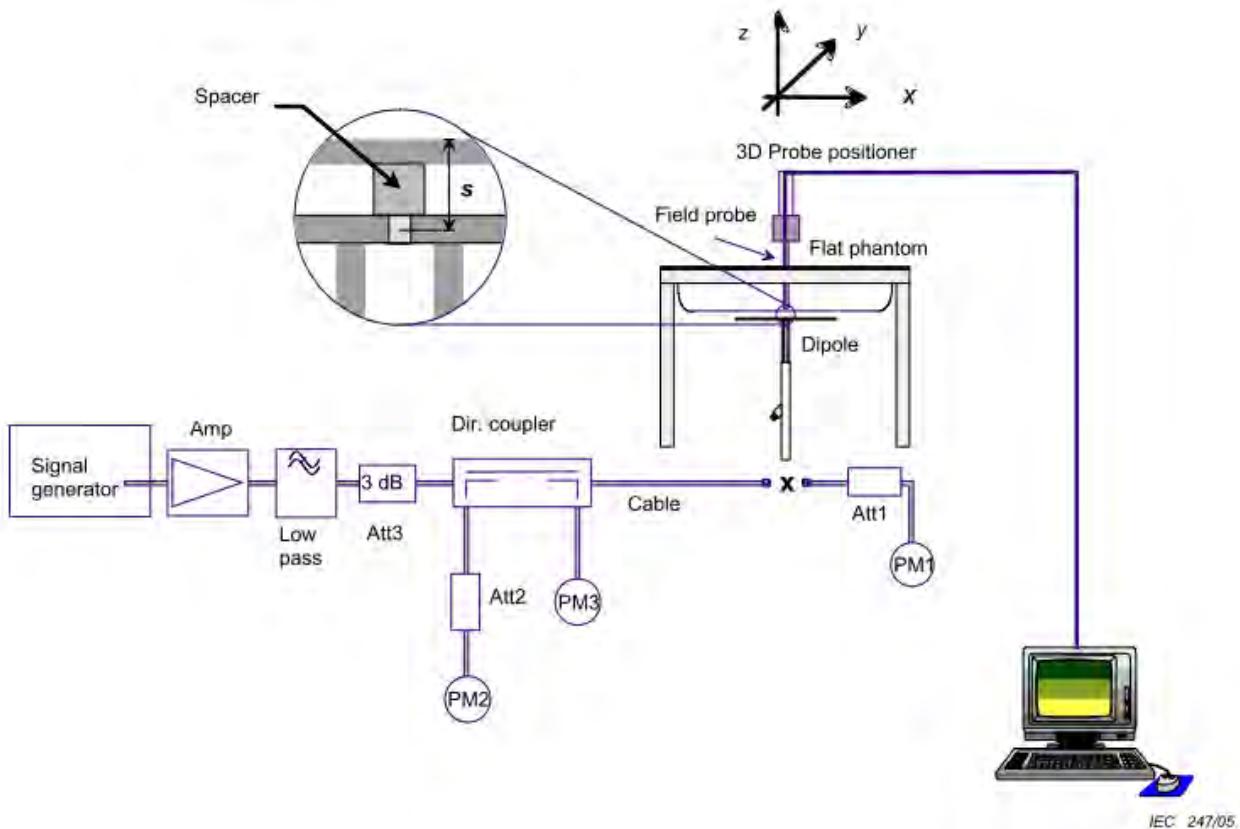
7.1. System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator at frequency 450MHz. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom.

Equipments:

| name | Type and specification |
|---------------------|-------------------------|
| Signal generator | E4433B |
| Directional coupler | 450MHz-3GHz |
| Amplifier | 3W 502(10-2500MHz) |
| Reference dipole | 450MHz:SN 36/08 DIPC 98 |

System Verification Setup Block Diagram



IEC 247/05

7.2. Validation Results

Comparing to the original SAR value provided by SATIMO, the validation data should be within its specification of 10 %.

Cal. On Mar.17, 2011

| Frequency | 450MHz | |
|--------------------|------------|------------|
| Phantom | Head | Body |
| Target value (1g) | 4.9 W/Kg | 4.9 W/Kg |
| 250 mW input power | 1.252 W/Kg | 1.337 W/Kg |
| Test value (1g) | 5.008 W/Kg | 5.348 W/Kg |

Note: System checks the specific test data please see page 62~65.

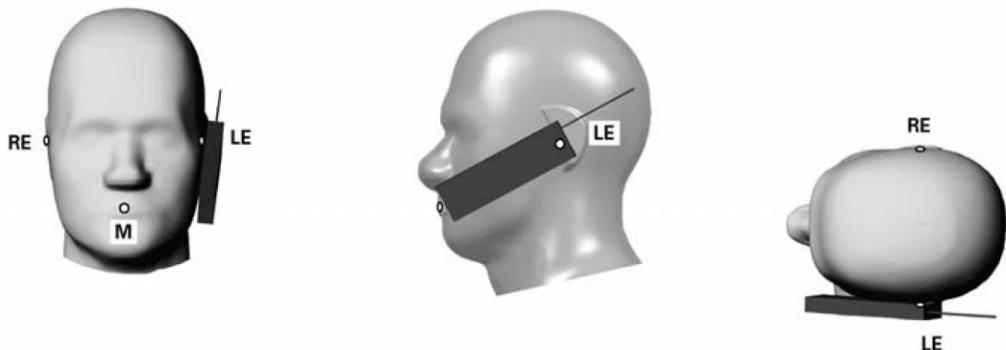
8. Operational Conditions During Test

8.1. Informations on the testing

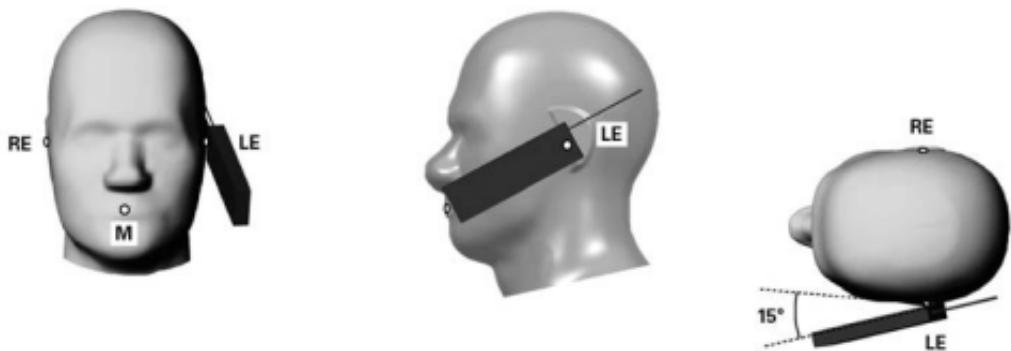
The mobile phone antenna and battery are those specified by the manufacturer. The battery is fully charged before each measurement. The output power and frequency are controlled using a base station simulator. The mobile phone is set to transmit at its highest output peak power level.

The mobile phone is test in the “cheek” and “tilted” positions on the left and right sides of the phantom. The mobile phone is placed with the vertical centre line of the body of the mobile phone and the horizontal line crossing the centre of the earpiece in a plane parallel to the sagittal plane of the phantom.

Check Position



Tilt Position



Description of the “cheek” position:

The mobile phone is well placed in the reference plane and the earpiece is in contact with the ear. Then the mobile phone is moved until any point on the front side get in contact with the cheek of the phantom or until contact with the ear is lost.

Description of the “tilted” position:

The mobile phone is well placed in the “cheek” position as described above. Then the mobile phone is moved outward away from the mouth by an angle of 15 degrees or until contact with the ear lost.

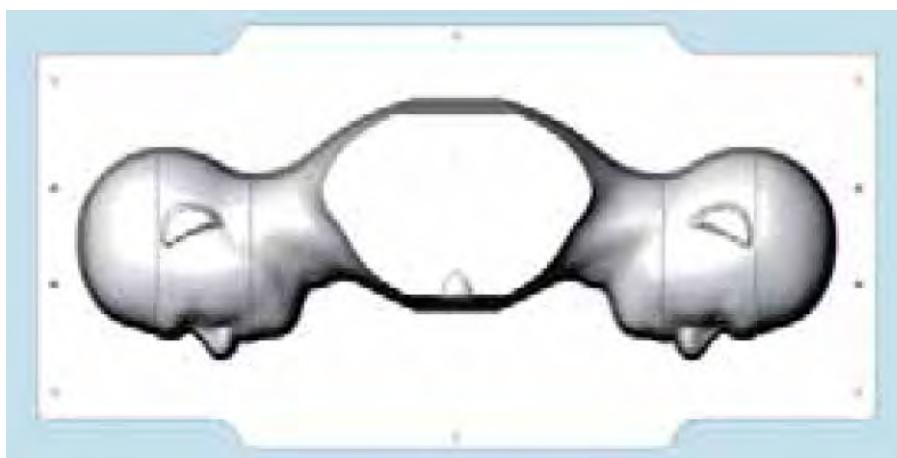
Remark: Please refer to Appendix B for the test setup photos.

8.2. Body-worn Configurations

The body-worn configurations shall be tested with the supplied accessories (belt-clips, holsters, etc.) attached to the device in normal use configuration.

The depth of the body tissue was 15.1cm. The distance between the back of the device and the bottom of the flat phantom is 1.5cm(taking into account of the IEEE 1528 and the place of the antenna)

For body-worn and other configurations a flat phantom shall be used which is comprised of material with electrical properties similar to the corresponding tissues.



SAR Measurement Points in Area Scan

8.3. 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 16mm * 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.

8.4. 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 minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is used 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 1mm 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.

9. PTT MEASUREMENT PROCEDURES

The test procedures of push-to-talk (PPT) radios refer KDB 447498 D01item 5) and KDB 643646.

9.1. Measurement Of Conducted Peak Output Power.

1. Conducted peak output power (High power mode)

| Item | Channel | Frequency (MHz) | Power | |
|----------------------|---------|--------------------|-------|------|
| | | | (dBm) | (W) |
| 12.5KHz Bandwidth | 1 | 136.025 | 36.19 | 4.16 |
| | 2 | 145.025 | 36.47 | 4.44 |
| | 3 | 173.950 | 36.12 | 4.09 |
| | 4 | 400.025 | 35.99 | 3.97 |
| | 5 | 435.025 | 35.94 | 3.93 |
| | 6 | 469.950 | 35.64 | 3.66 |
| 25KHz bandwidth | 1 | 136.025 | 36.19 | 4.16 |
| | 2 | 145.025 | 36.47 | 4.44 |
| | 3 | 173.950 | 36.12 | 4.09 |
| | 4 | 400.025 | 35.98 | 3.96 |
| | 5 | 435.025 | 35.94 | 3.93 |
| | 6 | 469.950 | 35.64 | 3.66 |

2. Conducted peak output power (Low power mode)

| Item | Channel | Frequency (MHz) | Power | |
|----------------------|---------|--------------------|-------|------|
| | | | (dBm) | (W) |
| 12.5KHz Bandwidth | 1 | 136.025 | 30.51 | 1.12 |
| | 2 | 145.025 | 30.77 | 1.19 |
| | 3 | 173.950 | 28.37 | 0.69 |
| | 4 | 400.025 | 29.74 | 0.94 |
| | 5 | 435.025 | 29.60 | 0.91 |
| | 6 | 469.950 | 31.14 | 1.30 |
| 25KHz bandwidth | 1 | 136.025 | 30.51 | 1.12 |
| | 2 | 145.025 | 30.76 | 1.19 |
| | 3 | 173.950 | 28.37 | 0.69 |
| | 4 | 400.025 | 29.72 | 0.94 |
| | 5 | 435.025 | 29.60 | 0.91 |
| | 6 | 469.950 | 31.11 | 1.29 |

10. 136MHz ~ 174MHz VHF Band SAR Evaluation

1. This push-to-talk (PPT) radio Device support 136MHz~174MHz VHF band, this band SAR evaluation has been subject to a KDB inquiry, and the tracking number is 488770.

11. 400MHz ~ 470MHz UHF Band SAR Test Results List

Summary of High Power Measurement Results

| Temperature: 22.0~23.8°C, humidity: 54~60%. | | | | | | | |
|---|--------------------|-------------------|-------------------------|----------------|-------------|----------------|------------|
| Phantom Configurations | Channel /Frequency | Antenna Positions | SAR(W/Kg), Limit: 8W/Kg | | | | |
| | | | Value 1g Peak | 50% duty cycle | Power Drift | Scaling Factor | Scaled SAR |
| Face toward Flat phantom- narrow bandwidth (Held to face) | | | | | | | |
| Body (2.5 cm Separation) | 4/400.025MHz | External | 7.508 | 3.754 | -1.17 | 1.07 | 4.017 |
| | 5/435.025MHz | External | 7.660 | 3.830 | -0.39 | 1.07 | 4.098 |
| | 6/469.950MHz | External | 6.891 | 3.446 | -1.97 | 1.07 | 3.687 |
| Face toward Flat phantom- wide bandwidth (Held to face) | | | | | | | |
| Body (2.5 cm Separation) | 4/400.025MHz | External | 7.928 | 3.964 | -0.82 | 1.07 | 4.241 |
| | 5/435.025MHz | External | 7.705 | 3.853 | -0.72 | 1.07 | 4.123 |
| | 6/469.950MHz | External | 7.789 | 3.895 | -0.60 | 1.07 | 4.168 |
| Back with belt clip toward Flat phantom- narrow bandwidth (Body-worn) | | | | | | | |
| Body (direct) | 4/400.025MHz | External | 6.018 | 3.009 | -1.43 | 1.07 | 3.220 |
| | 5/435.025MHz | External | 6.468 | 3.234 | -0.32 | 1.07 | 3.460 |
| | 6/469.950MHz | External | 6.520 | 3.260 | -1.52 | 1.07 | 3.488 |
| Back with belt clip toward Flat phantom- wide bandwidth (Body-worn) | | | | | | | |
| Body (direct) | 4/400.025MHz | External | 8.305 | 4.153 | -1.33 | 1.07 | 4.444 |
| | 5/435.025MHz | External | 8.067 | 4.034 | -0.72 | 1.07 | 4.316 |
| | 6/469.950MHz | External | 7.791 | 3.896 | -1.54 | 1.07 | 4.169 |

Summary of Low Power Measurement Results

Temperature: 22.0~23.8°C, humidity: 54~60%.

| Phantom Configurations | Channel /Frequency | Antenna Positions | SAR(W/Kg), Limit: 8W/Kg | | | | |
|---|--------------------|-------------------|-------------------------|----------------|-------------|----------------|------------|
| | | | Value 1g Peak | 50% duty cycle | Power Drift | Scaling Factor | Scaled SAR |
| Face toward Flat phantom- narrow bandwidth (Held to face) | | | | | | | |
| Body (2.5 cm Separation) | 6/469.950MHz | External | 1.268 | 0.634 | -0.11 | 1.07 | 0.678 |
| Face toward Flat phantom- wide bandwidth (Held to face) | | | | | | | |
| Body (2.5 cm Separation) | 6/469.950MHz | External | 1.315 | 0.658 | -0.21 | 1.07 | 0.704 |
| Back with belt clip toward Flat phantom- narrow bandwidth (Body-worn) | | | | | | | |
| Body (direct) | 6/469.950MHz | External | 1.591 | 0.796 | -0.22 | 1.07 | 0.852 |
| Back with belt clip toward Flat phantom- wide bandwidth (Body-worn) | | | | | | | |
| Body (direct) | 6/469.950MHz | External | 1.628 | 0.814 | -0.20 | 1.07 | 0.871 |

Note:

1. Refer KDB 447498 D01, Push-to-talk (PTT) devices Exposure Conditions should test under Held to face and Body-worn Conditions.
2. This Push-to-talk radio only with a mechanical PTT button and no other operating modes.
3. Scaling Factor=Max. Power /Test Power

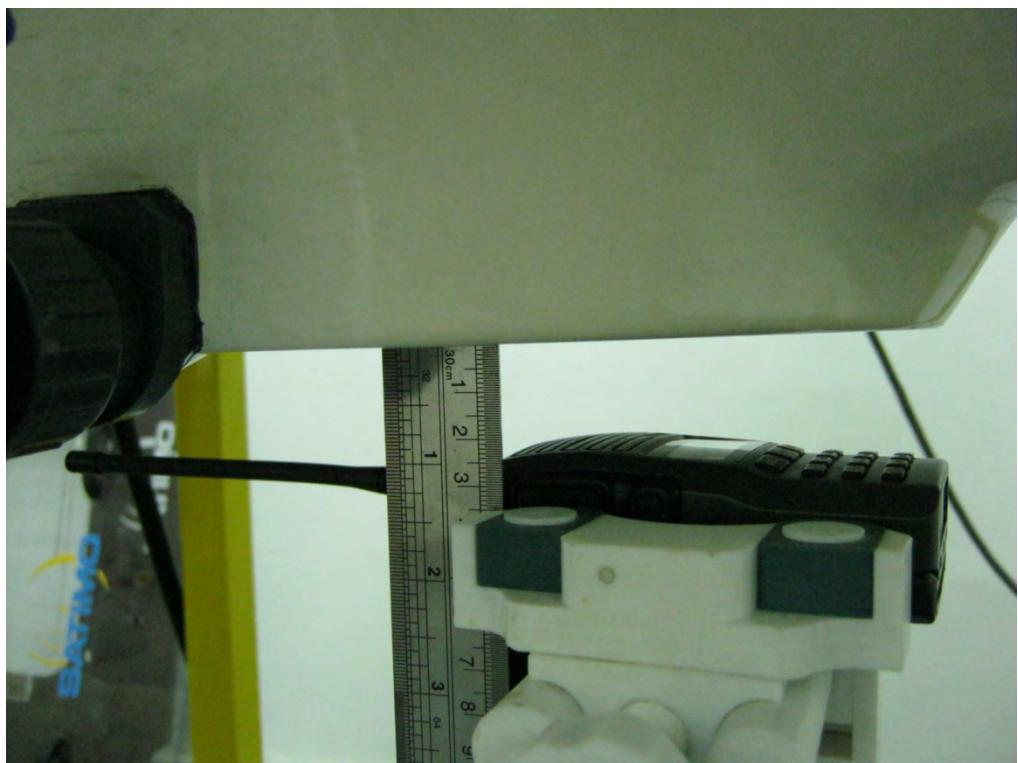
| Frequency (MHz) | High Power | | | Low Power | | |
|-----------------|------------|------------|----------------|-----------|------------|----------------|
| | Max.Power | Test Power | Scaling Factor | Max.Power | Test Power | Scaling Factor |
| 400.025 | 4.25 | 3.96 | 1.07 | 1.18 | 0.94 | 1.26 |
| 435.025 | 4.21 | 3.93 | 1.07 | 0.98 | 0.91 | 1.08 |
| 469.950 | 3.93 | 3.66 | 1.07 | 1.38 | 1.29 | 1.07 |

The 25KHz bandwidth is chosen to comput the scaling factor, for the powers of each bandwidth is nearly the same.

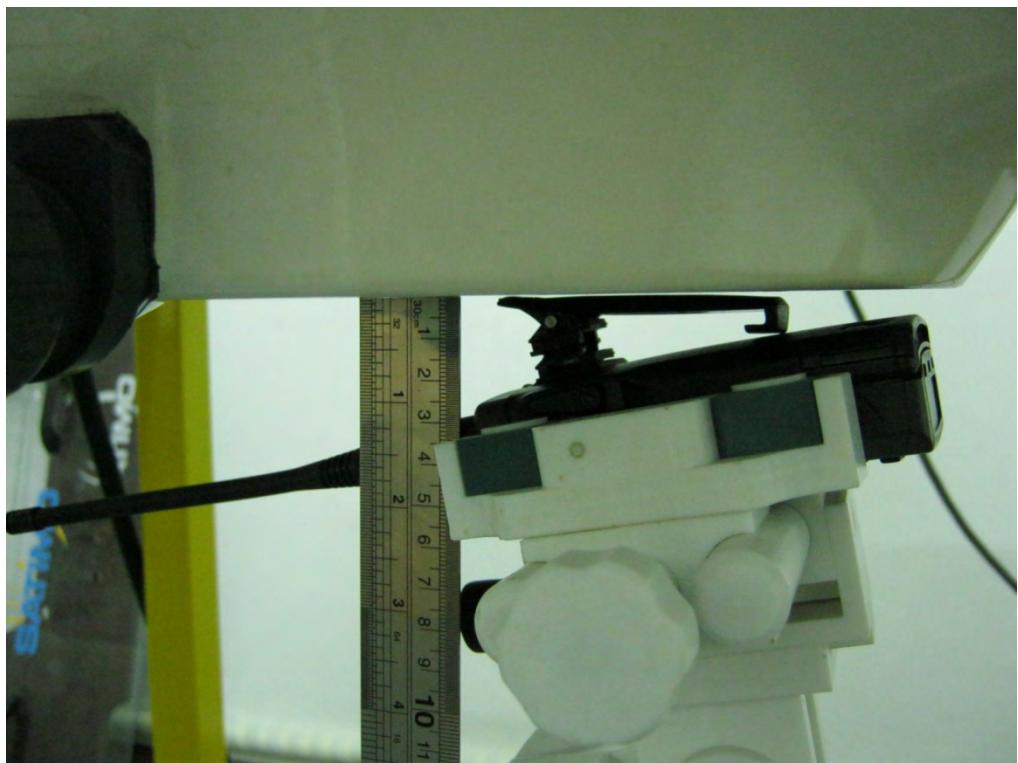
Scaled SAR=Test SAR* Scaling Factor

Annex A EUT Setup Photos

1 Held to face Condition



2 Body-worn Condition



Liquid Level Photo



Annex B Graph Test Results

| BAND | PARAMETERS |
|-------------------------------|--|
| <u>High Power Mode</u> | <p><u>Measurement 1:</u> Narrow band Held to face Condition on 4 Channel</p> <p><u>Measurement 2:</u> Narrow band Held to face Condition on 5 Channel</p> <p><u>Measurement 3:</u> Narrow band Held to face Condition on 6 Channel</p> <p><u>Measurement 4:</u> Wide band Held to face Condition on 4 Channel</p> <p><u>Measurement 5:</u> Wide band Held to face Condition on 5 Channel</p> <p><u>Measurement 6:</u> Wide band Held to face Condition on 6 Channel</p> <p><u>Measurement 7:</u> Narrow band Body-worn Condition on 4 Channel</p> <p><u>Measurement 8:</u> Narrow band Body-worn Condition on 5 Channel</p> <p><u>Measurement 9:</u> Narrow band Body-worn Condition on 6 Channel</p> <p><u>Measurement 10:</u> Wide band Body-worn Condition on 4 Channel</p> <p><u>Measurement 11:</u> Wide band Body-worn Condition on 5 Channel</p> <p><u>Measurement 12:</u> Wide band Body-worn Condition on 6 Channel</p> |
| <u>Low Power Mode</u> | <p><u>Measurement 13:</u> Narrow band Held to face Condition on 6 Channel</p> <p><u>Measurement 14:</u> Wide band Held to face Condition on 6 Channel</p> <p><u>Measurement 15:</u> Narrow band Body-worn Condition on 6 Channel</p> <p><u>Measurement 16:</u> Wide band Body-worn Condition on 6 Channel</p> |

MEASUREMENT 1

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

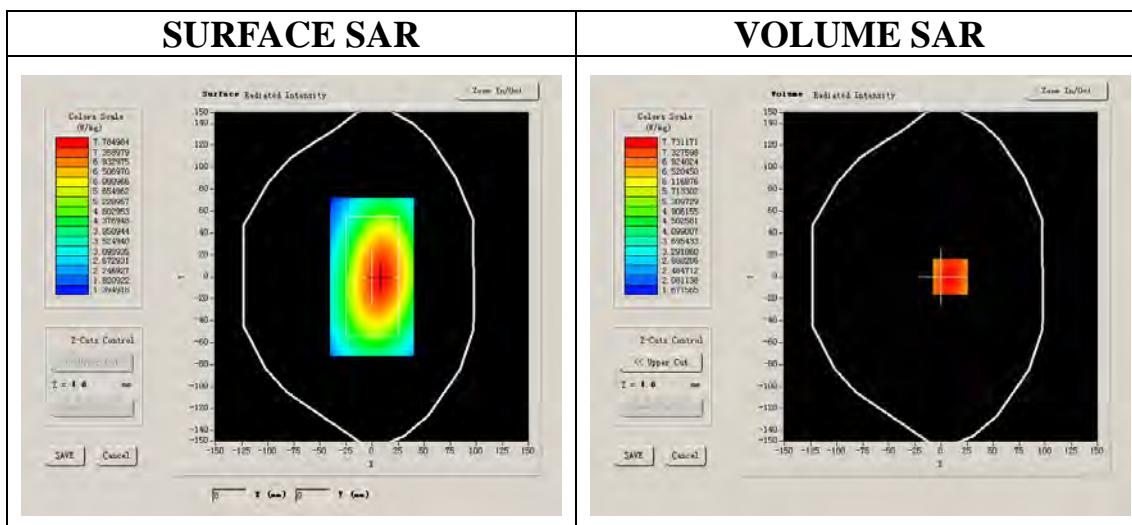
Measurement duration: 9 minutes 7 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 400.025MHz |
| Channels | Low |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 400.025000 |
| Relative permittivity (real part) | 43.464979 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.863409 |
| Power drift (%) | -1.170000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.451,22.393,24.045 |
| Crest factor: | 1:1 |



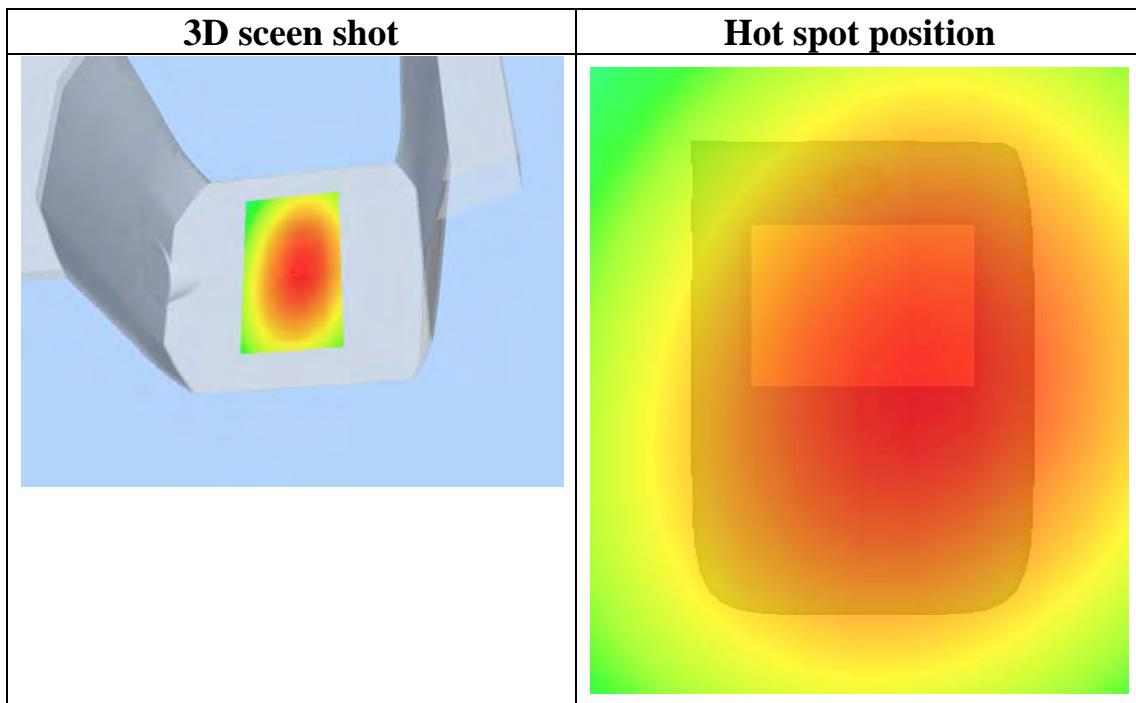
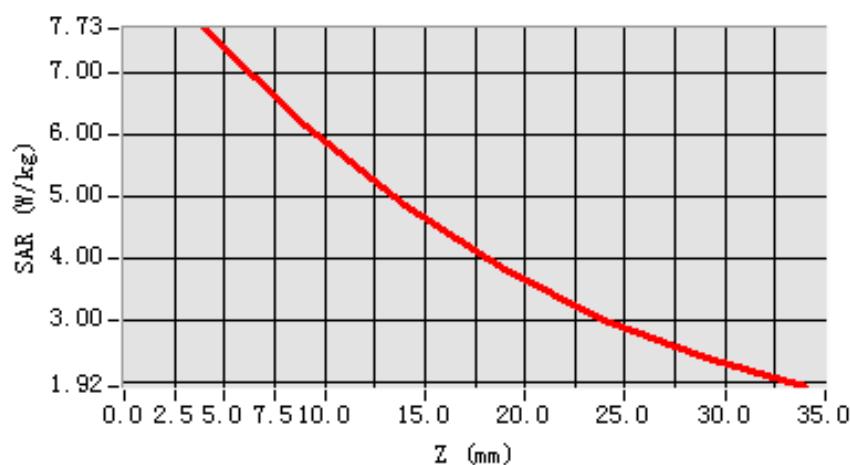
Maximum location: X=9.00, Y=0.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 5.771147 |
| SAR 1g (W/Kg) | 7.507988 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 7.7312 | 6.1400 | 4.8465 | 3.8216 | 3.0029 | 2.3841 |

SAR, Z Axis Scan (X = 9, Y = 0)



MEASUREMENT 2

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

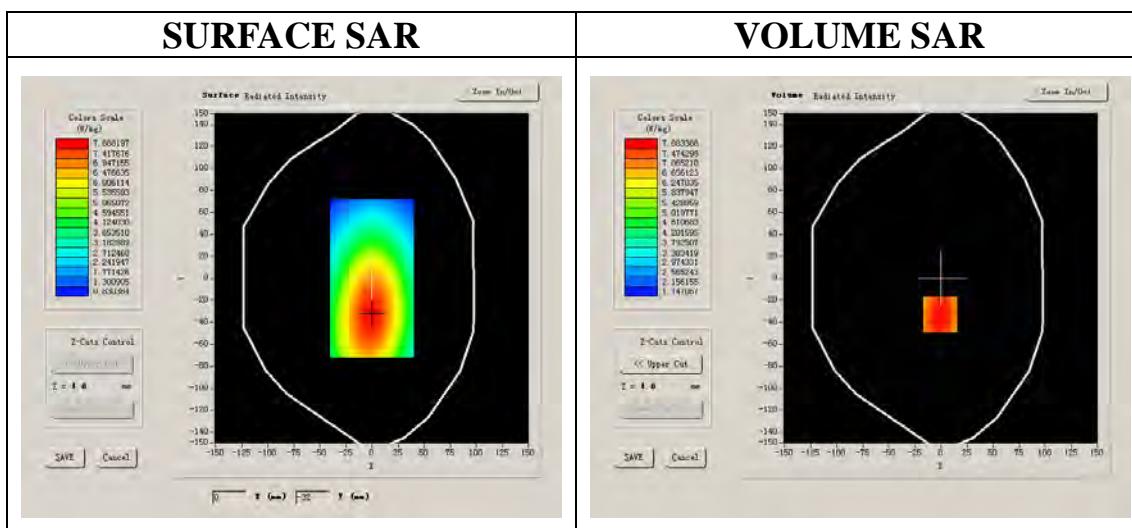
Measurement duration: 9 minutes 6 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 435.025MHz |
| Channels | Middle |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 435.025000 |
| Relative permittivity (real part) | 43.464979 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.863409 |
| Power drift (%) | -0.390000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.451,22.393,24.045 |
| Crest factor: | 1:1 |



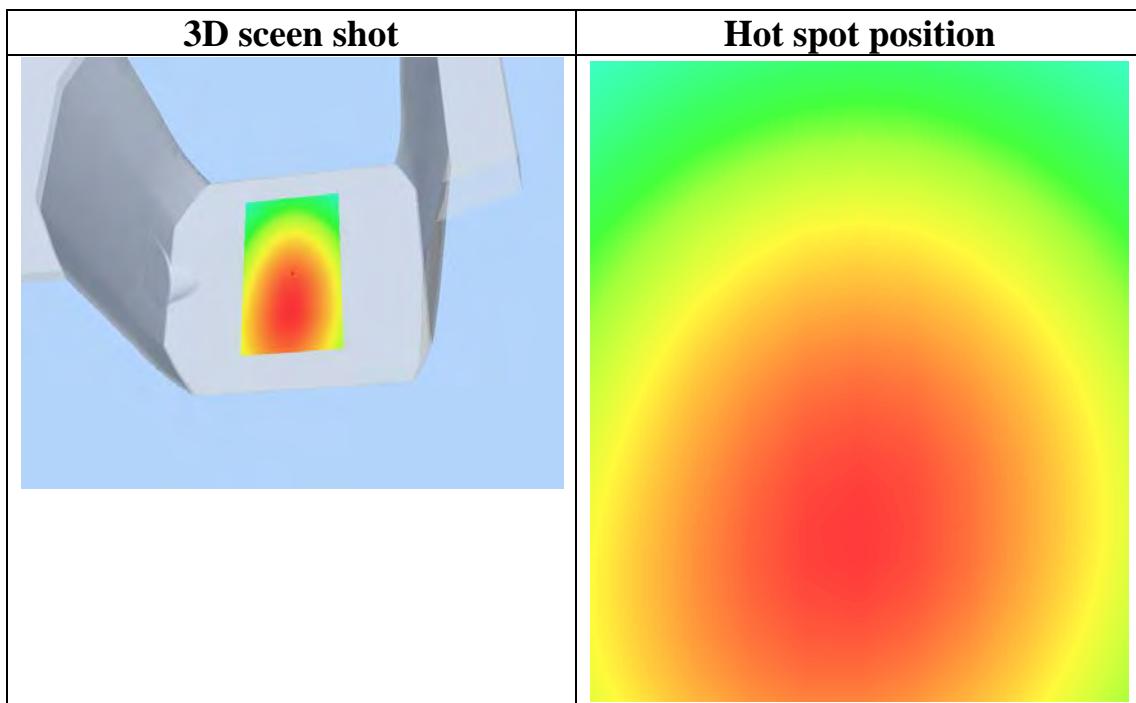
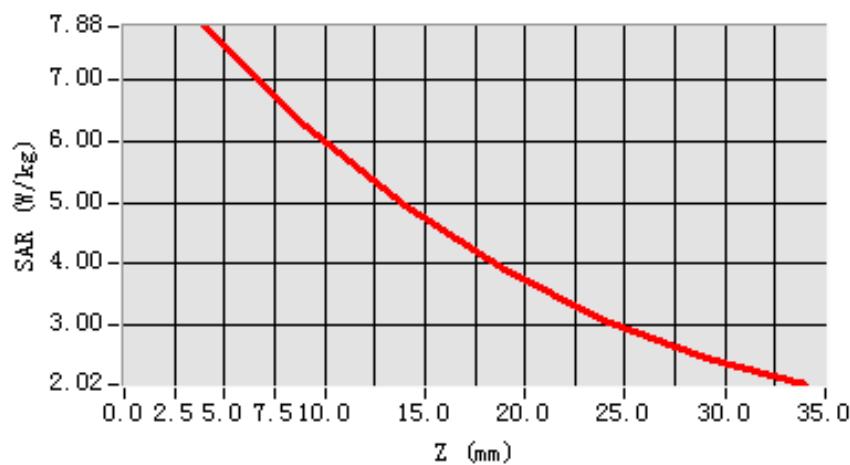
Maximum location: X=-1.00, Y=-33.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 5.883074 |
| SAR 1g (W/Kg) | 7.659896 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 7.8834 | 6.2523 | 4.9405 | 3.8894 | 3.0790 | 2.4649 |

SAR, Z Axis Scan (X = -1, Y = -33)



MEASUREMENT 3

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

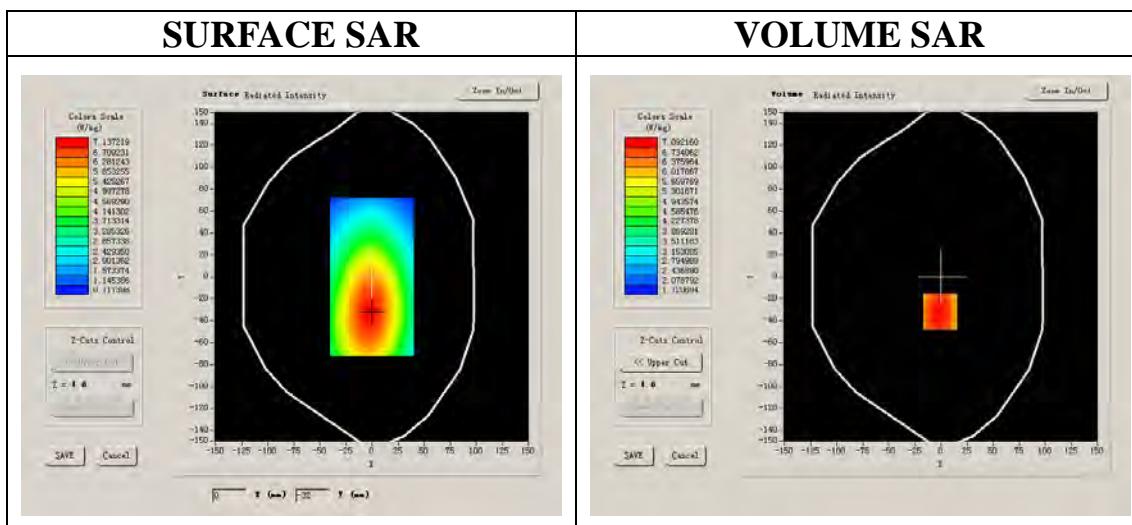
Measurement duration: 9 minutes 6 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 469.950MHz |
| Channels | High |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 469.950000 |
| Relative permittivity (real part) | 43.464979 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.863409 |
| Power drift (%) | -1.970000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.451,22.393,24.045 |
| Crest factor: | 1:1 |



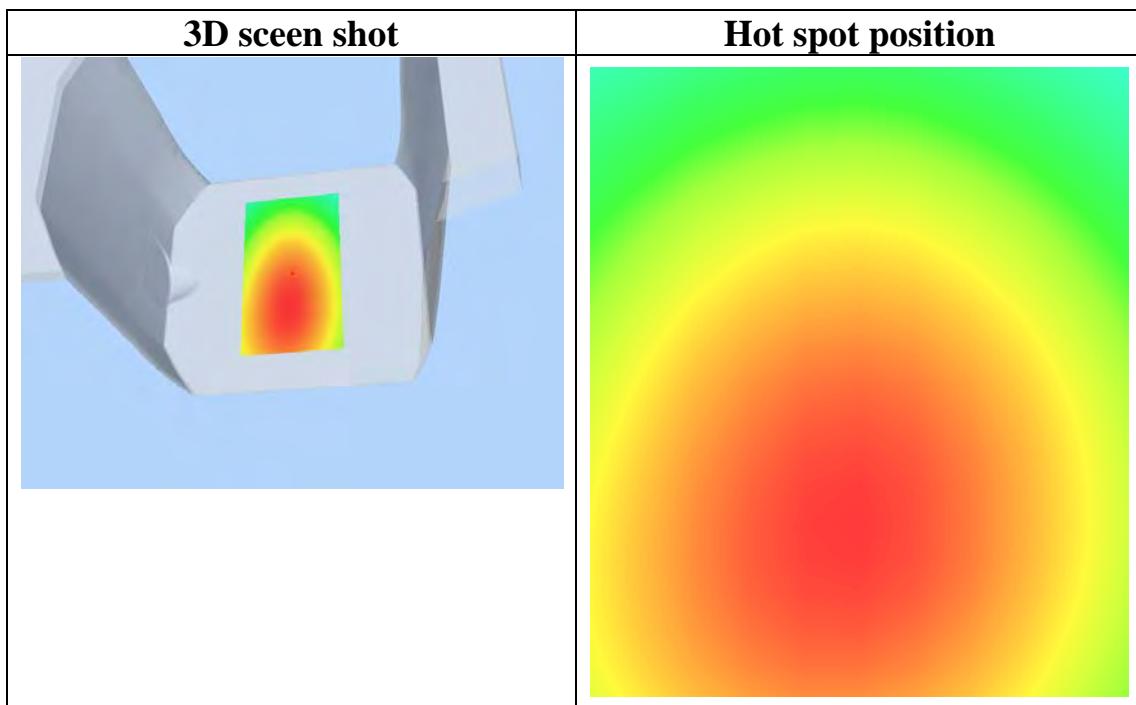
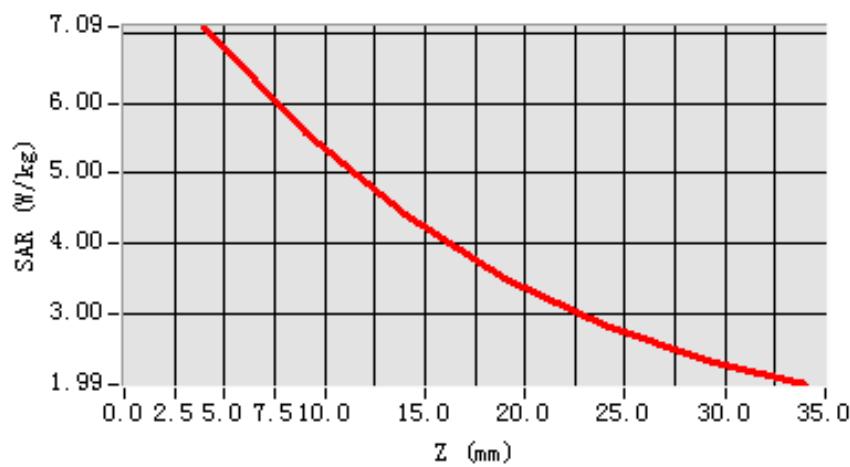
Maximum location: X=-1.00, Y=-32.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 5.284204 |
| SAR 1g (W/Kg) | 6.890531 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 7.0922 | 5.5823 | 4.4184 | 3.5118 | 2.8369 | 2.3467 |

SAR, Z Axis Scan (X = -1, Y = -32)



MEASUREMENT 4

Type: Phone measurement (Complete)

Area scan resolution: $dx=8\text{mm}, dy=8\text{mm}$

Zoom scan resolution: $dx=8\text{mm}, dy=8\text{mm}, dz=5\text{mm}$

Date of measurement: 17/3/2012

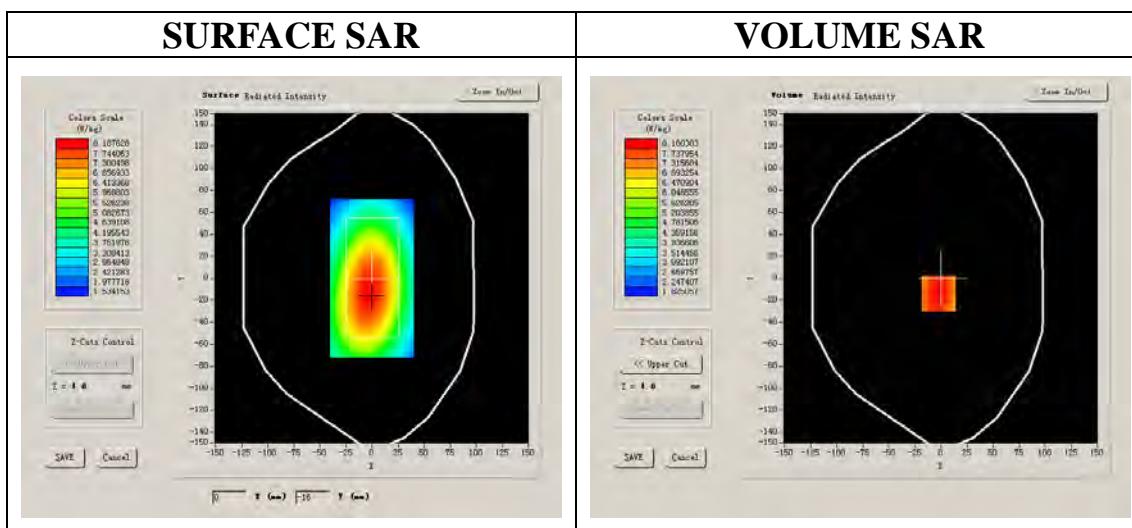
Measurement duration: 9 minutes 7 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 400.025MHz |
| Channels | Low |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 400.025000 |
| Relative permittivity (real part) | 43.464979 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.863409 |
| Power drift (%) | -0.820000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.451,22.393,24.045 |
| Crest factor: | 1:1 |



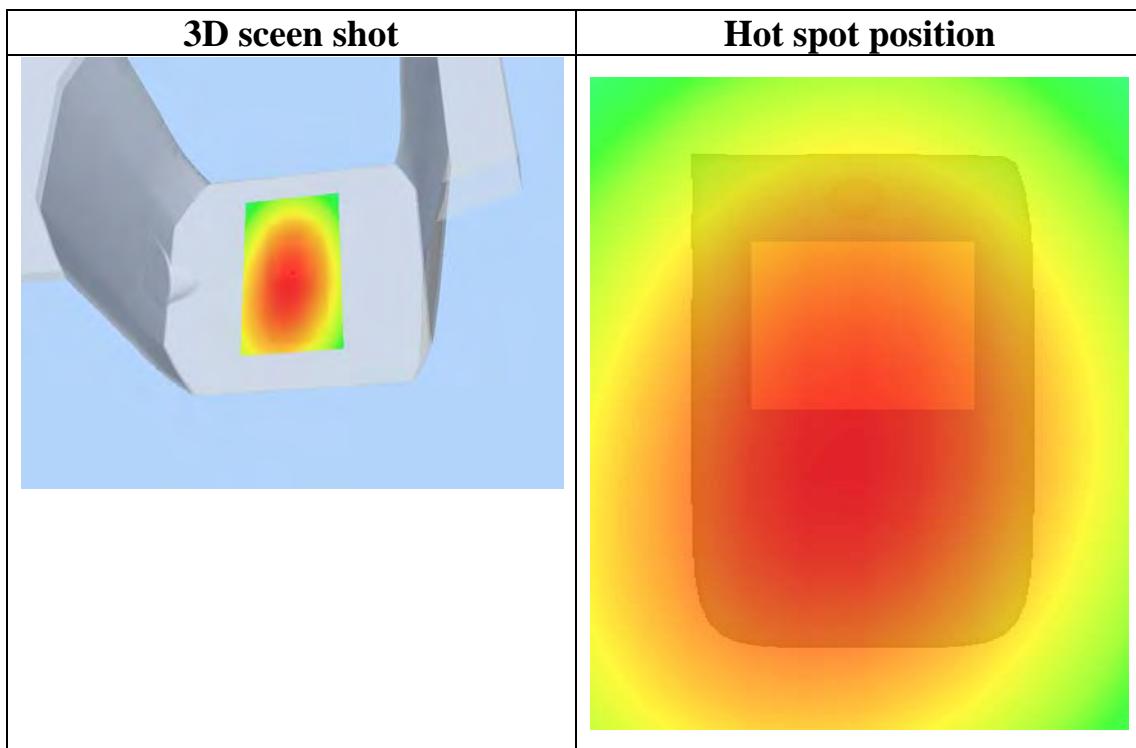
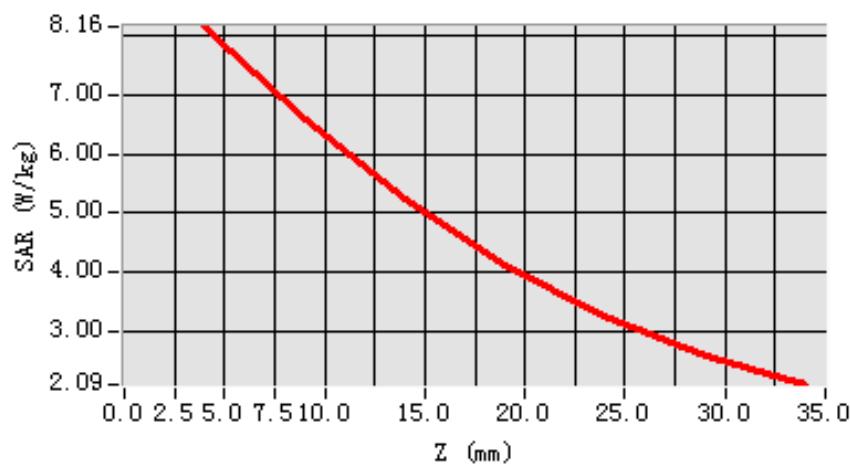
Maximum location: X=-2.00, Y=-14.00

| | |
|----------------|----------|
| SAR 10g (W/Kg) | 6.158095 |
| SAR 1g (W/Kg) | 7.928305 |

Z Axis Scan

| | | | | | | | |
|------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 8.1603 | 6.5763 | 5.2339 | 4.1334 | 3.2586 | 2.5864 |

SAR, Z Axis Scan (X = -2, Y = -14)



MEASUREMENT 5

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

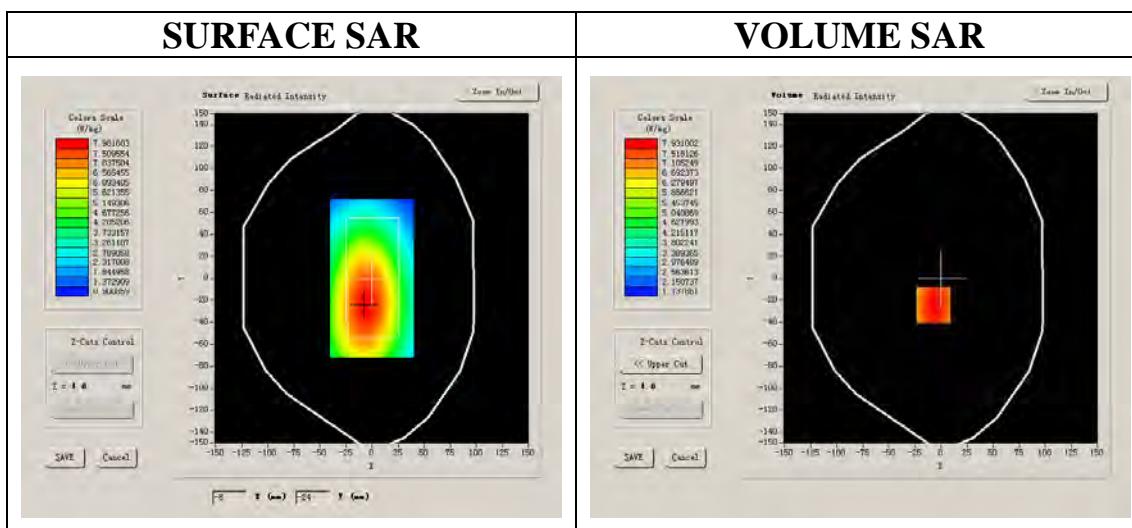
Measurement duration: 9 minutes 5 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 435.025MHz |
| Channels | Middle |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 435.025000 |
| Relative permittivity (real part) | 43.464979 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.863409 |
| Power drift (%) | -0.720000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.451,22.393,24.045 |
| Crest factor: | 1:1 |



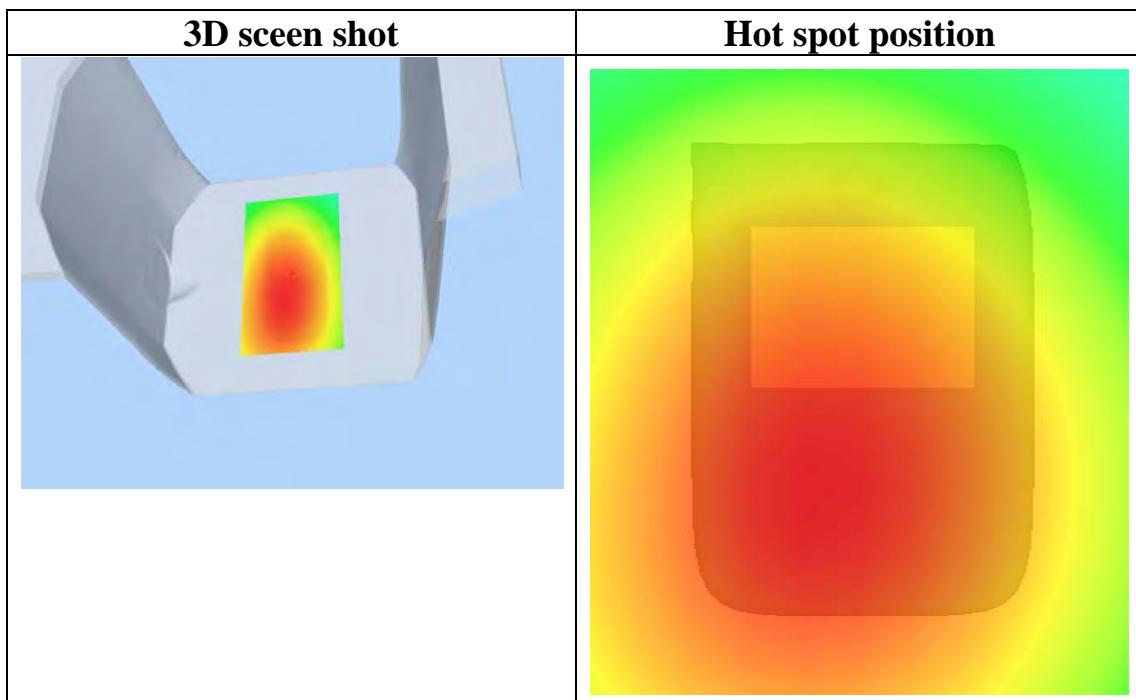
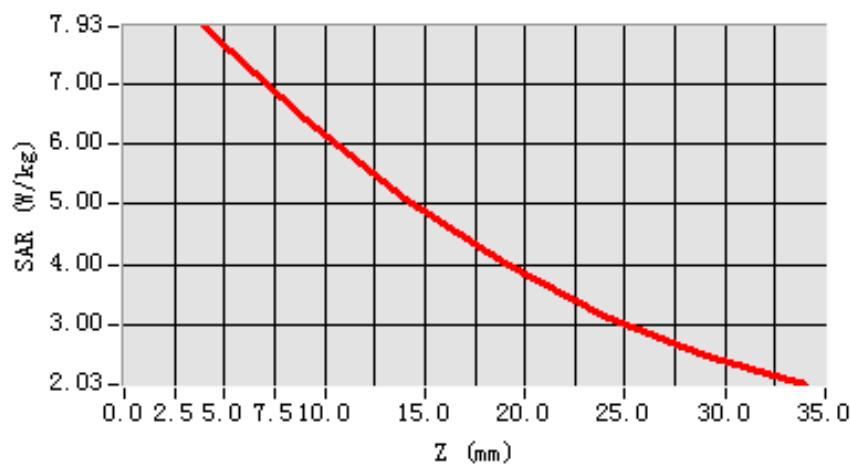
Maximum location: X=-7.00, Y=-24.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 5.993727 |
| SAR 1g (W/Kg) | 7.705154 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 7.9310 | 6.4095 | 5.1036 | 4.0332 | 3.1748 | 2.5205 |

SAR, Z Axis Scan (X = -7, Y = -24)



MEASUREMENT 6

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

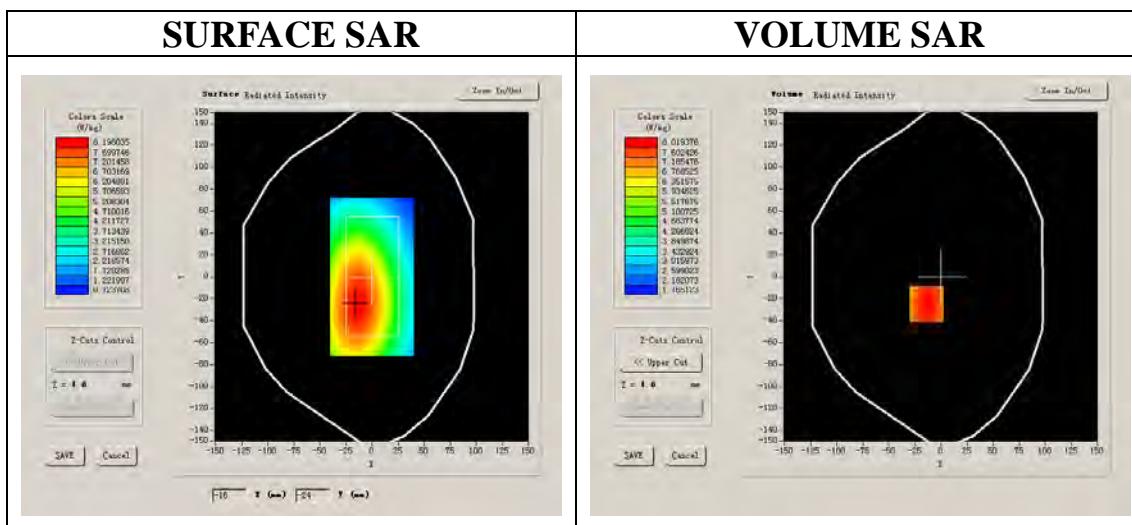
Measurement duration: 9 minutes 12 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 469.950MHz |
| Channels | High |
| Signal | FM |

B. SAR Measurement Results.

| | |
|--|----------------------|
| Frequency (MHz) | 469.950000 |
| Relative permittivity (real part) | 43.464979 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.863409 |
| Power drift (%) | 0.840000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.451,22.393,24.045 |
| Crest factor: | 1:1 |



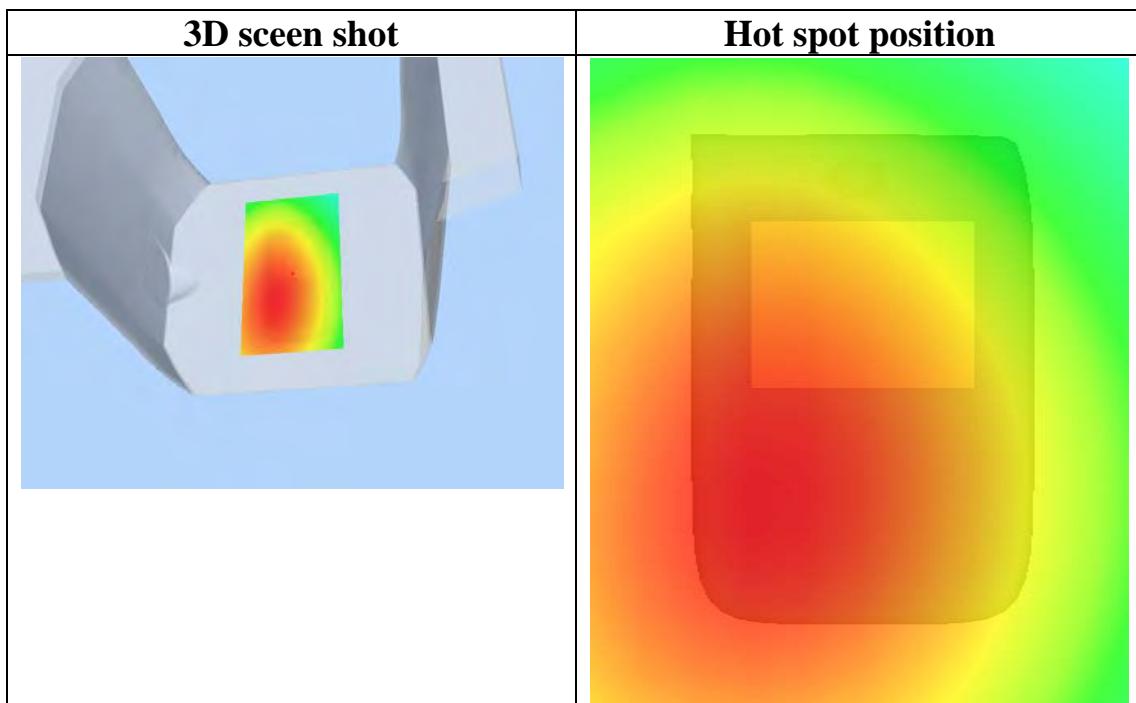
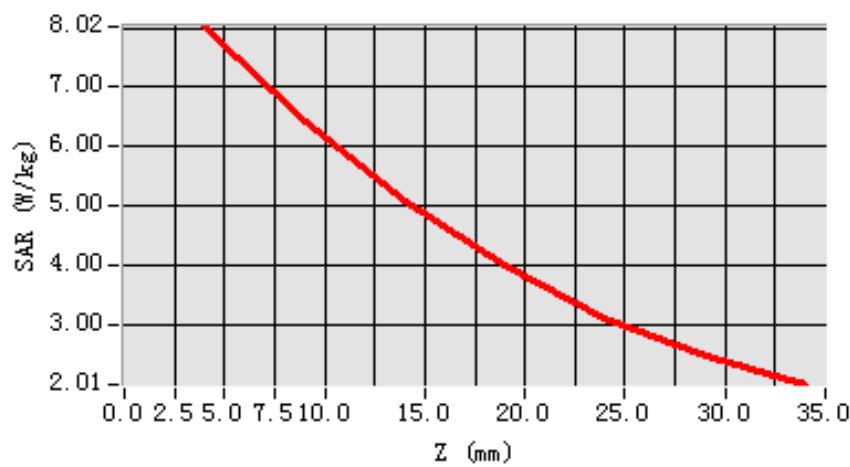
Maximum location: X=-14.00, Y=-25.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 6.019656 |
| SAR 1g (W/Kg) | 7.788786 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 8.0194 | 6.4237 | 5.0760 | 3.9965 | 3.1366 | 2.4905 |

SAR, Z Axis Scan (X = -14, Y = -25)



MEASUREMENT 7

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

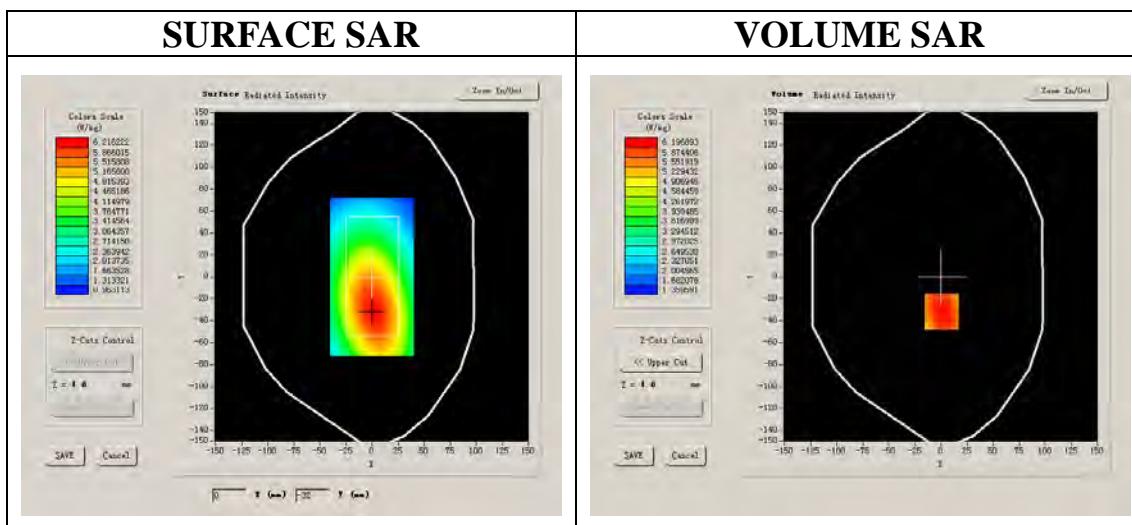
Measurement duration: 9 minutes 11 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 400.025MHz |
| Channels | Low |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 400.025000 |
| Relative permittivity (real part) | 56.842969 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.9317436 |
| Power drift (%) | -1.520000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.691,22.414,24.201 |
| Crest factor: | 1:1 |



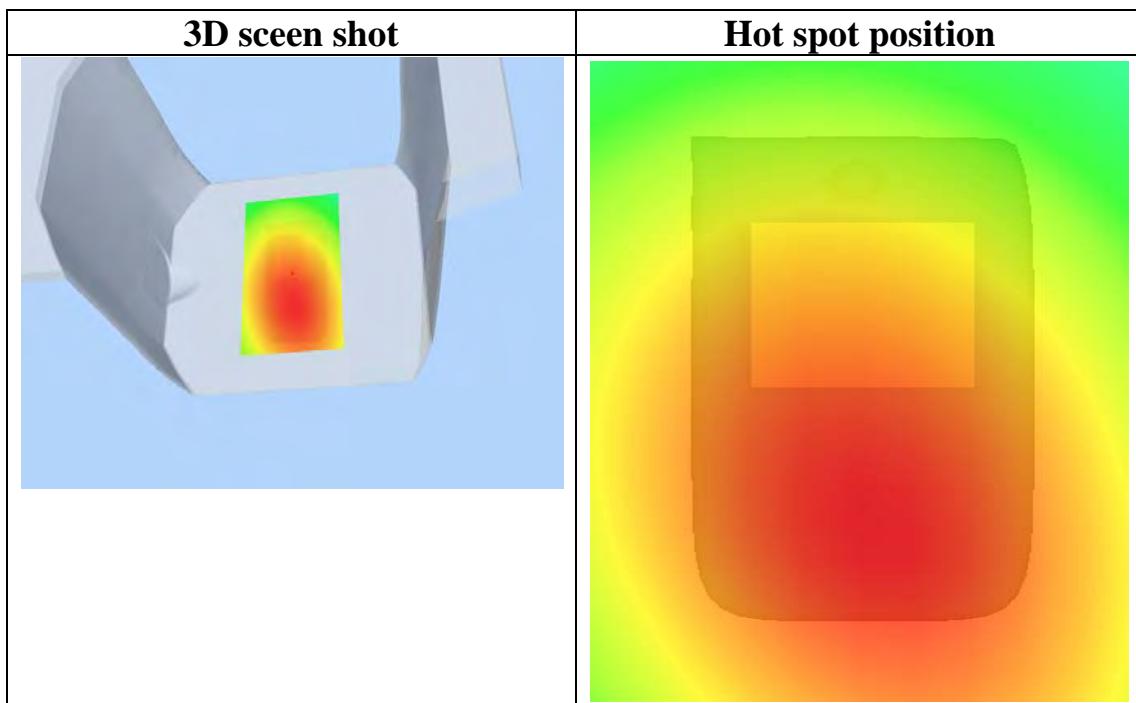
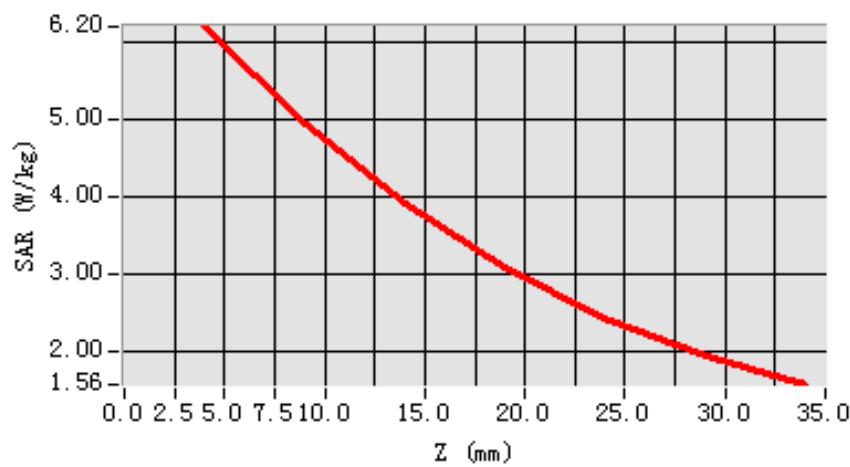
Maximum location: X=1.00, Y=-32.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 4.639037 |
| SAR 1g (W/Kg) | 6.018458 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 6.1969 | 4.9239 | 3.9101 | 3.0798 | 2.4193 | 1.9175 |

SAR, Z Axis Scan (X = 1, Y = -32)



MEASUREMENT 8

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

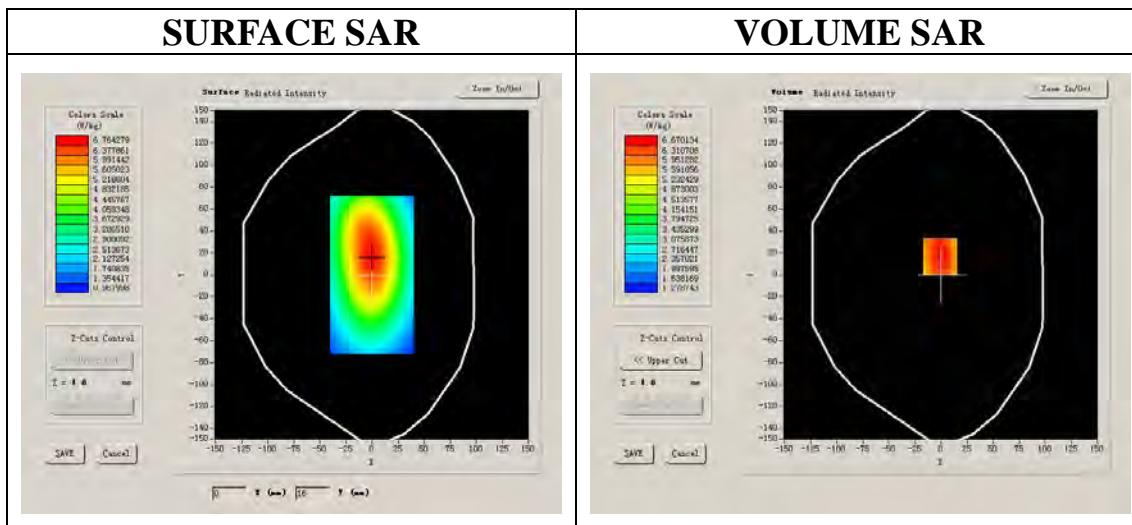
Measurement duration: 9 minutes 11 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 435MHz |
| Channels | Middle |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 435.025000 |
| Relative permittivity (real part) | 56.842969 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.9317436 |
| Power drift (%) | -0.320000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.691,22.414,24.201 |
| Crest factor: | 1:1 |



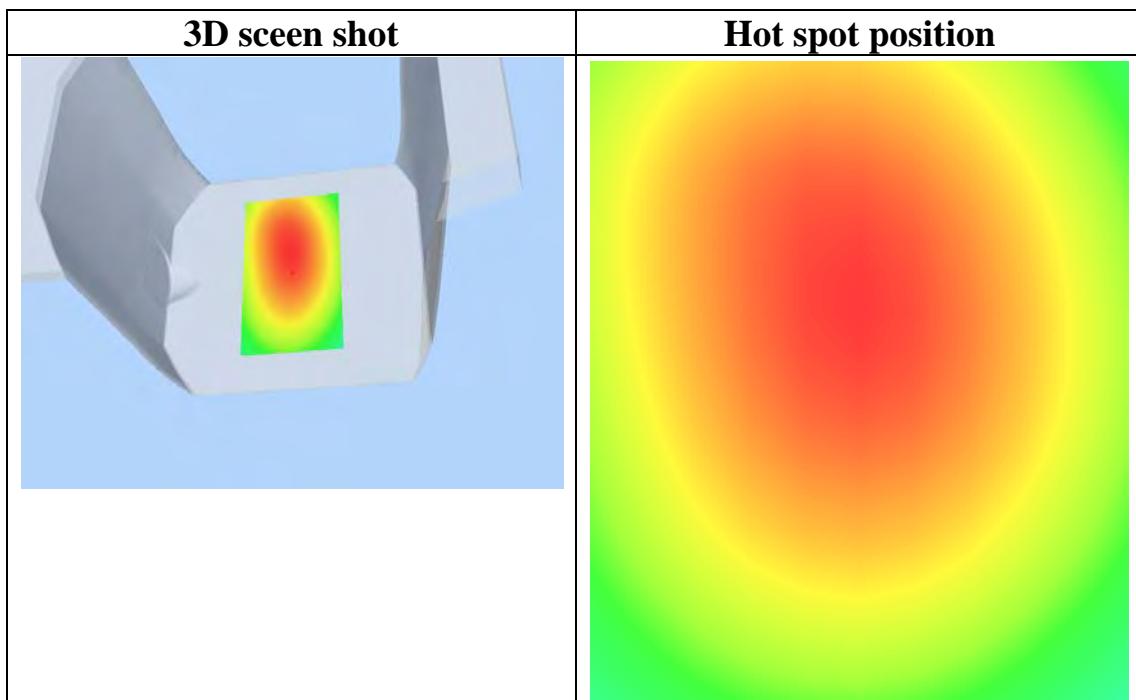
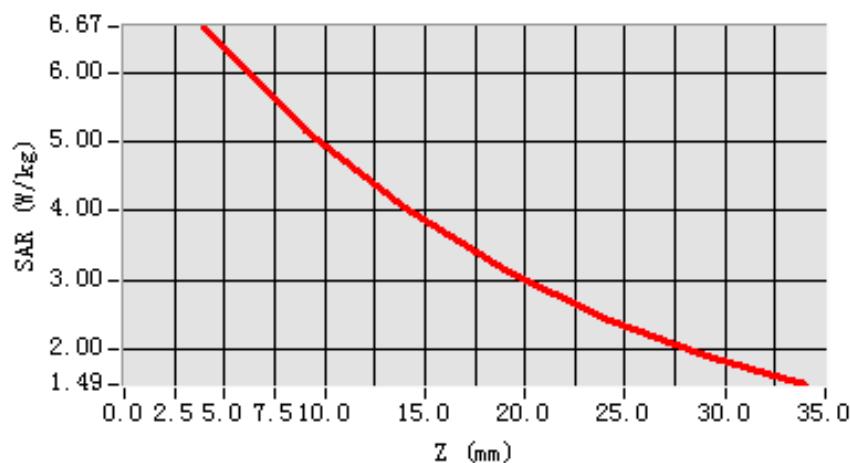
Maximum location: X=-1.00, Y=17.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 4.883852 |
| SAR 1g (W/Kg) | 6.468327 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 6.6701 | 5.1771 | 4.0596 | 3.1555 | 2.4491 | 1.9026 |

SAR, Z Axis Scan (X = -1, Y = 17)



MEASUREMENT 9

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

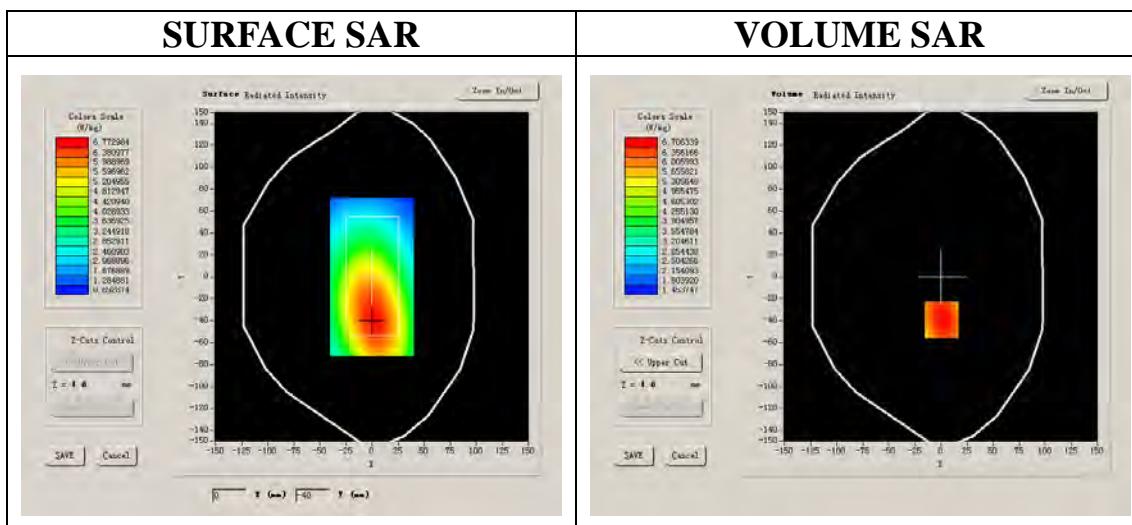
Measurement duration: 9 minutes 9 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 469.950MHz |
| Channels | High |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 469.950000 |
| Relative permittivity (real part) | 56.842969 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.9317436 |
| Power drift (%) | -1.430000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.691,22.414,24.201 |
| Crest factor: | 1:1 |



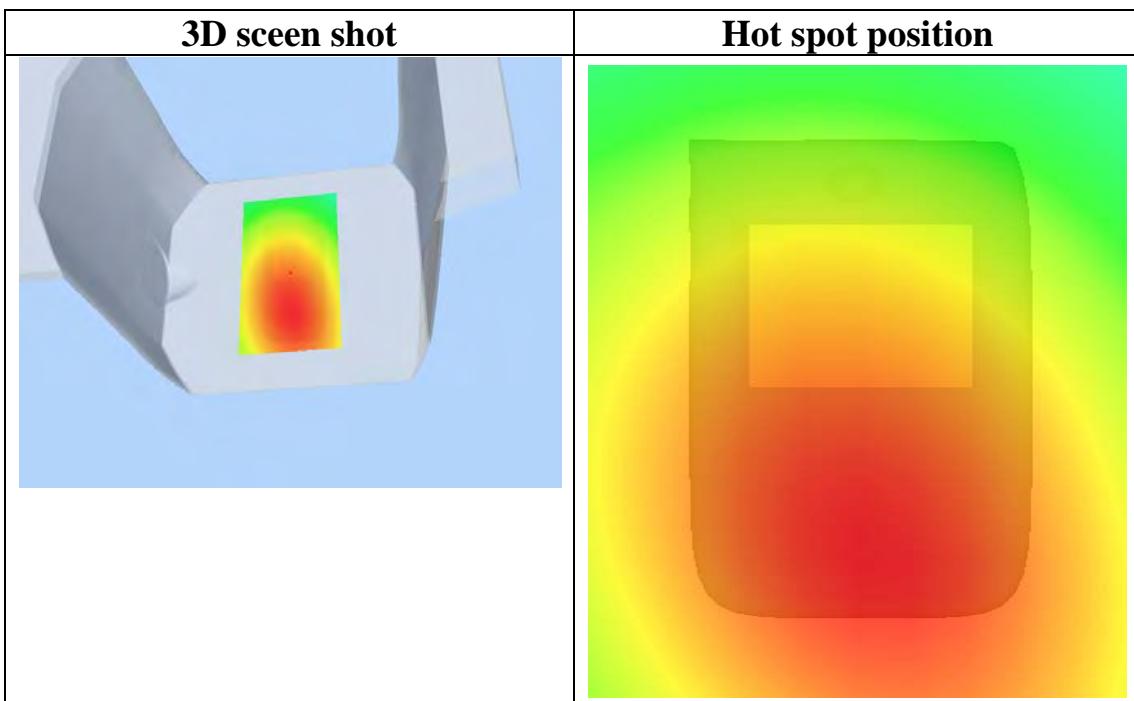
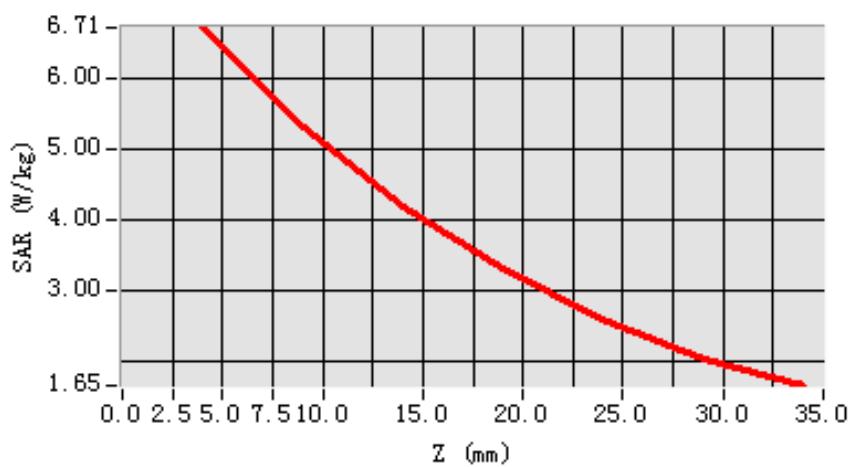
Maximum location: X=1.00, Y=-39.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 4.999942 |
| SAR 1g (W/Kg) | 6.519867 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 6.7063 | 5.3102 | 4.1947 | 3.2978 | 2.5795 | 2.0378 |

SAR, Z Axis Scan (X = 1, Y = -39)



MEASUREMENT 10

Type: Phone measurement (Complete)

Area scan resolution: $dx=8\text{mm}, dy=8\text{mm}$

Zoom scan resolution: $dx=8\text{mm}, dy=8\text{mm}, dz=5\text{mm}$

Date of measurement: 17/3/2012

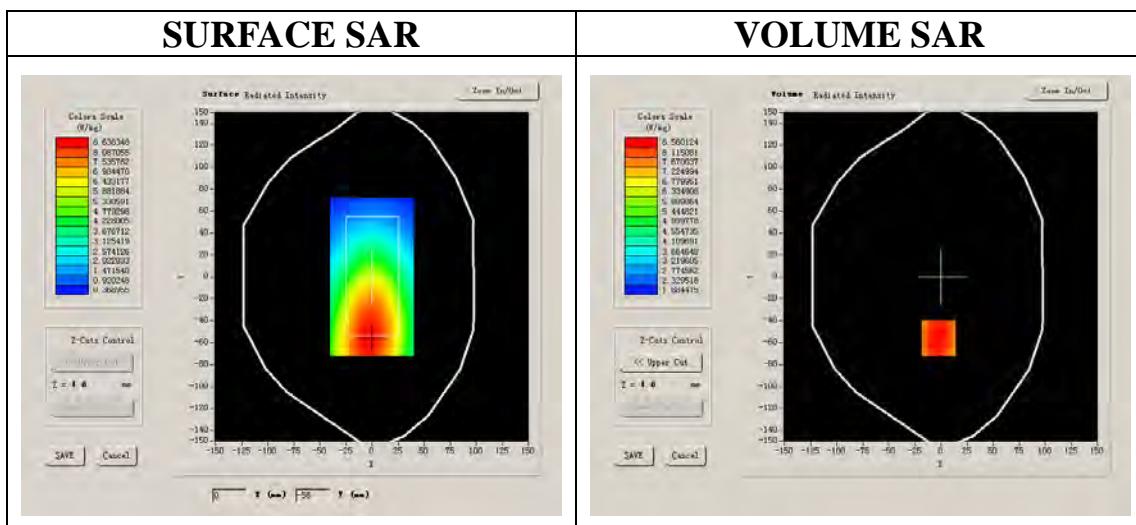
Measurement duration: 9 minutes 13 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 400.025MHz |
| Channels | Low |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 400.025000 |
| Relative permittivity (real part) | 56.842969 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.9317436 |
| Power drift (%) | -1.330000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.691,22.414,24.201 |
| Crest factor: | 1:1 |



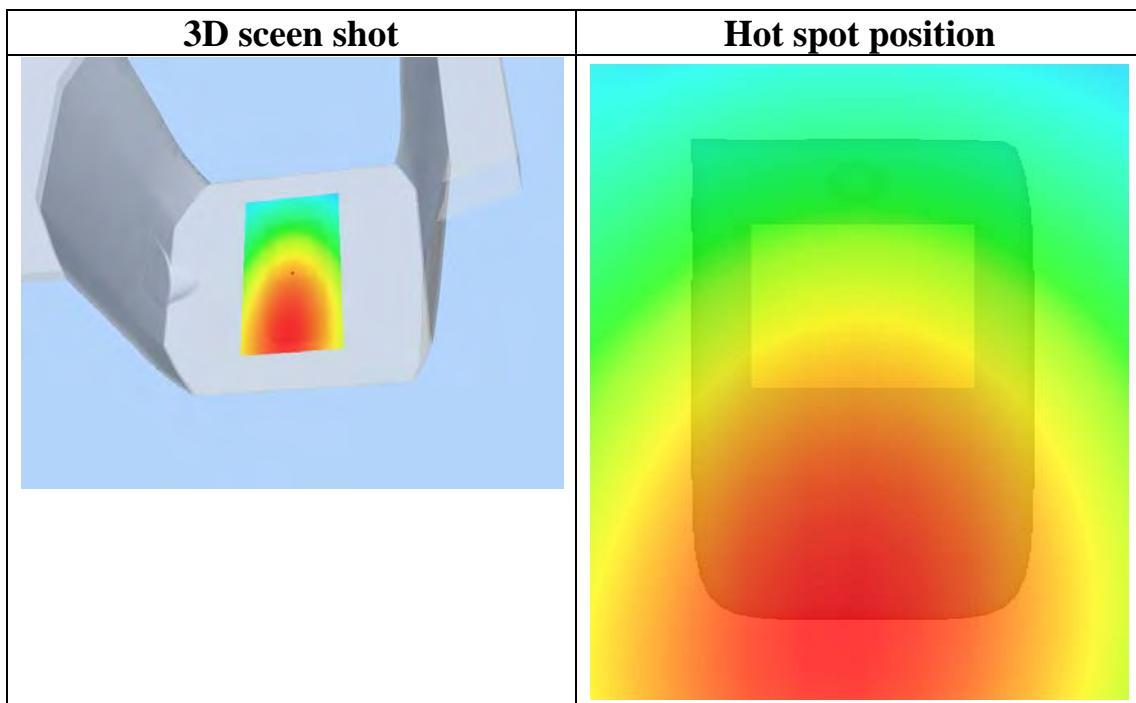
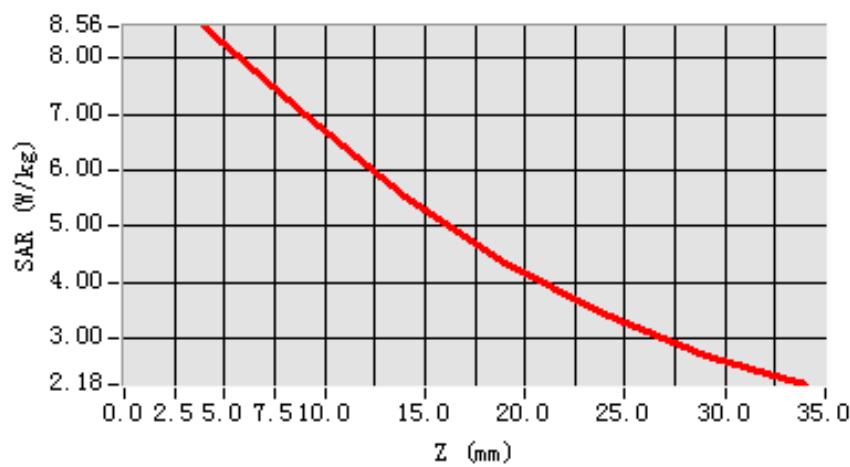
Maximum location: X=-2.00, Y=-56.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 6.480221 |
| SAR 1g (W/Kg) | 8.304615 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 8.5601 | 6.9820 | 5.5411 | 4.3598 | 3.4231 | 2.7018 |

SAR, Z Axis Scan (X = -2, Y = -56)



MEASUREMENT 11

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

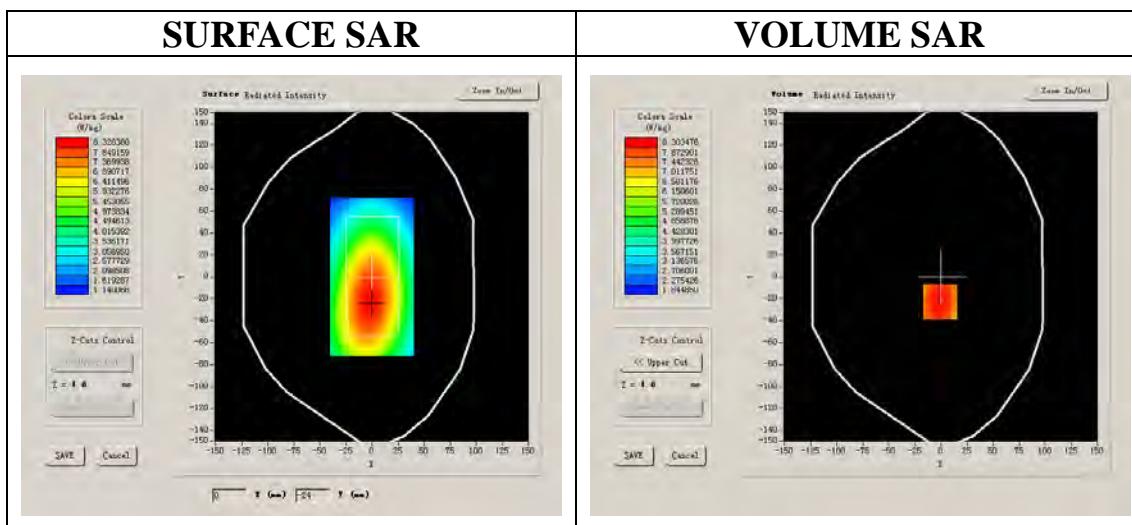
Measurement duration: 9 minutes 13 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 435.025MHz |
| Channels | Middle |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 435.025000 |
| Relative permittivity (real part) | 56.842969 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.9317436 |
| Power drift (%) | -0.720000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.691,22.414,24.201 |
| Crest factor: | 1:1 |



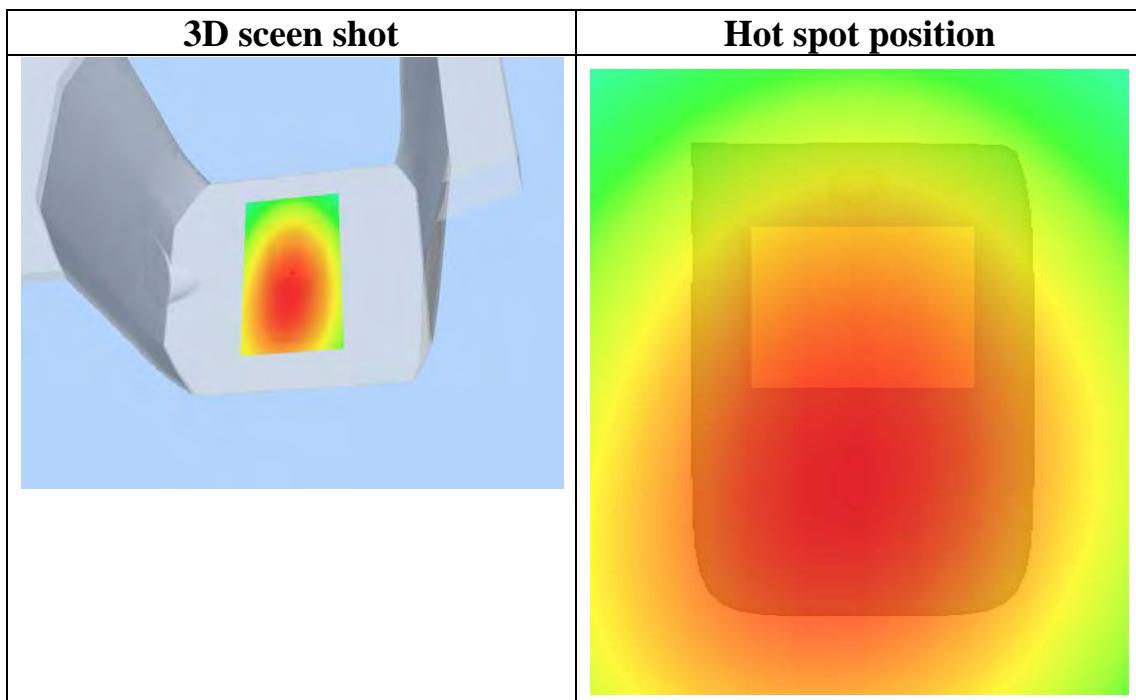
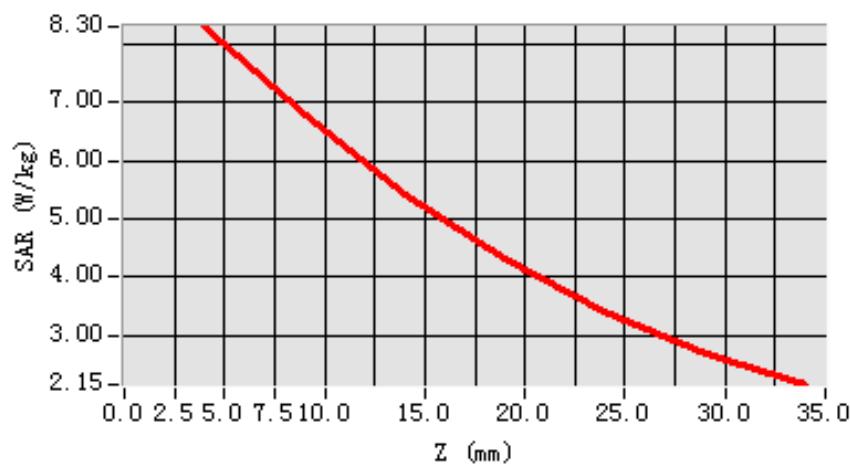
Maximum location: X=-1.00, Y=-23.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 6.321570 |
| SAR 1g (W/Kg) | 8.067405 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 8.3035 | 6.7940 | 5.4343 | 4.3054 | 3.4002 | 2.6860 |

SAR, Z Axis Scan (X = -1, Y = -23)



MEASUREMENT 12

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

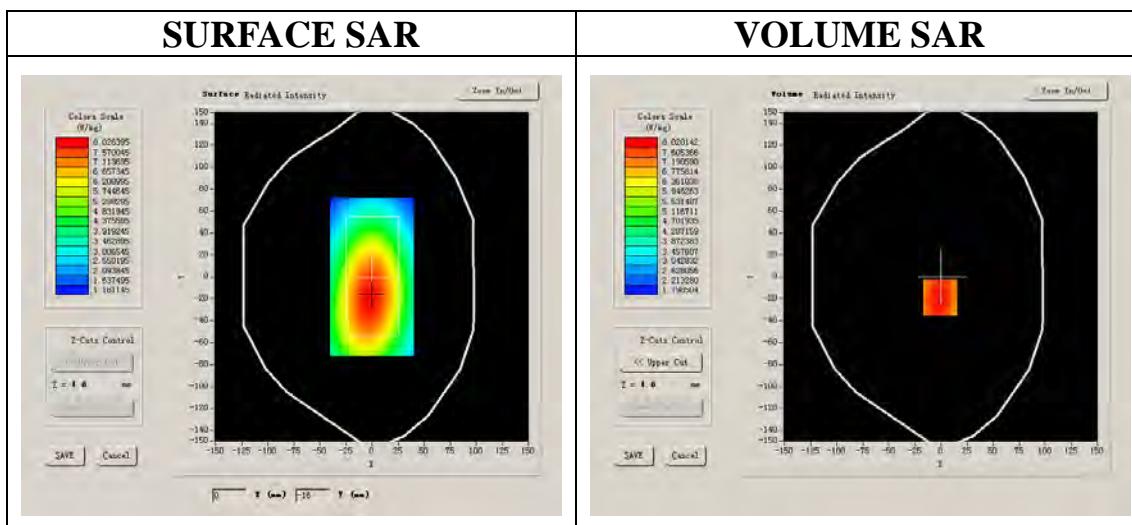
Measurement duration: 9 minutes 1 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 469.950MHz |
| Channels | High |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 469.950000 |
| Relative permittivity (real part) | 56.842969 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.9317436 |
| Power drift (%) | -1.540000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.691,22.414,24.201 |
| Crest factor: | 1:1 |



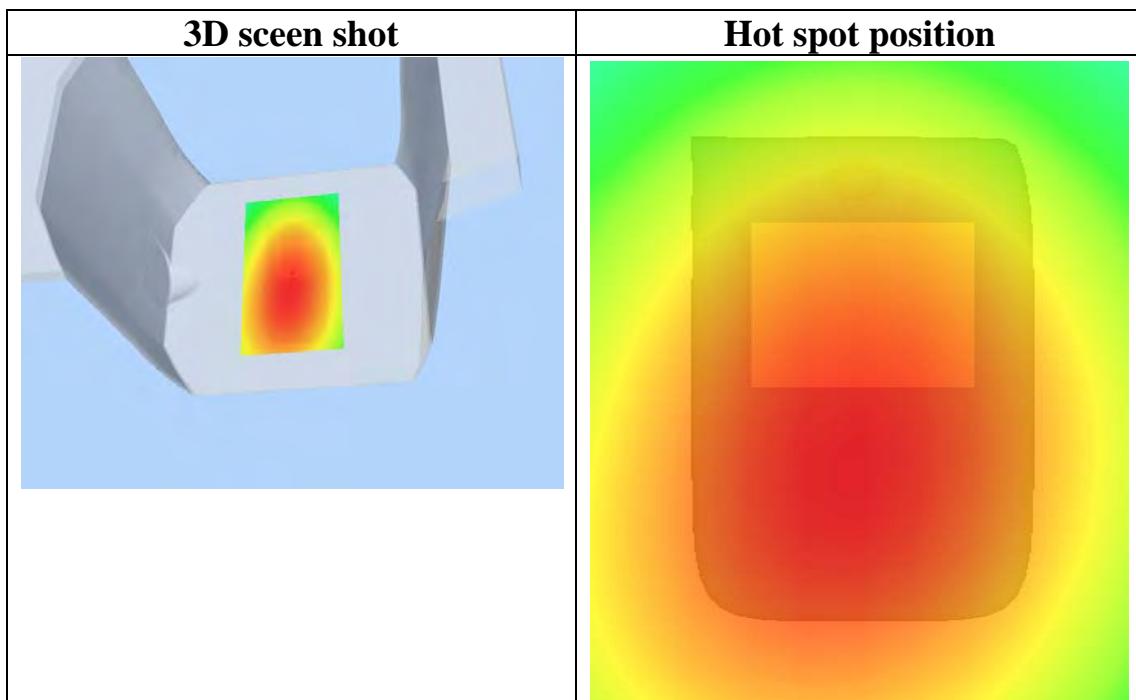
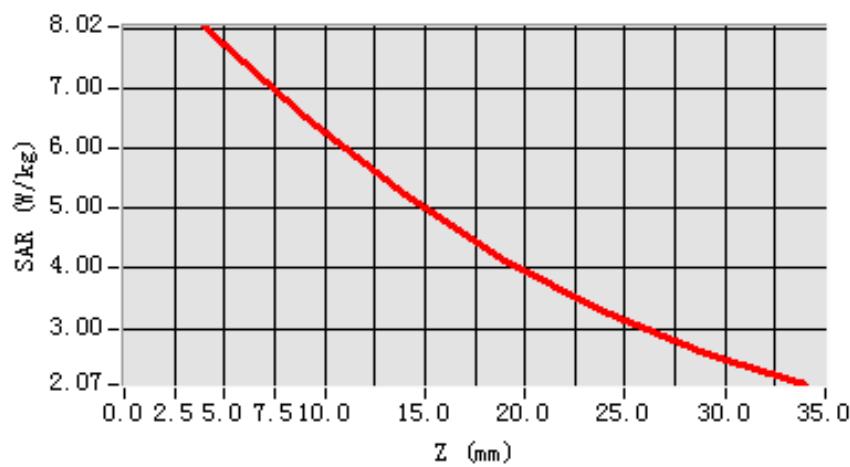
Maximum location: X=-1.00, Y=-19.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 6.089105 |
| SAR 1g (W/Kg) | 7.791484 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 8.0201 | 6.5159 | 5.2210 | 4.1363 | 3.2683 | 2.5853 |

SAR, Z Axis Scan (X = -1, Y = -19)



MEASUREMENT 13

Type: Phone measurement (Complete)

Area scan resolution: $dx=8\text{mm}, dy=8\text{mm}$

Zoom scan resolution: $dx=8\text{mm}, dy=8\text{mm}, dz=5\text{mm}$

Date of measurement: 17/3/2012

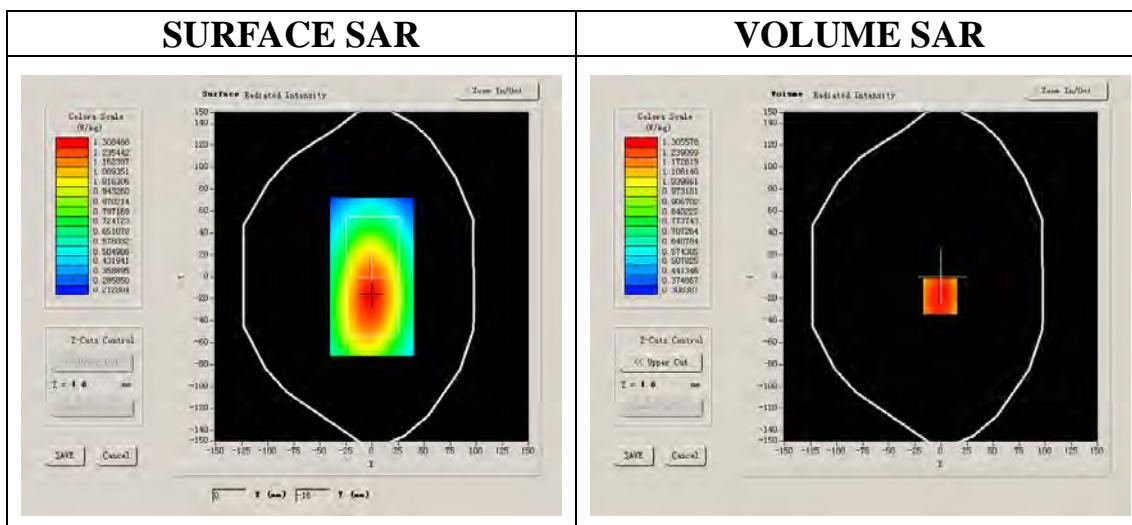
Measurement duration: 9 minutes 4 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 469.950MHz |
| Channels | High |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 469.950000 |
| Relative permittivity (real part) | 43.464979 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.863409 |
| Power drift (%) | -0.110000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.451,22.393,24.045 |
| Crest factor: | 1:1 |



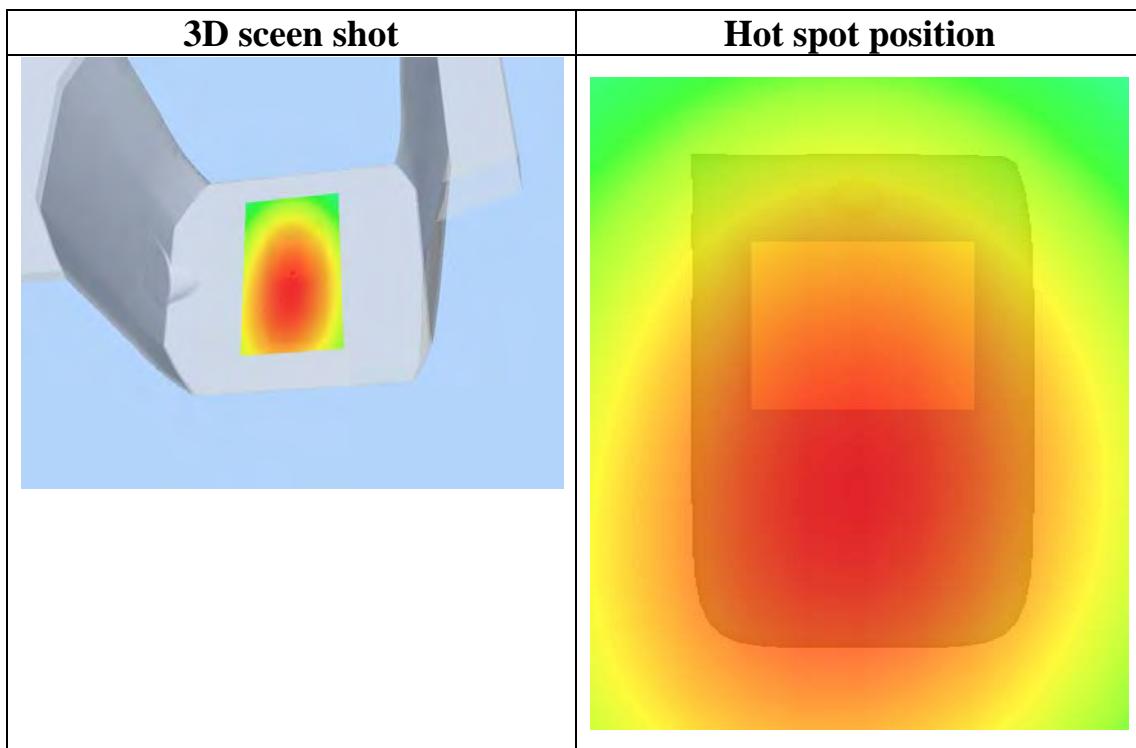
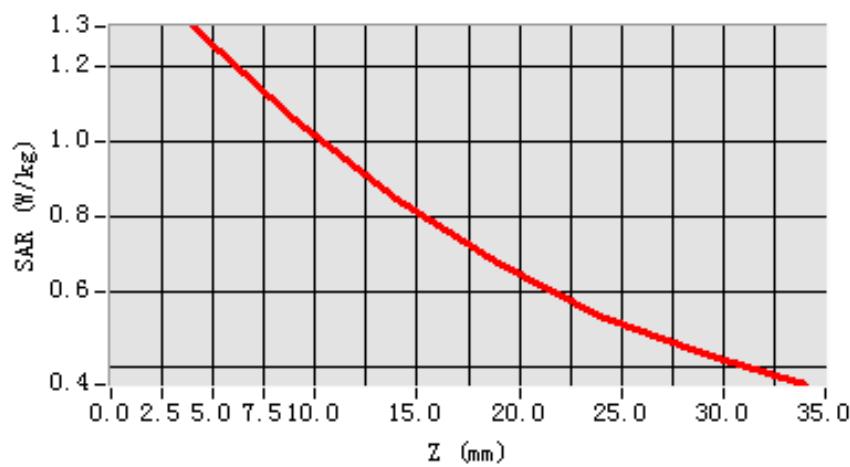
Maximum location: X=-1.00, Y=-18.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 0.990555 |
| SAR 1g (W/Kg) | 1.267764 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 1.3056 | 1.0560 | 0.8495 | 0.6769 | 0.5385 | 0.4338 |

SAR, Z Axis Scan (X = -1, Y = -18)



MEASUREMENT 14

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

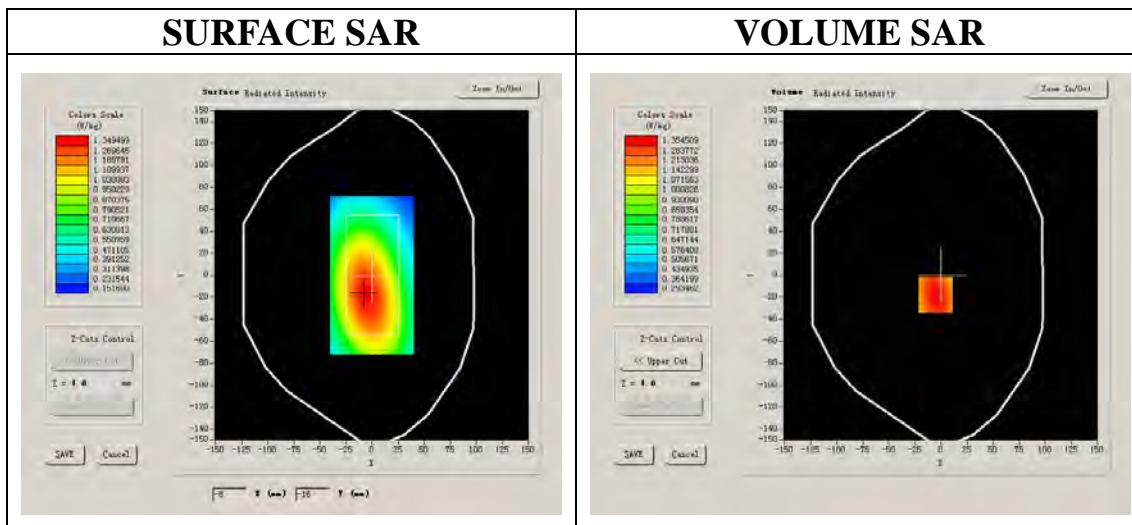
Measurement duration: 9 minutes 5 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 469.950MHz |
| Channels | High |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 469.9500000 |
| Relative permittivity (real part) | 43.464979 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.863409 |
| Power drift (%) | -0.210000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.451,22.393,24.045 |
| Crest factor: | 1:1 |



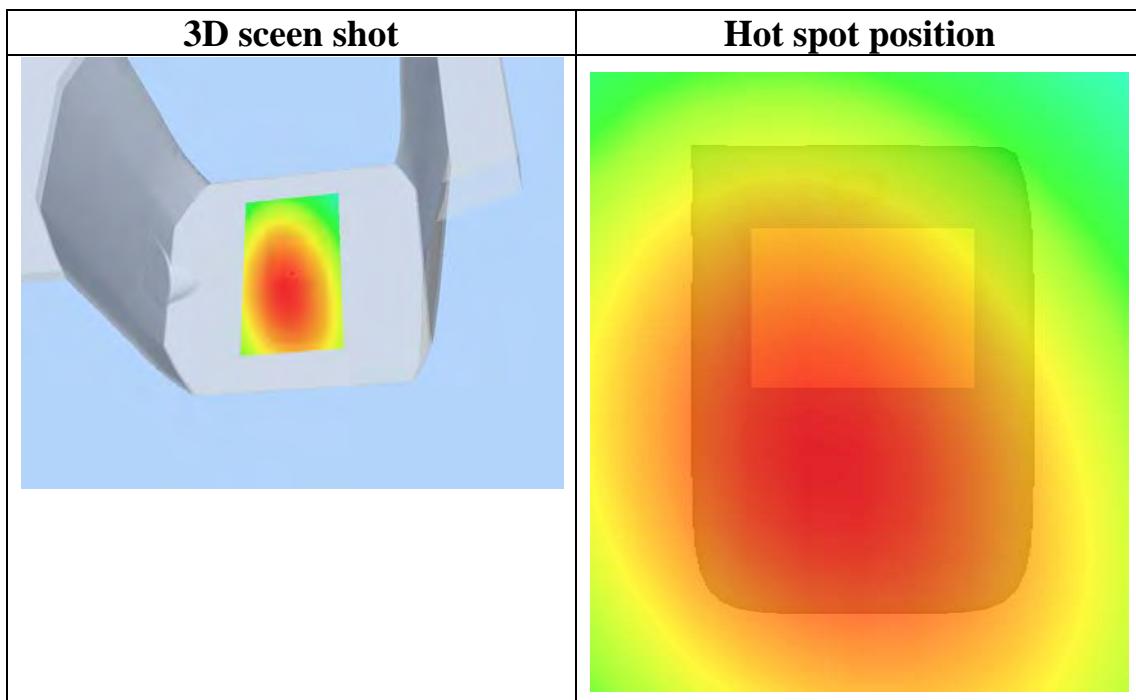
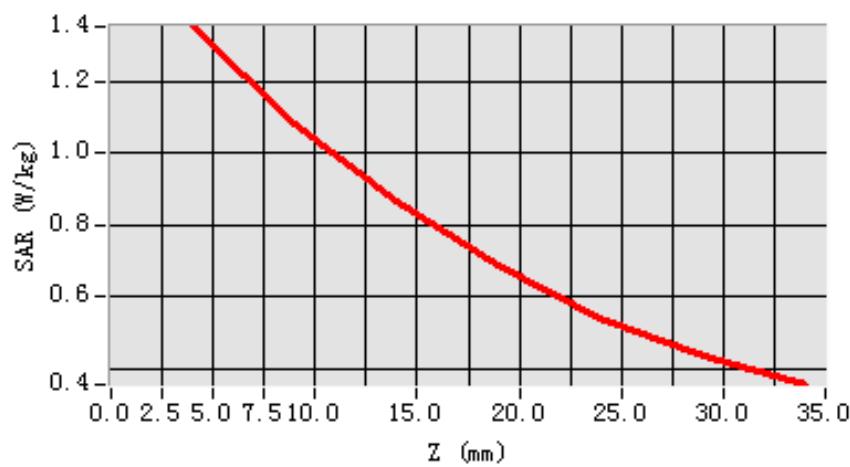
Maximum location: X=-5.00, Y=-18.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 1.018205 |
| SAR 1g (W/Kg) | 1.314653 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 1.3545 | 1.0842 | 0.8685 | 0.6863 | 0.5408 | 0.4343 |

SAR, Z Axis Scan (X = -5, Y = -18)



MEASUREMENT 15

Type: Phone measurement (Complete)

Area scan resolution: $dx=8\text{mm}, dy=8\text{mm}$

Zoom scan resolution: $dx=8\text{mm}, dy=8\text{mm}, dz=5\text{mm}$

Date of measurement: 17/3/2012

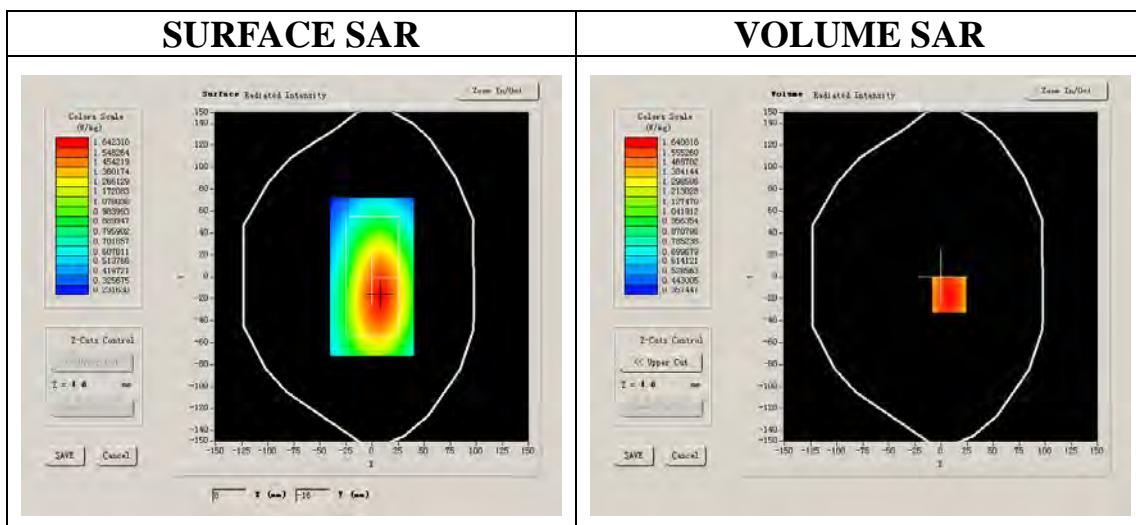
Measurement duration: 9 minutes 6 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 469.950MHz |
| Channels | High |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 469.950000 |
| Relative permittivity (real part) | 56.842969 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.9317436 |
| Power drift (%) | -0.220000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.691,22.414,24.201 |
| Crest factor: | 1:1 |



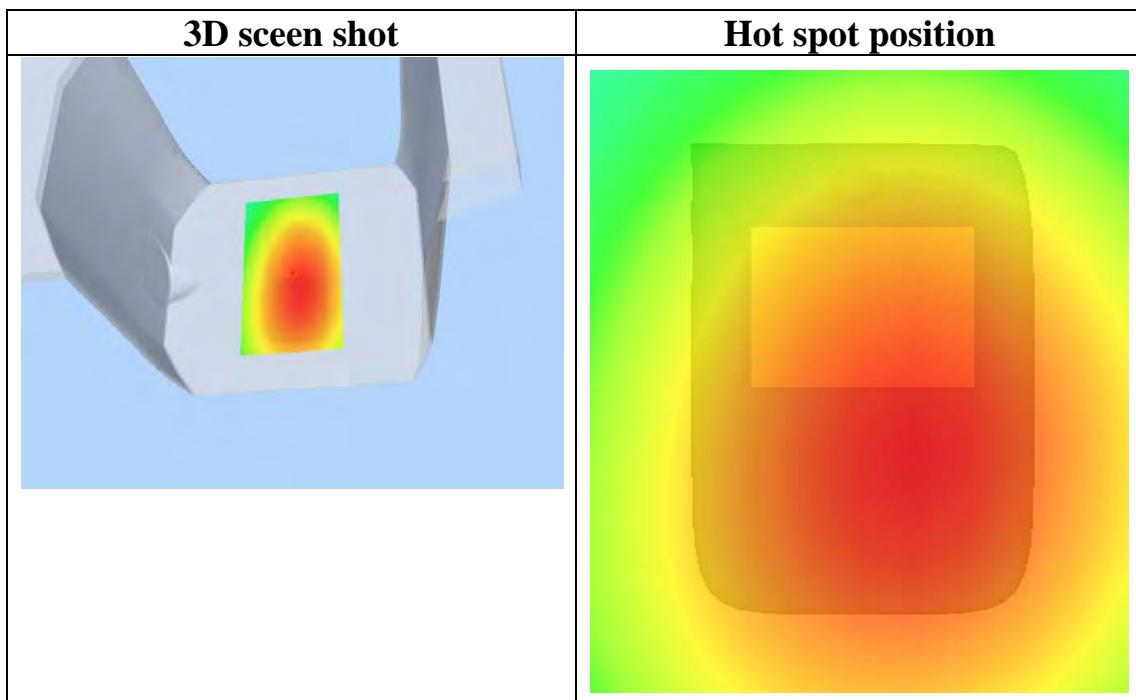
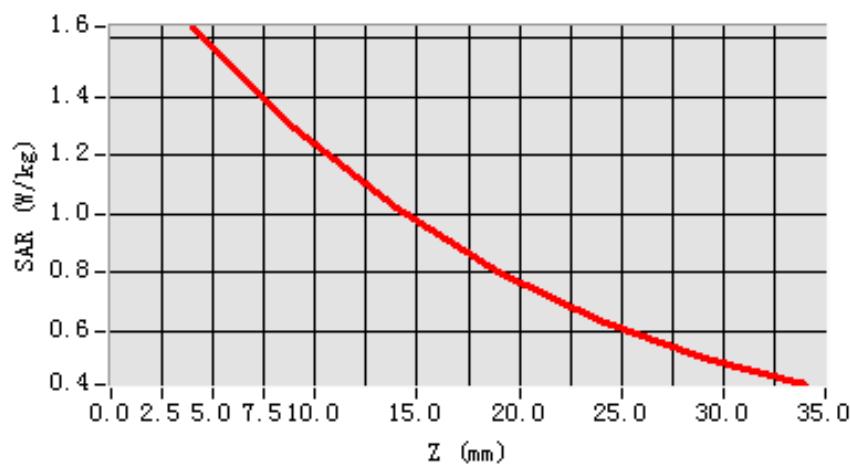
Maximum location: X=8.00, Y=-16.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 1.218296 |
| SAR 1g (W/Kg) | 1.591292 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 1.6408 | 1.2943 | 1.0226 | 0.8034 | 0.6366 | 0.5082 |

SAR, Z Axis Scan (X = 8, Y = -16)



MEASUREMENT 16

Type: Phone measurement (Complete)

Area scan resolution: $dx=8\text{mm}, dy=8\text{mm}$

Zoom scan resolution: $dx=8\text{mm}, dy=8\text{mm}, dz=5\text{mm}$

Date of measurement: 17/3/2012

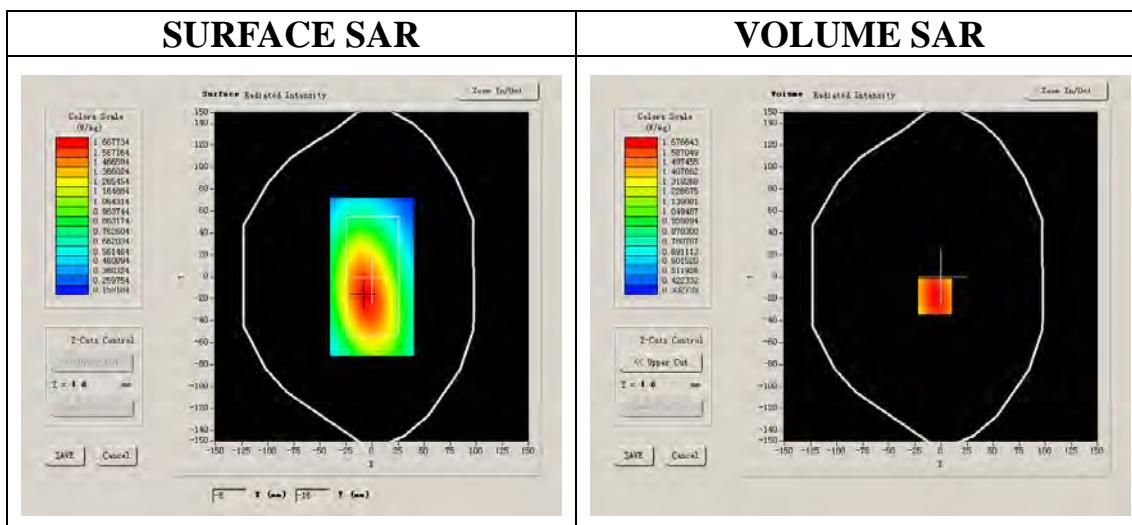
Measurement duration: 9 minutes 11 seconds

A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | Flat phantom |
| Band | 469.950MHz |
| Channels | High |
| Signal | FM |

B. SAR Measurement Results

| | |
|--|----------------------|
| Frequency (MHz) | 469.950000 |
| Relative permittivity (real part) | 56.842969 |
| Relative permittivity | 34.700001 |
| Conductivity (S/m) | 0.9317436 |
| Power drift (%) | -0.200000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.691,22.414,24.201 |
| Crest factor: | 1:1 |



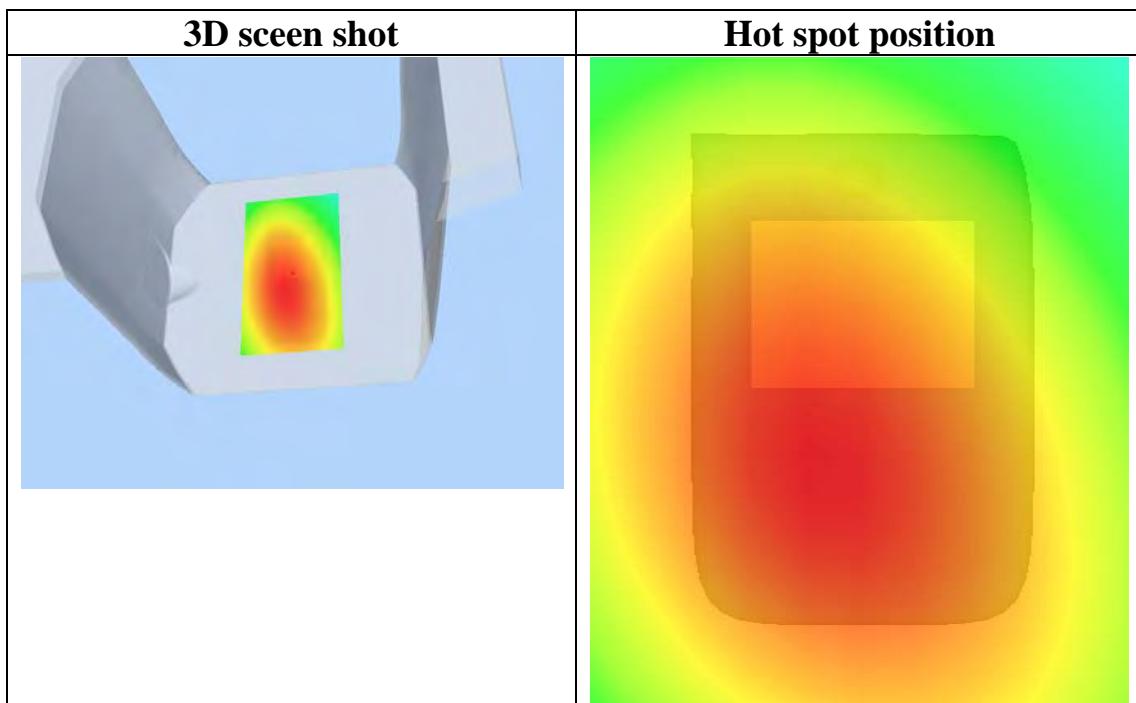
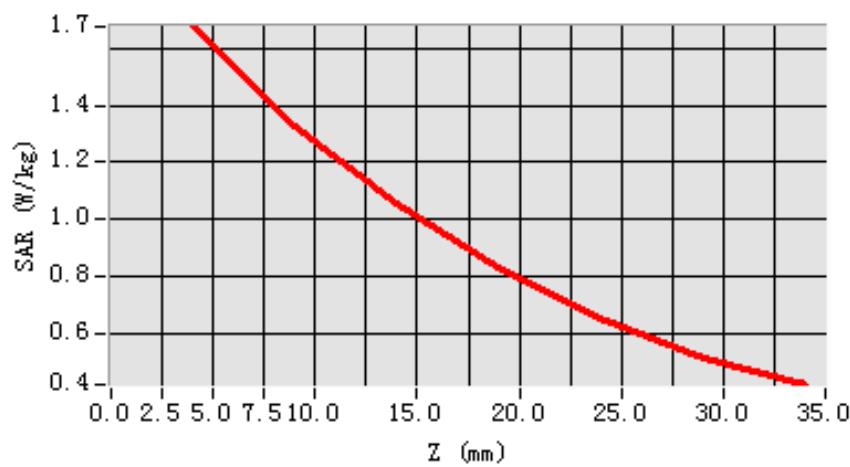
Maximum location: X=-6.00, Y=-18.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 1.248255 |
| SAR 1g (W/Kg) | 1.627878 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 1.6766 | 1.3247 | 1.0529 | 0.8308 | 0.6514 | 0.5157 |

SAR, Z Axis Scan (X = -6, Y = -18)



450MHz System Check Data (Head)

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

Measurement duration: 13 minutes 27 seconds

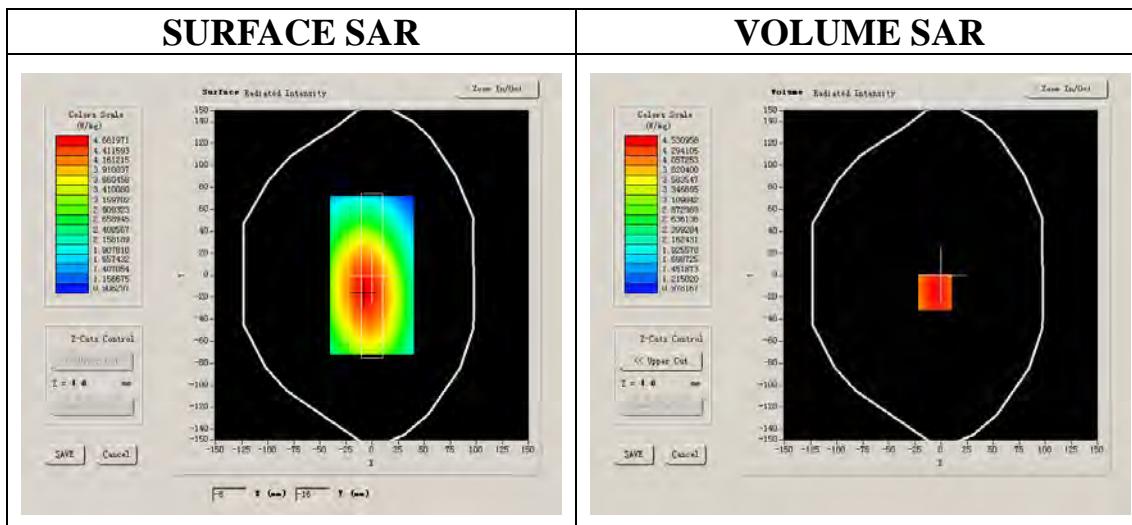
A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | |
| Band | 450MHz |
| Channels | |
| Signal | CW |

B. SAR Measurement Results

Band SAR

| | |
|--|------------------------|
| Frequency (MHz) | 450.000000 |
| Relative permittivity (real part) | 43.464979 |
| Relative permittivity | 19.070000 |
| Conductivity (S/m) | 0.863409 |
| Power drift (%) | -0.140000 |
| Ambient Temperature: | 22.3°C |
| Liquid Temperature: | 22.6°C |
| ConvF: | 24.451, 22.393, 24.045 |
| Crest factor: | 1:1 |



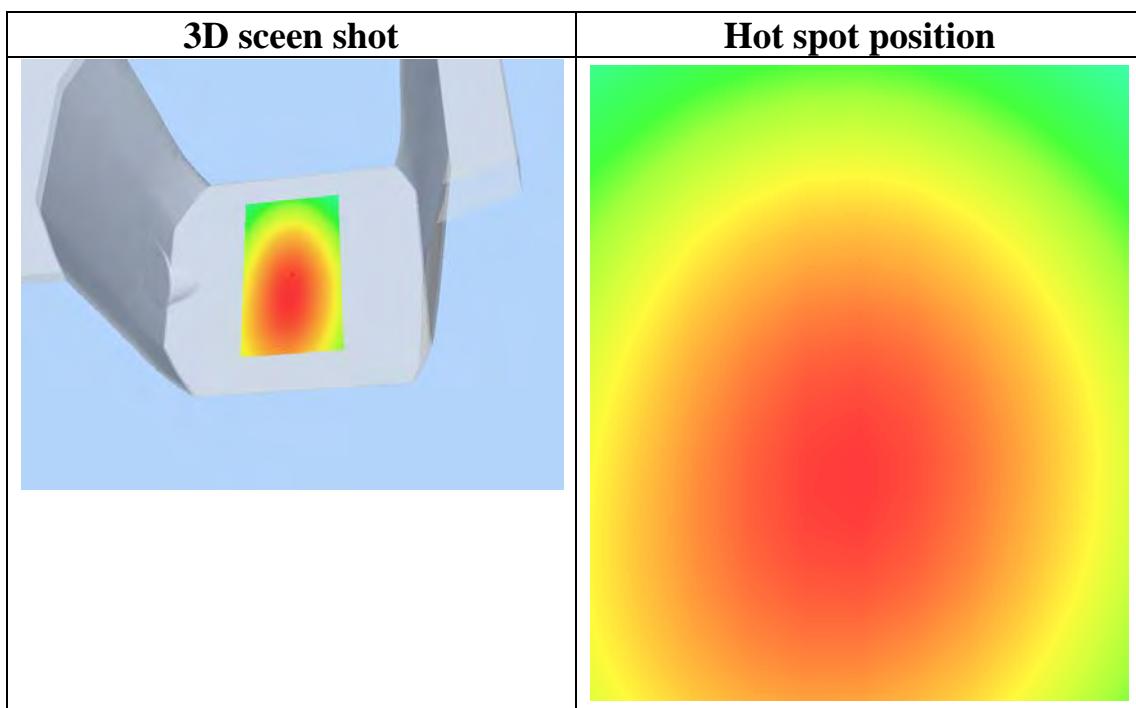
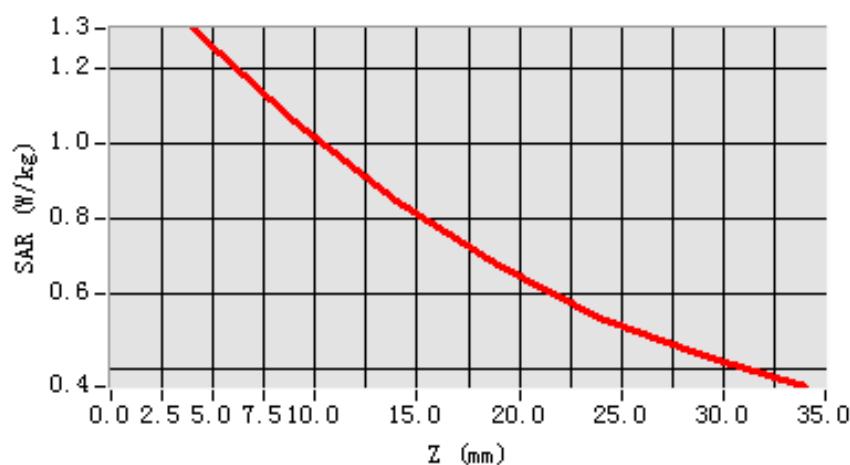
Maximum location: X=-1.00, Y=-18.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 0.880555 |
| SAR 1g (W/Kg) | 1.251764 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 1.3056 | 1.0560 | 0.8495 | 0.6769 | 0.5385 | 0.4338 |

SAR, Z Axis Scan (X = -1, Y = -18)



450MHz System Check Data (Body)

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 17/3/2012

Measurement duration: 13 minutes 27 seconds

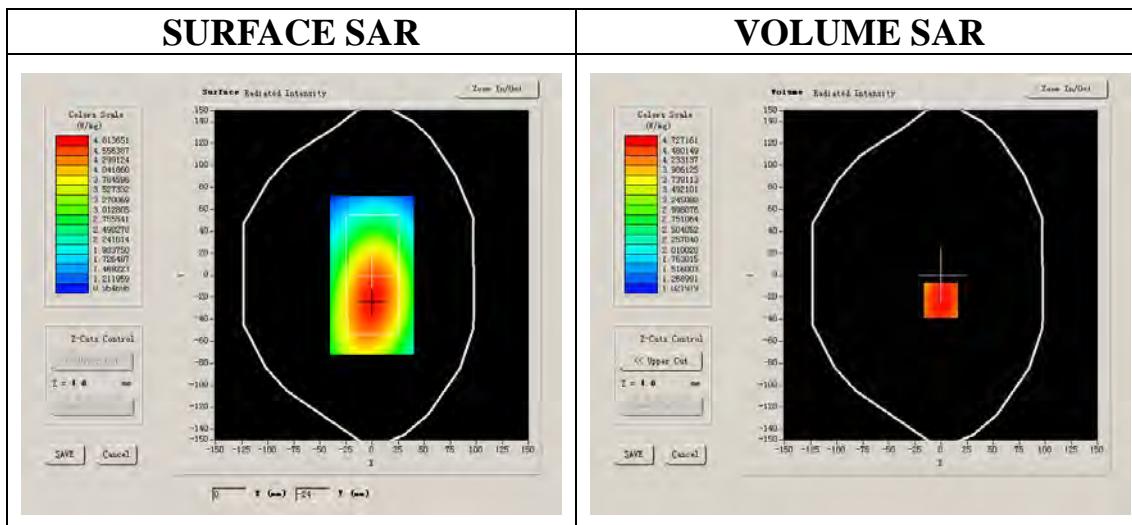
A. Experimental conditions.

| | |
|------------------------|-------------------|
| Phantom File | surf_sam_plan.txt |
| Phantom | Validation plane |
| Device Position | |
| Band | 450MHz |
| Channels | |
| Signal | CW |

B. SAR Measurement Results

Band SAR

| | |
|--|------------------------|
| Frequency (MHz) | 450.000000 |
| Relative permittivity (real part) | 56.842969 |
| Relative permittivity | 19.500000 |
| Conductivity (S/m) | 0.9317436 |
| Power Drift (%) | 0.170000 |
| Ambient Temperature: | 22.0°C |
| Liquid Temperature: | 21.8°C |
| ConvF: | 24.691, 22.414, 24.201 |
| Crest factor: | 1:1 |



Maximum location: X=-5.00, Y=-18.00

| | |
|-----------------------|----------|
| SAR 10g (W/Kg) | 0.918205 |
| SAR 1g (W/Kg) | 1.337453 |

Z Axis Scan

| | | | | | | | |
|-------------------|--------|--------|--------|--------|--------|--------|--------|
| Z (mm) | 0.00 | 4.00 | 9.00 | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.0000 | 1.3545 | 1.0842 | 0.8685 | 0.6863 | 0.5408 | 0.4343 |

SAR, Z Axis Scan (X = -5, Y = -18)

