

# FCC SAR

## Measurement and Test Report

### For

**Verykool USA Inc**

**3636 Nobel Drive, Suite 325, San Diego, CA 92122 USA**

**FCC ID: WA6I133**

<p>FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2003</p>	
<b>FCC Rules:</b>	<u>FCC OET Bulletin 65C (Edition 01-01)</u>
<b>Product Description:</b>	<u>Mobile Phone</u>
<b>Tested Model:</b>	<u>I133</u>
<b>Report No.:</b>	<u>STR13058022H</u>
<b>Tested Date:</b>	<u>2013-05-29 to 2013-05-31</u>
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## TABLE OF CONTENTS

<b>1. General Information .....</b>	<b>3</b>
1.1 Product Description for Equipment Under Test (EUT).....	3
1.2 Test Standards .....	5
1.3 Test Methodology .....	5
1.4 Test Facility .....	5
<b>2. Summary of Test Results .....</b>	<b>6</b>
<b>3. Specific Absorption Rate (SAR).....</b>	<b>7</b>
3.1 Introduction.....	7
3.2 SAR Definition .....	7
<b>4. SAR Measurement System.....</b>	<b>8</b>
4.1 The Measurement System .....	8
4.2 Probe.....	8
4.3 Probe Calibration Process .....	10
4.4 Phantom .....	11
4.5 Device Holder .....	11
4.6 Test Equipment List.....	12
<b>5. Tissue Simulating Liquids.....</b>	<b>13</b>
5.1 Composition of Tissue Simulating Liquid.....	13
5.2 Tissue Dielectric Parameters for Head and Body Phantoms.....	14
5.3 Tissue Calibration Result.....	15
<b>6. SAR Measurement Evaluation .....</b>	<b>16</b>
6.1 Purpose of System Performance Check.....	16
6.2 System Setup .....	16
6.3 Validation Results.....	17
<b>7. EUT Testing Position .....</b>	<b>18</b>
7.1 Define Two Imaginary Lines on The Handset.....	18
7.2 Cheek Position .....	19
7.3 Tilted Position .....	19
7.4 Body Worn Position .....	20
7.5 EUT Antenna Position .....	20
7.6 EUT Testing Position .....	21
<b>8. SAR Measurement Procedures.....</b>	<b>22</b>
8.1 Measurement Procedures .....	22
8.2 Spatial Peak SAR Evaluation .....	22
8.3 Area & Zoom Scan Procedures .....	23
8.4 Volume Scan Procedures .....	23
8.5 SAR Averaged Methods .....	23
8.6 Power Drift Monitoring .....	23
<b>9. SAR Test Result .....</b>	<b>24</b>
9.1 Conducted RF Output Power .....	24
9.2 Test Results for Standalone SAR Test.....	26
9.3 Simultaneous Multi-band Transmission SAR Analysis .....	29
<b>10. Measurement Uncertainty .....</b>	<b>30</b>
10.1 Uncertainty for EUT SAR Test.....	30
10.2 Uncertainty for System Performance Check.....	31
<b>Annex A. Plots of System Performance Check .....</b>	<b>33</b>
<b>Annex B. Plots of SAR Measurement .....</b>	<b>37</b>
<b>Annex C. EUT Photos .....</b>	<b>107</b>
<b>Annex D. Test Setup Photos .....</b>	<b>108</b>
<b>Annex E. Calibration Certificate.....</b>	<b>111</b>

## 1. General Information

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: Verykool USA Inc  
Address of applicant: 3636 Nobel Drive, Suite 325, San Diego, CA 92122 USA  
Manufacturer: ShenZhen Ginwave Technologies Ltd  
Address of manufacturer: Room 913 Software building. GaoXin M.1<sup>st</sup> Ave, Nanshan, Shenzhen, China

General Description of EUT	
Product Name:	Mobile Phone
Trade Name:	Verykool
Model No.:	I133
Adding Model(s):	I132
Hardware Version:	VK_Generic_Single/Dual_HW_1.0
Software Version:	VK_Generic_Single/Dual_SW_1.0
IMEI Code:	355473026000000
Device Category:	Portable Device
RF Exposure Environment:	General Public
Rated Voltage:	DC 3.7V
Battery:	Model: 423450AR
	Rated Voltage: DC 3.7V
	Capacity: 600mAh
Power Adapter:	Model: NBT-050B-B050UA
	Rated Input: AC 100-240V
	Rated Output: DC 5V 800mA
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	
<i>Adding model: I132 basis of the tested model I133</i>	
<i>This model is identical circuit and PCB Layout to the original model except I132 has a camera but I133 has no.</i>	

<b>Technical Characteristics of EUT</b>	
<b>2G</b>	
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS 850: 824~849MHz GSM/GPRS 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS 850: 869~894MHz GSM/GPRS 1900: 1930~1990MHz
RF Output Power:	GSM850: 31.56dBm GSM1900: 28.90dBm
Type of Modulation:	GMSK
Antenna Type:	PFIA Antenna
Antenna Gain:	GSM850: -2.0dBi GSM1900: 1.5dBi
GPRS Class:	Class 12
<b>3G</b>	
Support Band:	WCDMA Band II, Band V
Uplink Frequency:	WCDMA/UPA/DPA Band V: 824~849MHz WCDMA/UPA/DPA Band II: 1850~1910MHz
Downlink Frequency:	WCDMA/UPA/DPA Band V: 869~894MHz WCDMA/UPA/DPA Band II: 1930~1990MHz
RF Output Power:	WCDMA Band V: 25.74dBm WCDMA Band II: 24.66dBm
Type of Modulation:	QPSK
Antenna Type:	PFIA Antenna
Antenna Gain:	WCDMA Band V: -2.0dBi WCDMA Band II: 1.5dBi
<b>Bluetooth</b>	
Bluetooth Version:	V2.1+EDR
Frequency Range:	2402-2480MHz
RF Output Power:	4.633 dBm (Conducted)
Type of Modulation:	GFSK, Pi/4 QDPSK, 8DPSK
Antenna Type:	Chip Antenna
Antenna Gain:	0 dBi

## 1.2 Test Standards

The following report is prepared on behalf of the Verykool USA Inc in accordance with FCC 47 CFR Part 2.1093, ANSI/IEEE C95.1-1992, IEEE 1528-2003 and FCC OET Bulletin 65 Supplement C (Edition 01-01).

The objective is to determine compliance with FCC Part 2.1093 of the Federal Communication Commissions rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

## 1.3 Test Methodology

All measurements contained in this report were conducted with FCC OET Bulletin 65 Supplement C. The public notice KDB 447498 D01 V05 for Mobile and Portable Devices RF Exposure Procedure also.

## 1.4 Test Facility

### **FCC – Registration No.: 994117**

SEM.Test Compliance Services Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 994117.

### **Industry Canada (IC) Registration No.: 7673A**

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

### **CNAS Registration No.: L4062**

Shenzhen SEM.Test Electronics Service Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C (518101)

## 2. Summary of Test Results

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The maximum results of Specific Absorption Rate (SAR) have found during testing are as follows:

Frequency Band	Position	SAR <sub>1g</sub> (W/kg)	Scaled SAR <sub>1g</sub> (W/kg)
GSM850	Head	<b>1.283</b>	<b>1.420</b>
GSM1900	Head	<b>0.700</b>	<b>0.902</b>
WCDMA Band V	Head	<b>0.001</b>	<b>0.002</b>
WCDMA Band II	Head	<b>0.003</b>	<b>0.005</b>
GSM850	Body-worn (1.5cm Gap)	<b>1.378</b>	<b>1.391</b>
GSM1900	Body-worn (1.5cm Gap)	<b>0.552</b>	<b>0.614</b>
WCDMA Band V	Body-worn (1.5cm Gap)	<b>0.001</b>	<b>0.002</b>
WCDMA Band II	Body-worn (1.5cm Gap)	<b>0.001</b>	<b>0.002</b>

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR Part 2.1093 and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedure specified in IEEE 1528-2003 and FCC OET Bulletin 65 Supplement C (Edition 01-01).

### 3. Specific Absorption Rate (SAR)

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#### 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 ( $\rho$ ). The equation description is as below:

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

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

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

$$\mathbf{SAR} = C \left( \frac{\delta T}{\delta t} \right)$$

Where:  $C$  is the specific heat capacity,  $\delta T$  is the temperature rise and  $\delta t$  is the exposure duration, or related to the

electrical field in the tissue by

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

Where:  $\sigma$  is the conductivity of the tissue,  $\rho$  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 System

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### 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.

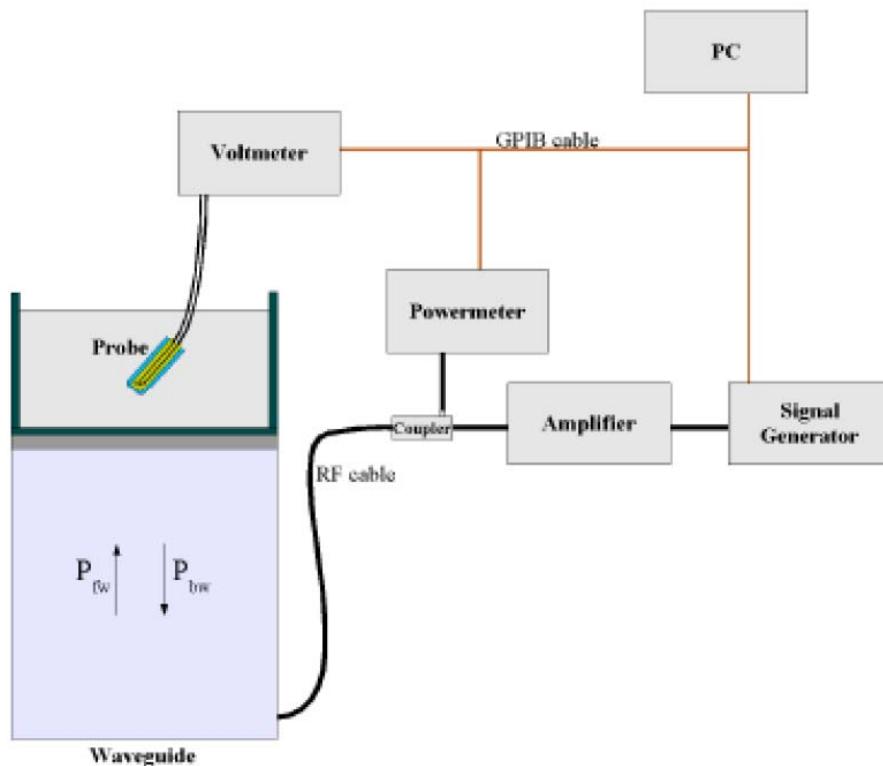
### 4.2 Probe

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 : 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: <0.50 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 EN 62209-1 and IEEE 1528 STD, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the EN 62209-1 annexe technique using reference guide at the five frequencies.



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

Where :

P<sub>f<sup>bw</sup></sub> = Forward Power

P<sub>b<sup>bw</sup></sub> = Backward Power

a and b = Waveguide dimensions

I = 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

#### 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/cm<sup>2</sup>) using an with CALISAR, Antenna proprietary calibration system.

#### 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 1mW/cm<sup>2</sup>.

#### 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:

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

$\Delta t$  = exposure time (30 seconds),

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

$\Delta T$  = 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:

$\sigma$  = simulated tissue conductivity,

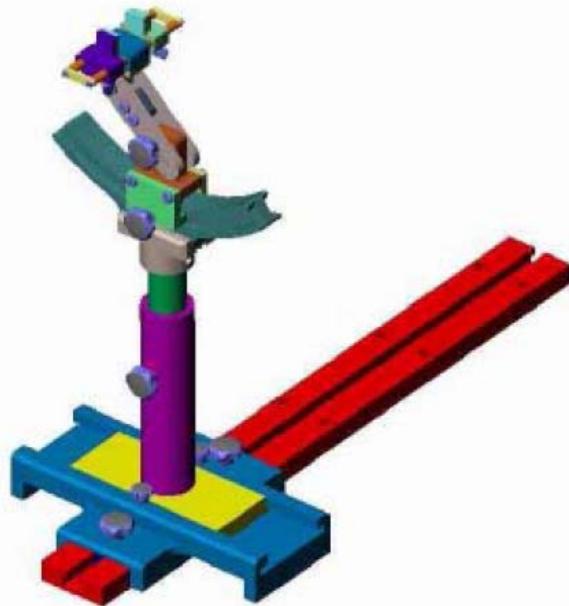
$\rho$  = Tissue density (1.25 g/cm<sup>3</sup> for brain tissue)

#### 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°.



System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

#### 4.6 Test Equipment List

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
E-Field Probe	SATIMO	SSE5	SN 22/12 EP155	2012-11-26	2013-11-25
835MHz Dipole	SATIMO	SID835	SN 47/12 DIP 0G835-204	2012-11-26	2013-11-25
1900MHz Dipole	SATIMO	SID1900	SN 47/12 DIP 1G900-207	2012-11-26	2013-11-25
2450MHz Dipole	SATIMO	SID2450	SN 47/12 DIP 2G450-209	2012-11-26	2013-11-25
Dielectric Probe	SATIMO	SCLMP	SN 47/12 OCPG49	2012-11-26	2013-11-25
SAM Phantom	SATIMO	SAM	SN/ 47/12 SAM95	N/A	N/A
Multi Meter	Keithley	Keithley 2000	4006367	2013-05-07	2014-05-06
Signal Generator	Rohde & Schwarz	SMR20	100047	2013-05-07	2014-05-06
Universal Tester	Rohde & Schwarz	CMU200	112012	2013-05-07	2014-05-06
Directional Coupler	Agilent	87300B	3123C03573	2013-05-07	2014-05-06

## 5. Tissue Simulating Liquids

### 5.1 Composition of Tissue Simulating Liquid

For the measurement of the field distribution inside the SAM phantom with SMTIMO, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. Please see the following photos for the liquid height.



Liquid Height for Head SAR



Liquid Height for Body SAR

#### The Composition of Tissue Simulating Liquid

Frequency (MHz)	Water (%)	Salt (%)	Triton (%)	HEC (%)	Preventol (%)	DGBE (%)
<b>Head</b>						
835	35.34	0.98	0.00	0.00	63.68	0.00
1900	55.26	0.52	30.40	0.00	0.00	13.82
<b>Body</b>						
835	52.87	1.07	0.00	0.00	46.10	0.00
1900	69.99	0.41	20.66	0.00	0.00	8.93

## 5.2 Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

Target Frequency (MHz)	Head		Body	
	Conductivity ( $\sigma$ )	Permittivity ( $\epsilon_r$ )	Conductivity ( $\sigma$ )	Permittivity ( $\epsilon_r$ )
150	0.76	52.3	0.80	61.9
300	0.87	45.3	0.92	58.2
450	0.87	43.5	0.94	56.7
<b>835</b>	<b>0.90</b>	<b>41.5</b>	<b>0.97</b>	<b>55.2</b>
900	0.97	41.5	1.05	55.0
915	0.98	41.5	1.06	55.0
1450	1.20	40.5	1.30	54.0
1610	1.29	40.3	1.40	53.8
<b>1800-2000</b>	<b>1.40</b>	<b>40.0</b>	<b>1.52</b>	<b>53.3</b>
2450	1.80	39.2	1.95	52.7
3000	2.40	38.5	2.73	52.0
5800	5.27	35.3	6.00	48.2

### 5.3 Tissue Calibration Result

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

#### Calibration Result for Dielectric Parameters of Tissue Simulating Liquid

Head Tissue Simulating Liquid									
Freq. MHz.	Temp. (°C)	Conductivity			Permittivity			Limit (%)	Date
		Reading ( $\sigma$ )	Target ( $\sigma$ )	Delta (%)	Reading ( $\epsilon_r$ )	Target ( $\epsilon_r$ )	Delta (%)		
835	21.2	0.88	0.90	-2.2	41.4	41.5	-0.2	±5	05-29-2013
1900	21.3	1.43	1.40	2.1	39.4	40.0	-1.5	±5	05-29-2013

Body Tissue Simulating Liquid									
Freq. MHz.	Temp. (°C)	Conductivity			Permittivity			Limit (%)	Date
		Reading ( $\sigma$ )	Target ( $\sigma$ )	Delta (%)	Reading ( $\epsilon_r$ )	Target ( $\epsilon_r$ )	Delta (%)		
835	21.2	0.96	0.97	-1.1	55.8	55.2	1.1	±5	05-29-2013
1900	21.3	1.54	1.52	1.3	51.2	53.3	-3.9	±5	05-29-2013

## 6. SAR Measurement Evaluation

### 6.1 Purpose of System Performance Check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

### 6.2 System Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator at frequency 835 MHz and 1900 MHz. 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.

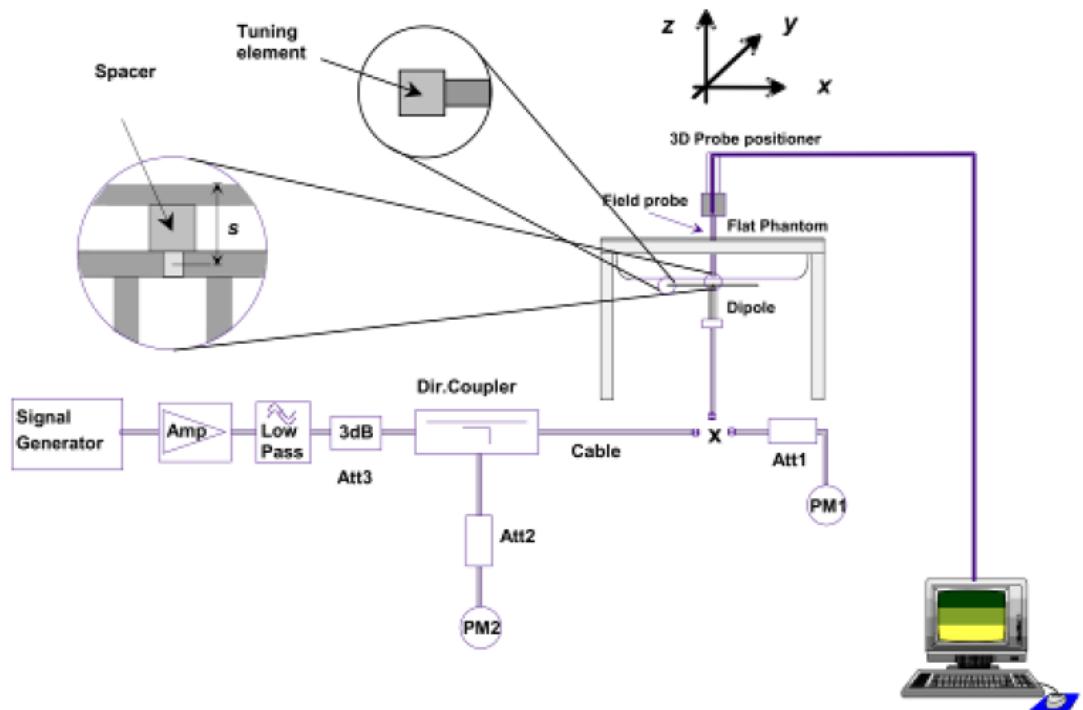


Fig 7.1 System Verification Setup Block Diagram



**Fig 7.2 Setup Photo of Dipole Antenna**

The output power on dipole port must be calibrated to 24 dBm (250 mW) before dipole is connected.

### 6.3 Validation Results

Comparing to the original SAR value provided by SATIMO, the validation data should be within its specification of 10 %. Table 7.2 shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion.

Frequency	Liquid	Targeted SAR <sub>1g</sub>	Measured SAR <sub>1g</sub>	Normalized SAR <sub>1g</sub>	Tolerance
MHz	(Head/Body)	(W/kg)	(W/kg)	(W/kg)	(%)
835	Head	9.82	2.42	9.67	-1.53
1900	Head	40.79	9.97	39.88	-2.23
835	Body	10.19	2.51	10.05	-1.37
1900	Body	40.41	9.93	39.73	-1.68

**Table 7.2 Targeted and Measurement SAR**

*Please refer to Annex A for the plots of system performance check.*

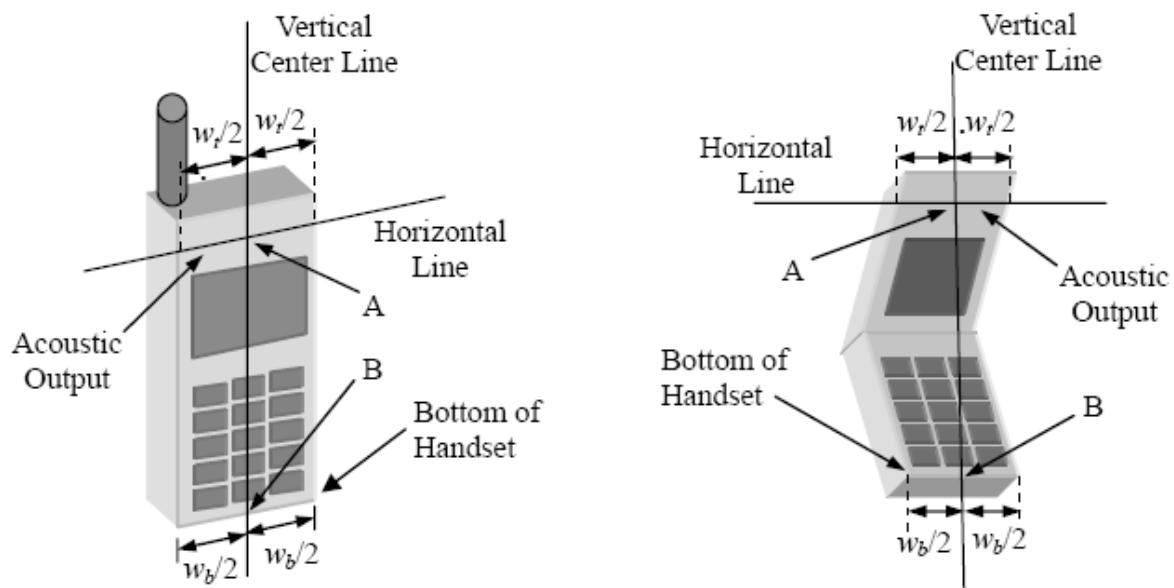
## 7. EUT Testing Position

### 7.1 Define Two Imaginary Lines on The Handset

(a) The vertical centerline passes through two points on the front side of the handset - the midpoint of the width  $w_t$  of the handset at the level of the acoustic output, and the midpoint of the width  $w_b$  of the bottom of the handset.

(b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.

(c) The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

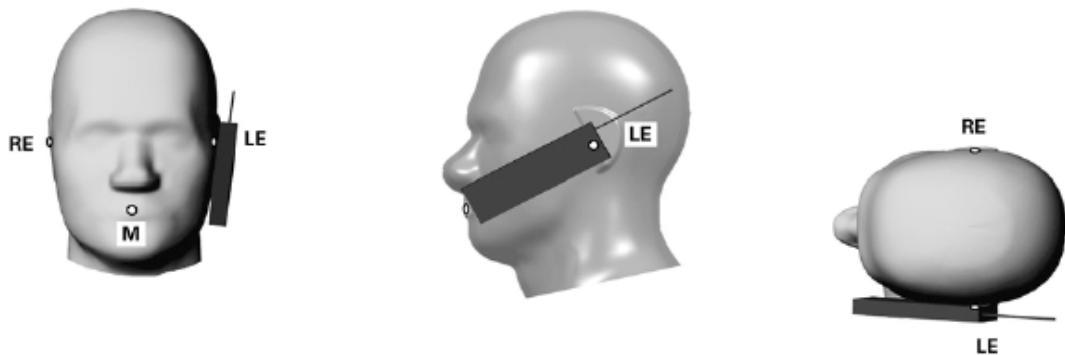


**Fig 7.1 Illustration for Handset Vertical and Horizontal Reference Lines**

## 7.2 Cheek Position

(a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

(b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see Fig. 7.2).

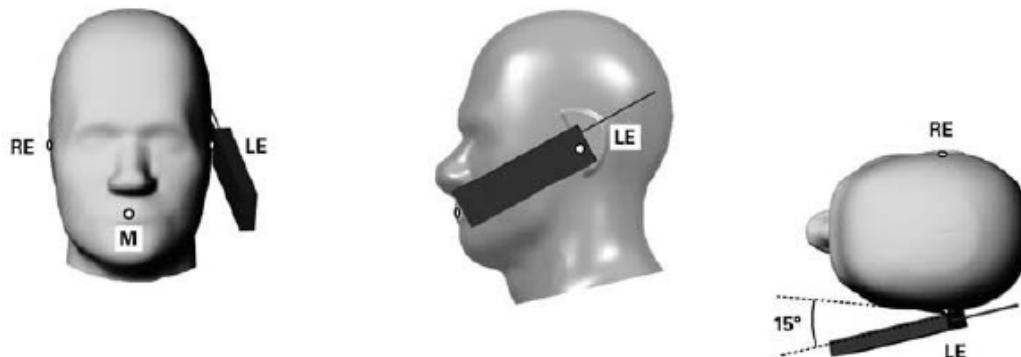


**Fig 7.2 Illustration for Cheek Position**

## 7.3 Tilted Position

(a) To position the device in the “cheek” position described above.

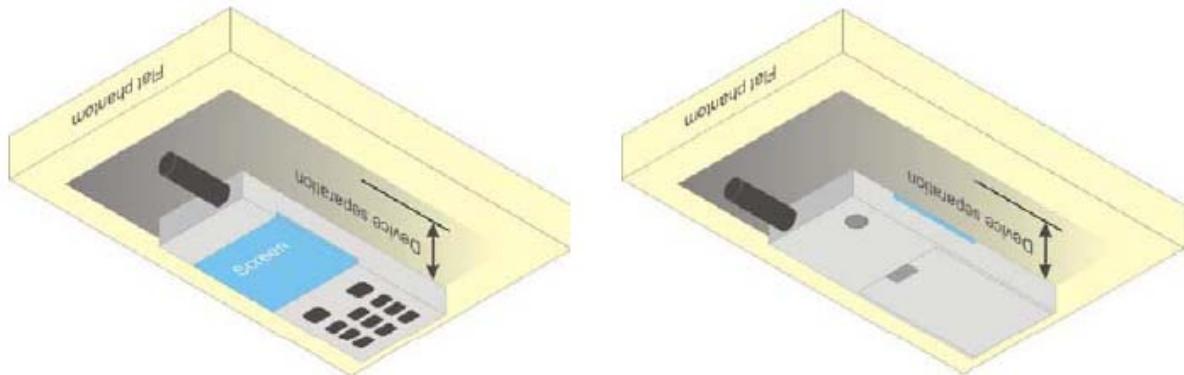
(b) While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see Fig. 7.3).



**Fig 7.3 Illustration for Tilted Position**

## 7.4 Body Worn Position

- (a) To position the device parallel to the phantom surface with either keypad up or down.
- (b) To adjust the device parallel to the flat phantom.
- (c) To adjust the distance between the device surface and the flat phantom to 1.5 cm.

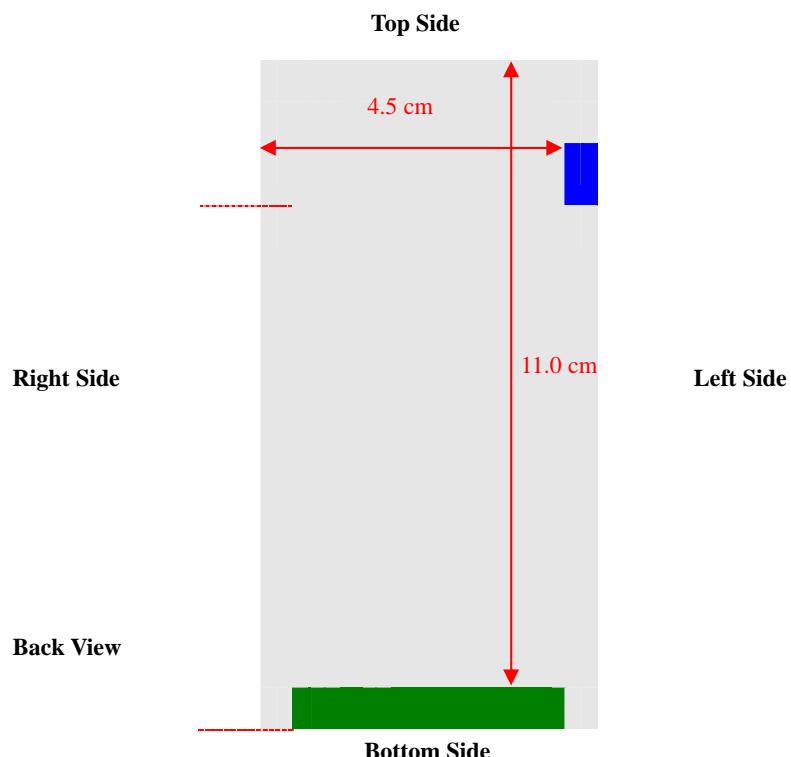


**Fig 7.4 Illustration for Body Worn Position**

## 7.5 EUT Antenna Position

Green Area: WWAN Antenna (GSM850/1900, WCDMA Band II/V)

Blue Area: RLAN Antenna (Bluetooth)



**Fig 7.5 Block Diagram for EUT Antenna Position**

## 7.6 EUT Testing Position

Head/Body-worn mode SAR assessments are required for this device. This EUT was tested in different positions for different SAR test modes, more information as below:

Head SAR tests				
Antennas	Right Cheek	Left Cheek	Right Tilted	Left Tilted
WWAN	Yes	Yes	Yes	Yes
RLAN	Yes	Yes	Yes	Yes

Body SAR tests, Test distance: 15mm			
Antennas	Front	Back	Body-wron with headset
WWAN	Yes	Yes	Yes
RLAN	Yes	Yes	Yes

**Remark:** Body-worn means display of device up.

**Remark:**

1. Referring to KDB 941225 D06, when the overall device length and width are  $\geq 9\text{cm} \times 5\text{cm}$ , the test separation is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
2. For WWAN antenna, SAR measurements at Top side are not required since the distance between WWAN transmitting antenna and surface or edge  $> 25\text{mm}$ .
3. For Bluetooth antenna, SAR measurements Bottom/Right sides are not required since the distance between Bluetooth transmitting antenna and surface or edge  $> 25\text{mm}$ .

***Please refer to Annex E for the EUT test setup photos.***

## 8. SAR Measurement Procedures

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### 8.1 Measurement Procedures

The measurement procedures are as follows:

- (a) Use base station simulator (if applicable) or engineering software to transmit RF power continuously (continuous Tx) in the highest power channel.
- (b) Keep EUT to radiate maximum output power or 100% factor (if applicable)
- (c) Measure output power through RF cable and power meter.
- (d) Place the EUT in the positions as Annex E demonstrates.
- (e) Set scan area, grid size and other setting on the SATIMO software.
- (f) Measure SAR results for the highest power channel on each testing position.
- (g) Find out the largest SAR result on these testing positions of each band
- (h) Measure SAR results for other channels in worst SAR testing position if the SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

### 8.2 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The SATIMO software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine. The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

### 8.3 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan measures 5x5x7 points with step size 8, 8 and 5 mm for 300 MHz to 3 GHz, and 8x8x8 points with step size 4, 4 and 2.5 mm for 3 GHz to 6 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

### 8.4 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing (step-size is 4, 4 and 2.5 mm). When all volume scan were completed, the software can combine and subsequently superpose these measurement data to calculating the multiband SAR.

### 8.5 SAR Averaged Methods

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 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 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 10g and 1 g requires a very fine resolution in the three dimensional scanned data array.

### 8.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In SATIMO measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drift more than 5%, the SAR will be retested.

## 9. SAR Test Result

### 9.1 Conducted RF Output Power

GSM - Burst Average Power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880	1909.8
GSM	31.55	31.01	31.56	28.26	28.50	28.90
GPRS (1 slot)	31.64	31.03	31.60	28.40	28.61	28.97
GPRS (2 slots)	31.07	30.87	31.27	27.95	27.98	28.04
GPRS (3 slots)	29.86	29.58	30.05	25.43	25.65	25.70
GPRS (4 slots)	28.96	28.52	28.90	24.55	24.68	24.82

GSM - Source-Based Time-Average Power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880	1909.8
GSM	22.55	22.01	22.56	19.26	19.50	19.90
GPRS (1 slot)	22.64	22.03	22.60	19.40	19.61	19.97
GPRS (2 slots)	25.07	24.87	25.27	21.95	21.98	22.04
GPRS (3 slots)	25.61	25.33	25.80	21.18	21.40	21.45
GPRS (4 slots)	25.96	25.52	25.90	21.55	21.68	21.82

Note: The source-based time-averaged power is linearly scaled the maximum burst averaged power based on time slots. The calculated method are shown as below:

Source based time-average power = Burst averaged power - Duty cycle factor in dB

Duty cycle factor = 9 dB for 1 Tx slot, 6 dB for 2 Tx slots, 4.25 dB for 3 Tx slots, 3 dB for 4 Tx slots

#### Remark:

1. For Head SAR testing, GSM should be evaluated, therefore the EUT was set in GSM for GSM850 and GSM1900 due to its highest source-based time-average power.
2. For Body SAR testing, GPRS should be evaluated, therefore the EUT was set in GPRS (4 Tx slots) for GSM850 and GPRS (2 Tx slots) for GSM1900 due to its highest source-based time-average power.
3. Per KDB 447498, the maximum output power channel is used for SAR testing and for further SAR test reduction.
4. The DUT do not support DTM function.

WCDMA - Average Power (dBm)						
Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4182	4233	9262	9400	9538
Frequency (MHz)	826.4	836.4	846.6	1852.4	1880	1907.6
AMR	25.57	25.74	25.25	24.14	24.66	24.59

Bluetooth - Maximum Average Power				
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)
GFSK	1Mbps	CH 00	2402	2.884
		CH 39	2441	4.218
		CH 78	2480	4.633
Pi/4 DQPSK	2Mbps	CH 00	2402	2.660
		CH 39	2441	3.833
		CH 78	2480	4.171
8DPSK	3Mbps	CH 00	2402	2.741
		CH 39	2441	3.976
		CH 78	2480	4.272

**Remark:**

Bluetooth maximum output power is 4.633dBm. Per KDB 648474 D01, the power is less than Pref. Its SAR value is considered zero in the 1-g SAR. Therefore, SAR for Bluetooth is not required.

## 9.2 Test Results for Standalone SAR Test

### Head SAR

GSM850 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
3	GSM	Right Cheek	251	848.8	31.56	32	1.11	1.229	1.360
4	GSM	Right Tilted	251	848.8	31.56	32	1.11	0.525	0.581
7	GSM	Left Cheek	251	848.8	31.56	32	1.11	1.283	1.420
8	GSM	Left Tilted	251	848.8	31.56	32	1.11	0.592	0.655
1	GSM	Right Cheek	128	824.2	31.55	32	1.11	1.059	1.175
2	GSM	Right Cheek	190	836.6	31.01	32	1.26	0.940	1.181
5	GSM	Left Cheek	128	824.2	31.55	32	1.11	0.950	1.054
6	GSM	Left Cheek	190	836.6	31.01	32	1.26	0.958	1.203

**Remark:** Per KDB 447498, if the highest output channel SAR for each exposure position  $\leq 0.8$  W/kg other channels SAR tests are not necessary.

GSM1900 – Head SAR Test									
Plot No.	Mode	Test Position Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
12	GSM	Right Cheek	810	1909.8	28.90	30	1.29	0.700	0.902
13	GSM	Right Tilted	810	1909.8	28.90	30	1.29	0.075	0.097
14	GSM	Left Cheek	810	1909.8	28.90	30	1.29	0.585	0.754
15	GSM	Left Tilted	810	1909.8	28.90	30	1.29	0.055	0.071

**Remark:** Per KDB 447498, if the highest output channel SAR for each exposure position  $\leq 0.8$  W/kg other channels SAR tests are not necessary.

WCDMA Band V – Head SAR Test									
Plot No.	Mode	Test Postion Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
23	UMTS Band V	Right Cheek	4182	836.4	25.74	26	1.06	0.001	0.002
24	UMTS Band V	Right Tilted	4182	836.4	25.74	26	1.06	0.001	0.002
25	UMTS Band V	Left Cheek	4182	836.4	25.74	26	1.06	0.001	0.002
26	UMTS Band V	Left Tilted	4182	836.4	25.74	26	1.06	0.001	0.002

**Remark:** Per KDB 447498, if the highest output channel SAR for each exposure position  $\leq 0.8$  W/kg other channels SAR tests are not necessary.

WCDMA Band II – Head SAR Test									
Plot No.	Mode	Test Postion Head	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
29	UMTS Band II	Right Cheek	9400	1880	24.66	26	1.36	0.003	0.005
30	UMTS Band II	Right Tilted	9400	1880	24.66	26	1.36	0.001	0.002
31	UMTS Band II	Left Cheek	9400	1880	24.66	26	1.36	0.002	0.003
32	UMTS Band II	Left Tilted	9400	1880	24.66	26	1.36	0.001	0.002

**Remark:** Per KDB 447498, if the highest output channel SAR for each exposure position  $\leq 0.8$  W/kg other channels SAR tests are not necessary.

**Body SAR**

GSM850 – Body SAR Test (Gap: 15mm)									
Plot No.	Mode	Test Postion Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
9	GSM	Body-worn	128	824.2	31.55	32	1.11	1.281	1.421
10	GSM	Body-worn	190	836.6	31.01	32	1.26	1.038	1.304
11	GSM	Body-worn	251	848.8	31.56	32	1.11	1.038	1.149
17	GPRS 4 slots	Front	128	824.2	28.96	29	1.01	1.378	1.391
18	GPRS 4 slots	Back	128	824.2	28.96	29	1.01	0.750	0.757
19	GPRS 4 slots	Front	190	836.6	28.52	29	1.12	1.317	1.471
20	GPRS 4 slots	Front	251	848.8	28.90	29	1.02	1.439	1.473

**Remark:** Per KDB 447498, if the highest output channel SAR for each exposure position  $\leq 0.8$  W/kg other channels SAR tests are not necessary.

GSM1900 – Body SAR Test (Gap: 15mm)									
Plot No.	Mode	Test Postion Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
16	GSM	Body-worn	810	1909.8	28.90	30	1.29	0.468	0.603
21	GPRS 2 slots	Front	810	1909.8	28.04	28.5	1.11	0.552	0.614
22	GPRS 2 slots	Back	810	1909.8	28.04	28.5	1.11	0.462	0.514

**Remark:** Per KDB 447498, if the highest output channel SAR for each exposure position  $\leq 0.8$  W/kg other channels SAR tests are not necessary.

WCDMA Band V – Body SAR Test (Gap: 15mm)									
Plot No.	Mode	Test Postion Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
27	UMTS Band V	Body-worn	4182	836.4	25.74	26	1.06	0.001	0.002
28	UMTS Band V	Back	4182	836.4	25.74	26	1.06	0.001	0.002

**Remark:** Per KDB 447498, if the highest output channel SAR for each exposure position  $\leq 0.8$  W/kg other channels SAR tests are not necessary.

WCDMA Band II – Body SAR Test (Gap: 15mm)									
Plot No.	Mode	Test Postion Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
33	UMTS Band II	Body-worn	9400	1880	24.66	26	1.36	0.001	0.002
34	UMTS Band II	Back	9400	1880	24.66	26	1.36	0.001	0.002

**Remark:** Per KDB 447498, if the highest output channel SAR for each exposure position  $\leq 0.8$  W/kg other channels SAR tests are not necessary.

### 9.3 Simultaneous Multi-band Transmission SAR Analysis

#### List of Mode for Simultaneous Multi-band Transmission

Configure Mode No.	WWAN Antenna	RLAN Antenna
1	GSM	Bluetooth
2	WCDMA	Bluetooth

#### Maximum SAR value and the sum of the 1-g SAR for WWAN & RLAN

WWAN Band	WWAN		WLAN		Max. SAR Sum (W/kg)	Scaled SAR Sum (W/kg)
	Max. SAR (W/kg)	Scaled SAR (W/kg)	Max. SAR (W/kg)	Scaled SAR (W/kg)		
Head SAR						
GSM850	1.283	1.420	0	0	1.283	1.420
GSM1900	0.700	0.902	0	0	0.700	0.902
UMTS Band V	0.001	0.002	0	0	0.001	0.001
UMTS Band II	0.003	0.005	0	0	0.003	0.005
Body SAR						
GSM850	1.378	1.391	0	0	1.378	1.391
GSM1900	0.552	0.614	0	0	0.552	0.614
UMTS Band V	0.001	0.002	0	0	0.001	0.002
UMTS Band II	0.001	0.002	0	0	0.001	0.002

**Conclusion:** Per KDB 648474 D01, the simultaneous transmission SAR for WWAN and RLAN was not required, because the SAR scaled summation (Head: 1.420 W/kg; Body: 1.391 W/kg) is less than 1.6 W/kg.

#### Remark:

1. GSM and WCDMA share the same antenna, and cannot transmit simultaneously.
2. Bluetooth output power is 4.633dBm. Per KDB 648474 D01, the power is less than Pref. and the distance to WWAN antenna exceed to 5cm. Its SAR value is considered zero in the 1-g SAR. Therefore, standalone SAR and simultaneous SAR for Bluetooth is not required.
3. The maximum SAR summation is calculated based on the same configuration and test position.
4. When stand-alone 1-g SAR is not required for a transmitter or antenna, its SAR is considered zero in the 1-g SAR summing process to determine simultaneous transmission SAR evaluation requirements.
5. If 1g-SAR scalar summation < 1.6W/kg, simultaneous SAR measurement is not necessary.

## 10. Measurement Uncertainty

### 10.1 Uncertainty for EUT 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
<b>Measurement System</b>									
Probe calibration	E.2.1	7.0	N	1	1	1	7.00	7.00	$\infty$
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	$(1_{-Cp})^{1/2}$	$(1_{-Cp})^{1/2}$	1.02	1.02	$\infty$
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	$(Cp)^{1/2}$	$(Cp)^{1/2}$	1.63	1.63	$\infty$
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	$\infty$
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	$\infty$
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	$\infty$
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	$\infty$
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	$\infty$
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	$\infty$
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	$\infty$
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	$\infty$
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	$\infty$
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	$\infty$
<b>Test Sample Related</b>									
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	
Output power Variation - SAR drift measurement	6.6.2	12.02	R	$\sqrt{3}$	1	1	6.94	6.94	$\infty$
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	$\infty$
Liquid conductivity - deviation from target value	E.3.2	5.00	R	$\sqrt{3}$	0.64	0.43	1.85	1.24	
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.20	2.15	
Liquid permittivity - deviation from target value	E.3.2	0.37	R	$\sqrt{3}$	0.6	0.49	0.13	0.10	
Liquid permittivity -	E.3.3	10.00	N	1	0.6	0.49	6.00	4.90	M

measurement uncertainty									
Combined Standard Uncertainty			RSS				12.98	12.53	
Expanded Uncertainty (95% Confidence interval)			K=2				25.32	24.43	

## 10.2 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
<b>Measurement System</b>									
Probe calibration	E.2.1	7.0	N	1	1	1	7.00	7.00	$\infty$
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	$(1_{-Cp})^{1/2}$	$(1_{-Cp})^{1/2}$	1.02	1.02	$\infty$
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	$(Cp)^{1/2}$	$(Cp)^{1/2}$	1.63	1.63	$\infty$
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	$\infty$
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	$\infty$
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	$\infty$
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	$\infty$
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	$\infty$
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	$\infty$
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	$\infty$
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	$\infty$
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	$\infty$
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	$\infty$
<b>Dipole</b>									
Dipole axis to liquid Distance	8,E.4.2	1.00	N	$\sqrt{3}$	1	1	0.58	0.58	N-1
Input power and SAR drift measurement	8,6.6.2	12.02	R	$\sqrt{3}$	1	1	6.94	6.94	$\infty$
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	$\infty$
Liquid conductivity - deviation from target value	E.3.2	5.00	R	$\sqrt{3}$	0.64	0.43	1.85	1.24	

Liquid conductivity measurement uncertainty	-	E.3.3	5.00	N	1	0.64	0.43	3.20	2.15	
Liquid permittivity - deviation from target value	E.3.2	0.37	R	$\sqrt{3}$	0.6	0.49	0.13	0.10		
Liquid permittivity measurement uncertainty	-	E.3.3	10.00	N	1	0.6	0.49	6.00	4.90	M
Combined Standard Uncertainty			RSS					12.00	11.50	
Expanded Uncertainty (95% Confidence interval)			K=2					23.39	22.43	

## Annex A. Plots of System Performance Check

# MEASUREMENT 1

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 29/5/2013

Measurement duration: 7 minutes 21 seconds

### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Validation plane
Device Position	Dipole
Band	CW835
Channels	Middle
Signal	CW (Crest factor: 1.0)

### B. SAR Measurement Results

#### Middle Band SAR (Channel 49)

Frequency (MHz)	835.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.970000
Variation (%)	1.810000

#### Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	2.02
SAR 1g (W/Kg)	2.42

#### Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	2.5337	2.2516	2.1418	2.0906	1.9576	1.5362

## MEASUREMENT 2

### For Head Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 21 seconds

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW1900
<b>Channels</b>	Middle
<b>Signal</b>	CW (Crest factor: 1.0)

### B. SAR Measurement Results

#### Middle Band SAR

<b>Frequency (MHz)</b>	1900
<b>Relative permittivity (real part)</b>	40.76000
<b>Relative permittivity (imaginary part)</b>	14.37000
<b>Conductivity (S/m)</b>	1.467000
<b>Variation (%)</b>	-0.523000

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

<b>SAR 10g (W/Kg)</b>	8.11
<b>SAR 1g (W/Kg)</b>	9.97

#### Z Axis Scan

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>	<b>24.00</b>	<b>29.00</b>
<b>SAR (W/Kg)</b>	<b>0.0000</b>	<b>10.2935</b>	<b>9.2454</b>	<b>8.2804</b>	<b>8.1530</b>	<b>7.9201</b>	<b>7.3892</b>

## MEASUREMENT 3

### For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 21 seconds

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW835
<b>Channels</b>	Middle
<b>Signal</b>	CW (Crest factor: 1.0)

### B. SAR Measurement Results

#### Middle Band SAR

<b>Frequency (MHz)</b>	835
<b>Relative permittivity (real part)</b>	55.102100
<b>Relative permittivity (imaginary part)</b>	14.347500
<b>Conductivity (S/m)</b>	1.04000
<b>Variation (%)</b>	0.80000

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

<b>SAR 10g (W/Kg)</b>	1.83
<b>SAR 1g (W/Kg)</b>	2.51

#### Z Axis Scan

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>	<b>24.00</b>	<b>29.00</b>
<b>SAR (W/Kg)</b>	<b>0.0000</b>	<b>2.6537</b>	<b>2.1445</b>	<b>1.8988</b>	<b>1.5256</b>	<b>1.0586</b>	<b>0.9457</b>

## MEASUREMENT 4

### For Body Liquid

Type: Validation measurement (Fast, 75.00 %)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 21 seconds

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW1900
<b>Channels</b>	Middle
<b>Signal</b>	CW (Crest factor: 1.0)

### B. SAR Measurement Results

#### Middle Band SAR

<b>Frequency (MHz)</b>	1900
<b>Relative permittivity (real part)</b>	51.90200
<b>Relative permittivity (imaginary part)</b>	14.35200
<b>Conductivity (S/m)</b>	1.580200
<b>Variation (%)</b>	0.752100

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

<b>SAR 10g (W/Kg)</b>	8.26
<b>SAR 1g (W/Kg)</b>	9.93

#### Z Axis Scan

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>	<b>24.00</b>	<b>29.00</b>
<b>SAR (W/Kg)</b>	<b>0.0000</b>	<b>10.2026</b>	<b>9.4540</b>	<b>9.1458</b>	<b>8.3720</b>	<b>8.1300</b>	<b>7.8750</b>

## Annex B. Plots of SAR Measurement

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<u>TYPE</u>	<u>BAND</u>	<u>PARAMETERS</u>
Phone	<b>GSM850</b>	<u>Measurement 1:</u> Right Head with Cheek device position on Low Channel in GSM mode
Phone	<b>GSM850</b>	<u>Measurement 2:</u> Right Head with Cheek device position on Middle Channel in GSM mode
Phone	<b>GSM850</b>	<u>Measurement 3:</u> Right Head with Cheek device position on High Channel in GSM mode
Phone	<b>GSM850</b>	<u>Measurement 4:</u> Right Head with Tilt device position on Middle Channel in GSM mode
Phone	<b>GSM850</b>	<u>Measurement 5:</u> Left Head with Cheek device position on Low Channel in GSM mode
Phone	<b>GSM850</b>	<u>Measurement 6:</u> Left Head with Cheek device position on Middle Channel in GSM mode
Phone	<b>GSM850</b>	<u>Measurement 7:</u> Left Head with Cheek device position on High Channel in GSM mode
Phone	<b>GSM850</b>	<u>Measurement 8:</u> Left Head with Tilt device position on Middle Channel in GSM mode
Phone	<b>GSM850</b>	<u>Measurement 9:</u> Flat Plane with Body-worn device position on Low Channel in GSM mode
Phone	<b>GSM850</b>	<u>Measurement 10:</u> Flat Plane with Body-worn device position on Middle Channel in GSM mode
Phone	<b>GSM850</b>	<u>Measurement 11:</u> Flat Plane with Body-worn device position on High Channel in GSM mode
Phone	<b>GSM1900</b>	<u>Measurement 12:</u> Right Head with Cheek device position on High Channel in GSM mode
Phone	<b>GSM1900</b>	<u>Measurement 13:</u> Right Head with Tilt device position on High Channel in GSM mode
Phone	<b>GSM1900</b>	<u>Measurement 14:</u> Left Head with Cheek device position on High Channel in GSM mode
Phone	<b>GSM1900</b>	<u>Measurement 15:</u> Left Head with Tilt device position on High Channel in GSM mode
Phone	<b>GSM1900</b>	<u>Measurement 16:</u> Flat Plane with Body-worn device position on High Channel in GSM mode
Phone	<b>GSM850</b>	<u>Measurement 17:</u> Flat Plane with Front Body device position on Low Channel (band GPRS850_4Tx)
Phone	<b>GSM850</b>	<u>Measurement 18:</u> Flat Plane with Back Body device position on Low Channel (band GPRS850_4Tx)
Phone	<b>GSM850</b>	<u>Measurement 19:</u> Flat Plane with Front Body device position on Middle Channel (band GPRS850_4Tx)

<b>Phone</b>	<b>GSM850</b>	<u>Measurement 20:</u> Flat Plane with Front Body device position on High Channel (band GPRS850_4Tx)
<b>Phone</b>	<b>GSM1900</b>	<u>Measurement 21:</u> Flat Plane with Front Body device position on High Channel (band GPRS1900_2Tx)
<b>Phone</b>	<b>GSM1900</b>	<u>Measurement 22:</u> Flat Plane with Back Body device position on High Channel (band GPRS1900_2Tx)
<b>Phone</b>	<b>W Band V</b>	<u>Measurement 23:</u> Right Head with Cheek device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>W Band V</b>	<u>Measurement 24:</u> Right Head with Tilt device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>W Band V</b>	<u>Measurement 25:</u> Left Head with Cheek device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>W Band V</b>	<u>Measurement 26:</u> Left Head with Tilt device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>W Band V</b>	<u>Measurement 27:</u> Flat Plane with Body-worn device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>W Band V</b>	<u>Measurement 28:</u> Flat Plane with Back Body device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>W Band II</b>	<u>Measurement 29:</u> Right Head with Cheek device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>W Band II</b>	<u>Measurement 30:</u> Right Head with Tilt device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>W Band II</b>	<u>Measurement 31:</u> Left Head with Cheek device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>W Band II</b>	<u>Measurement 32:</u> Left Head with Tilt device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>W Band II</b>	<u>Measurement 33:</u> Flat Plane with Body-worn device position on Middle Channel in WCDMA mode
<b>Phone</b>	<b>W Band II</b>	<u>Measurement 34:</u> Flat Plane with Back Body device position on Middle Channel in WCDMA mode

# MEASUREMENT 1

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 3 seconds

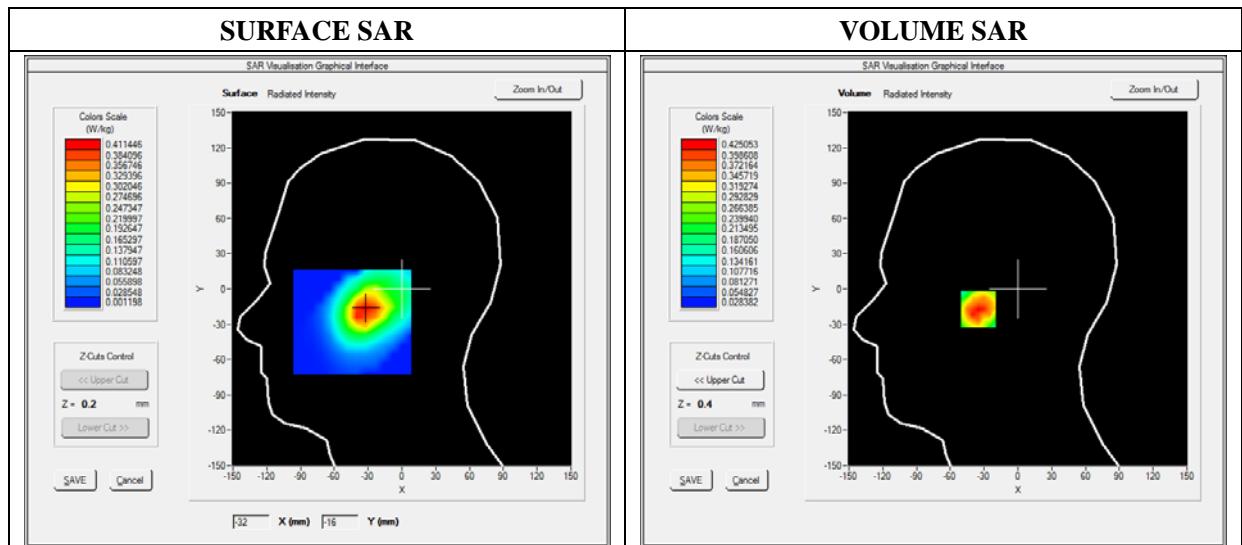
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Cheek
<b>Band</b>	GSM850
<b>Channels</b>	Low
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

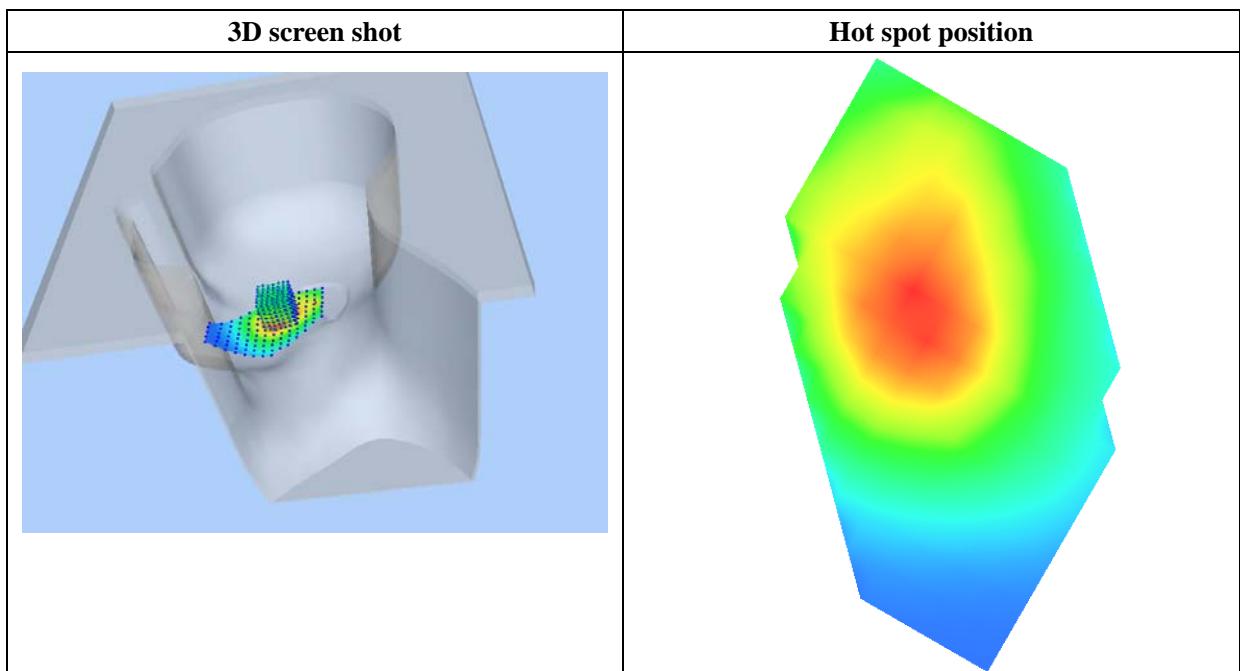
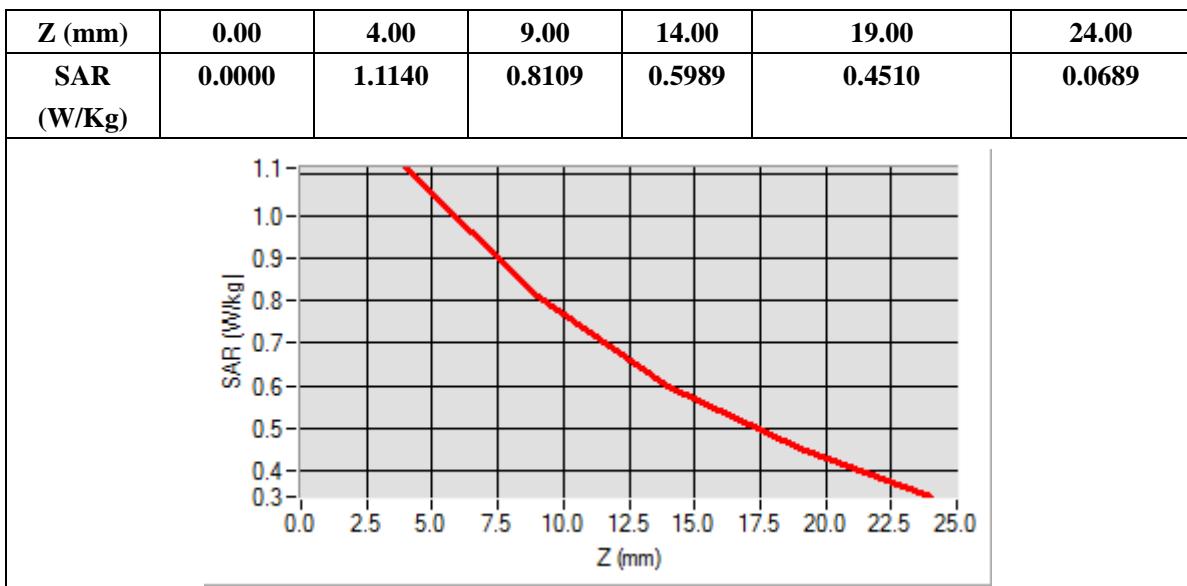
<b>Frequency (MHz)</b>	824.200012
<b>Relative permittivity (real part)</b>	39.769001
<b>Relative permittivity (imaginary part)</b>	17.778120
<b>Conductivity (S/m)</b>	0.814040
<b>Variation (%)</b>	3.810000



Maximum location: X=-48.00, Y=-38.00

SAR 10g (W/Kg)	0.734119
SAR 1g (W/Kg)	1.059065

**Z Axis Scan**



## MEASUREMENT 2

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 3 seconds

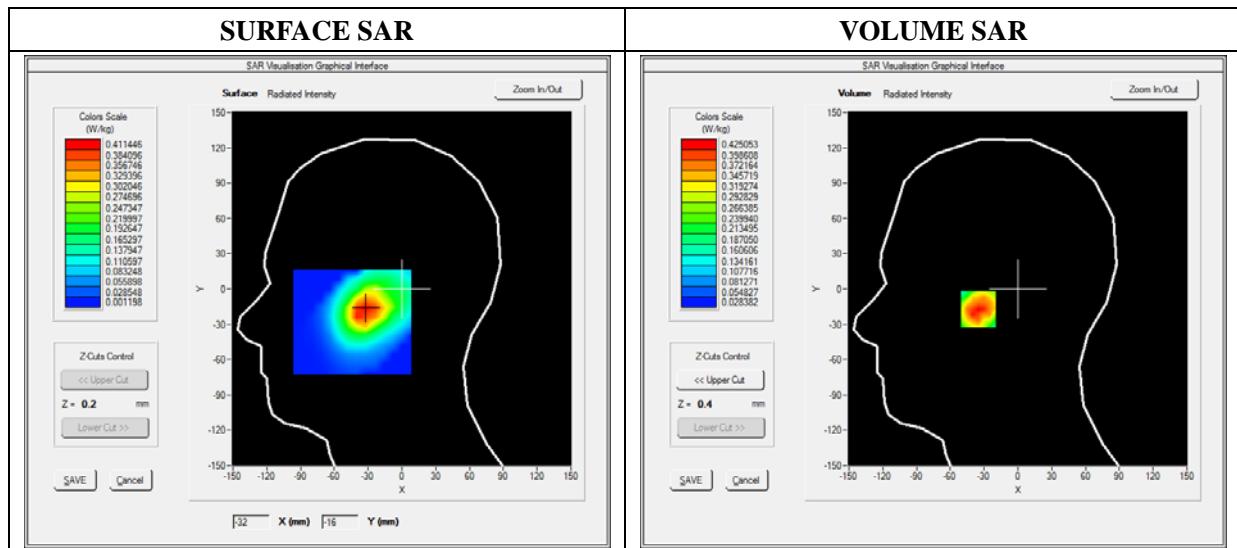
### A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Cheek
<b>Band</b>	GSM850
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

### B. SAR Measurement Results

#### Lower Band SAR (Channel 975)

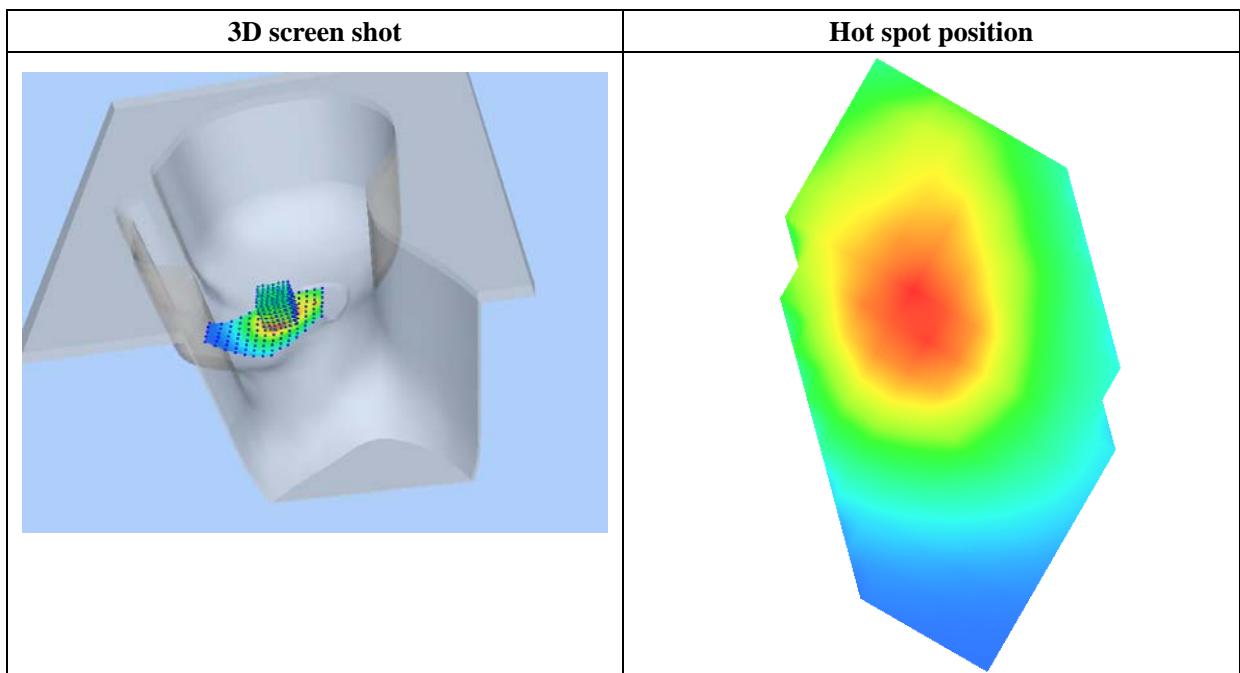
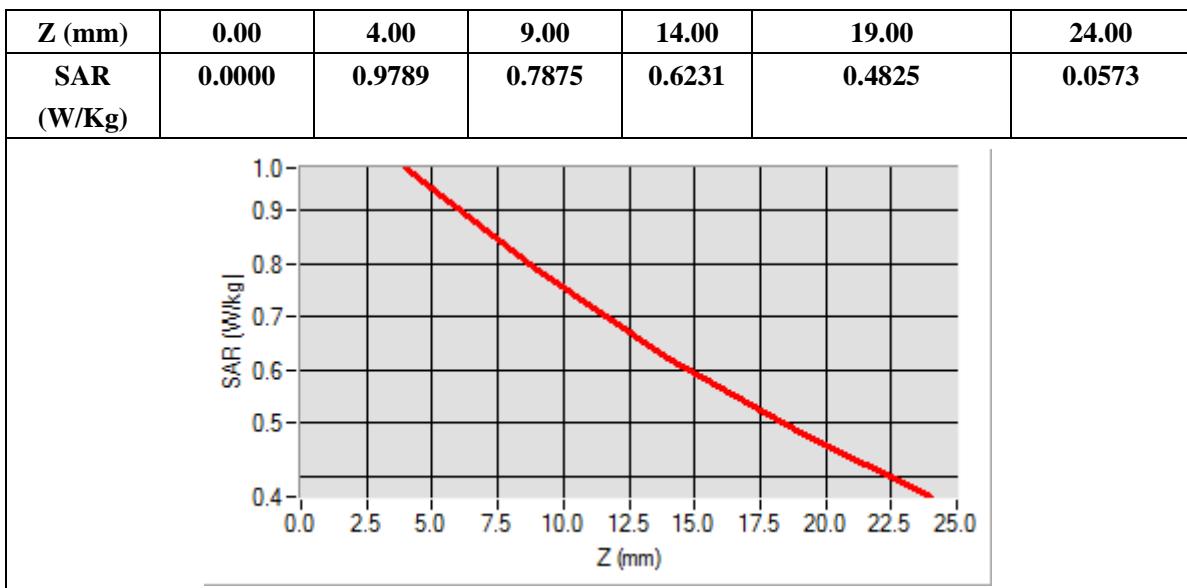
<b>Frequency (MHz)</b>	836.599976
<b>Relative permittivity (real part)</b>	39.520321
<b>Relative permittivity (imaginary part)</b>	18.432920
<b>Conductivity (S/m)</b>	0.856721
<b>Variation (%)</b>	-3.600000



**Maximum location: X=-48.00, Y=-31.00**

<b>SAR 10g (W/Kg)</b>	0.700773
<b>SAR 1g (W/Kg)</b>	0.939623

**Z Axis Scan**



# MEASUREMENT 3

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 11 minutes 48 seconds

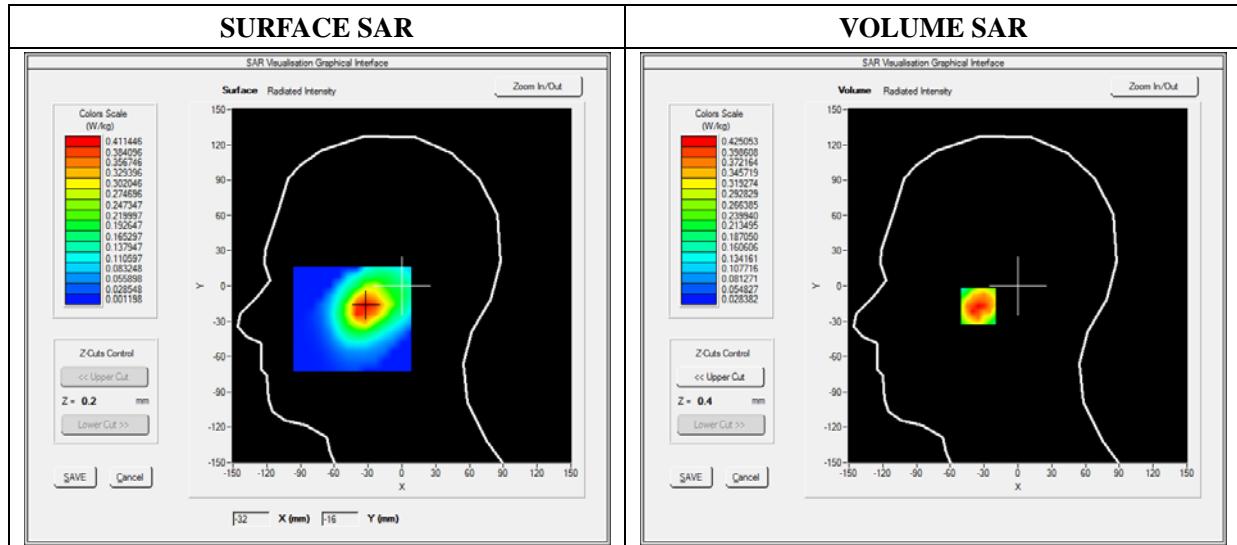
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Cheek
<b>Band</b>	GSM850
<b>Channels</b>	High
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

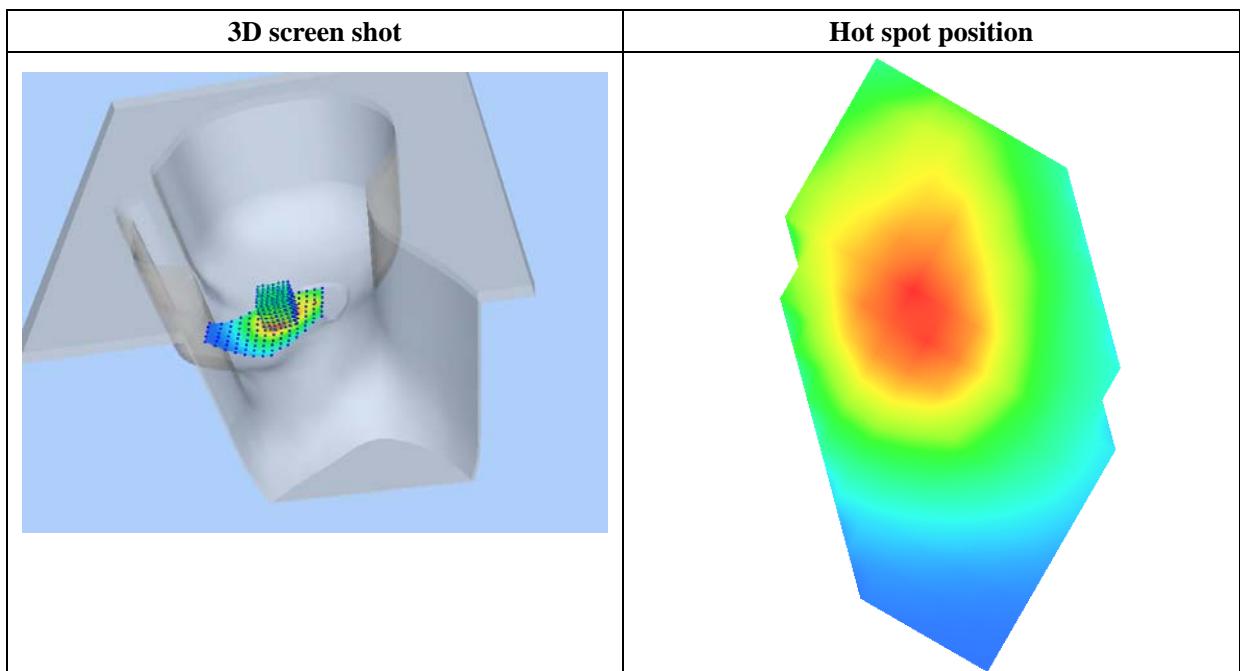
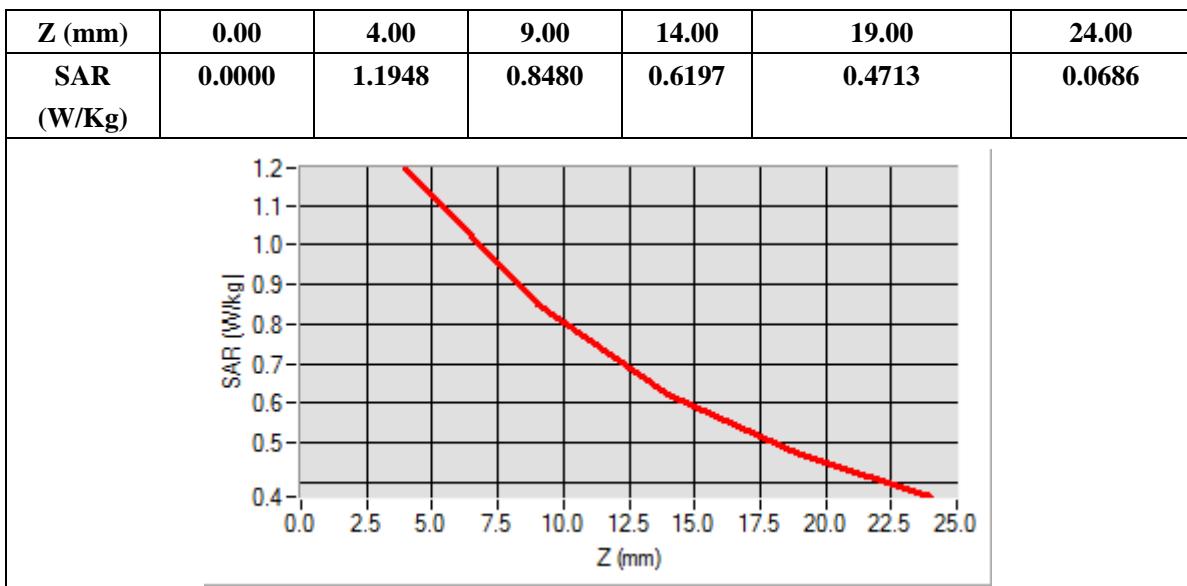
<b>Frequency (MHz)</b>	848.799988
<b>Relative permittivity (real part)</b>	39.566879
<b>Relative permittivity (imaginary part)</b>	18.602560
<b>Conductivity (S/m)</b>	0.877214
<b>Variation (%)</b>	1.110000



**Maximum location: X=-48.00, Y=-32.00**

<b>SAR 10g (W/Kg)</b>	0.825280
<b>SAR 1g (W/Kg)</b>	1.229052

**Z Axis Scan**



# MEASUREMENT 4

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 12 seconds

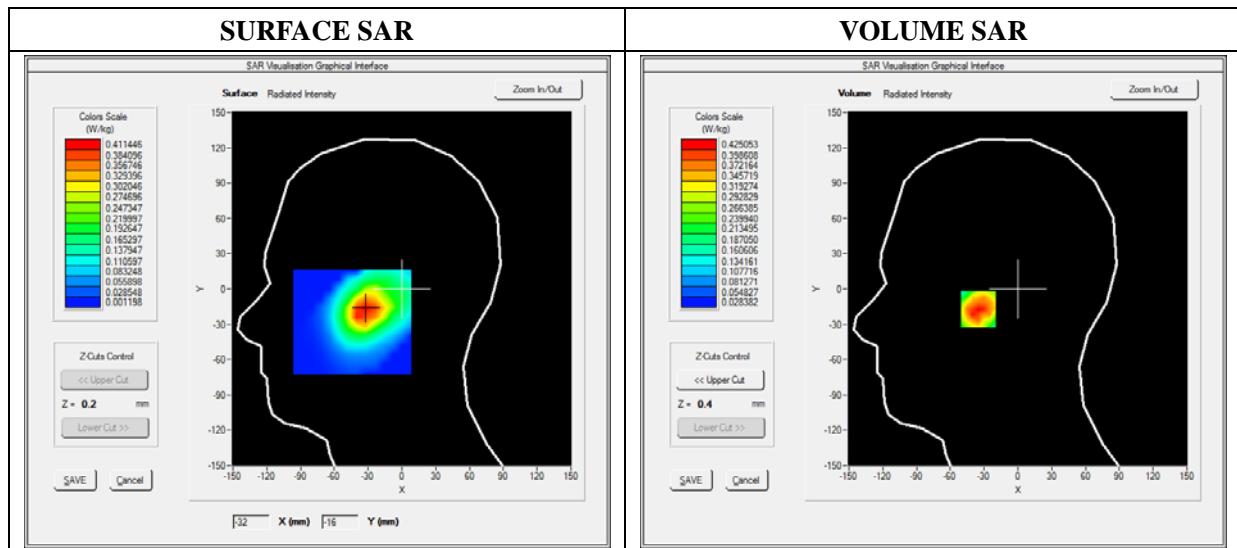
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Tilt
<b>Band</b>	GSM850
<b>Channels</b>	High
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

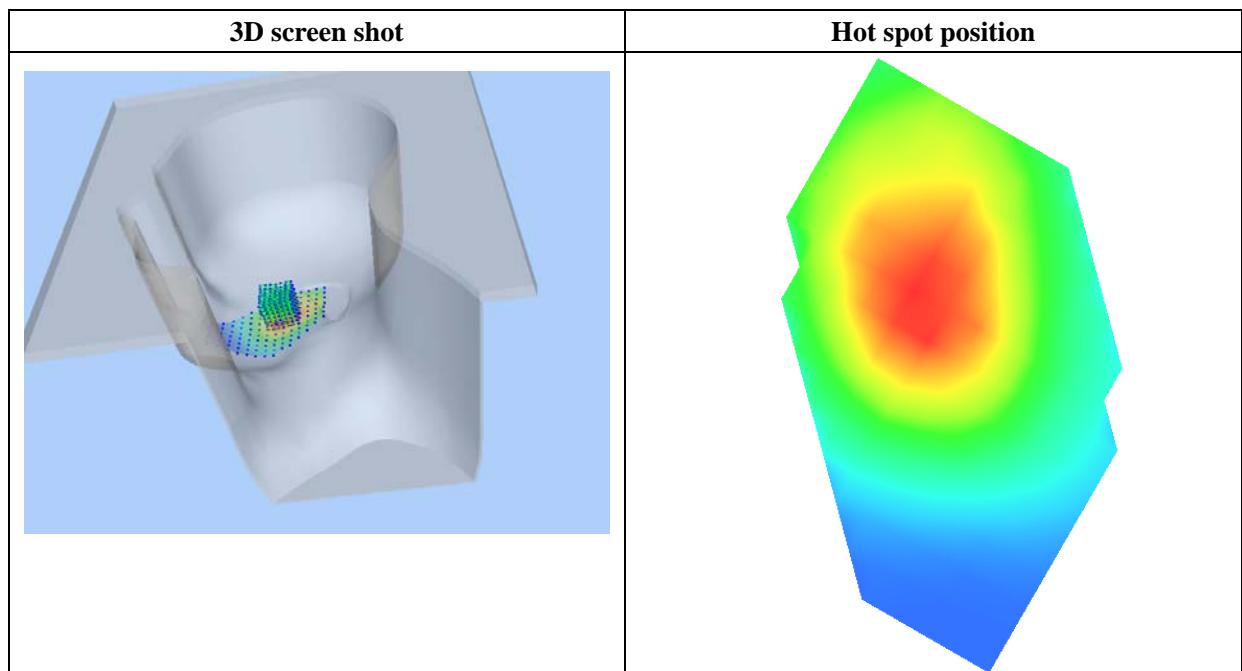
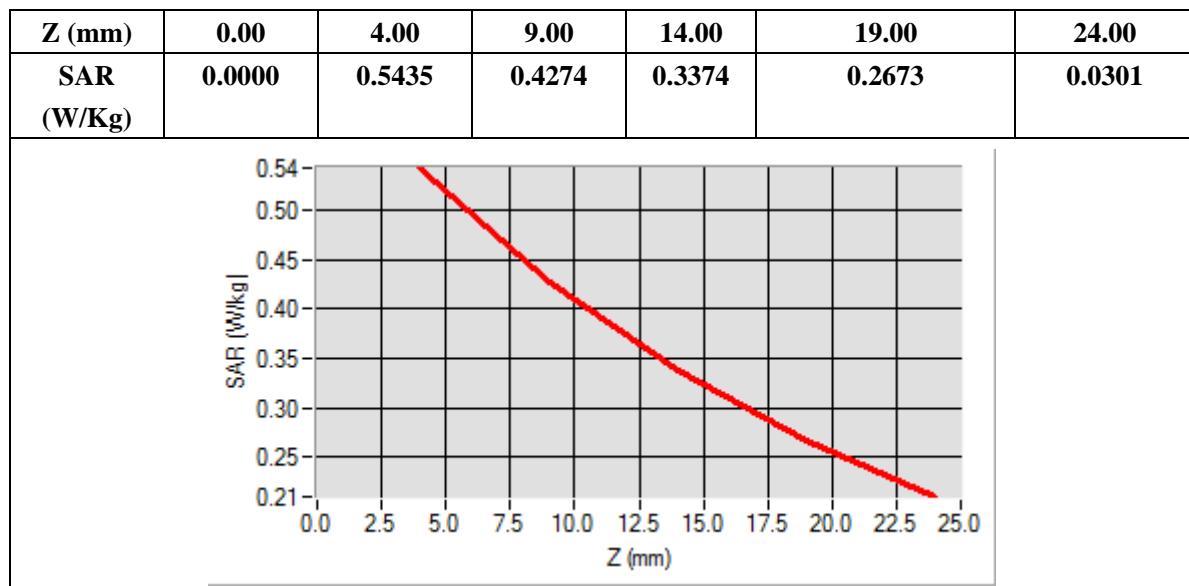
<b>Frequency (MHz)</b>	848.799988
<b>Relative permittivity (real part)</b>	39.566879
<b>Relative permittivity (imaginary part)</b>	18.602560
<b>Conductivity (S/m)</b>	0.877214
<b>Variation (%)</b>	1.870000



**Maximum location: X=-47.00, Y=-38.00**

<b>SAR 10g (W/Kg)</b>	0.390422
<b>SAR 1g (W/Kg)</b>	0.525486

**Z Axis Scan**



# MEASUREMENT 5

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 11 minutes 59 seconds

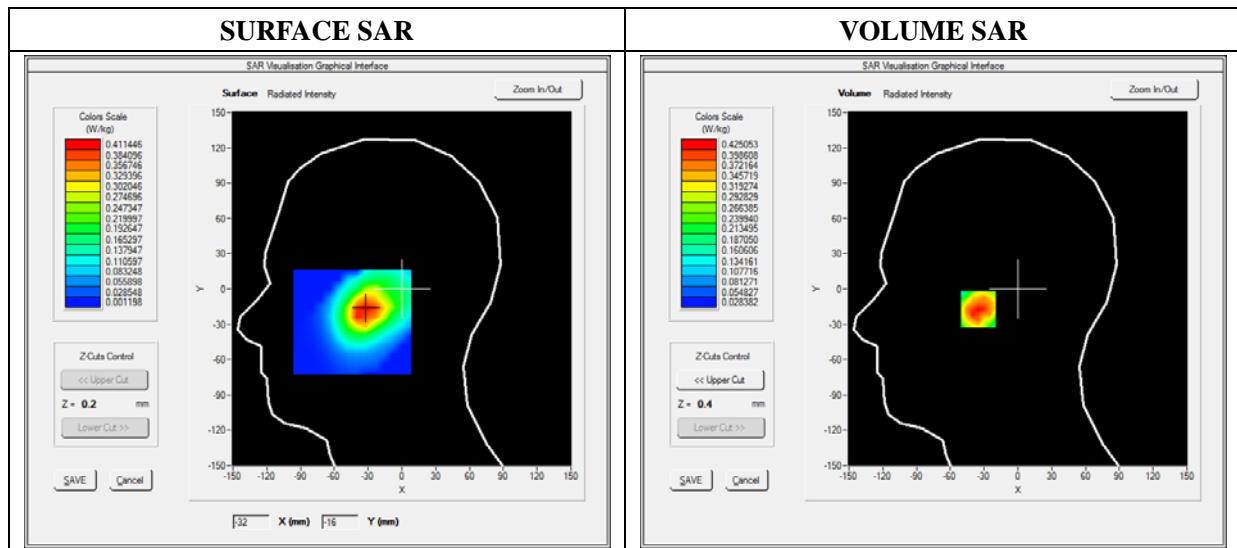
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	GSM850
<b>Channels</b>	Low
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

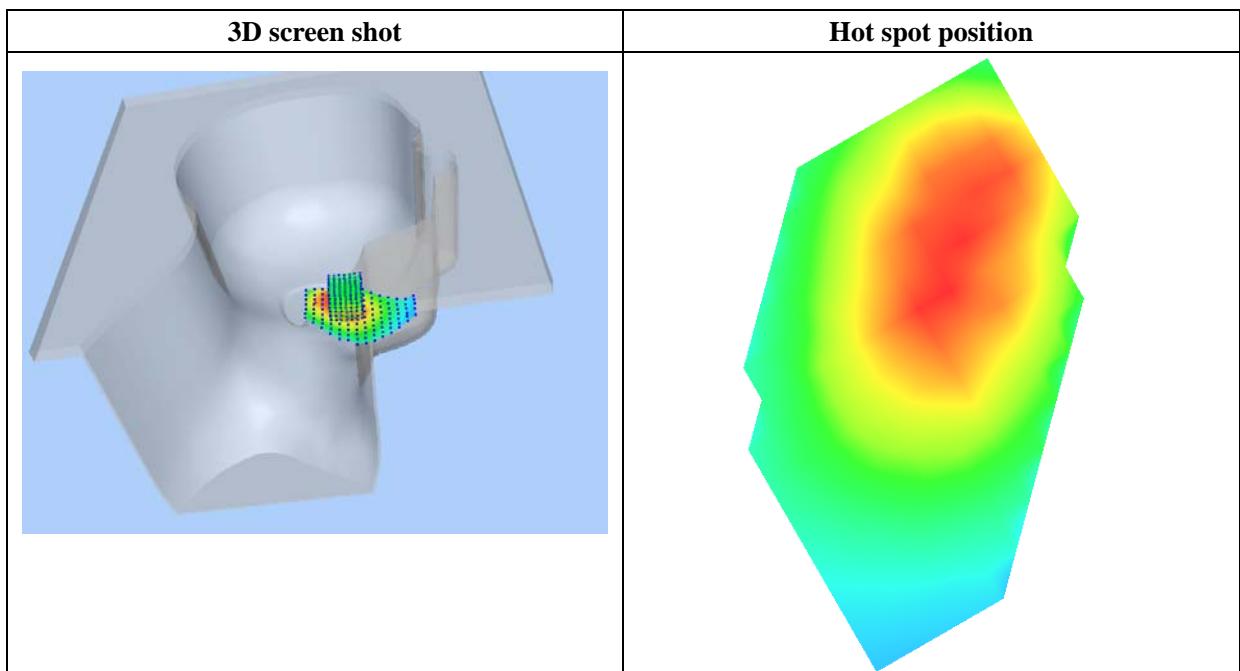
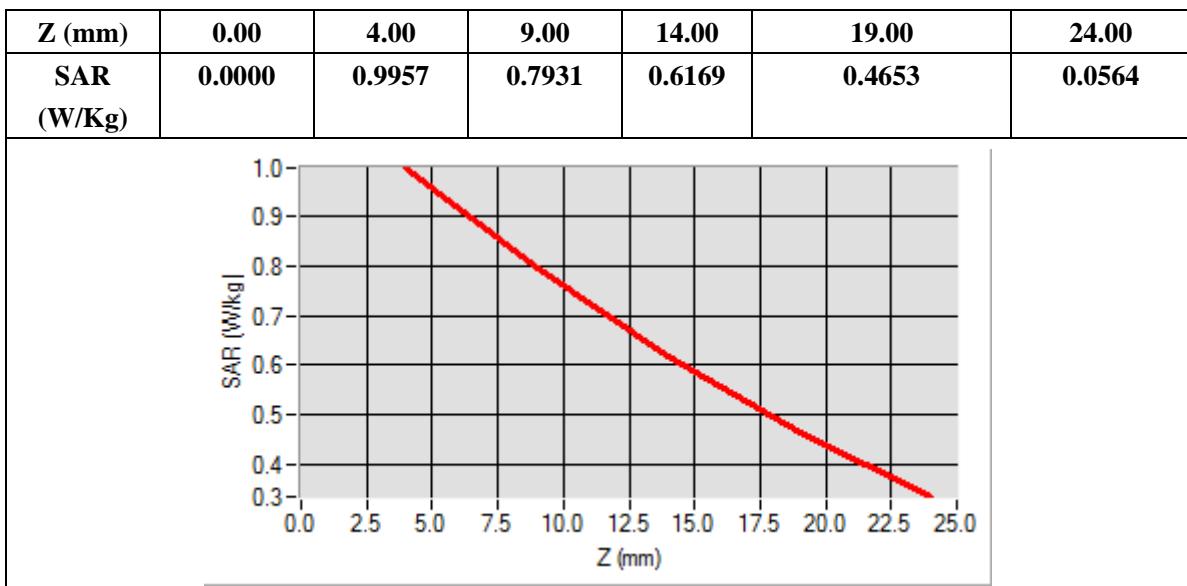
<b>Frequency (MHz)</b>	824.200012
<b>Relative permittivity (real part)</b>	39.769001
<b>Relative permittivity (imaginary part)</b>	17.778120
<b>Conductivity (S/m)</b>	0.814040
<b>Variation (%)</b>	-4.680000



**Maximum location: X=-47.00, Y=-36.00**

<b>SAR 10g (W/Kg)</b>	0.689798
<b>SAR 1g (W/Kg)</b>	0.950162

**Z Axis Scan**



# MEASUREMENT 6

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 3 seconds

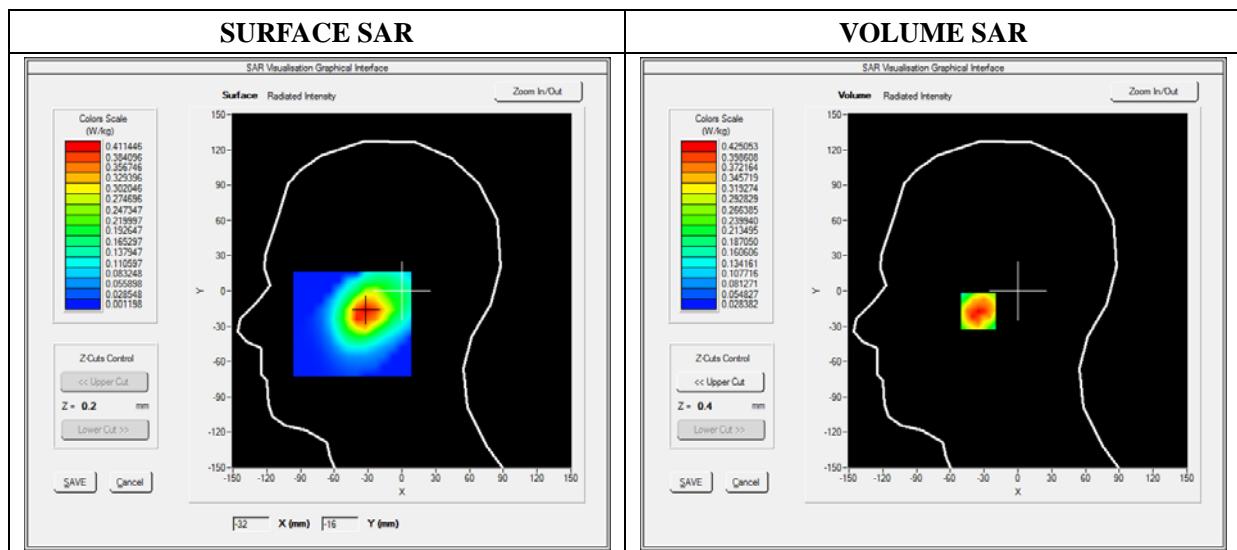
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	GSM850
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

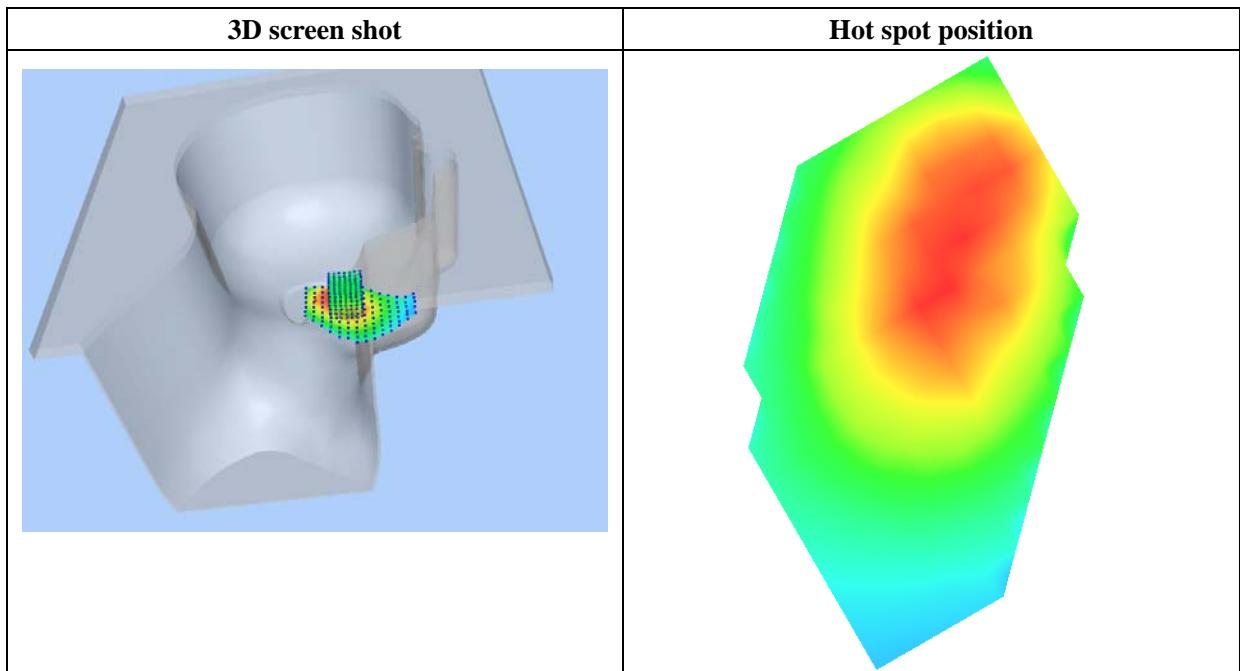
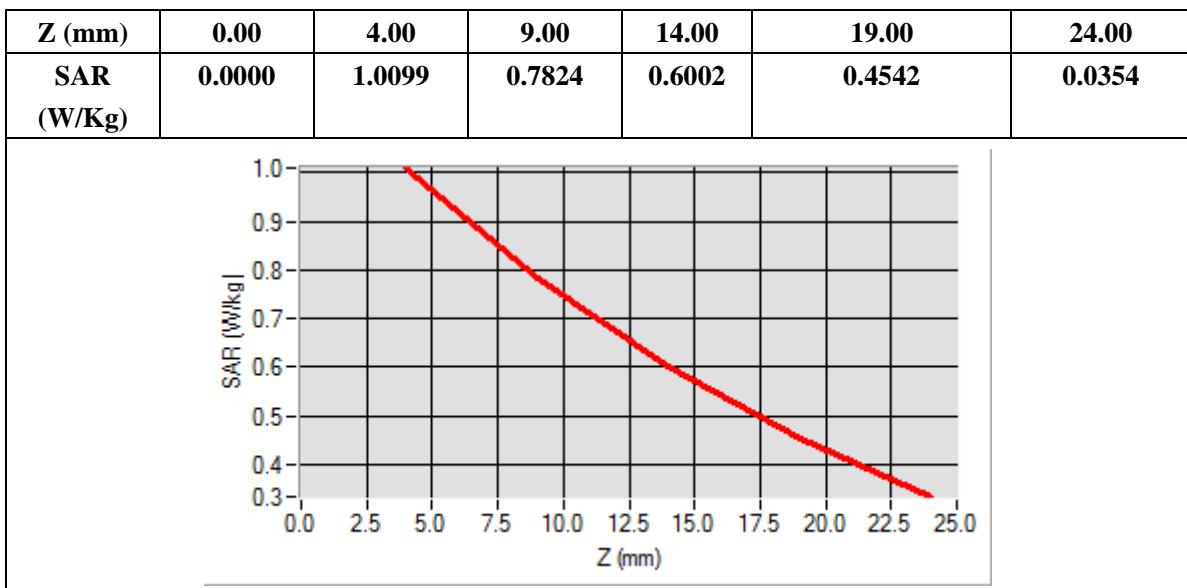
<b>Frequency (MHz)</b>	836.599976
<b>Relative permittivity (real part)</b>	39.520321
<b>Relative permittivity (imaginary part)</b>	18.432920
<b>Conductivity (S/m)</b>	0.856721
<b>Variation (%)</b>	-3.200000



**Maximum location: X=-48.00, Y=-39.00**

<b>SAR 10g (W/Kg)</b>	0.684184
<b>SAR 1g (W/Kg)</b>	0.958409

**Z Axis Scan**



# MEASUREMENT 7

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 8 seconds

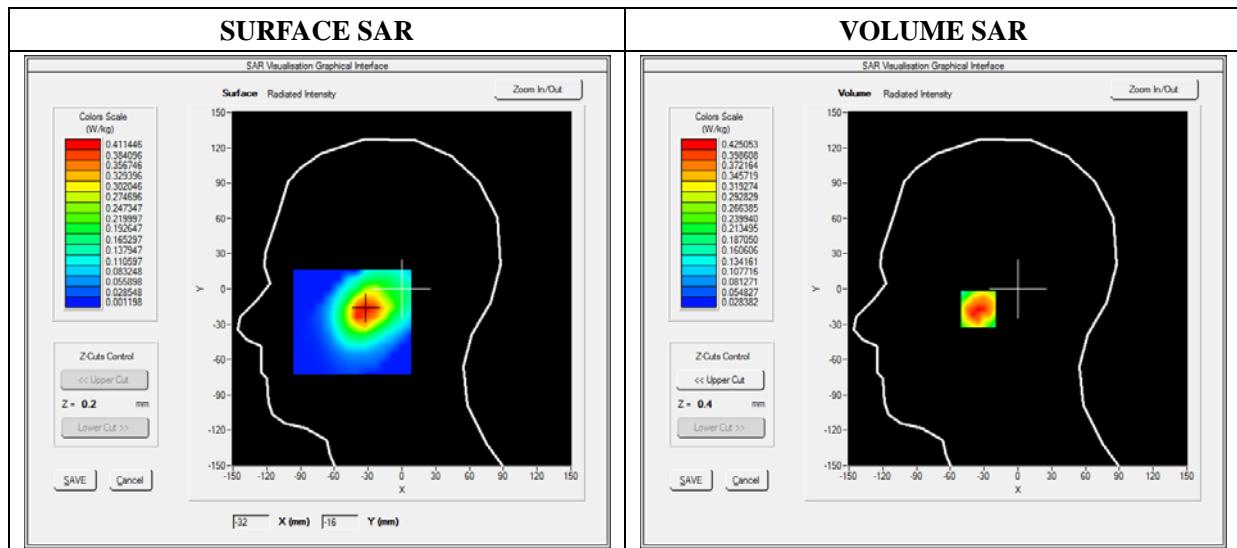
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	GSM850
<b>Channels</b>	High
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

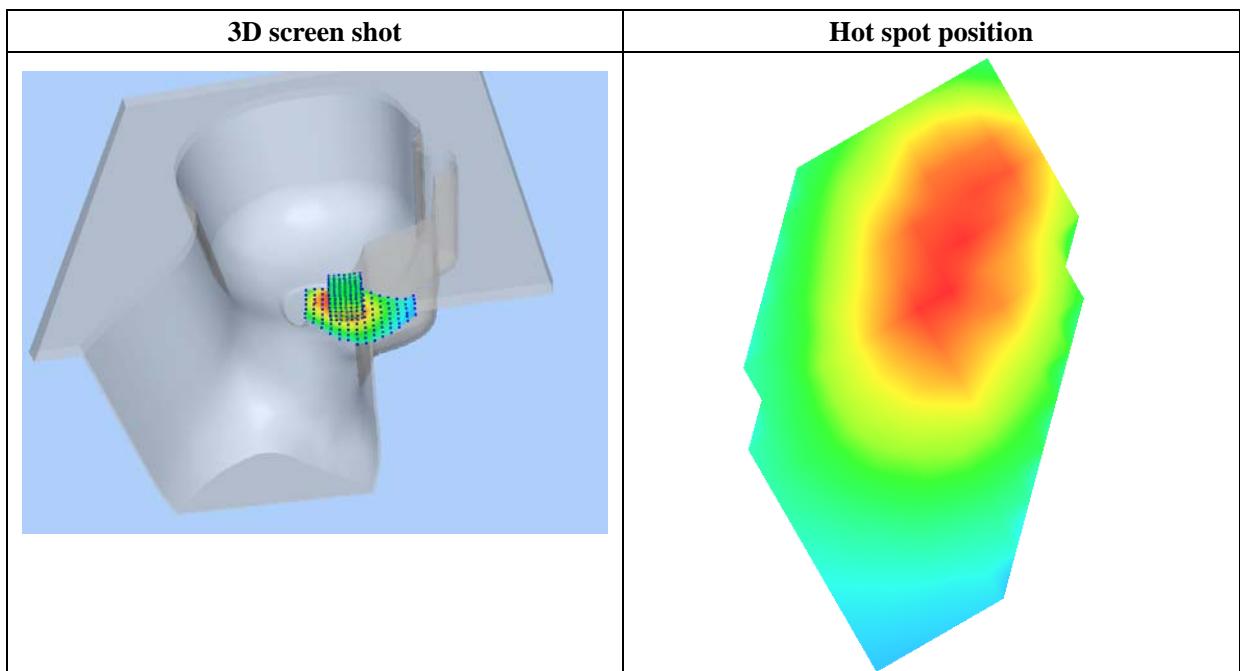
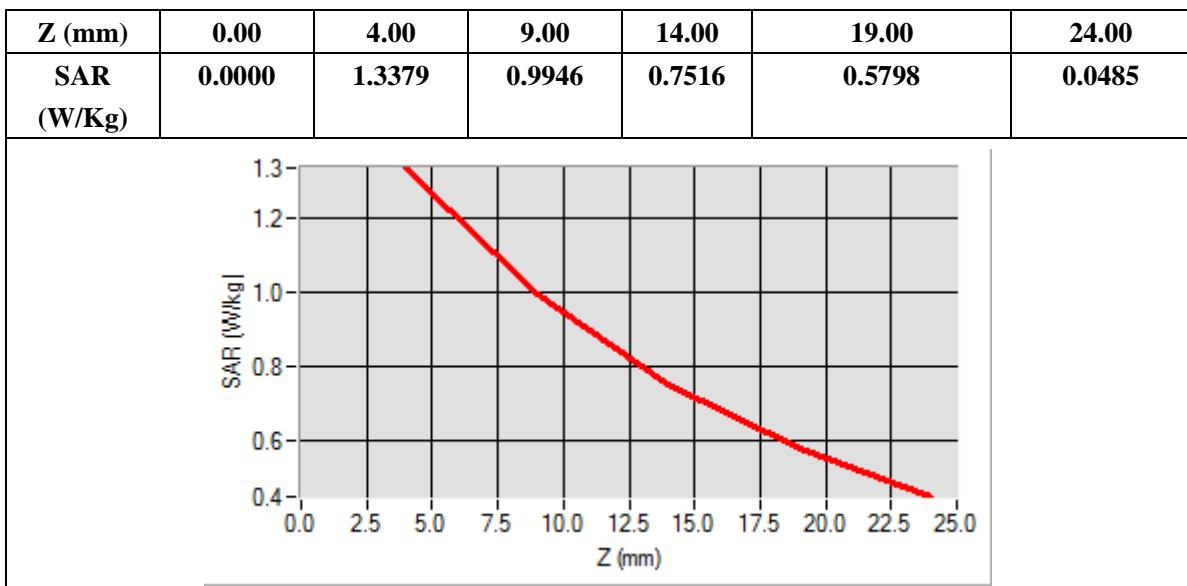
<b>Frequency (MHz)</b>	848.799988
<b>Relative permittivity (real part)</b>	39.566879
<b>Relative permittivity (imaginary part)</b>	18.602560
<b>Conductivity (S/m)</b>	0.877214
<b>Variation (%)</b>	29.650000



**Maximum location: X=-49.00, Y=-36.00**

<b>SAR 10g (W/Kg)</b>	0.905665
<b>SAR 1g (W/Kg)</b>	1.282970

**Z Axis Scan**



# MEASUREMENT 8

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 10 seconds

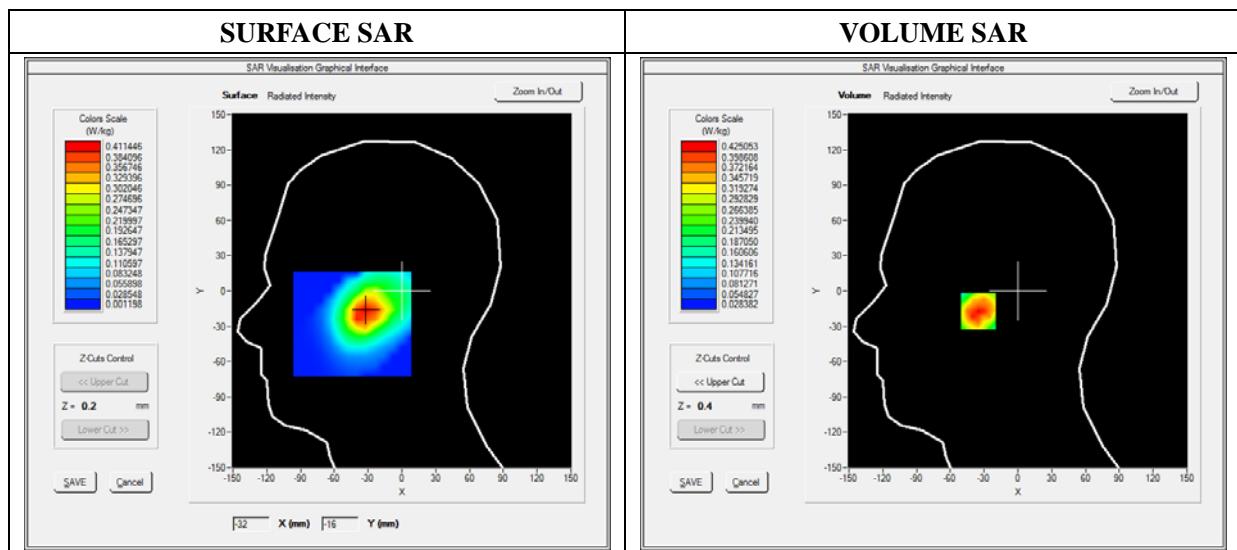
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Tilt
<b>Band</b>	GSM850
<b>Channels</b>	High
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

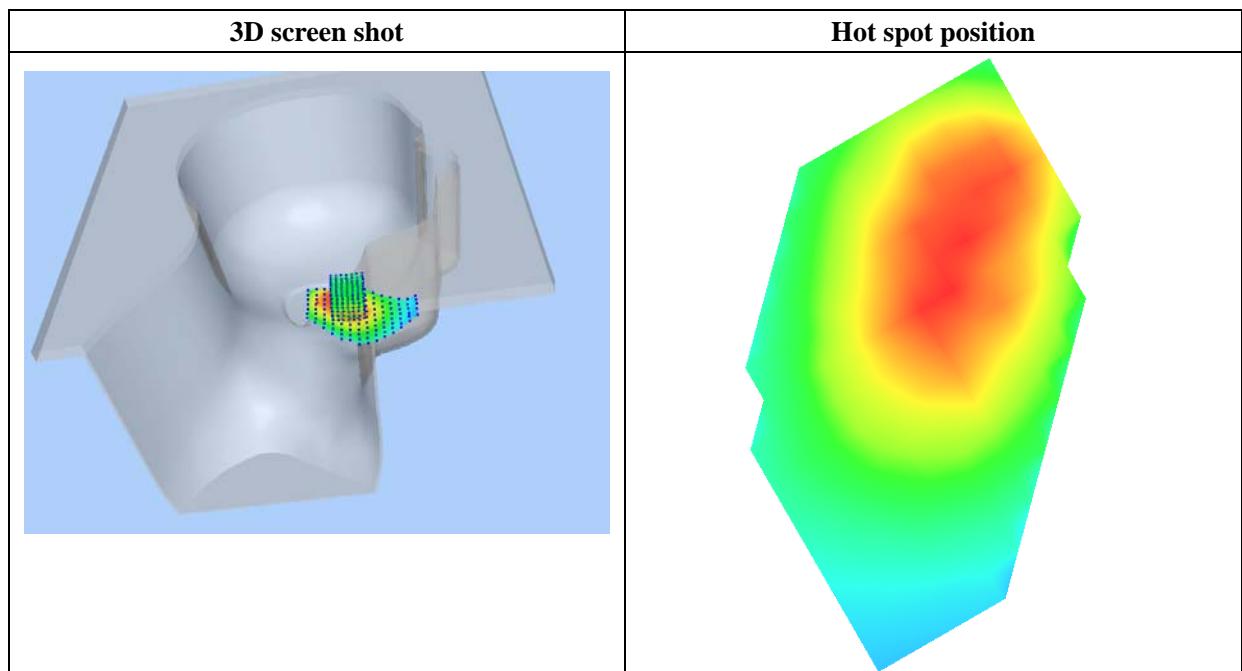
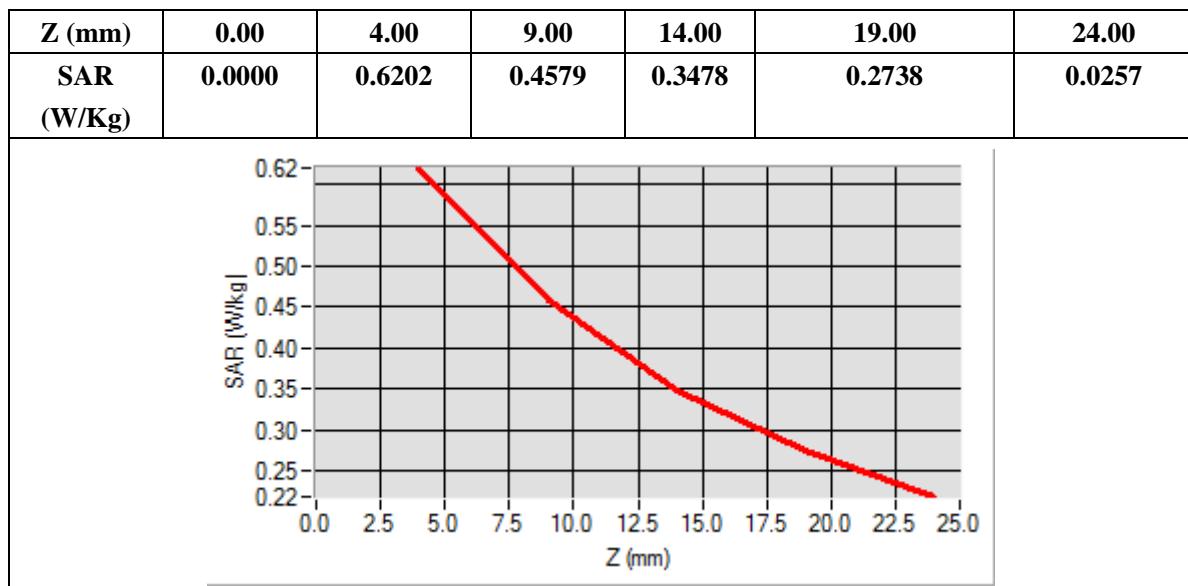
<b>Frequency (MHz)</b>	848.799988
<b>Relative permittivity (real part)</b>	39.566879
<b>Relative permittivity (imaginary part)</b>	18.602560
<b>Conductivity (S/m)</b>	0.877214
<b>Variation (%)</b>	-4.000000



**Maximum location: X=-46.00, Y=-40.00**

<b>SAR 10g (W/Kg)</b>	0.420618
<b>SAR 1g (W/Kg)</b>	0.591731

**Z Axis Scan**



# MEASUREMENT 9

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 15 seconds

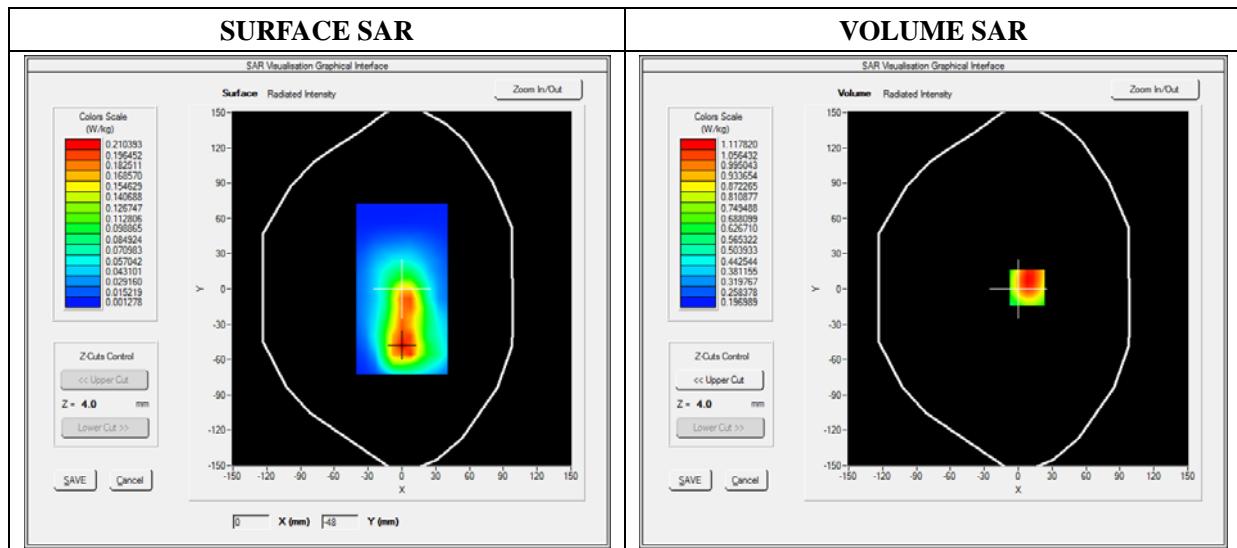
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body Front
<b>Band</b>	GSM850
<b>Channels</b>	Low
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

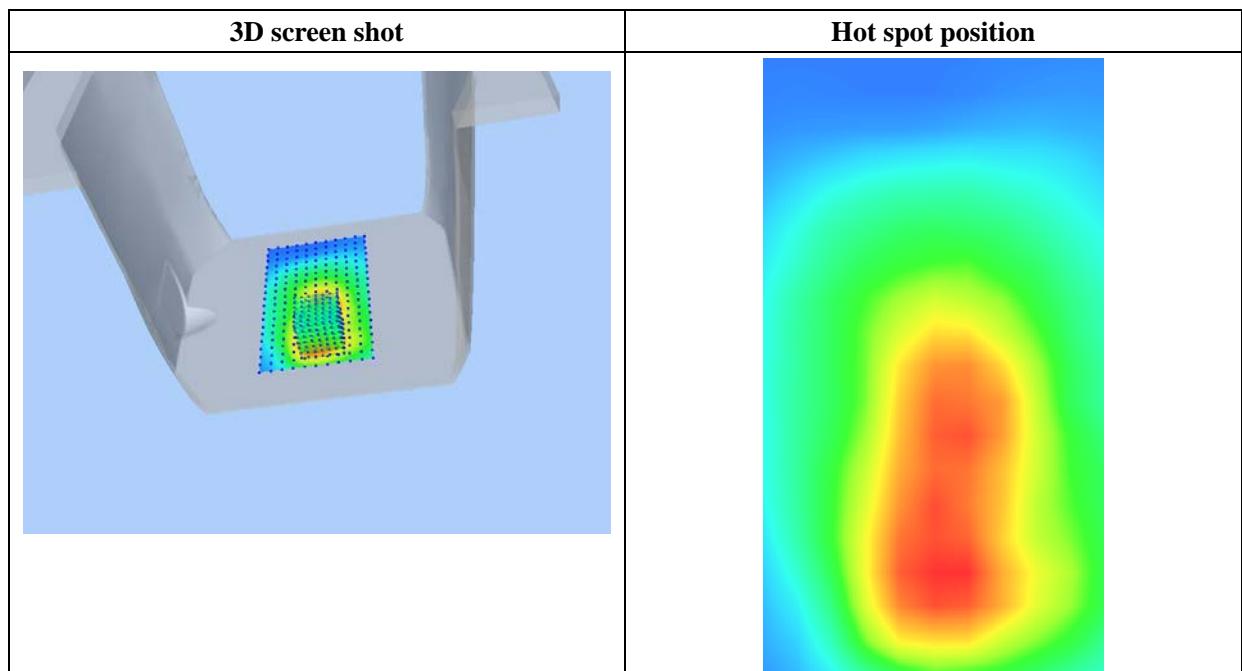
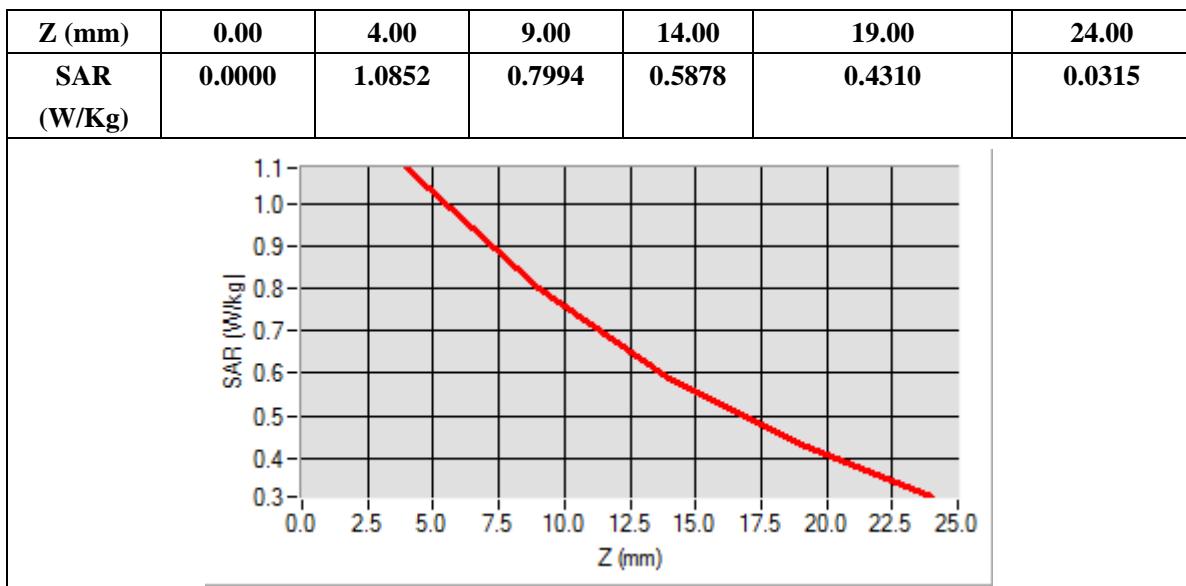
<b>Frequency (MHz)</b>	824.200012
<b>Relative permittivity (real part)</b>	55.242077
<b>Relative permittivity (imaginary part)</b>	21.378187
<b>Conductivity (S/m)</b>	0.978883
<b>Variation (%)</b>	1.890000



**Maximum location: X=-8.00, Y=-1.00**

<b>SAR 10g (W/Kg)</b>	0.881192
<b>SAR 1g (W/Kg)</b>	1.281254

**Z Axis Scan**



# MEASUREMENT 10

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 15 seconds

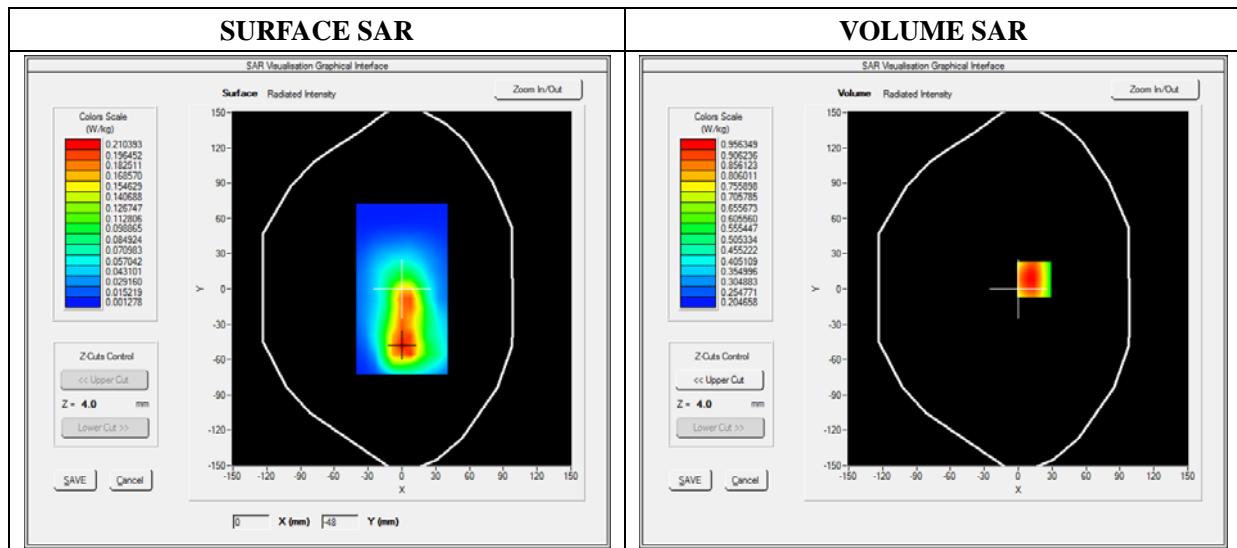
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body back
<b>Band</b>	GSM850
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

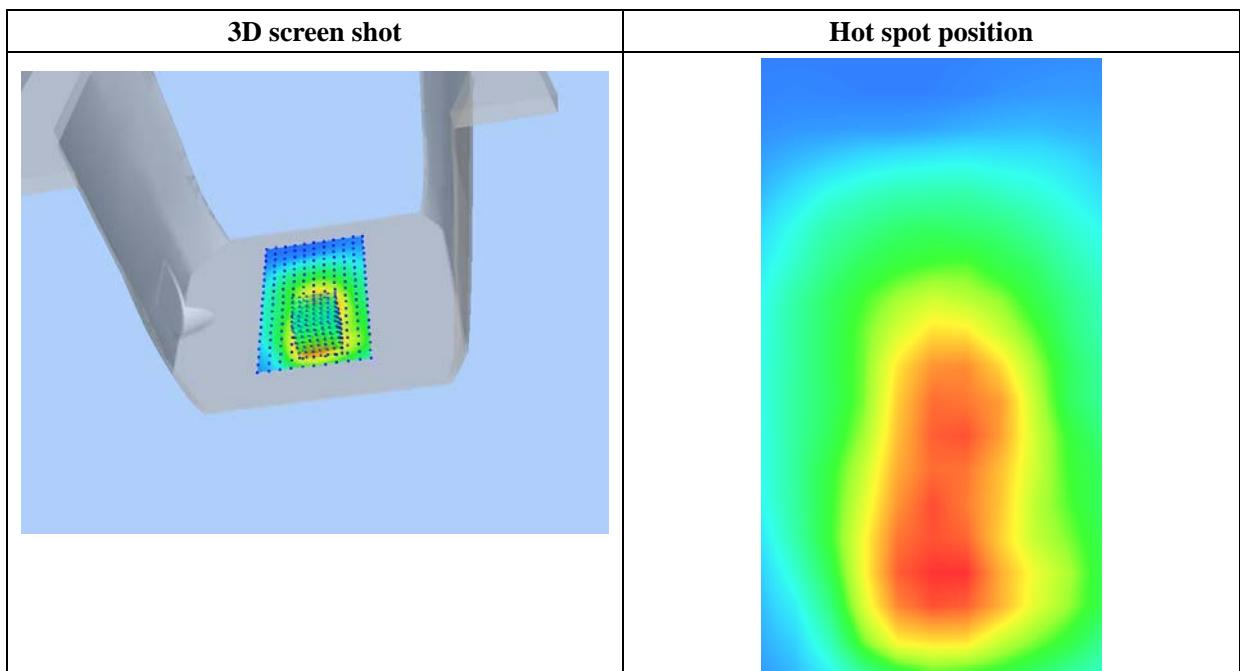
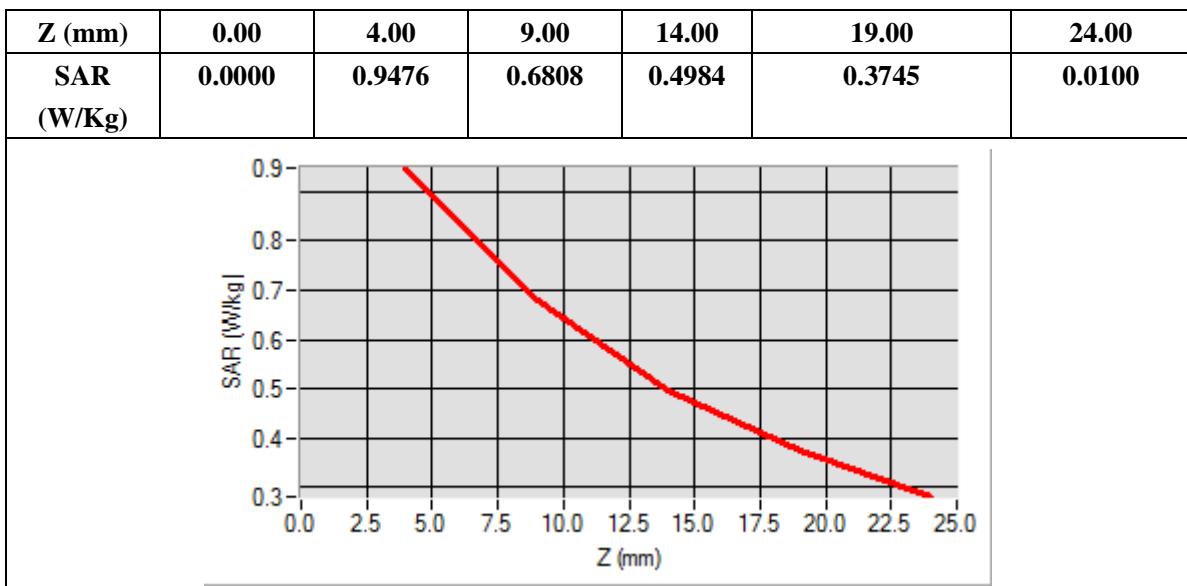
<b>Frequency (MHz)</b>	836.599976
<b>Relative permittivity (real part)</b>	55.195076
<b>Relative permittivity (imaginary part)</b>	20.912214
<b>Conductivity (S/m)</b>	0.971953
<b>Variation (%)</b>	3.180000



Maximum location: X=-14.00, Y=-8.00

SAR 10g (W/Kg)	0.719512
SAR 1g (W/Kg)	1.038081

**Z Axis Scan**



# MEASUREMENT 11

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 16 seconds

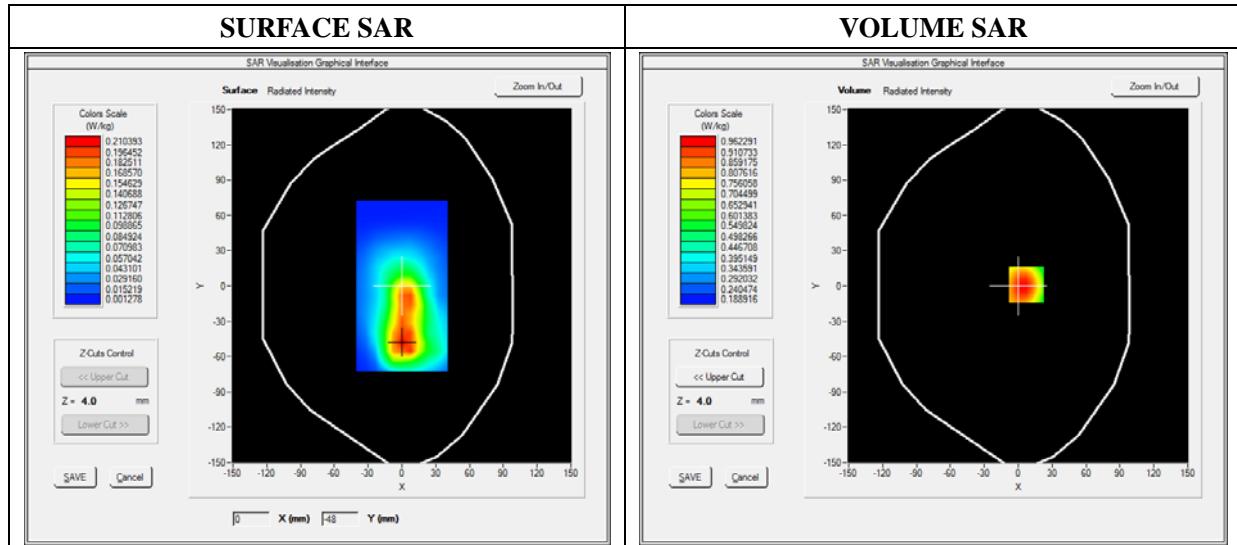
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body front
<b>Band</b>	GSM850
<b>Channels</b>	High
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

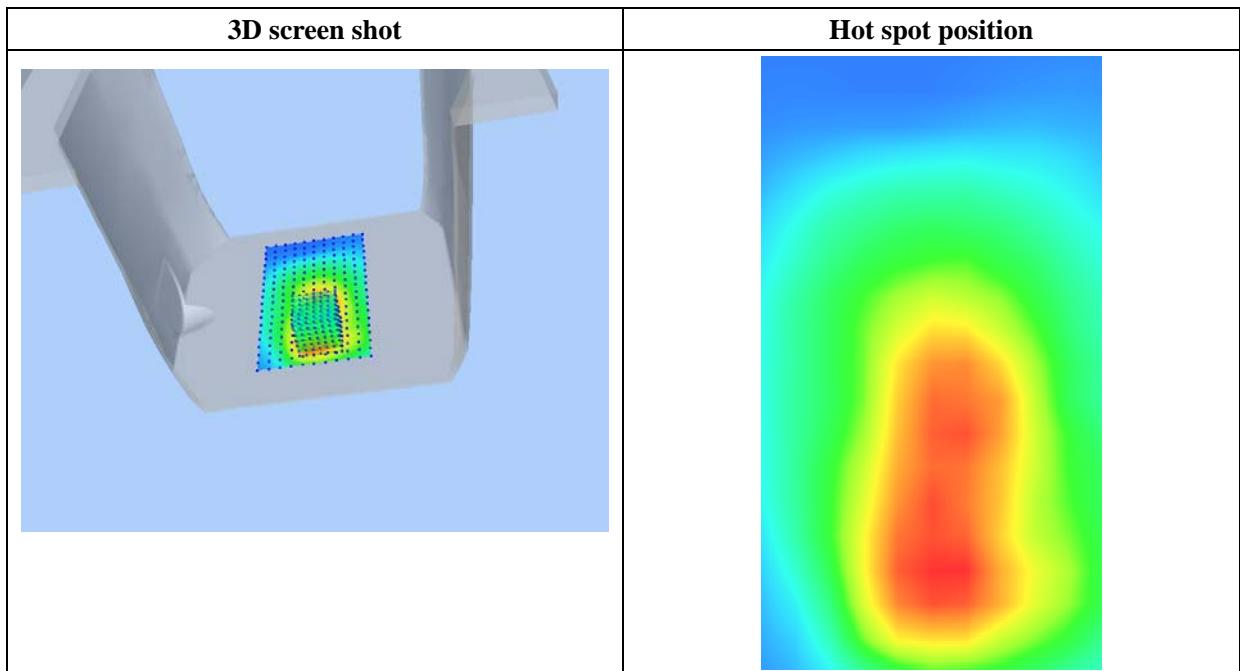
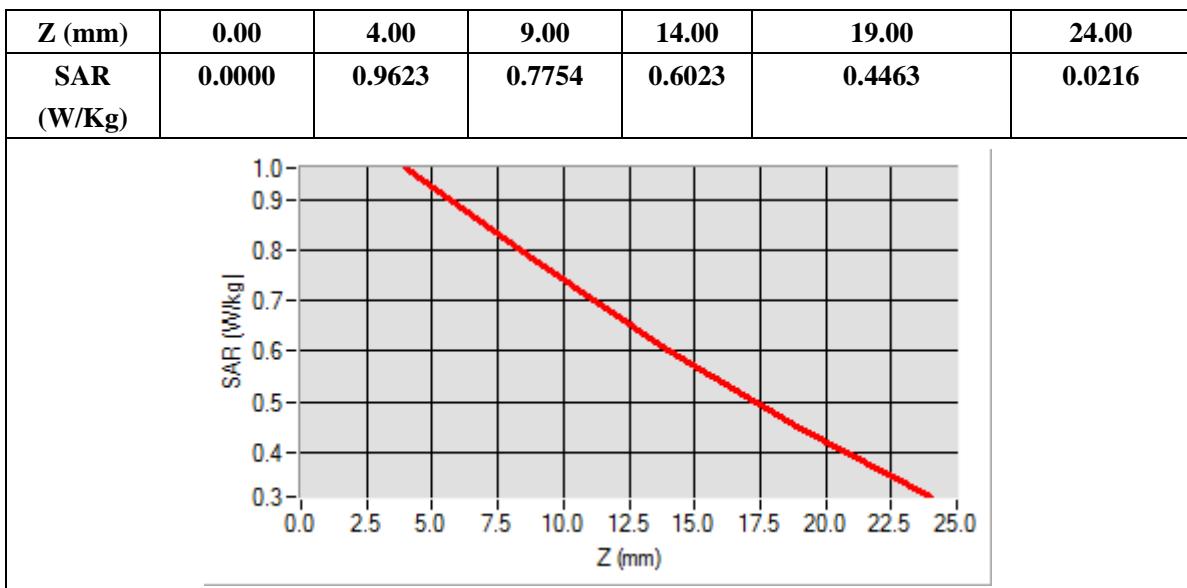
<b>Frequency (MHz)</b>	848.799988
<b>Relative permittivity (real part)</b>	55.157539
<b>Relative permittivity (imaginary part)</b>	20.929108
<b>Conductivity (S/m)</b>	0.986924
<b>Variation (%)</b>	0.810000



**Maximum location: X=-7.00, Y=-1.00**

<b>SAR 10g (W/Kg)</b>	0.752052
<b>SAR 1g (W/Kg)</b>	1.037592

**Z Axis Scan**



# MEASUREMENT 12

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 20 seconds

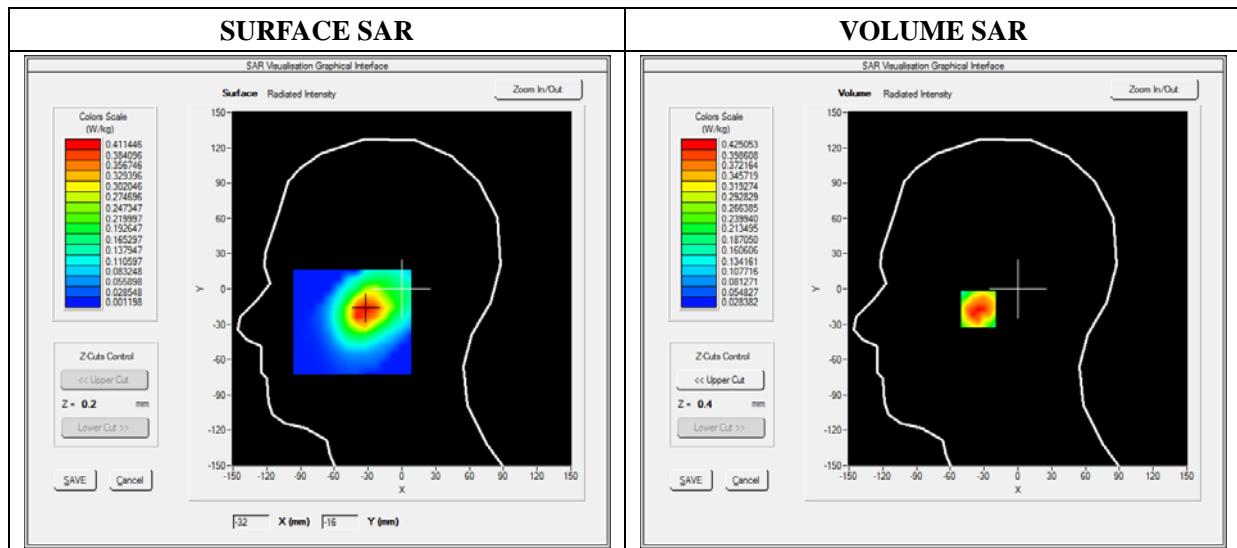
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Cheek
<b>Band</b>	GSM1900
<b>Channels</b>	High
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

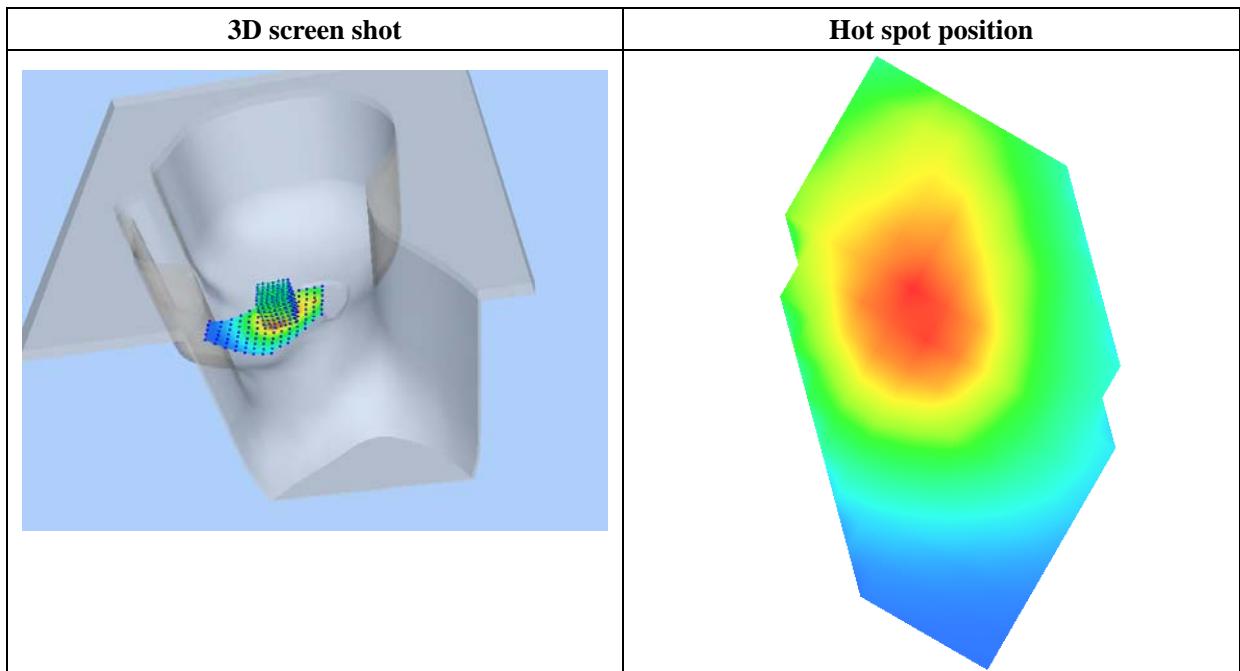
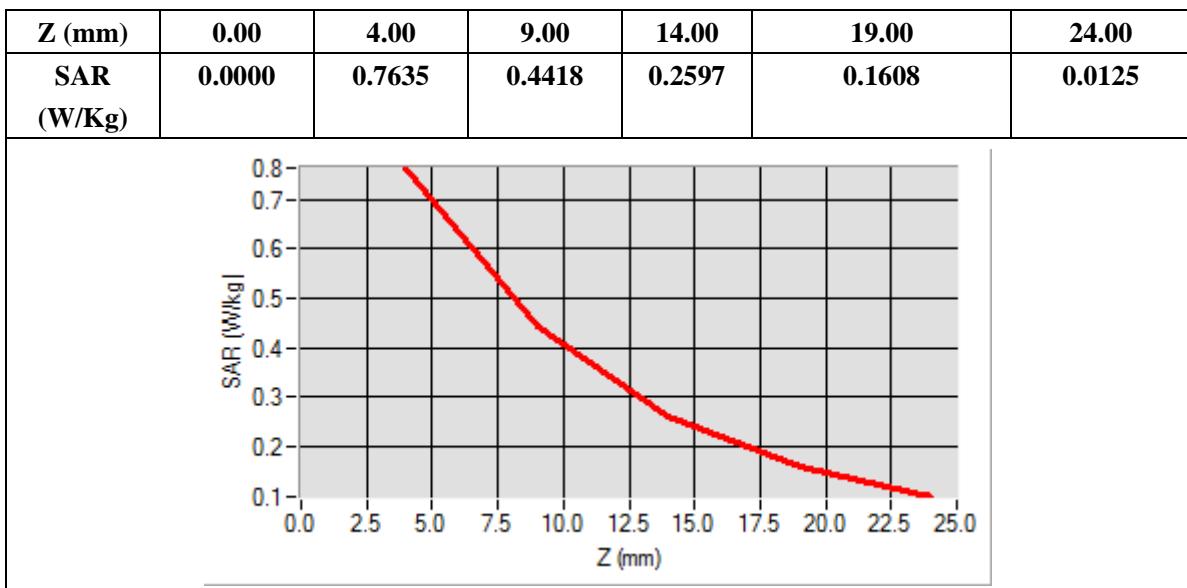
<b>Frequency (MHz)</b>	1909.800049
<b>Relative permittivity (real part)</b>	36.696239
<b>Relative permittivity (imaginary part)</b>	12.652680
<b>Conductivity (S/m)</b>	1.342449
<b>Variation (%)</b>	0.510000



**Maximum location: X=-46.00, Y=-36.00**

<b>SAR 10g (W/Kg)</b>	0.383076
<b>SAR 1g (W/Kg)</b>	0.700419

**Z Axis Scan**



# MEASUREMENT 13

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 29 seconds

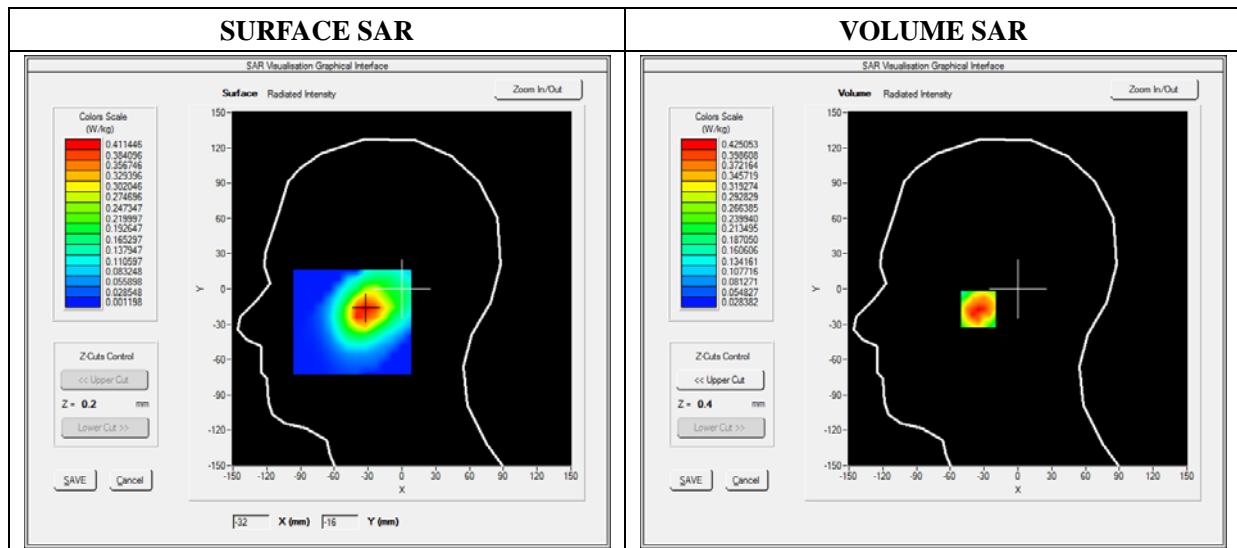
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Tilt
<b>Band</b>	GSM1900
<b>Channels</b>	High
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

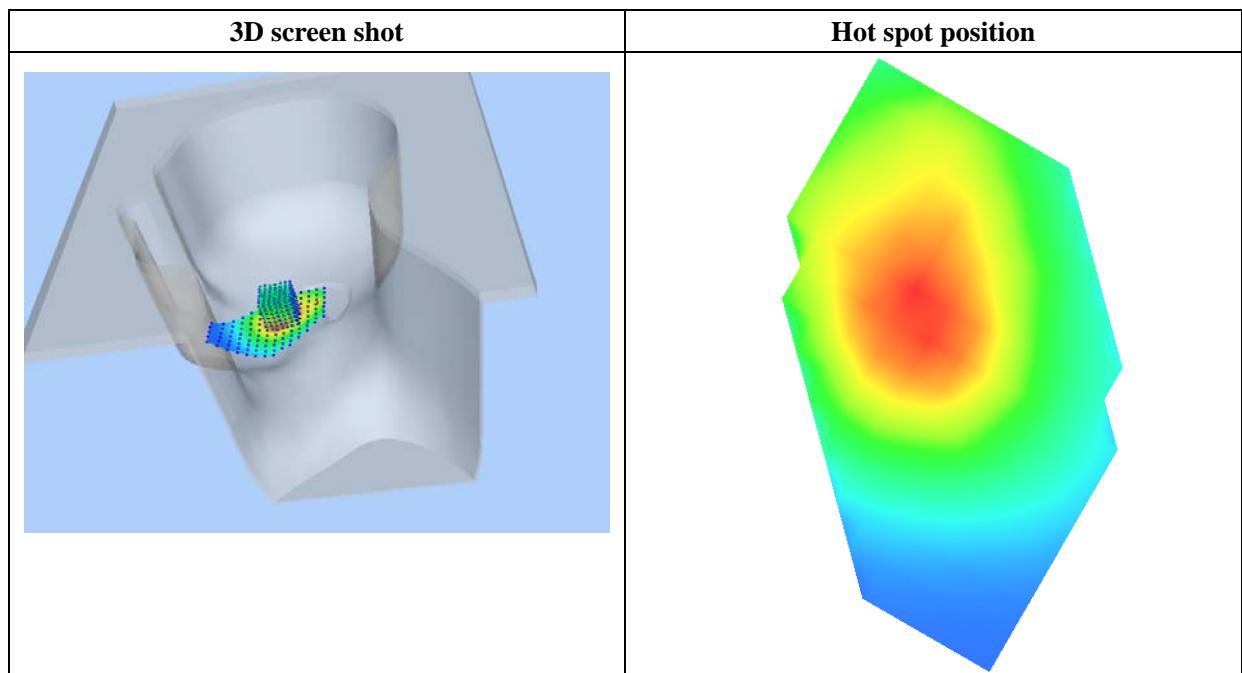
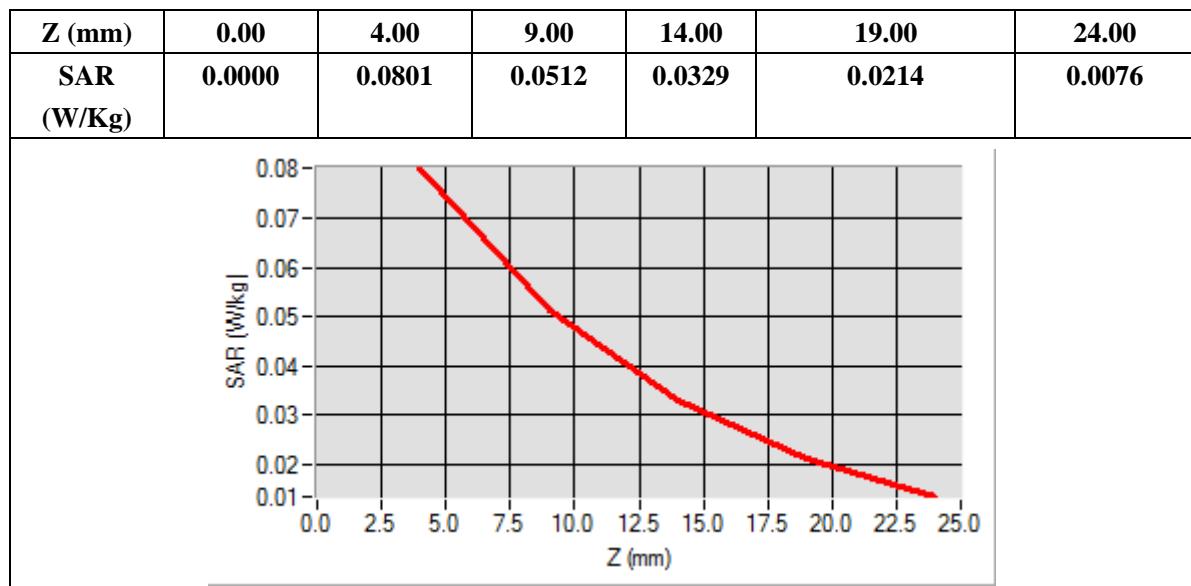
<b>Frequency (MHz)</b>	1909.800049
<b>Relative permittivity (real part)</b>	36.696239
<b>Relative permittivity (imaginary part)</b>	12.652680
<b>Conductivity (S/m)</b>	1.342449
<b>Variation (%)</b>	0.690000



Maximum location: X=-46.00, Y=-37.00

SAR 10g (W/Kg)	0.045332
SAR 1g (W/Kg)	0.074573

**Z Axis Scan**



# MEASUREMENT 14

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 30 seconds

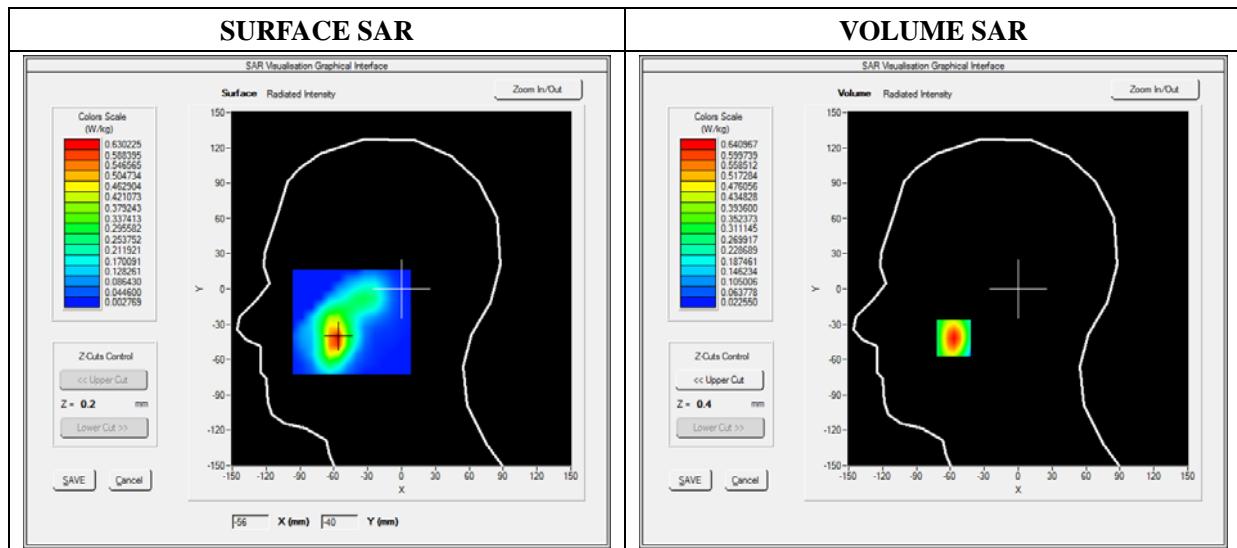
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	GSM1900
<b>Channels</b>	High
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

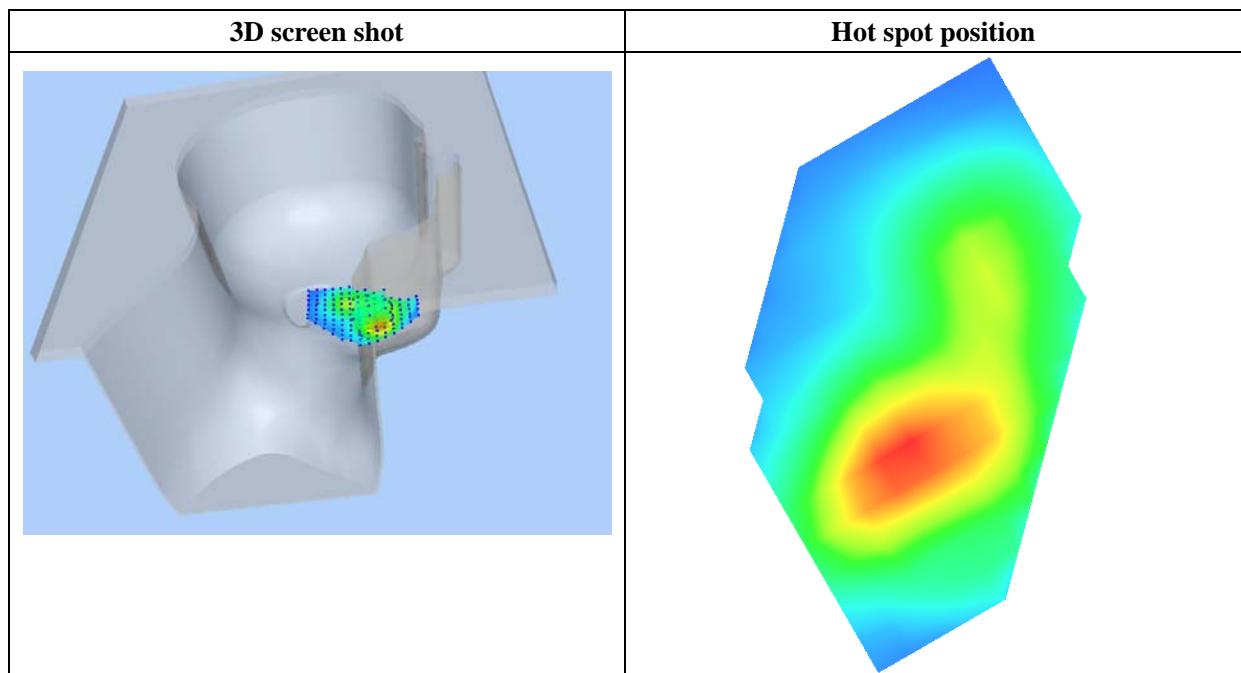
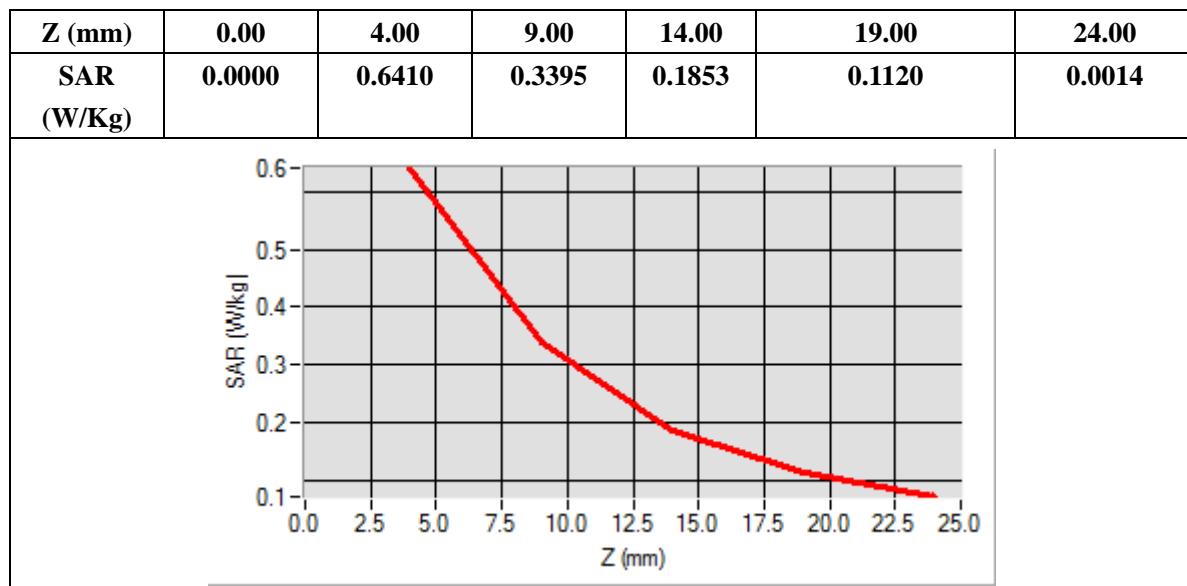
<b>Frequency (MHz)</b>	1909.800049
<b>Relative permittivity (real part)</b>	36.696239
<b>Relative permittivity (imaginary part)</b>	12.652680
<b>Conductivity (S/m)</b>	1.342449
<b>Variation (%)</b>	1.240000



Maximum location: X=-57.00, Y=-42.00

SAR 10g (W/Kg)	0.307784
SAR 1g (W/Kg)	0.584901

**Z Axis Scan**



# MEASUREMENT 15

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 14 seconds

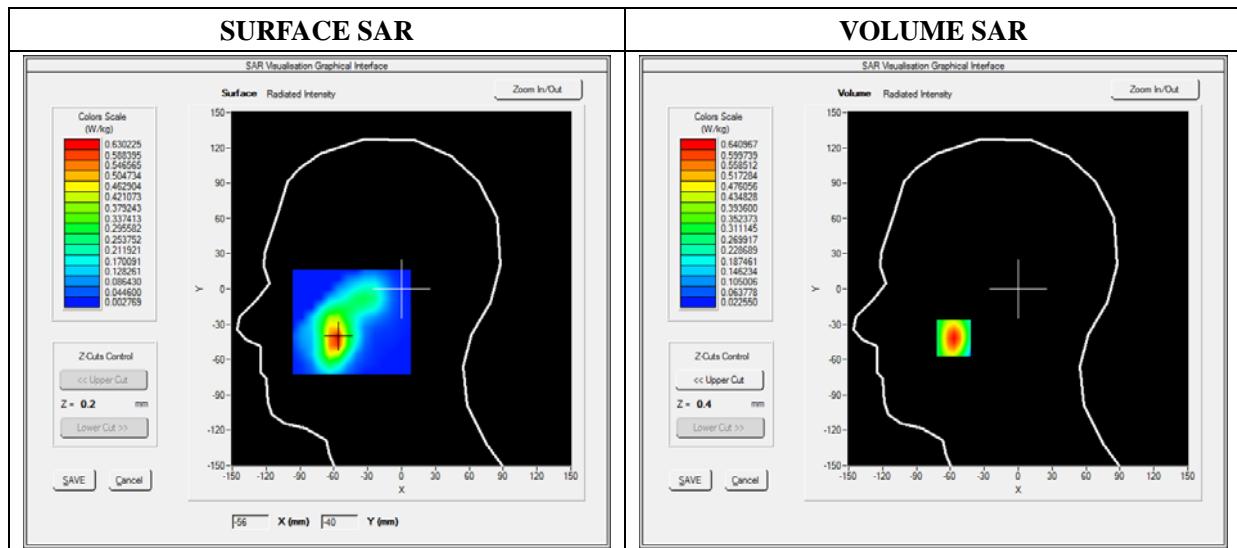
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Tilt
<b>Band</b>	GSM1900
<b>Channels</b>	High
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

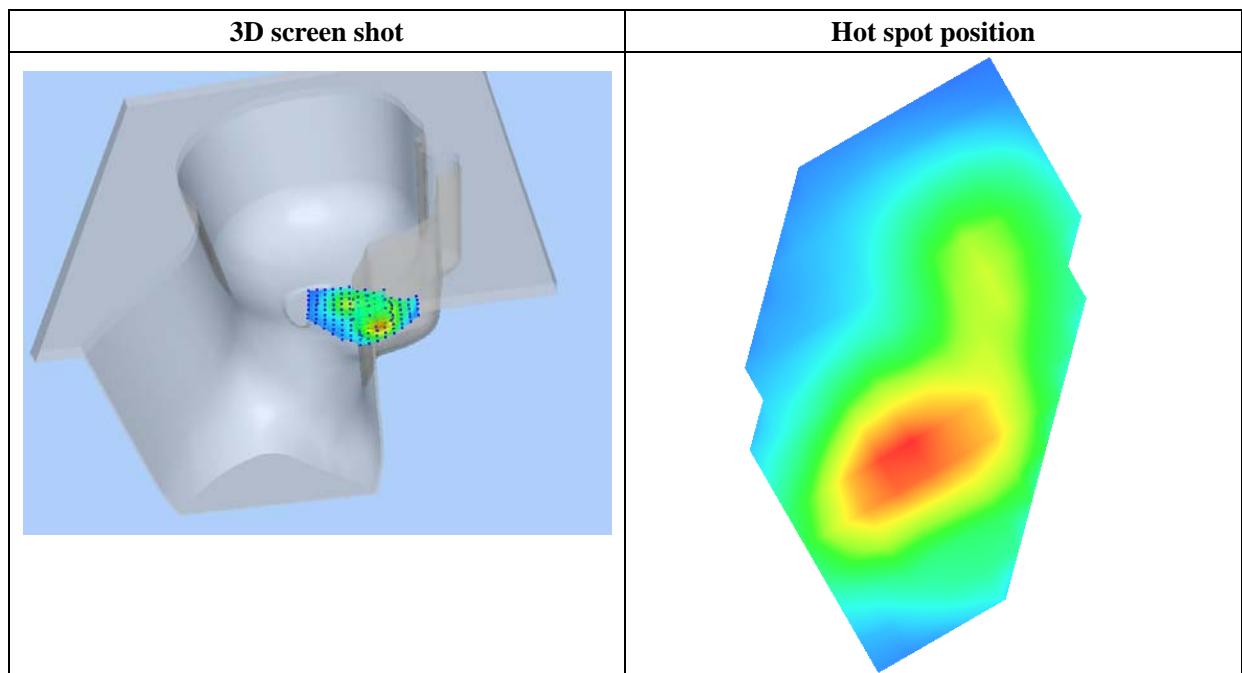
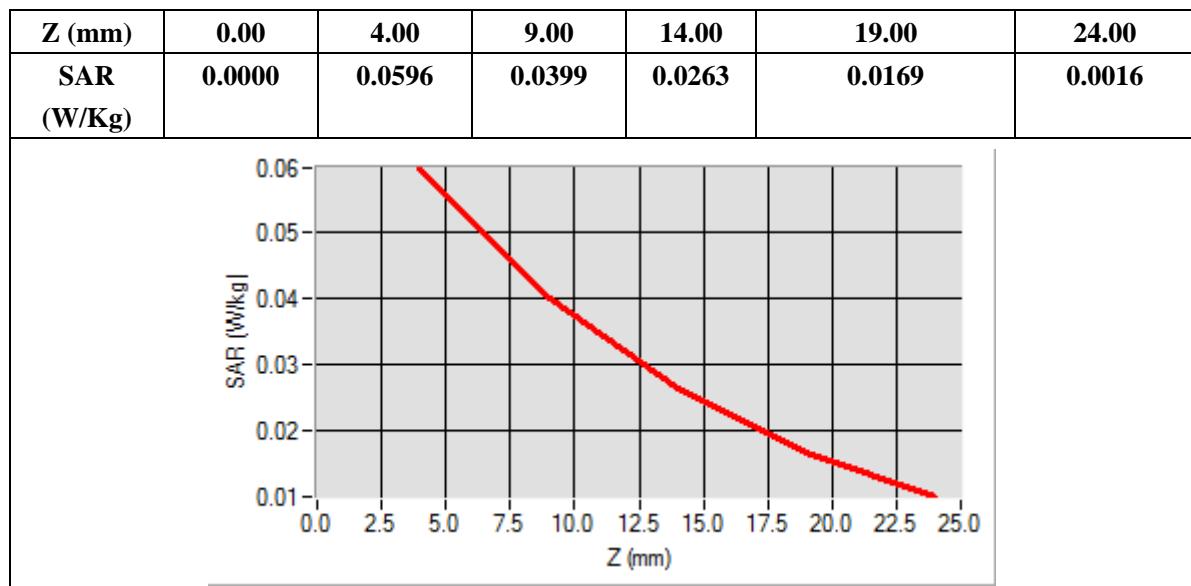
<b>Frequency (MHz)</b>	1909.800049
<b>Relative permittivity (real part)</b>	36.696239
<b>Relative permittivity (imaginary part)</b>	12.652680
<b>Conductivity (S/m)</b>	1.342449
<b>Variation (%)</b>	1.100000



**Maximum location: X=-57.00, Y=-46.00**

<b>SAR 10g (W/Kg)</b>	0.033461
<b>SAR 1g (W/Kg)</b>	0.055143

**Z Axis Scan**



# MEASUREMENT 16

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 10 seconds

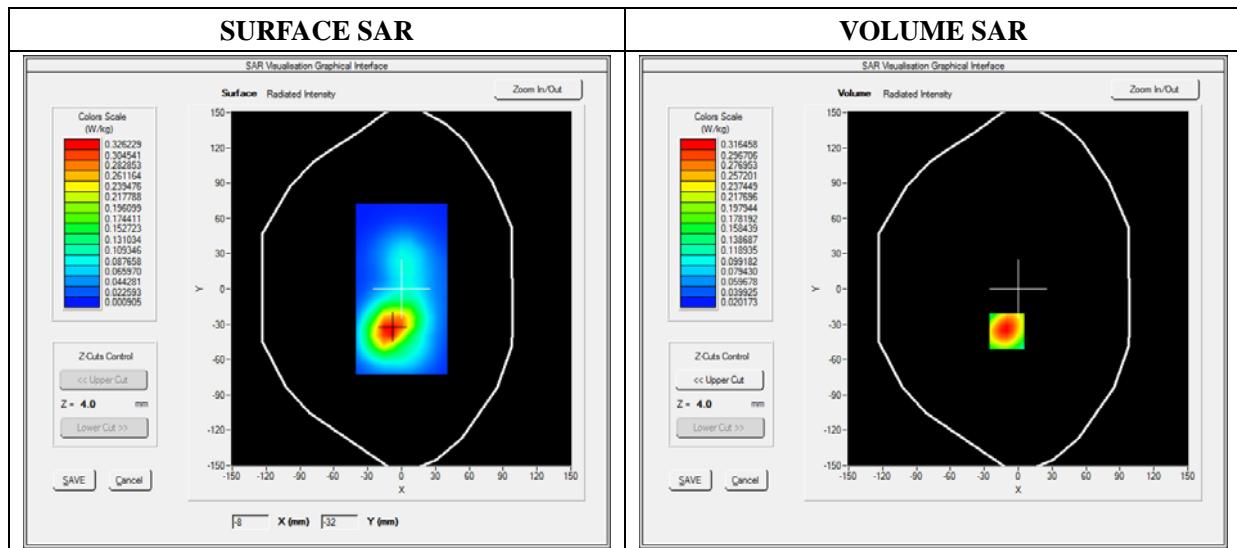
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body front
<b>Band</b>	GSM1900
<b>Channels</b>	High
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

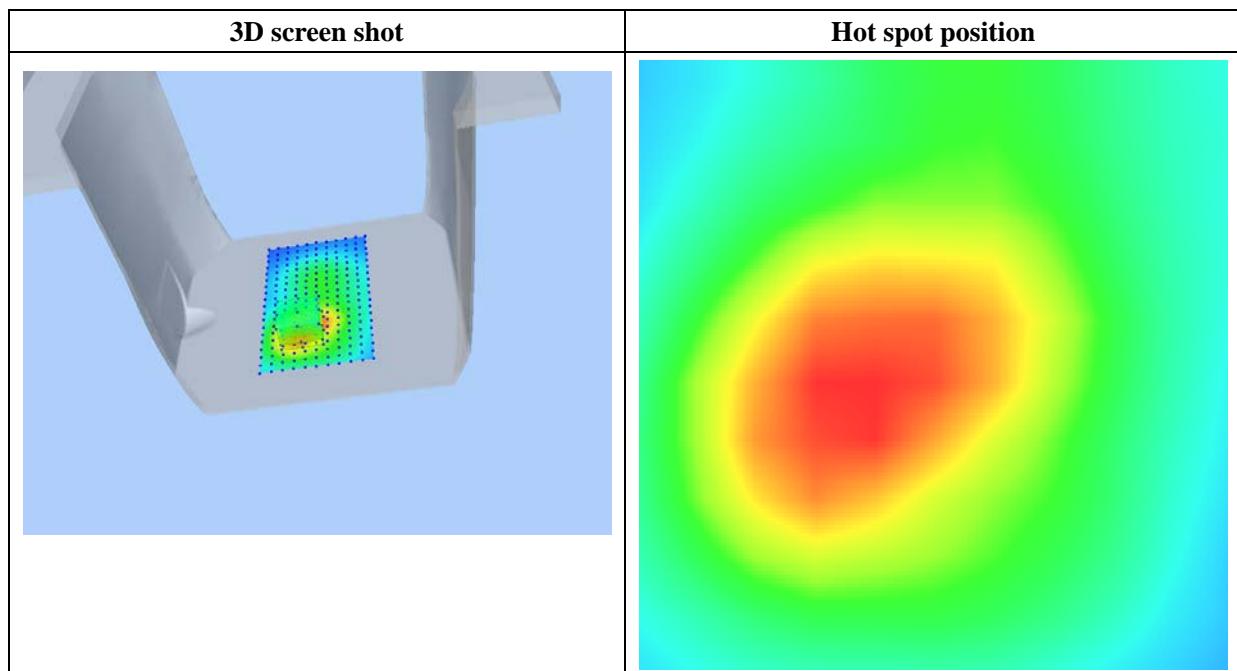
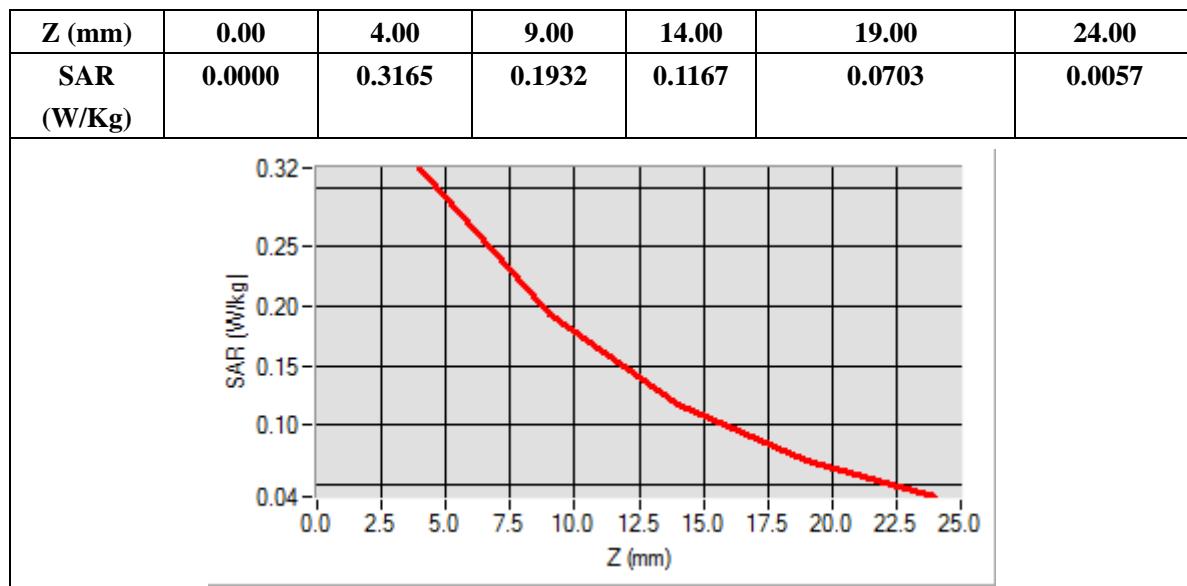
<b>Frequency (MHz)</b>	1909.800049
<b>Relative permittivity (real part)</b>	36.696239
<b>Relative permittivity (imaginary part)</b>	12.652680
<b>Conductivity (S/m)</b>	1.342449
<b>Variation (%)</b>	-2.610000



**Maximum location: X=-10.00, Y=-36.00**

<b>SAR 10g (W/Kg)</b>	0.271471
<b>SAR 1g (W/Kg)</b>	0.467588

**Z Axis Scan**



# MEASUREMENT 17

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 18 seconds

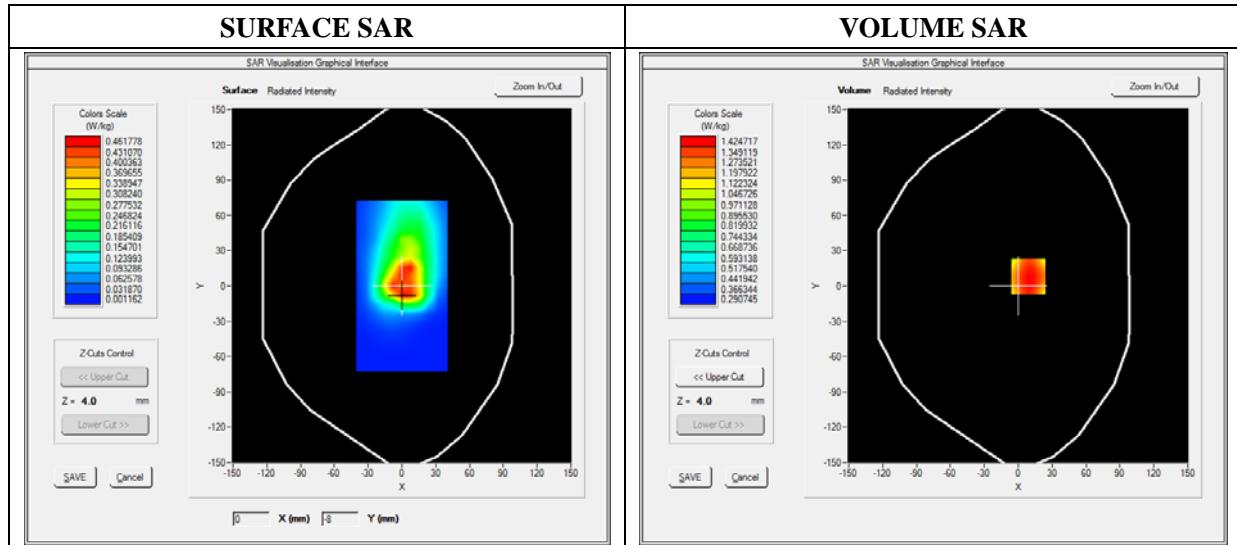
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body front
<b>Band</b>	GSM850 (GPRS850_4Tx)
<b>Channels</b>	Low
<b>Signal</b>	Duty Cycle: 3.00 (Crest factor: 3.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

<b>Frequency (MHz)</b>	824.200012
<b>Relative permittivity (real part)</b>	39.769001
<b>Relative permittivity (imaginary part)</b>	17.778120
<b>Conductivity (S/m)</b>	0.814040
<b>Variation (%)</b>	-3.050000

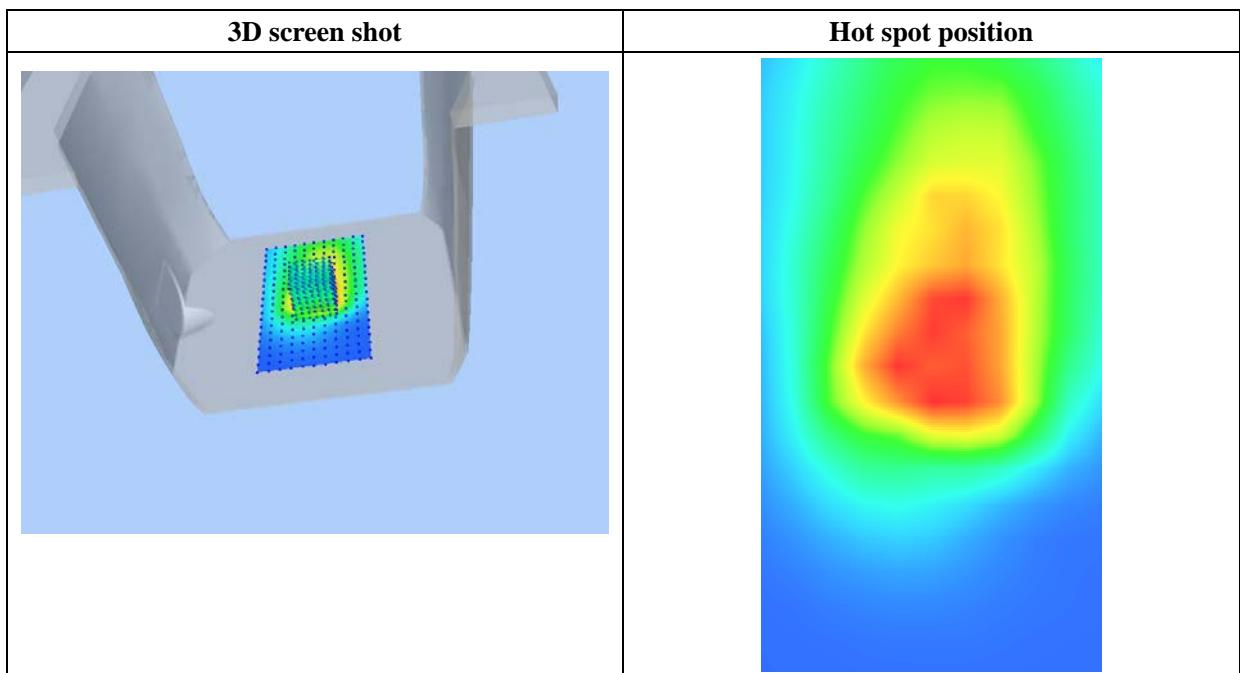
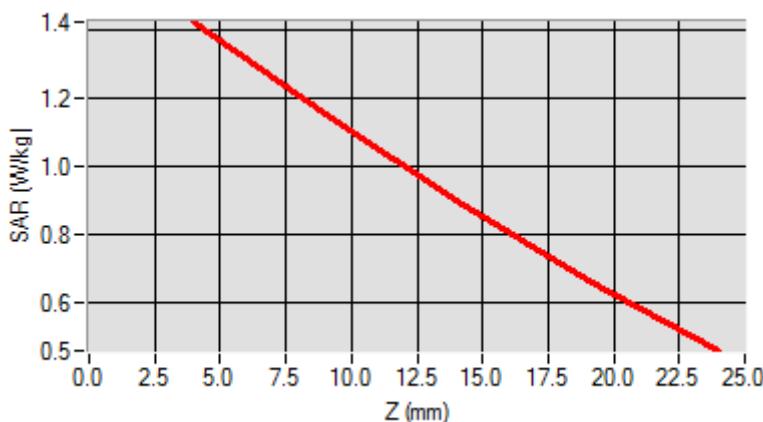


**Maximum location: X=-9.00, Y=-8.00**

<b>SAR 10g (W/Kg)</b>	1.017837
<b>SAR 1g (W/Kg)</b>	1.378204

**Z Axis Scan**

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00
<b>SAR (W/Kg)</b>	0.0000	1.4247	1.1561	0.8993	0.6626	0.0348



# MEASUREMENT 18

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 24 seconds

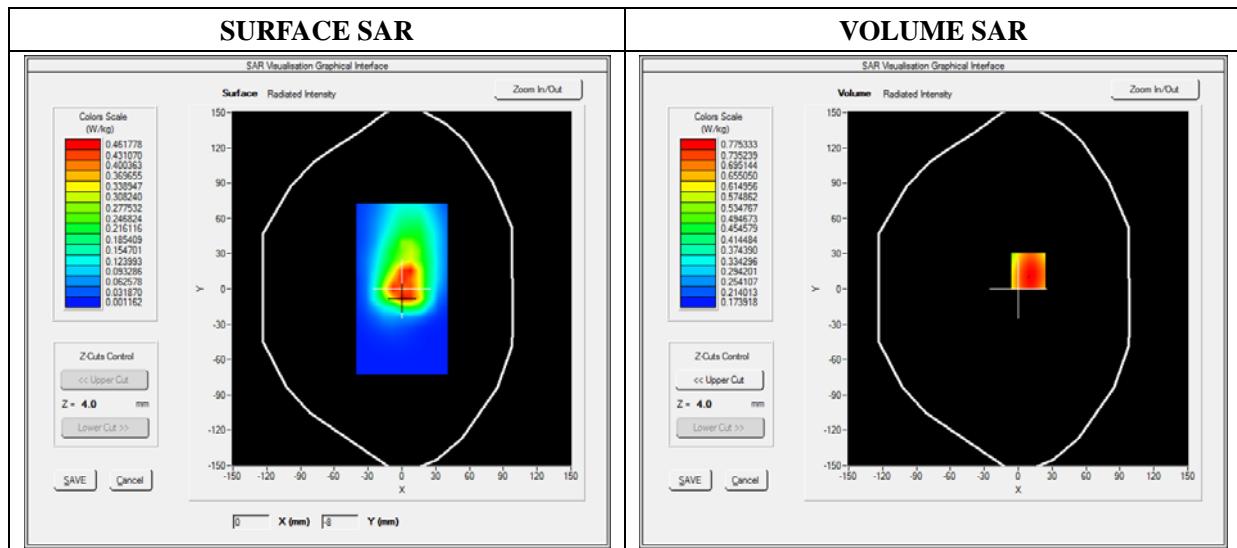
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body back
<b>Band</b>	GSM850 (GPRS850_4Tx)
<b>Channels</b>	Low
<b>Signal</b>	Duty Cycle: 3.00 (Crest factor: 3.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

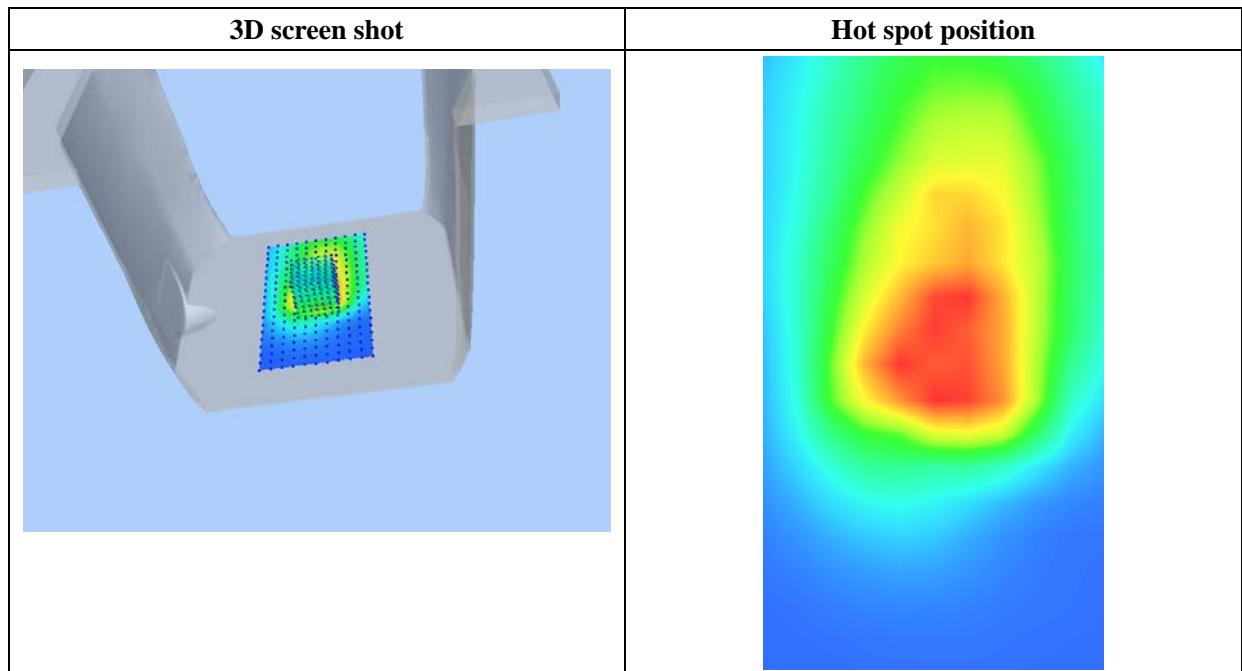
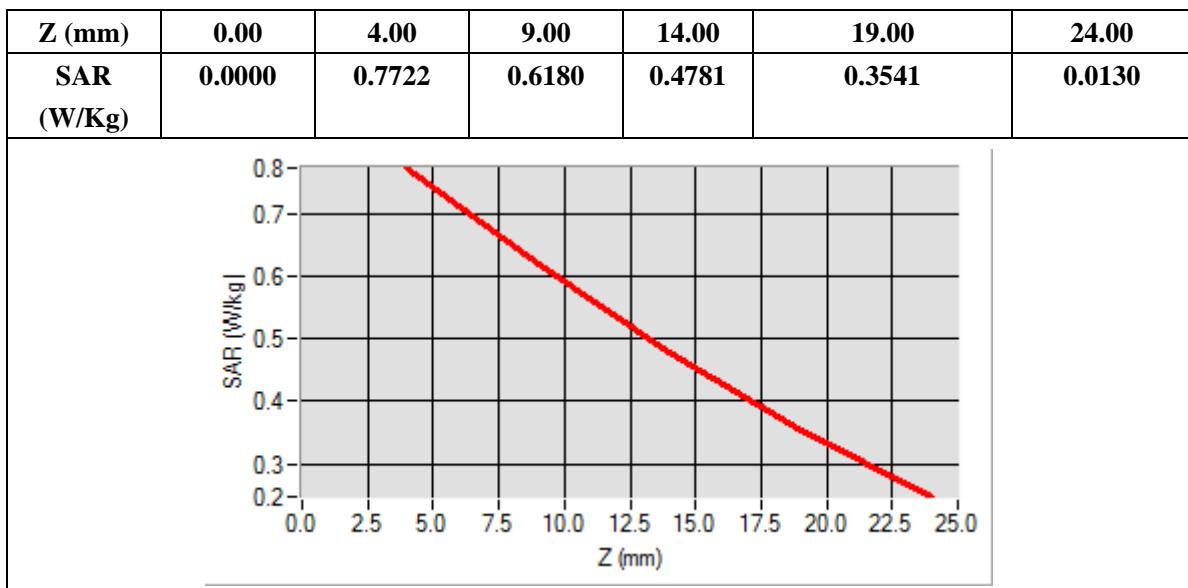
<b>Frequency (MHz)</b>	824.200012
<b>Relative permittivity (real part)</b>	39.769001
<b>Relative permittivity (imaginary part)</b>	17.778120
<b>Conductivity (S/m)</b>	0.814040
<b>Variation (%)</b>	-1.310000



**Maximum location: X=-9.00, Y=-15.00**

<b>SAR 10g (W/Kg)</b>	0.552777
<b>SAR 1g (W/Kg)</b>	0.750343

**Z Axis Scan**



# MEASUREMENT 19

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 21 seconds

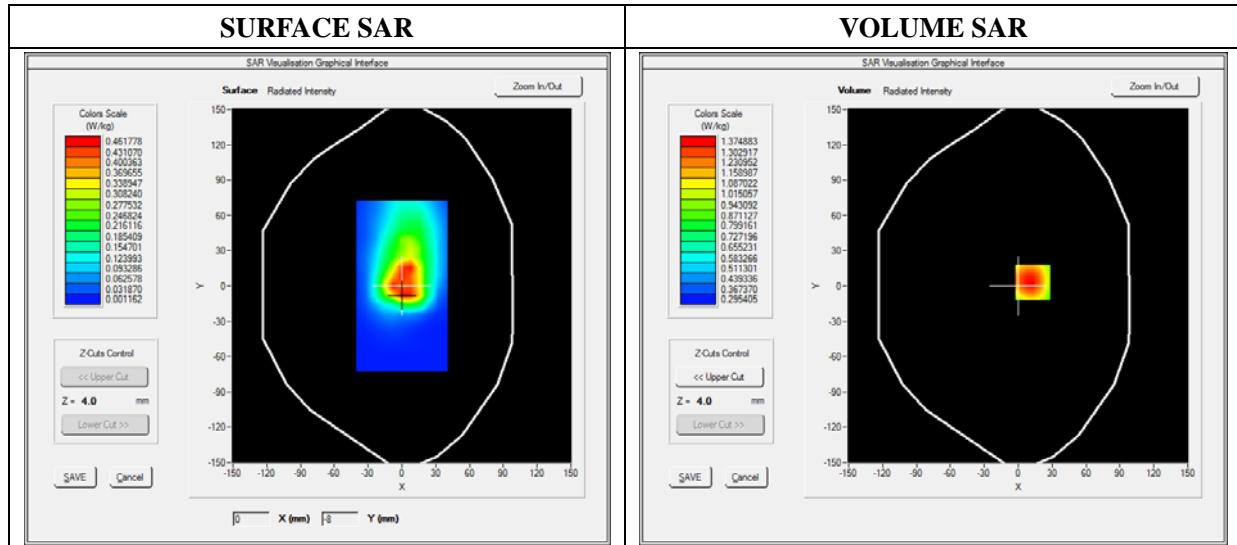
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body front
<b>Band</b>	GSM850 (GPRS850_4Tx)
<b>Channels</b>	Middle
<b>Signal</b>	Duty Cycle: 3.00 (Crest factor: 3.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

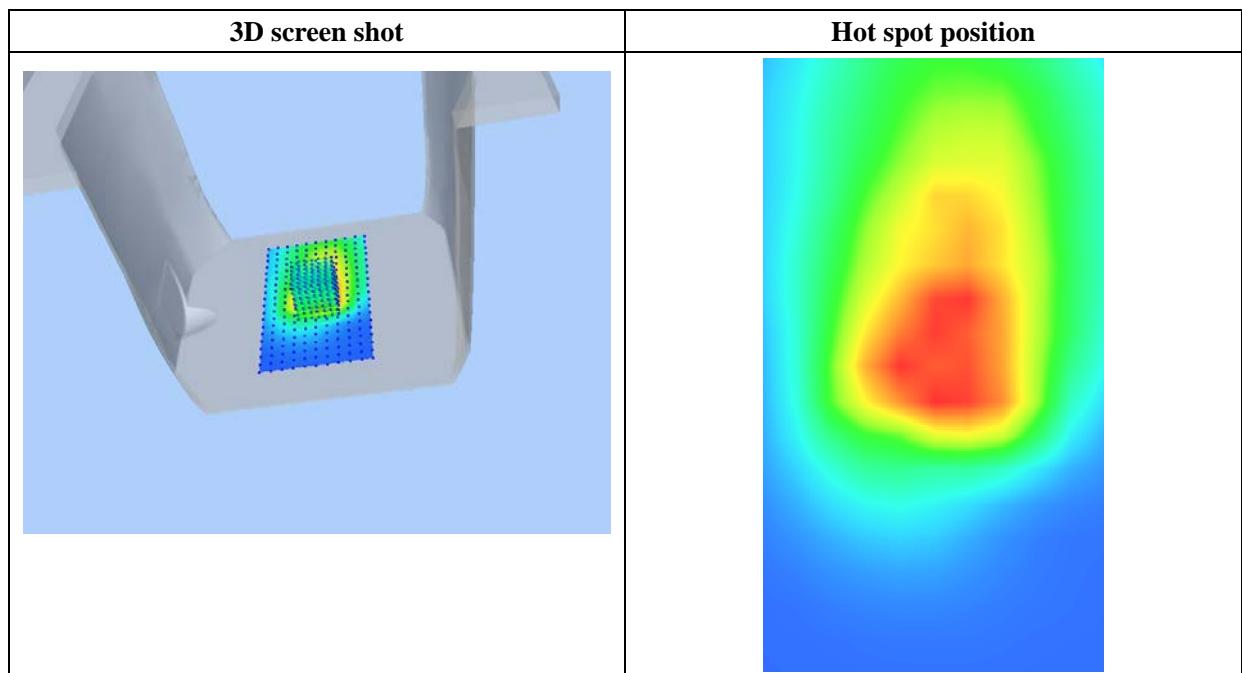
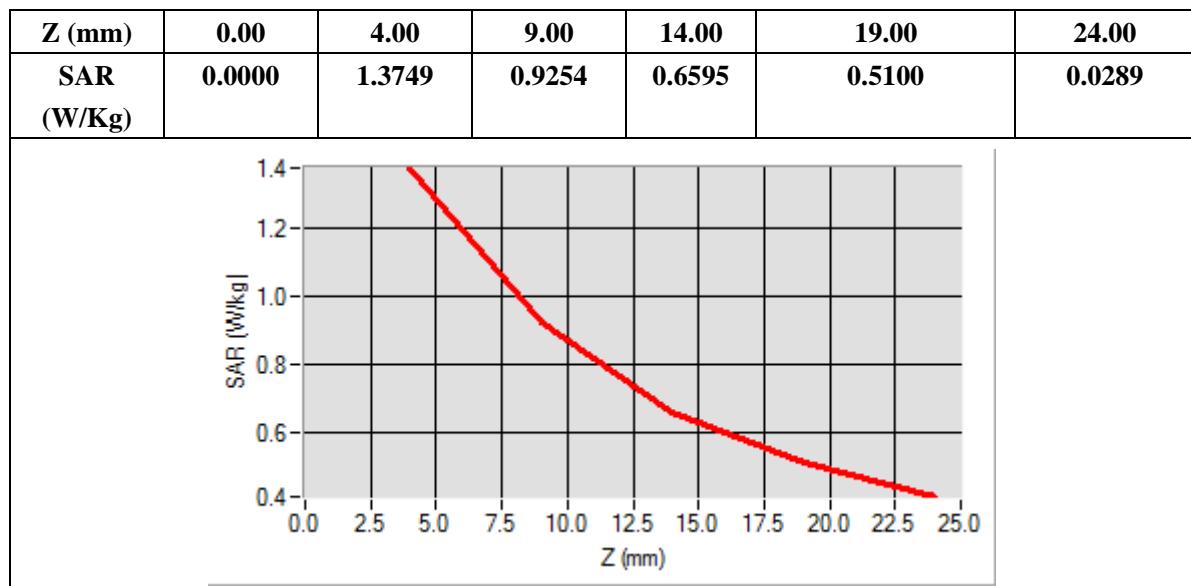
<b>Frequency (MHz)</b>	836.599976
<b>Relative permittivity (real part)</b>	39.520321
<b>Relative permittivity (imaginary part)</b>	18.432920
<b>Conductivity (S/m)</b>	0.856721
<b>Variation (%)</b>	0.930000



Maximum location: X=-13.00, Y=-3.00

SAR 10g (W/Kg)	0.902497
SAR 1g (W/Kg)	1.317385

**Z Axis Scan**



# MEASUREMENT 20

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 26 seconds

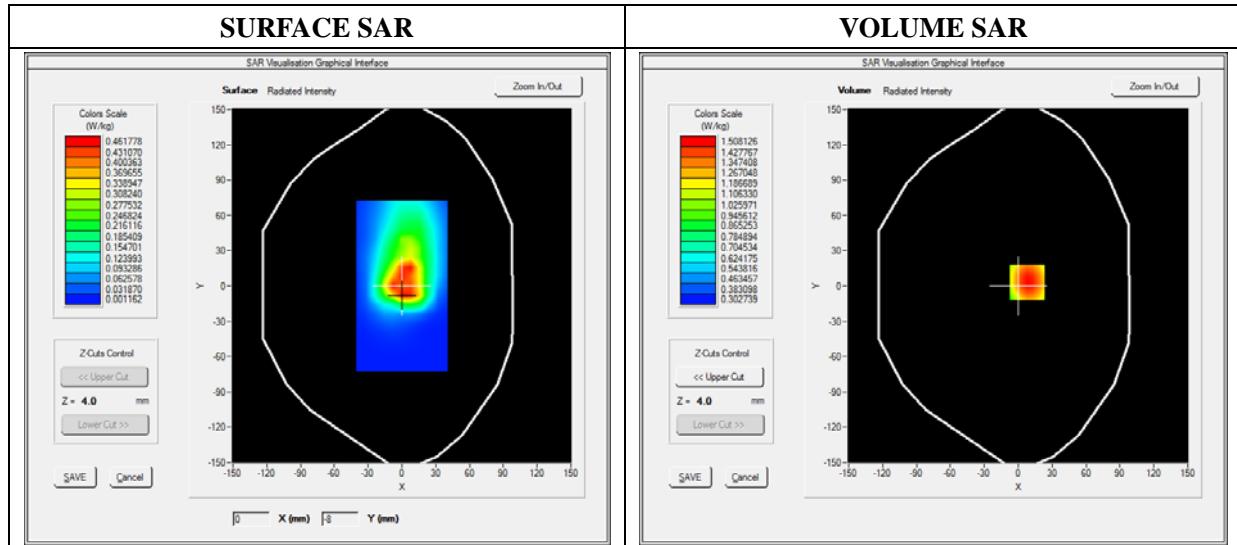
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body front
<b>Band</b>	GSM850 (GPRS850_4Tx)
<b>Channels</b>	High
<b>Signal</b>	Duty Cycle: 3.00 (Crest factor: 3.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

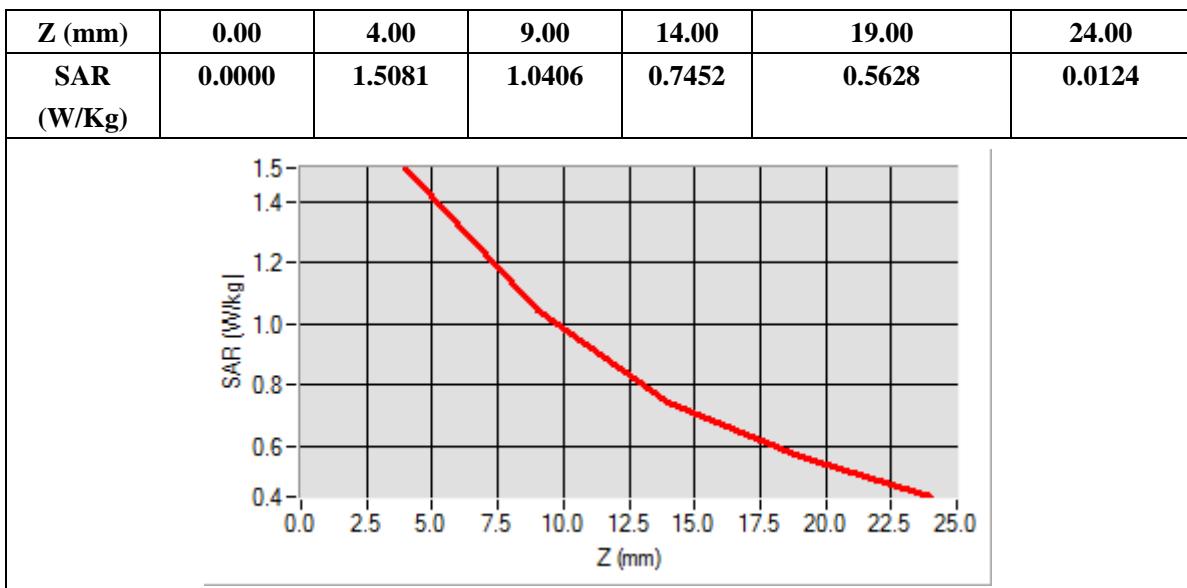
<b>Frequency (MHz)</b>	848.799988
<b>Relative permittivity (real part)</b>	39.566879
<b>Relative permittivity (imaginary part)</b>	18.602560
<b>Conductivity (S/m)</b>	0.877214
<b>Variation (%)</b>	-4.130000



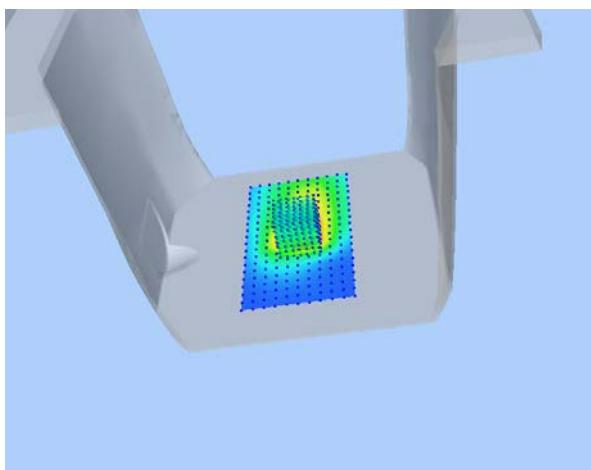
**Maximum location: X=-8.00, Y=-3.00**

<b>SAR 10g (W/Kg)</b>	0.991108
<b>SAR 1g (W/Kg)</b>	1.438810

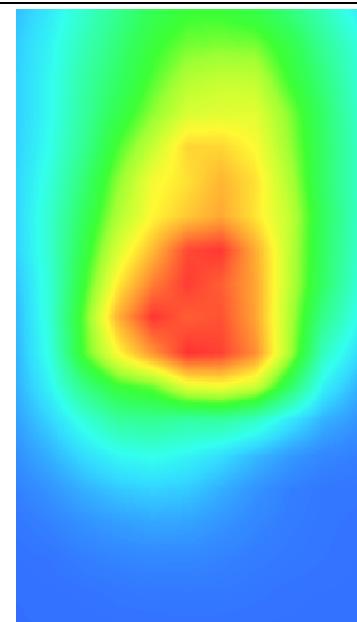
**Z Axis Scan**



**3D screen shot**



**Hot spot position**



# MEASUREMENT 21

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 34 seconds

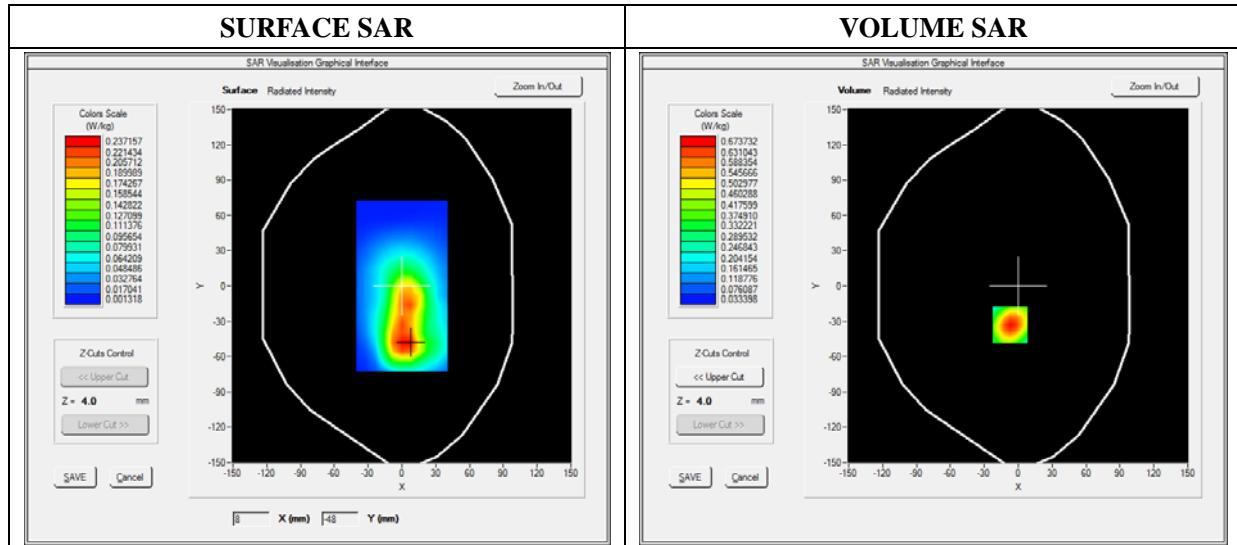
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body front
<b>Band</b>	GSM1900 (GPRS1900_2Tx)
<b>Channels</b>	High
<b>Signal</b>	Duty Cycle: 6.00 (Crest factor: 6.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

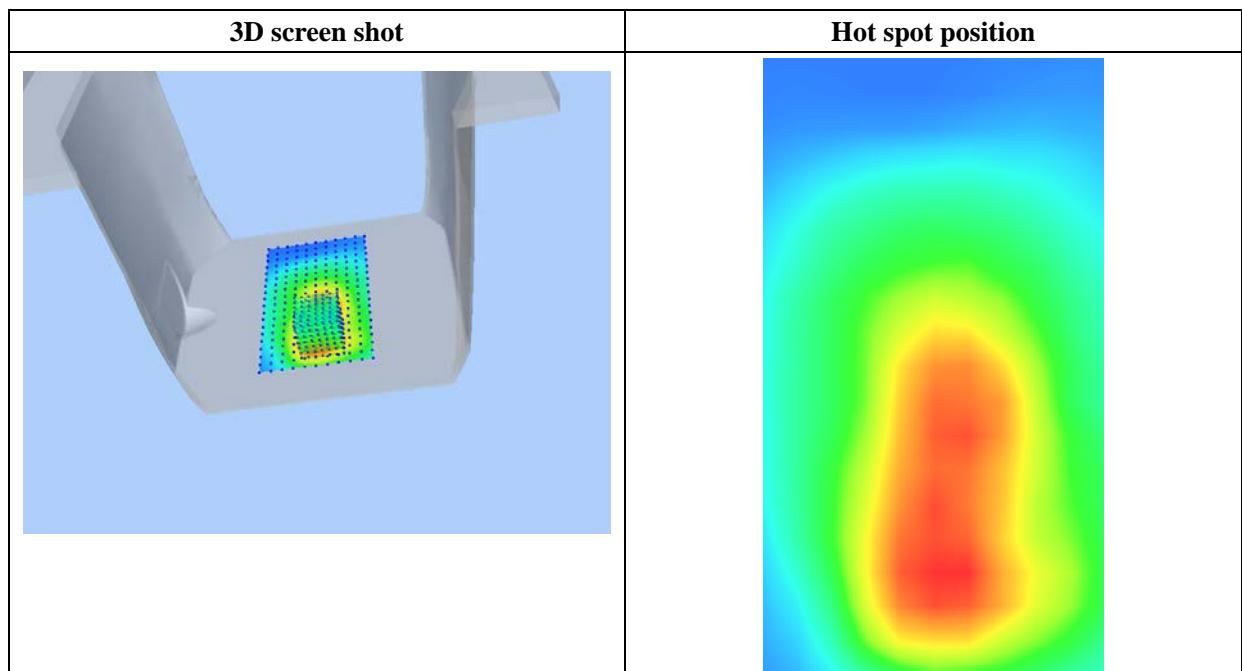
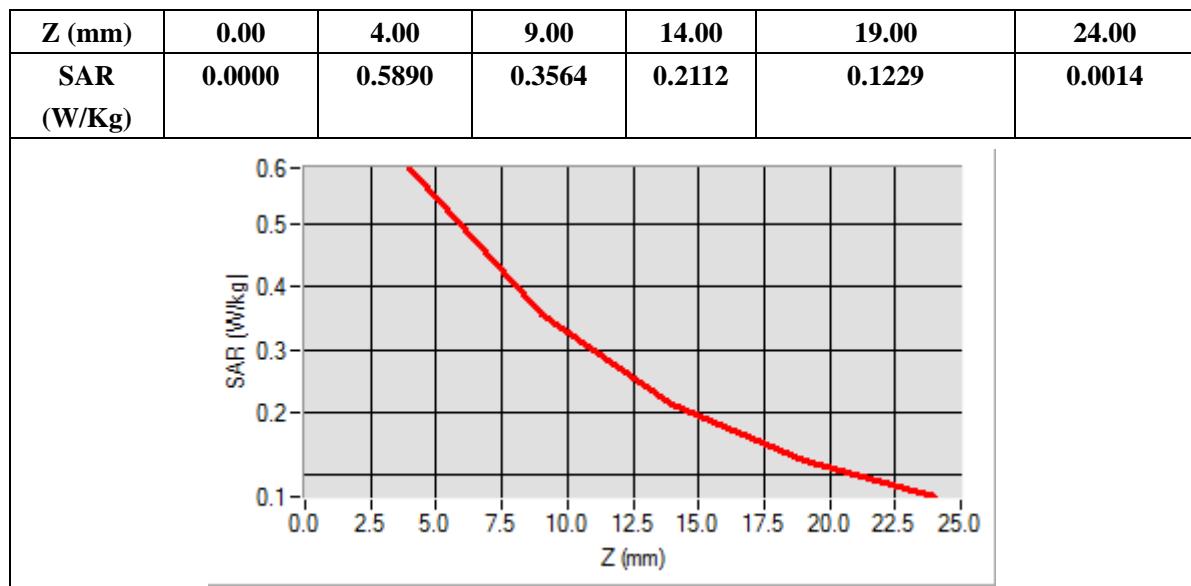
<b>Frequency (MHz)</b>	1909.800049
<b>Relative permittivity (real part)</b>	40.000000
<b>Relative permittivity (imaginary part)</b>	13.195320
<b>Conductivity (S/m)</b>	1.400023
<b>Variation (%)</b>	-3.580000



**Maximum location: X=-5.00, Y=-35.00**

<b>SAR 10g (W/Kg)</b>	0.314609
<b>SAR 1g (W/Kg)</b>	0.551568

**Z Axis Scan**



# MEASUREMENT 22

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 53 seconds

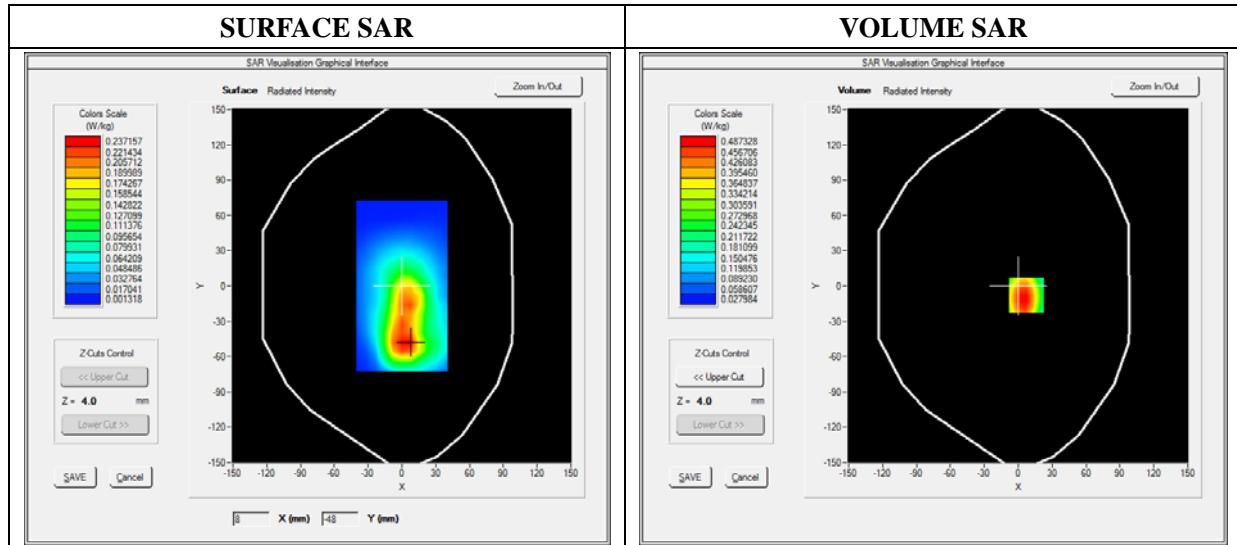
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body back
<b>Band</b>	GSM1900 (GPRS850_2Tx)
<b>Channels</b>	High
<b>Signal</b>	Duty Cycle: 6.00 (Crest factor: 6.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

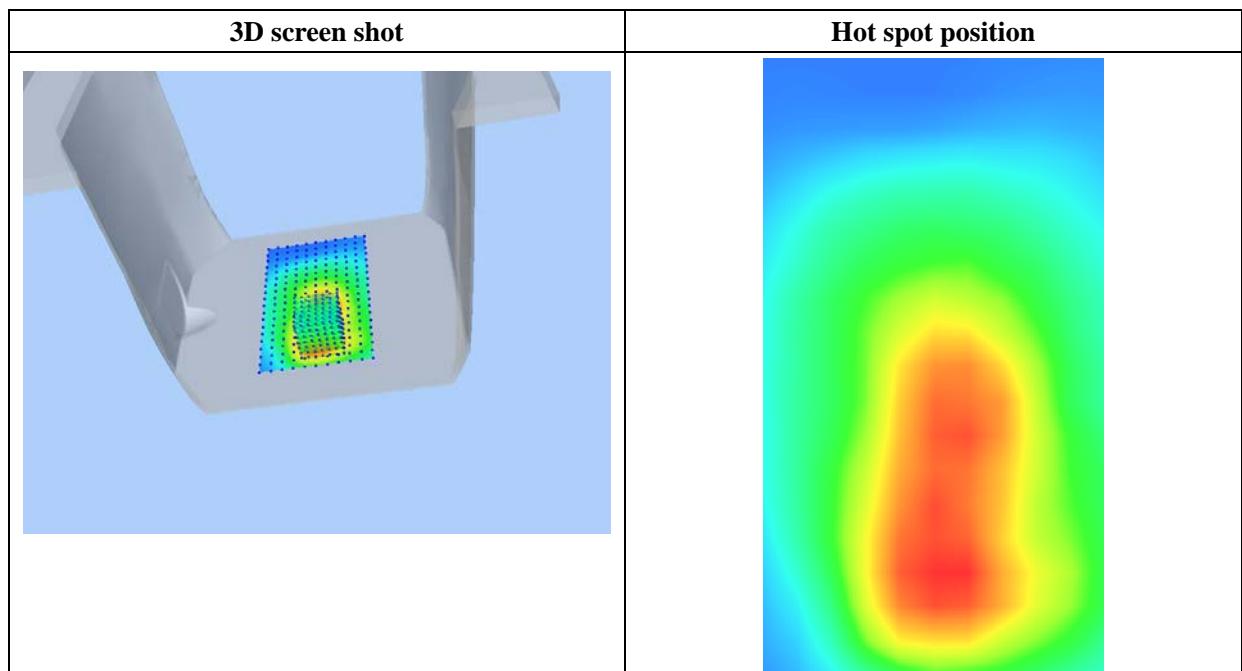
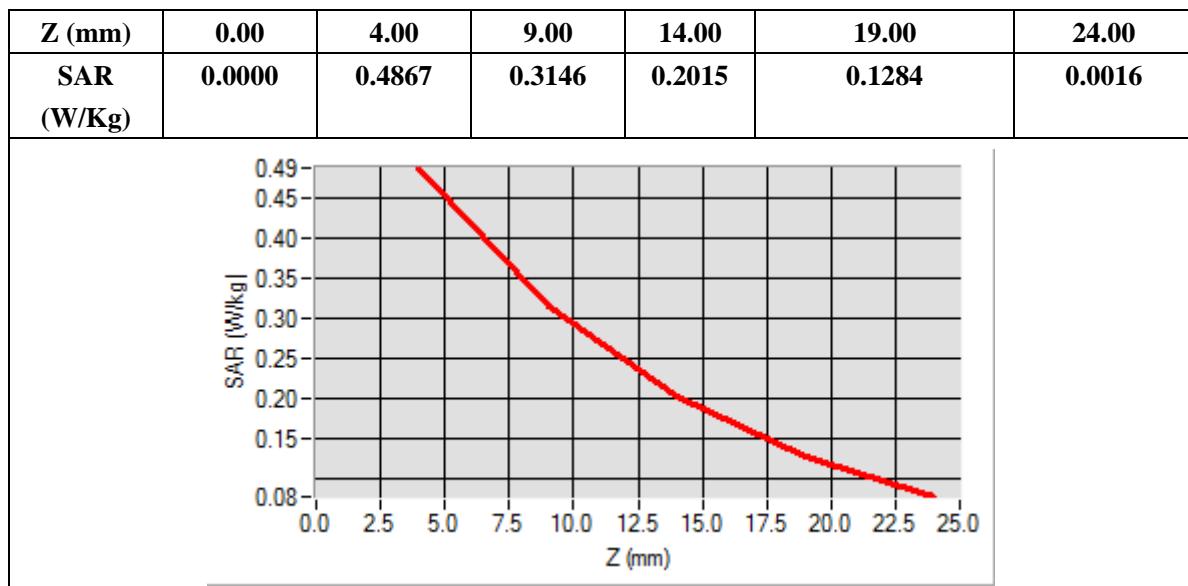
<b>Frequency (MHz)</b>	1909.800049
<b>Relative permittivity (real part)</b>	40.000000
<b>Relative permittivity (imaginary part)</b>	13.195320
<b>Conductivity (S/m)</b>	1.400023
<b>Variation (%)</b>	0.590000



**Maximum location: X=-7.00, Y=-8.00**

<b>SAR 10g (W/Kg)</b>	0.275576
<b>SAR 1g (W/Kg)</b>	0.462495

**Z Axis Scan**



# MEASUREMENT 23

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 56 seconds

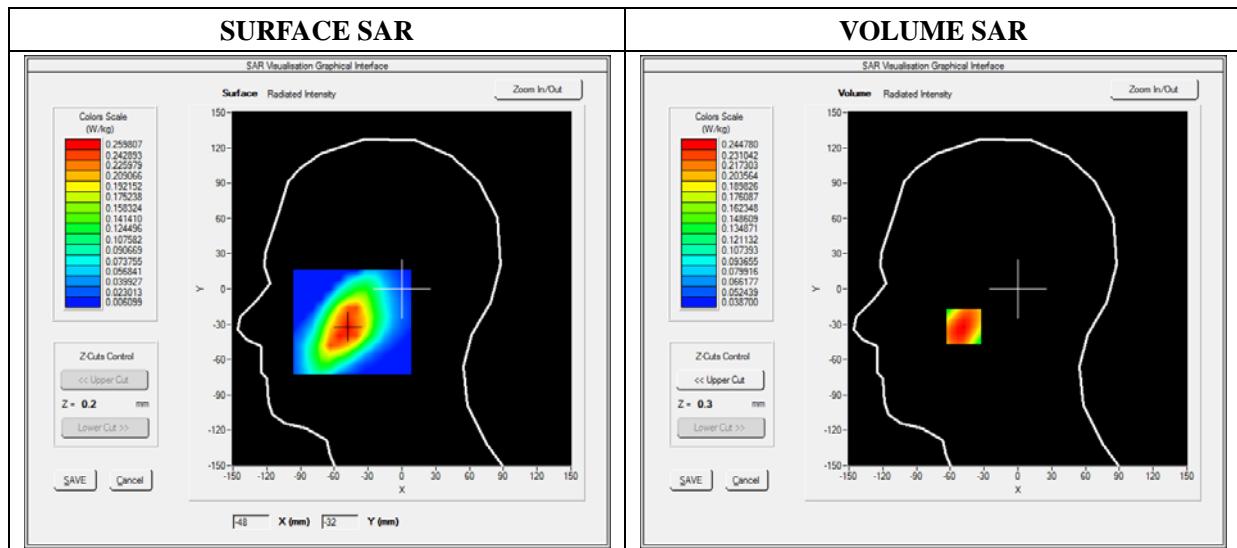
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Cheek
<b>Band</b>	Band 5 WCDMA850
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

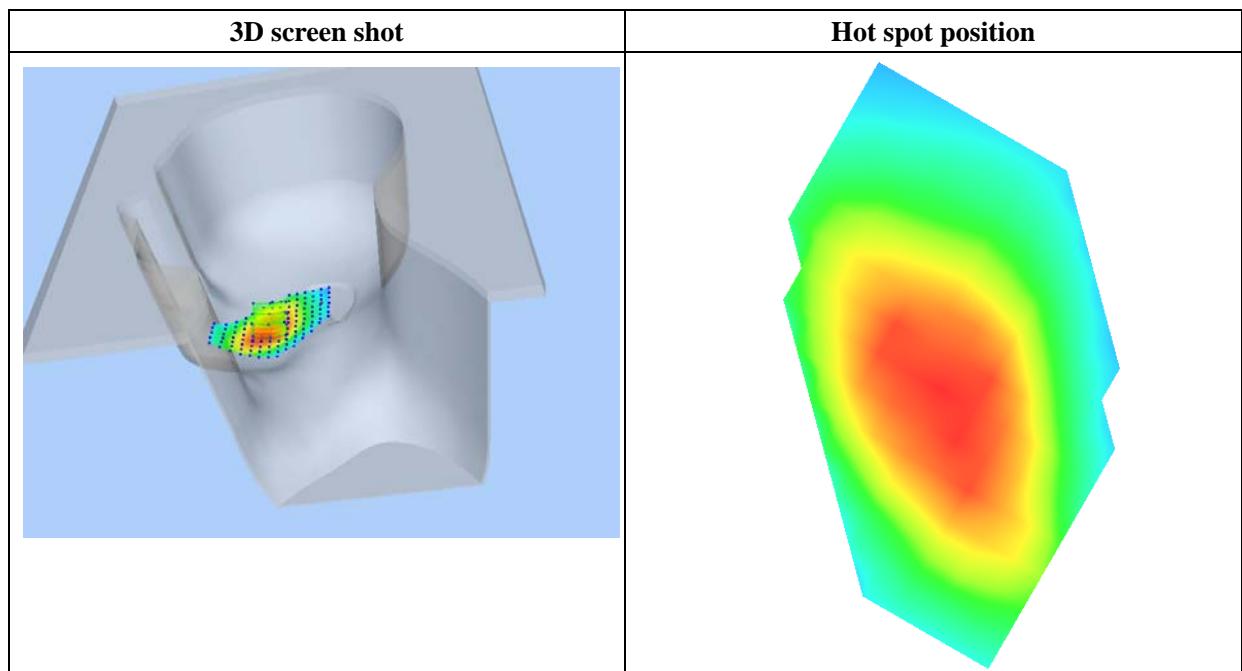
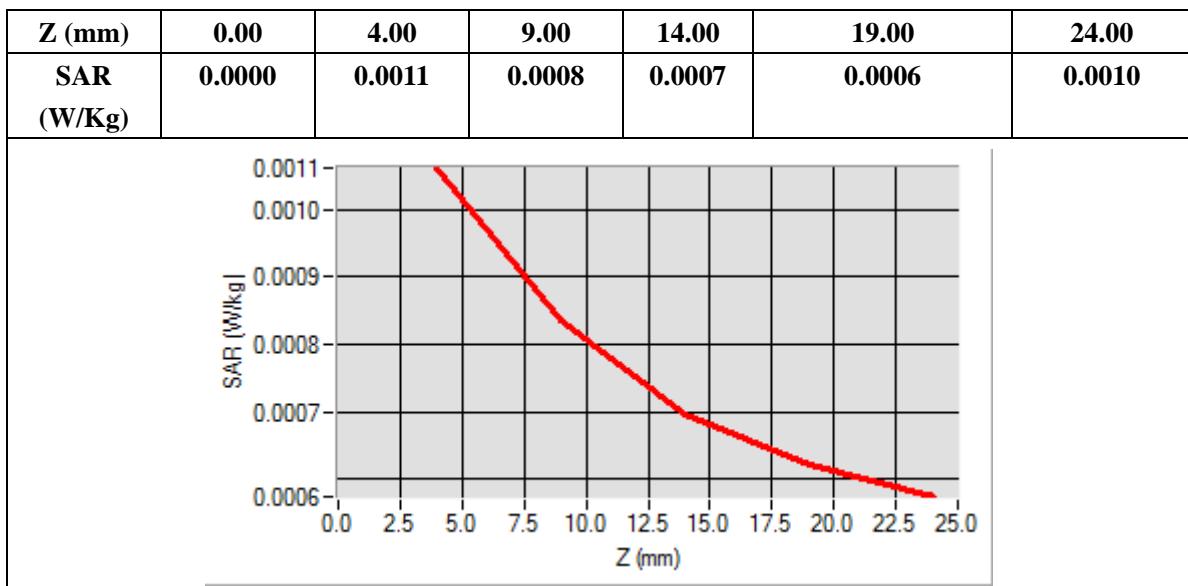
<b>Frequency (MHz)</b>	836.599976
<b>Relative permittivity (real part)</b>	39.520321
<b>Relative permittivity (imaginary part)</b>	18.432920
<b>Conductivity (S/m)</b>	0.856721
<b>Variation (%)</b>	-3.200000



**Maximum location: X=-54.00, Y=-39.00**

<b>SAR 10g (W/Kg)</b>	0.000776
<b>SAR 1g (W/Kg)</b>	0.001012

**Z Axis Scan**



# MEASUREMENT 24

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 43 seconds

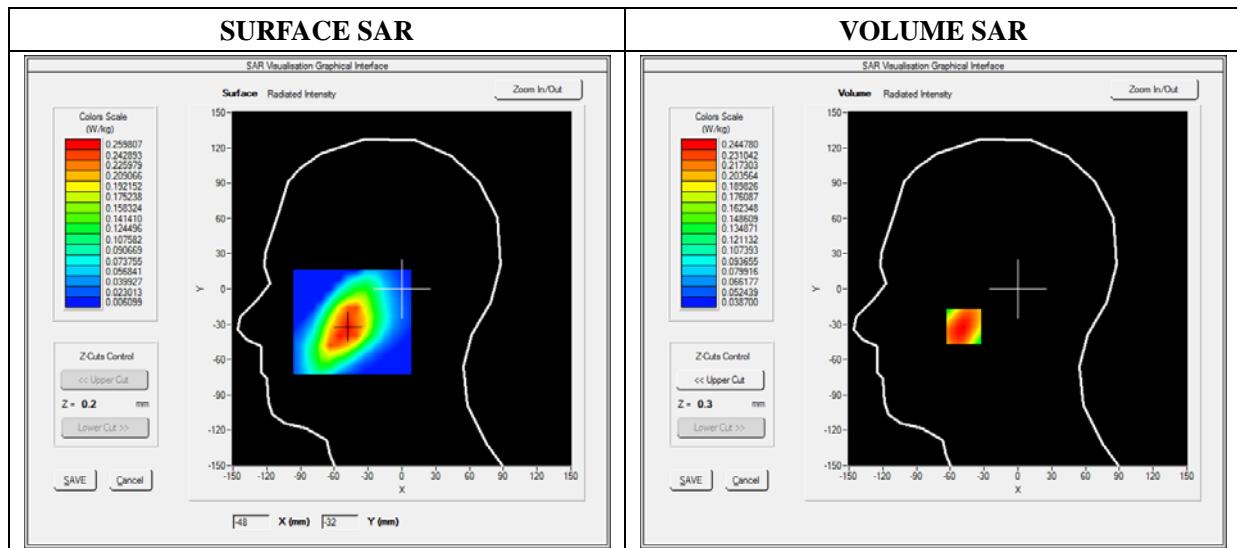
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Tilt
<b>Band</b>	Band 5 WCDMA850
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

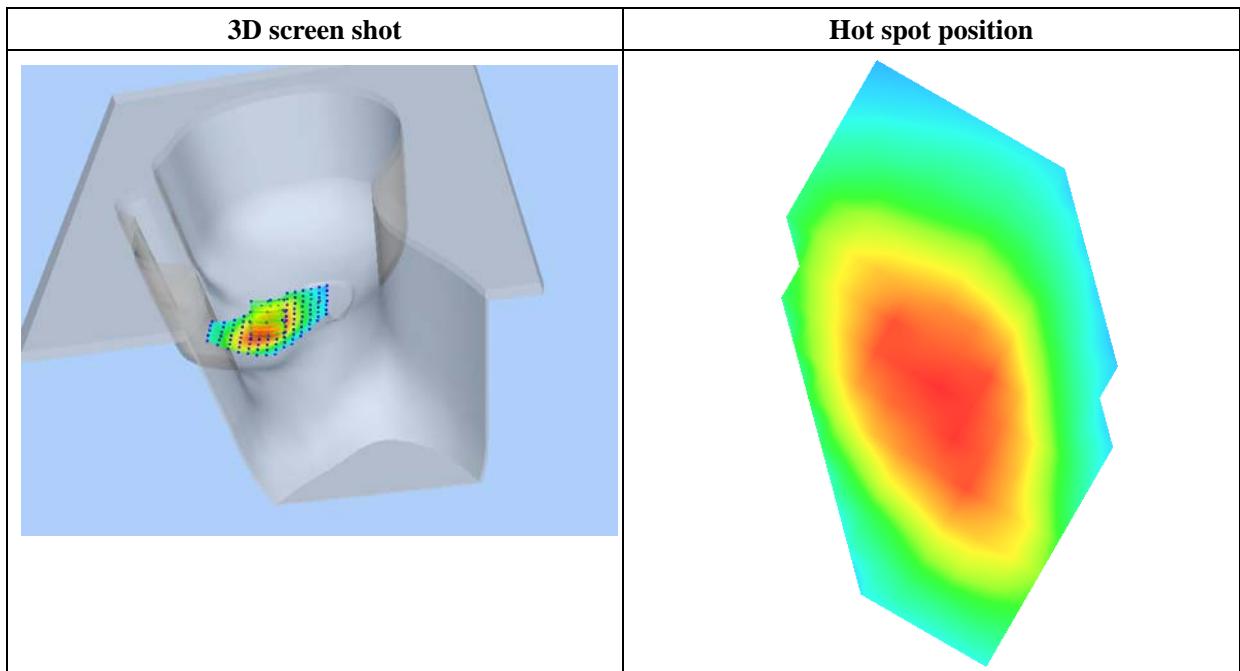
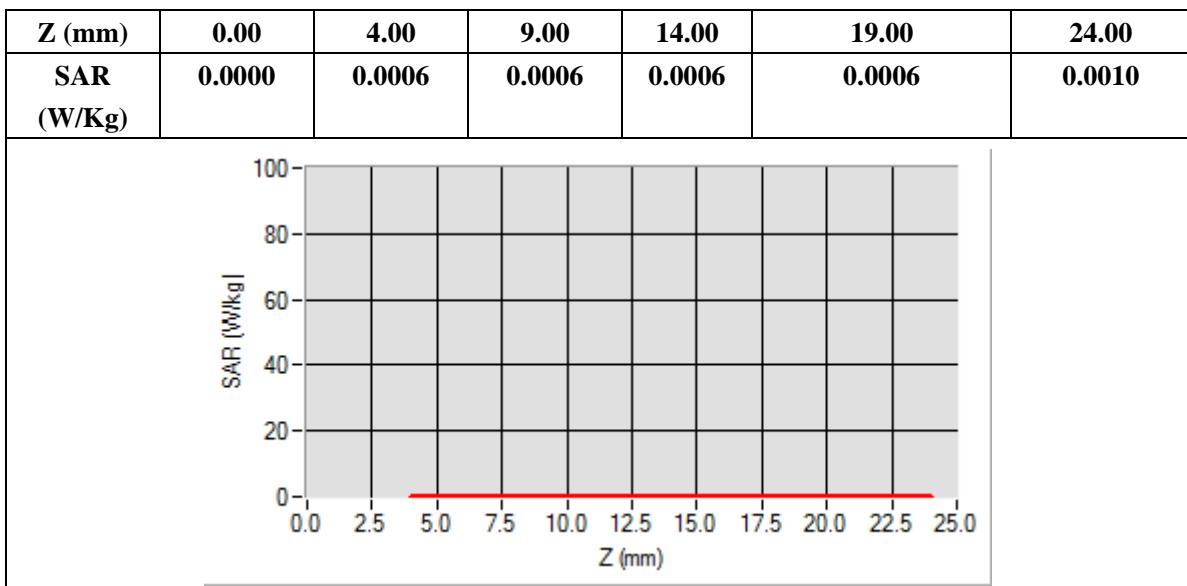
<b>Frequency (MHz)</b>	836.599976
<b>Relative permittivity (real part)</b>	39.520321
<b>Relative permittivity (imaginary part)</b>	18.432920
<b>Conductivity (S/m)</b>	0.856721
<b>Variation (%)</b>	3.50000



**Maximum location: X=-54.00, Y=-36.00**

<b>SAR 10g (W/Kg)</b>	0.000574
<b>SAR 1g (W/Kg)</b>	0.000574

**Z Axis Scan**



# MEASUREMENT 25

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 59 seconds

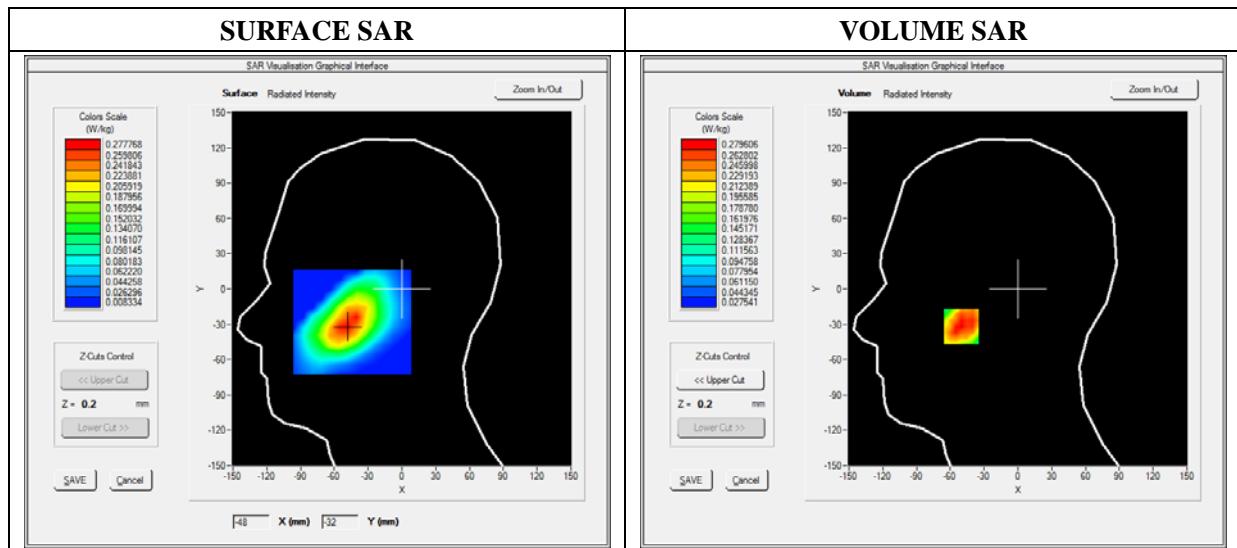
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	Band 5 WCDMA850
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

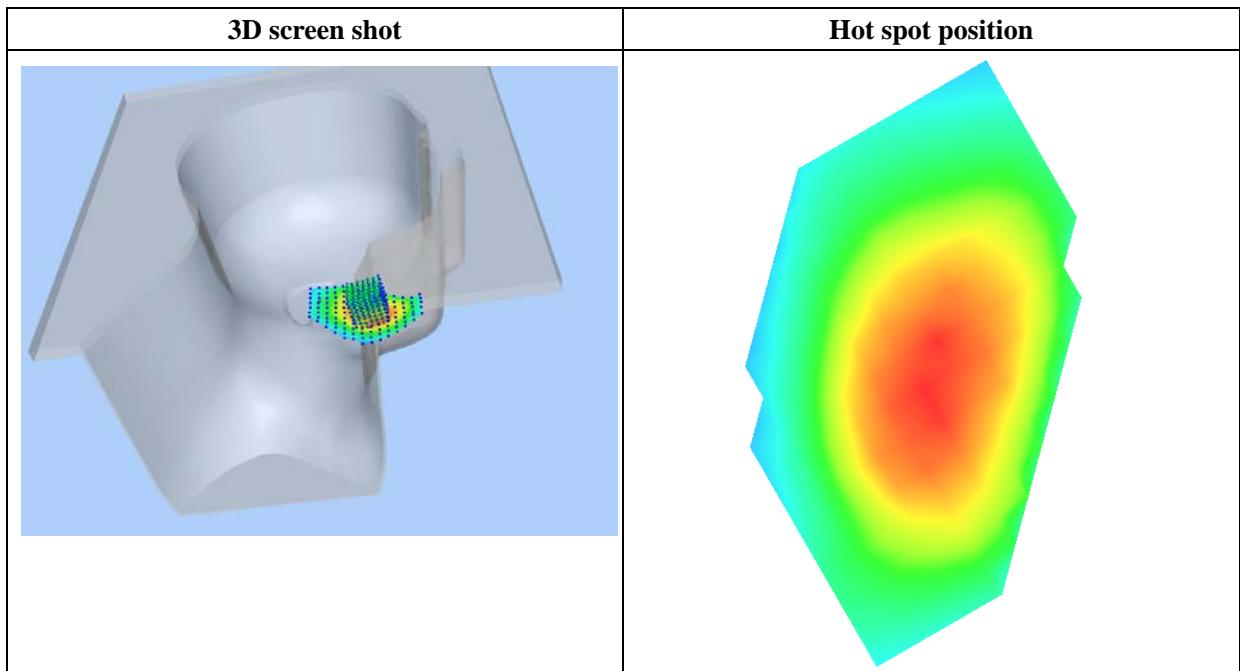
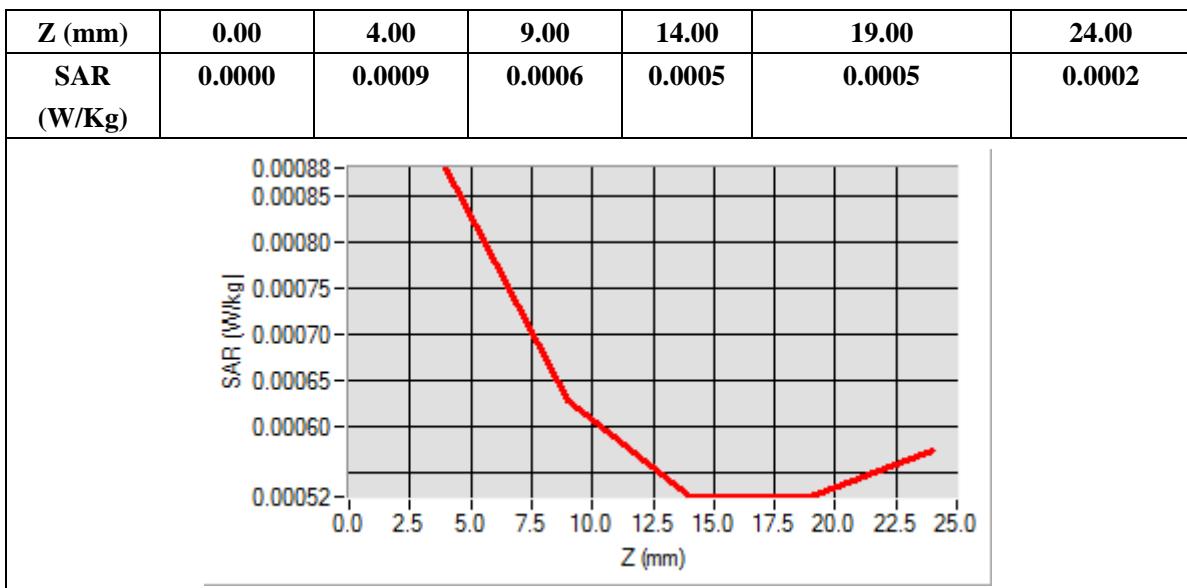
<b>Frequency (MHz)</b>	836.599976
<b>Relative permittivity (real part)</b>	39.520321
<b>Relative permittivity (imaginary part)</b>	18.432920
<b>Conductivity (S/m)</b>	0.856721
<b>Variation (%)</b>	2.45000



**Maximum location: X=-54.00, Y=-36.00**

<b>SAR 10g (W/Kg)</b>	0.000672
<b>SAR 1g (W/Kg)</b>	0.000850

**Z Axis Scan**



# MEASUREMENT 26

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 34 seconds

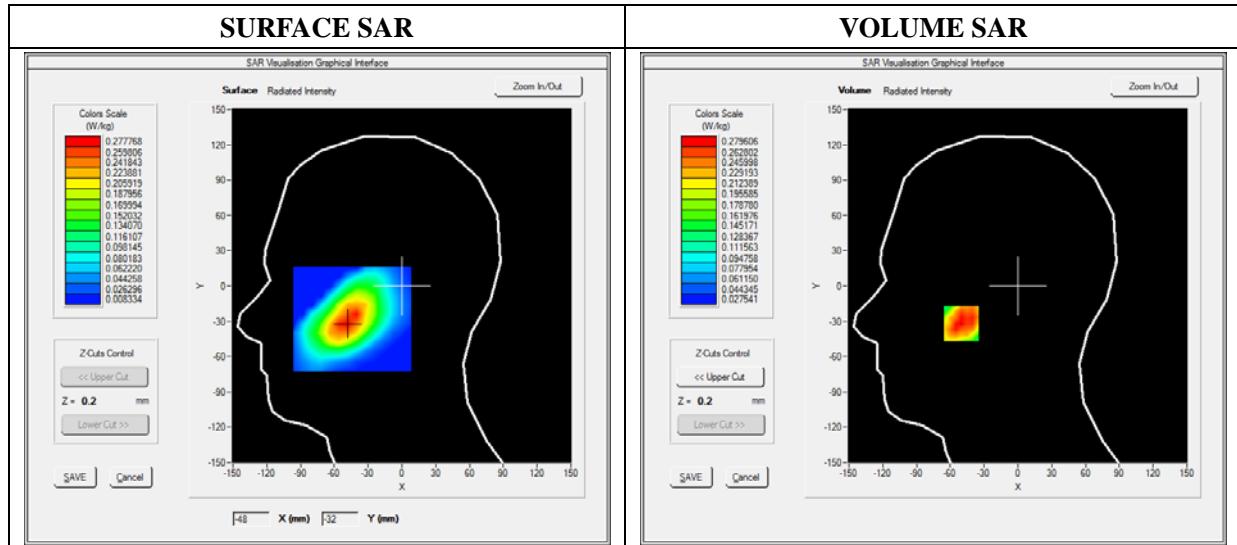
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Tilt
<b>Band</b>	Band 5 WCDMA850
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

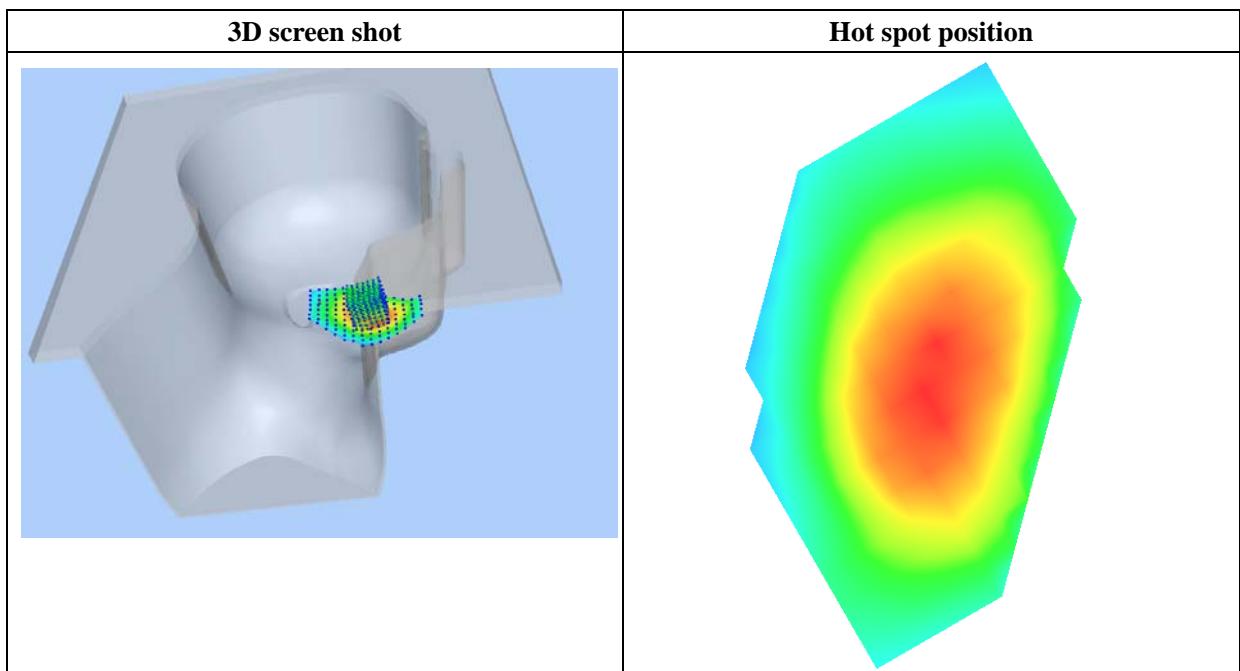
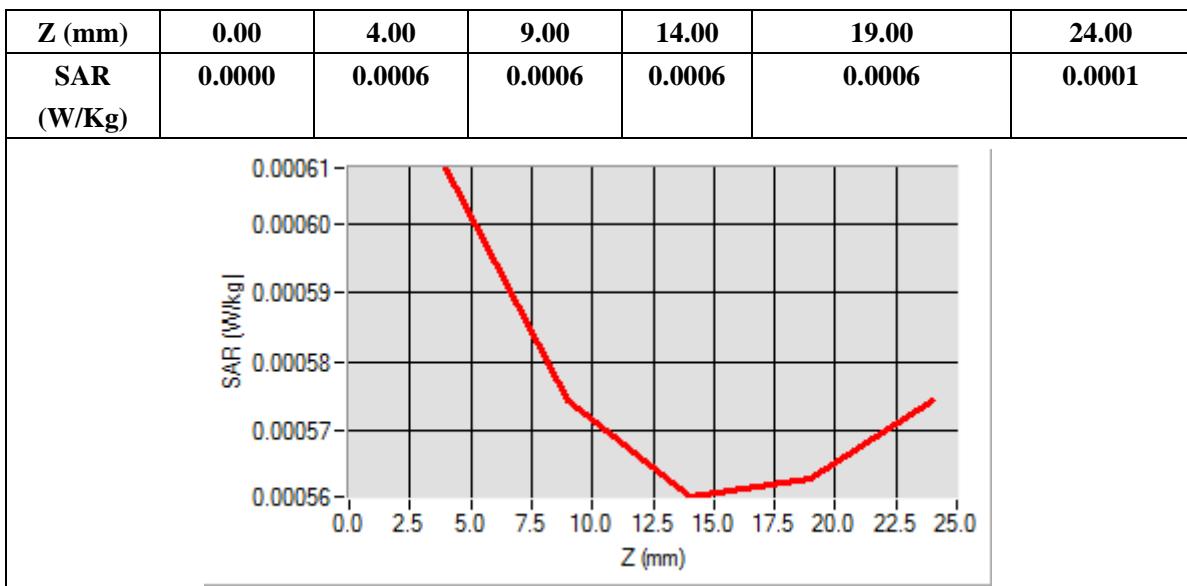
<b>Frequency (MHz)</b>	836.599976
<b>Relative permittivity (real part)</b>	39.520321
<b>Relative permittivity (imaginary part)</b>	18.432920
<b>Conductivity (S/m)</b>	0.856721
<b>Variation (%)</b>	2.45000



**Maximum location: X=-54.00, Y=-33.00**

<b>SAR 10g (W/Kg)</b>	0.000580
<b>SAR 1g (W/Kg)</b>	0.000601

**Z Axis Scan**



# MEASUREMENT 27

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 34 seconds

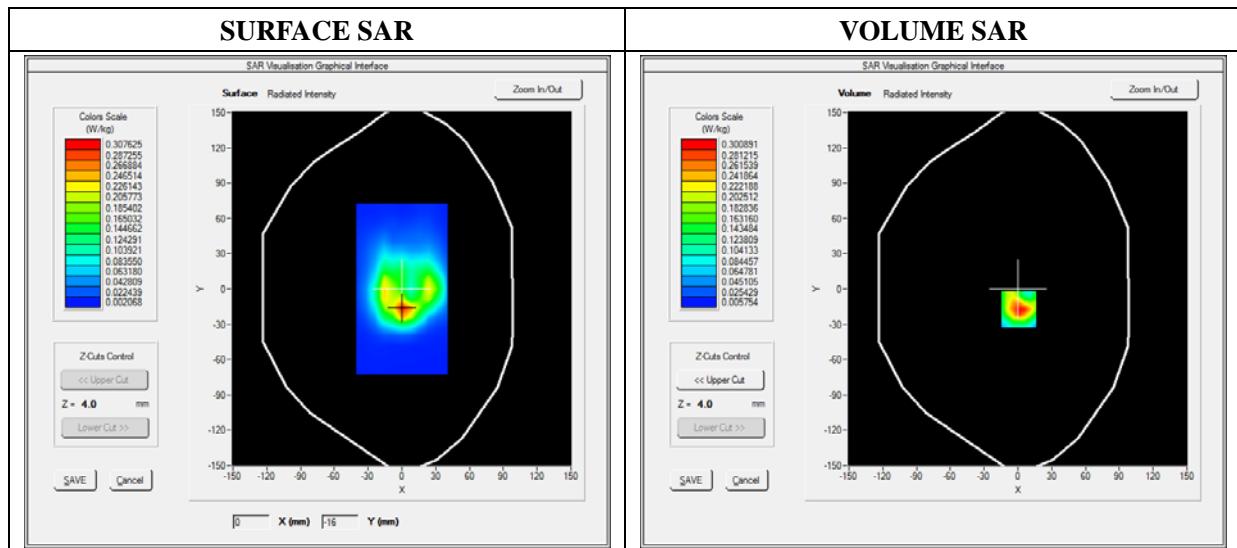
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body front
<b>Band</b>	Band 5 WCDMA850
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

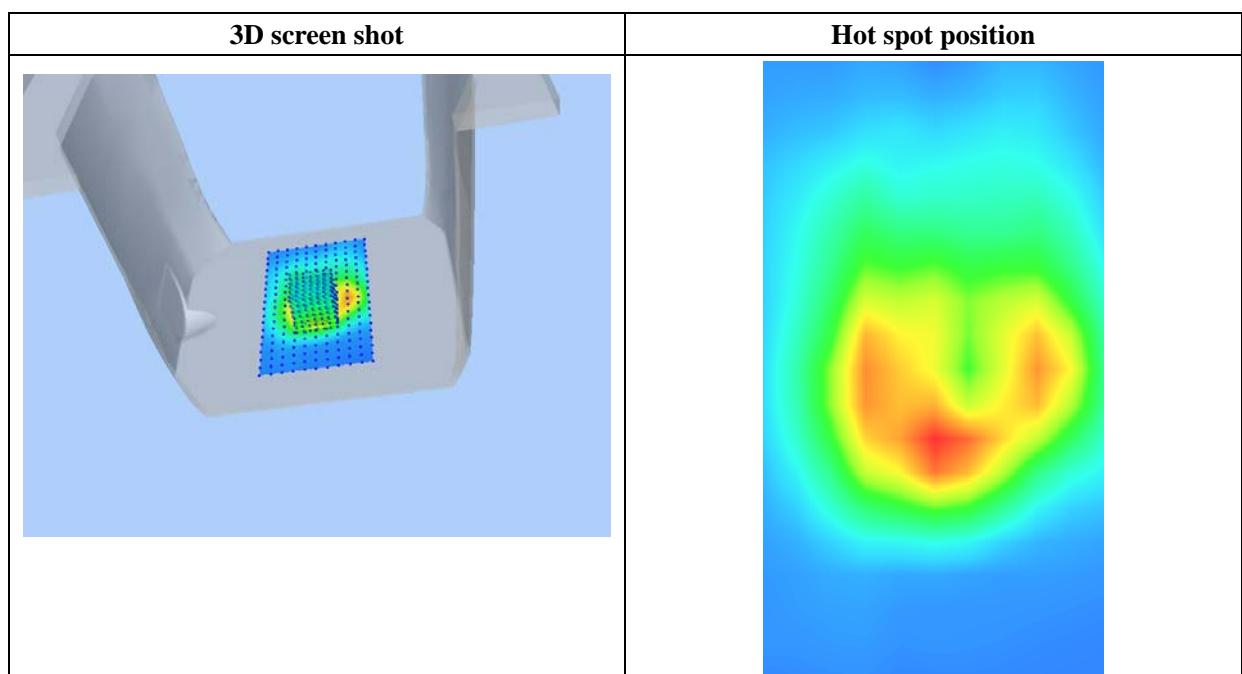
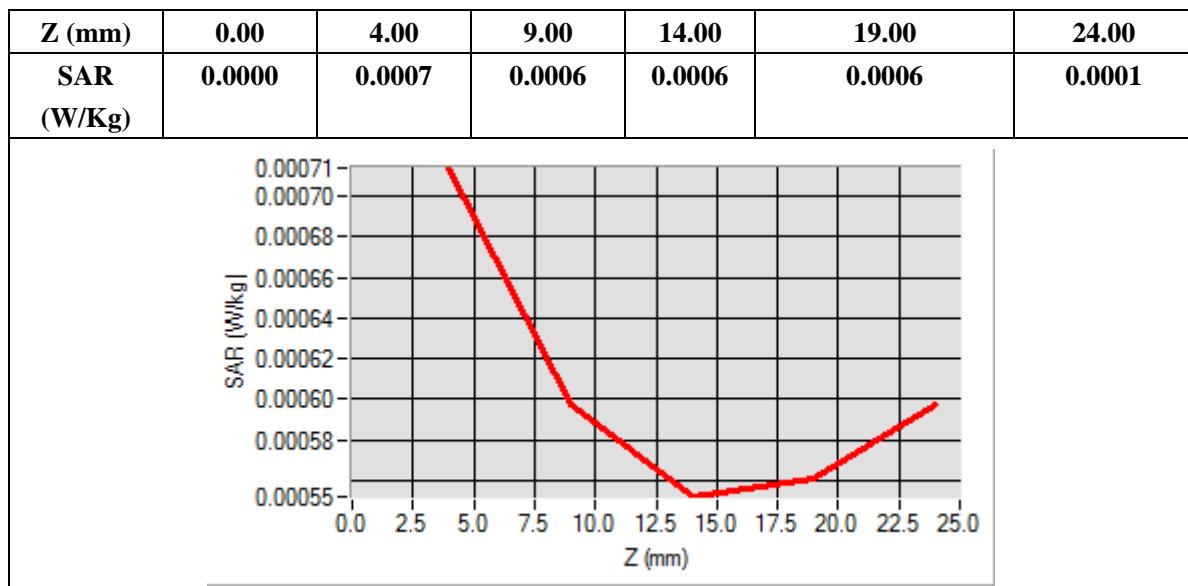
<b>Frequency (MHz)</b>	836.599976
<b>Relative permittivity (real part)</b>	39.520321
<b>Relative permittivity (imaginary part)</b>	18.432920
<b>Conductivity (S/m)</b>	0.856721
<b>Variation (%)</b>	-4.60000



**Maximum location: X=-4.00, Y=-9.00**

<b>SAR 10g (W/Kg)</b>	0.000671
<b>SAR 1g (W/Kg)</b>	0.000752

**Z Axis Scan**



# MEASUREMENT 28

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 24 seconds

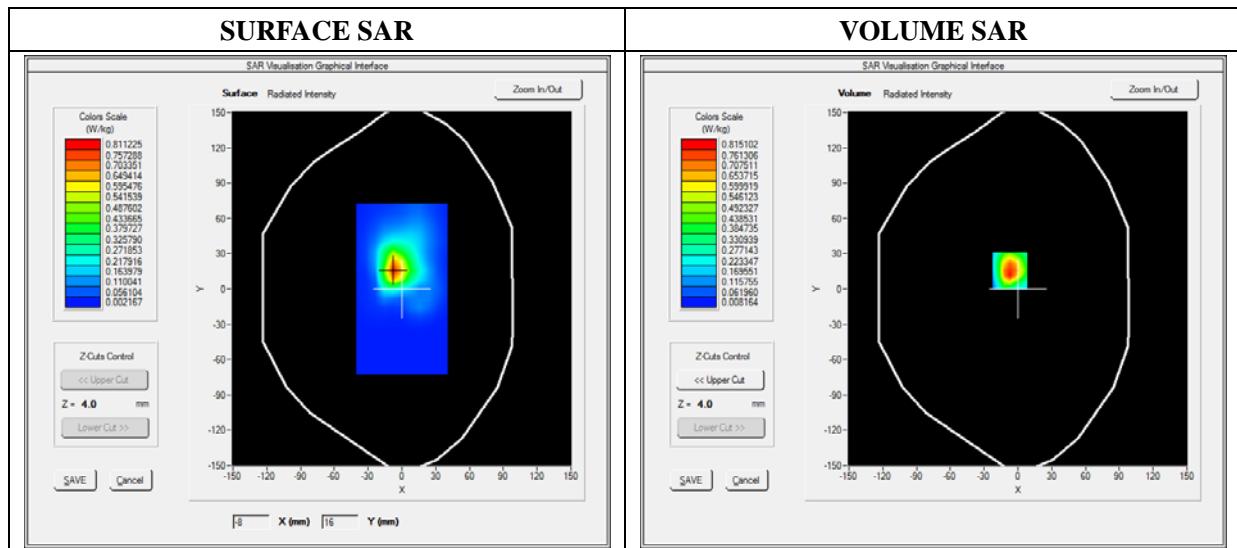
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body back
<b>Band</b>	Band 5 WCDMA850
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

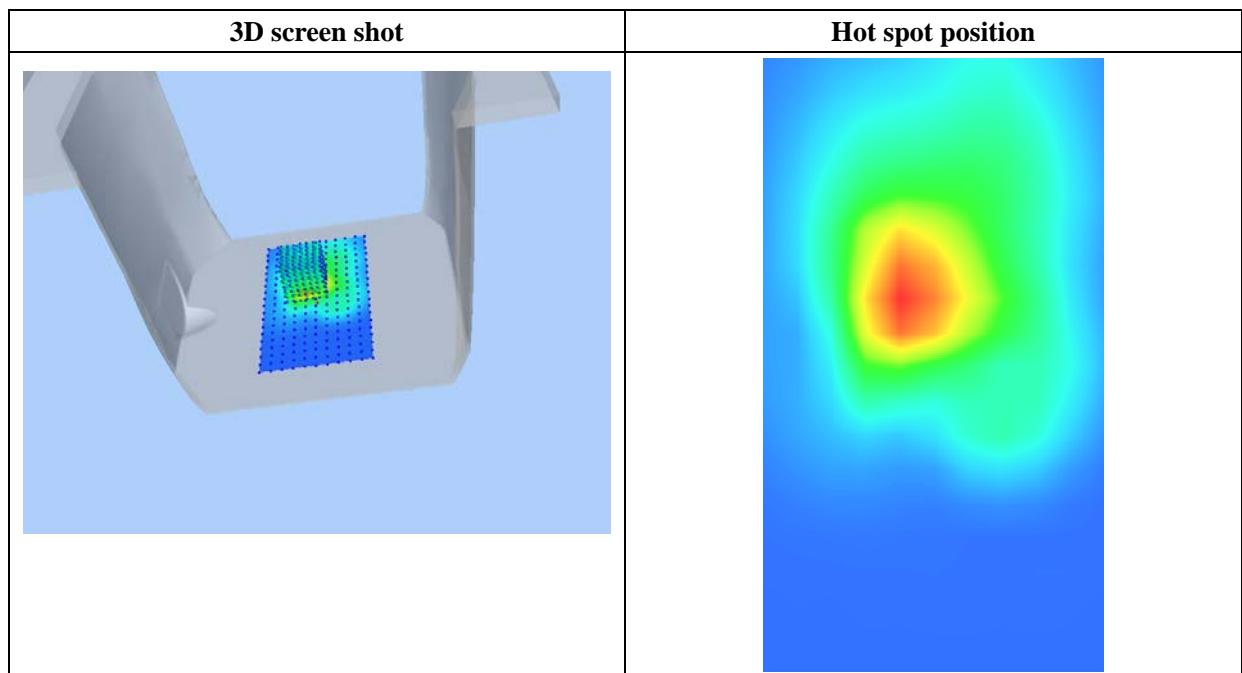
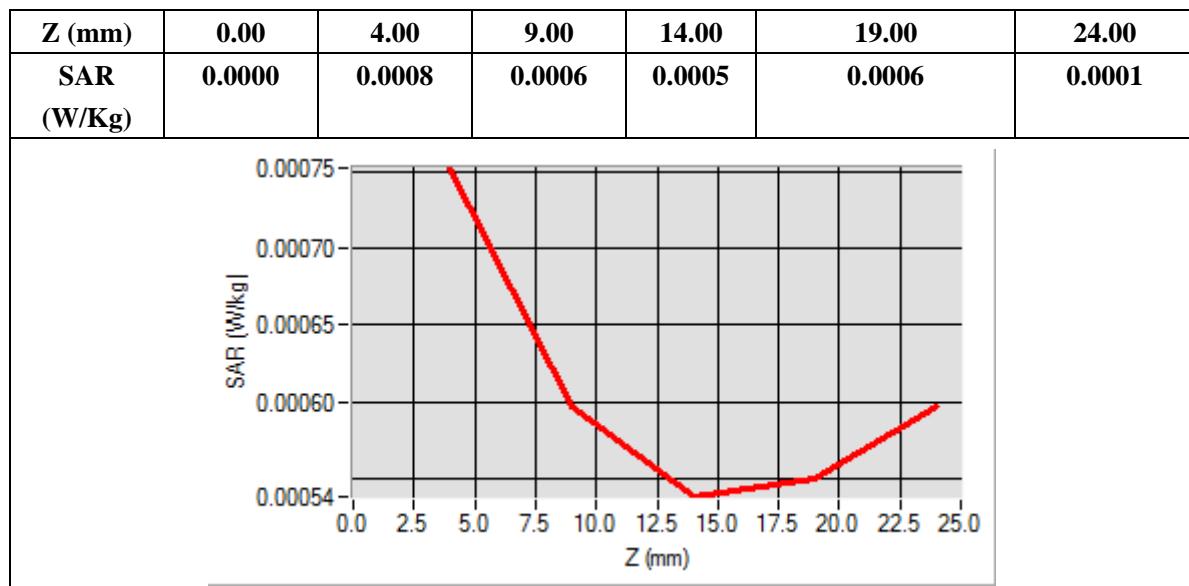
<b>Frequency (MHz)</b>	836.599976
<b>Relative permittivity (real part)</b>	39.520321
<b>Relative permittivity (imaginary part)</b>	18.432920
<b>Conductivity (S/m)</b>	0.856721
<b>Variation (%)</b>	-3.40000



**Maximum location: X=-2.00, Y=-11.00**

<b>SAR 10g (W/Kg)</b>	0.000678
<b>SAR 1g (W/Kg)</b>	0.000786

**Z Axis Scan**



# MEASUREMENT 29

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 13 minutes 04 seconds

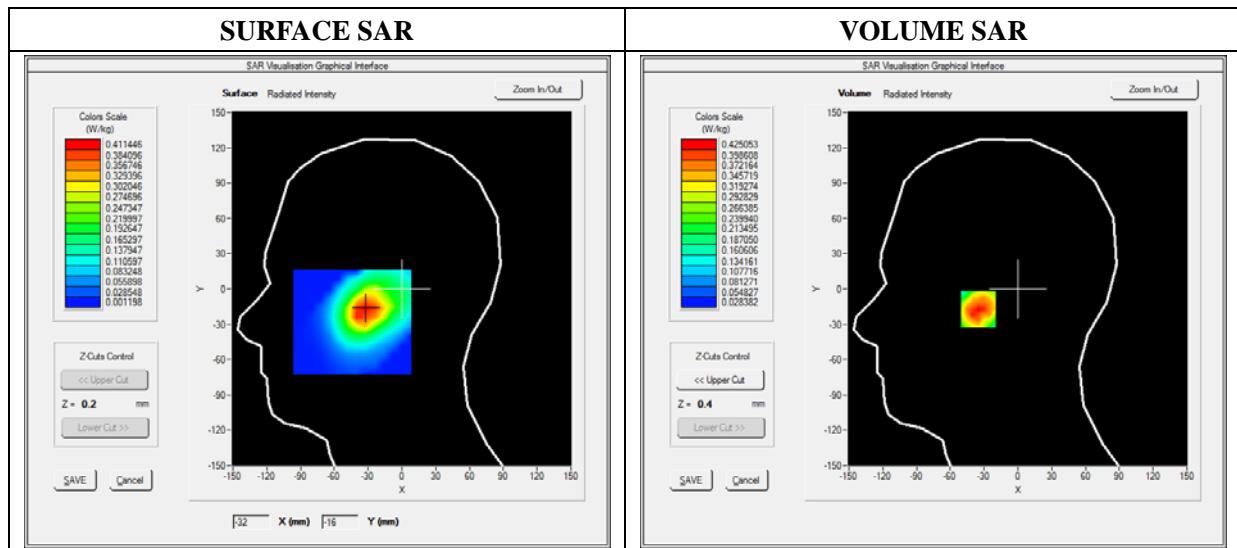
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Cheek
<b>Band</b>	Band 2 WCDMA1900
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

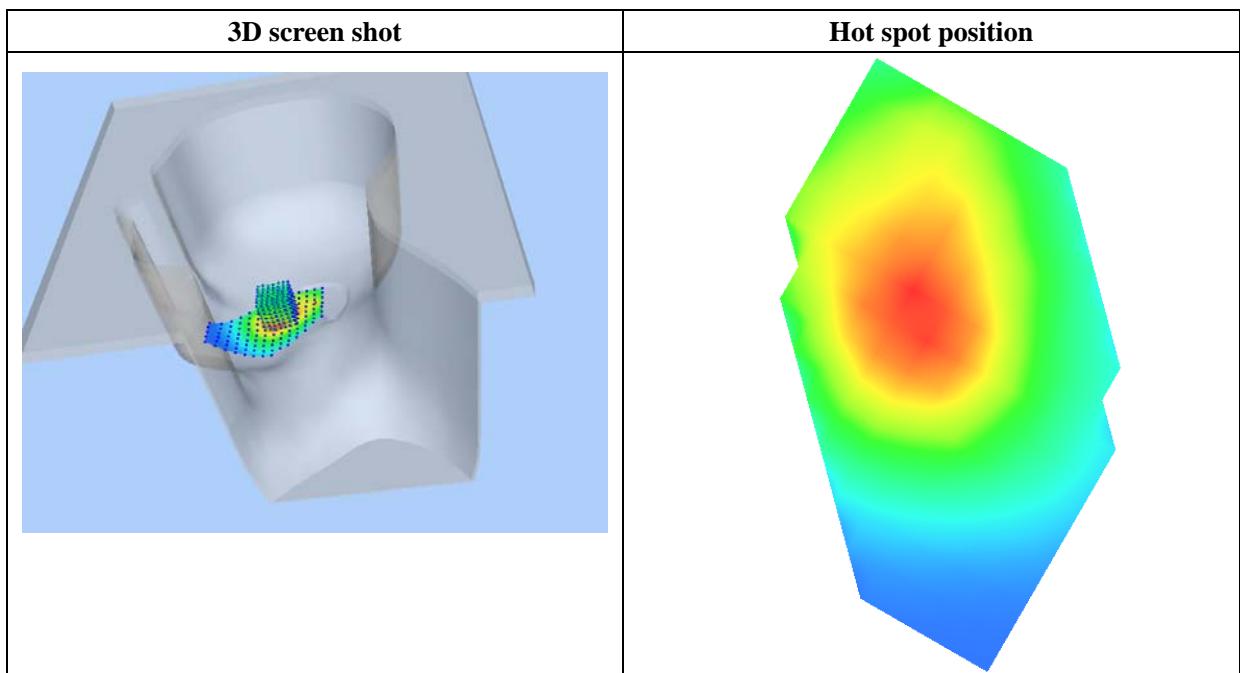
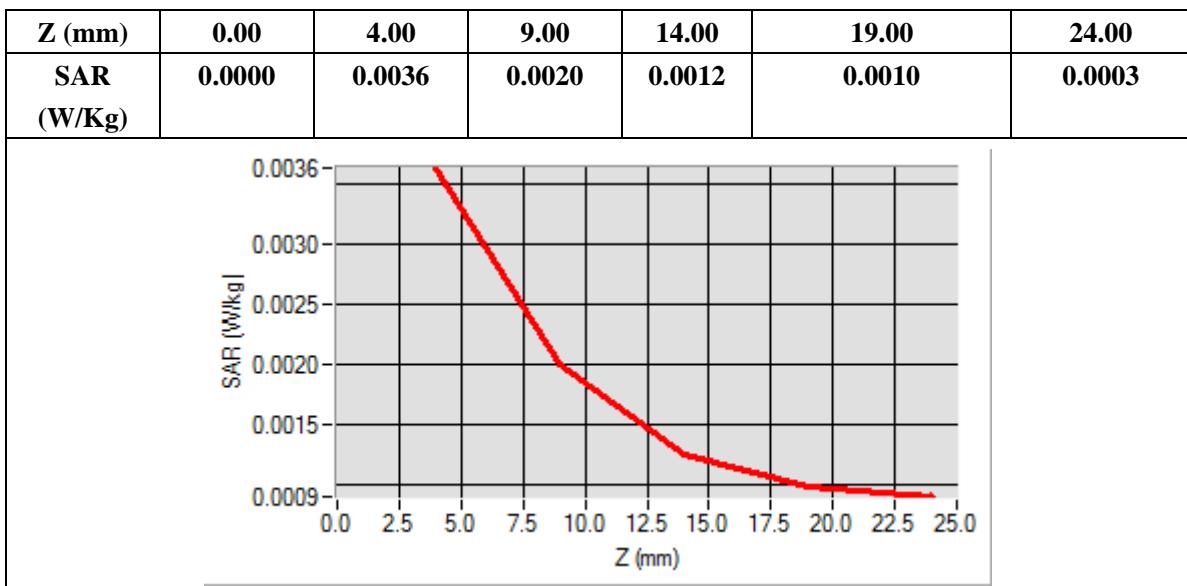
<b>Frequency (MHz)</b>	1880.000000
<b>Relative permittivity (real part)</b>	53.299999
<b>Relative permittivity (imaginary part)</b>	14.560000
<b>Conductivity (S/m)</b>	1.520711
<b>Variation (%)</b>	-2.610000



**Maximum location: X=-12.00, Y=-15.00**

<b>SAR 10g (W/Kg)</b>	0.001852
<b>SAR 1g (W/Kg)</b>	0.003302

**Z Axis Scan**



# MEASUREMENT 30

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 13 minutes 04 seconds

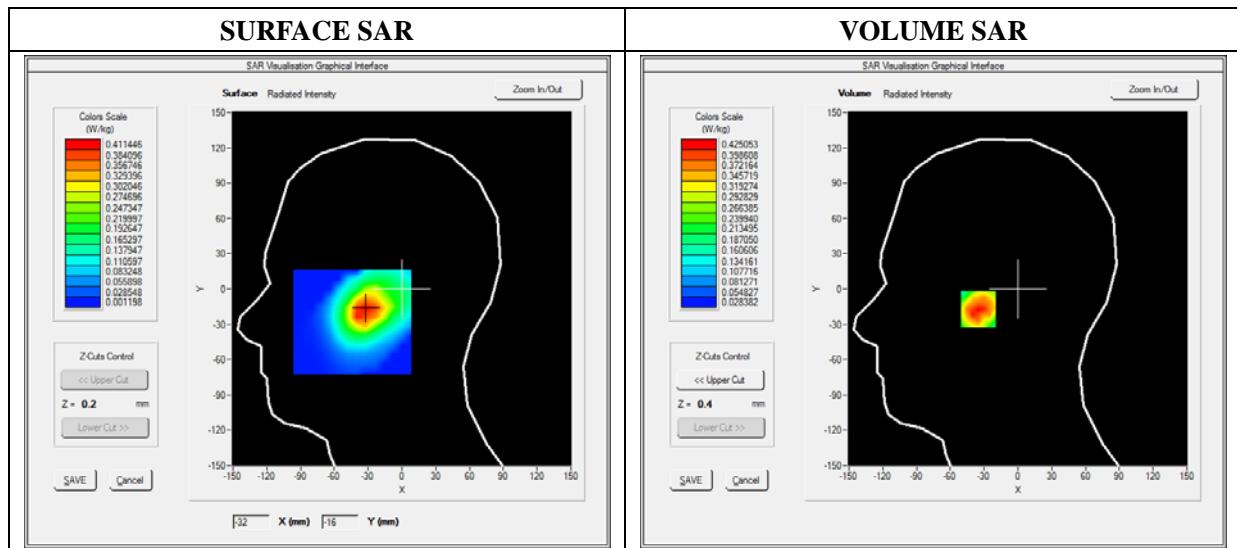
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Right head
<b>Device Position</b>	Tilt
<b>Band</b>	Band 2 WCDMA1900
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

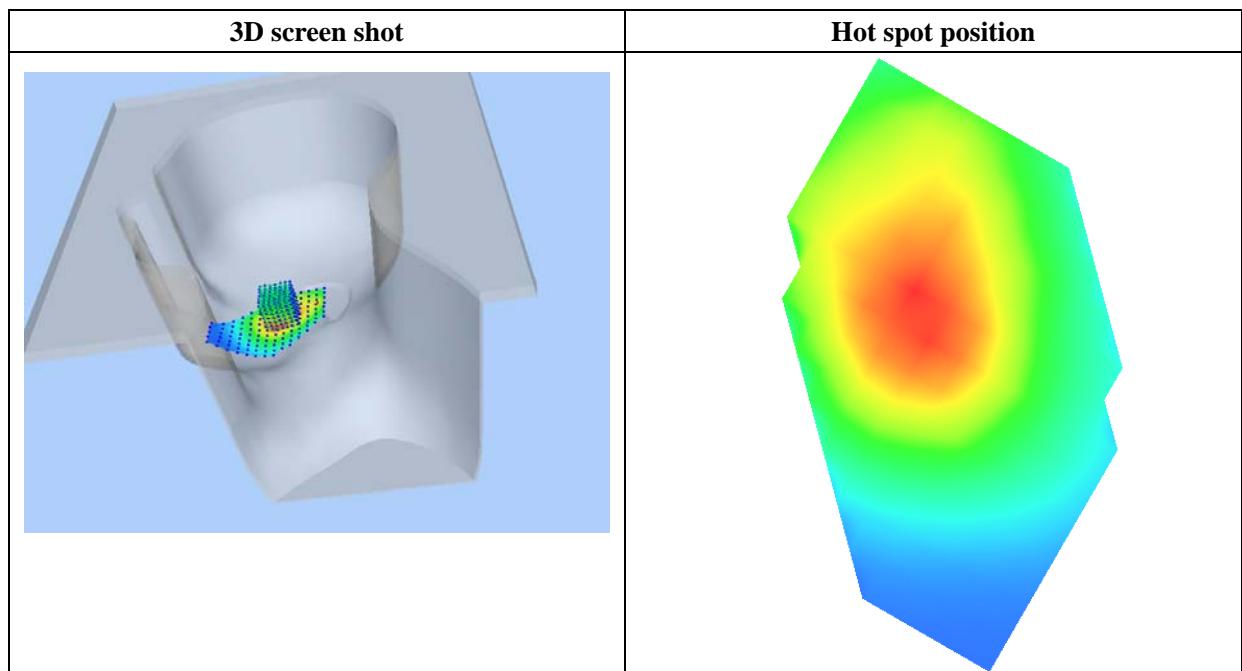
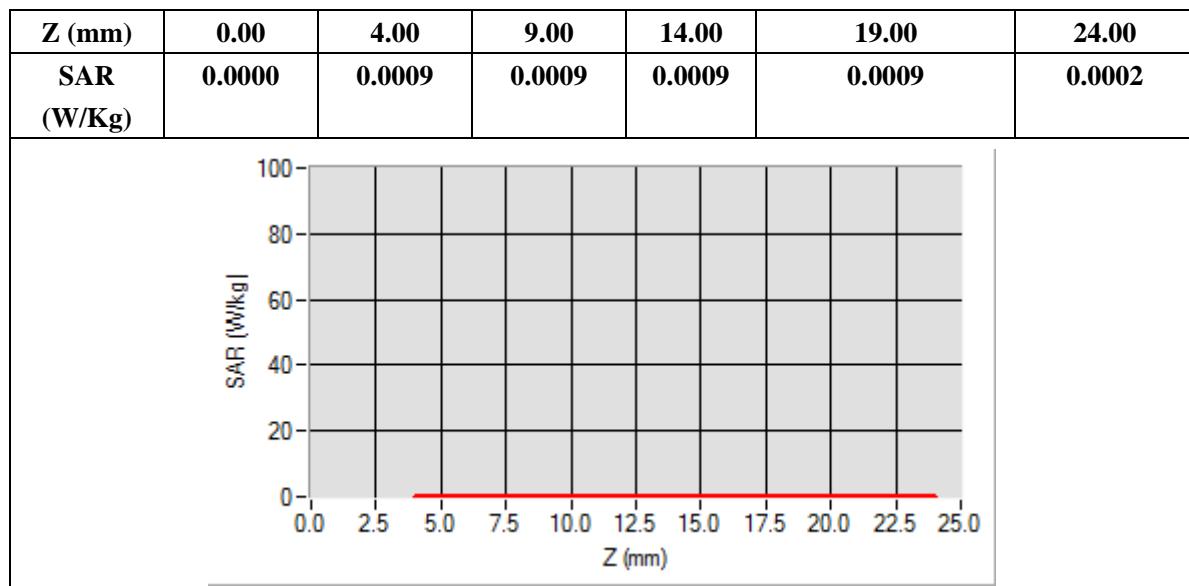
<b>Frequency (MHz)</b>	1880.000000
<b>Relative permittivity (real part)</b>	53.299999
<b>Relative permittivity (imaginary part)</b>	14.560000
<b>Conductivity (S/m)</b>	1.520711
<b>Variation (%)</b>	-2.640000



**Maximum location: X=-12.00, Y=-15.00**

<b>SAR 10g (W/Kg)</b>	0.000898
<b>SAR 1g (W/Kg)</b>	0.000898

**Z Axis Scan**



# MEASUREMENT 31

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 34 seconds

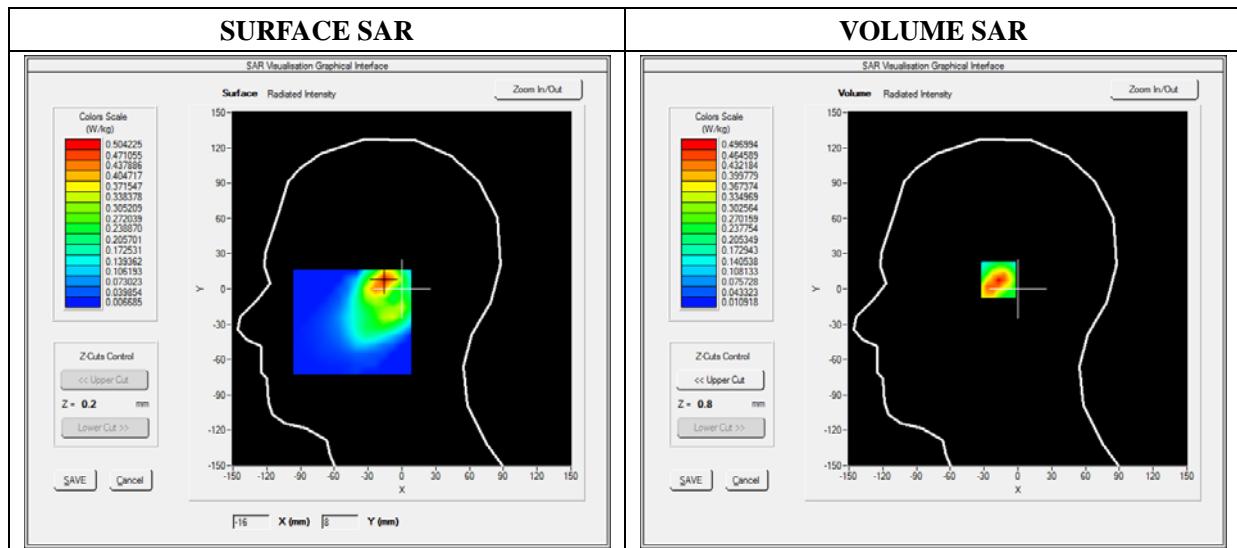
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Cheek
<b>Band</b>	Band 2 WCDMA1900
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

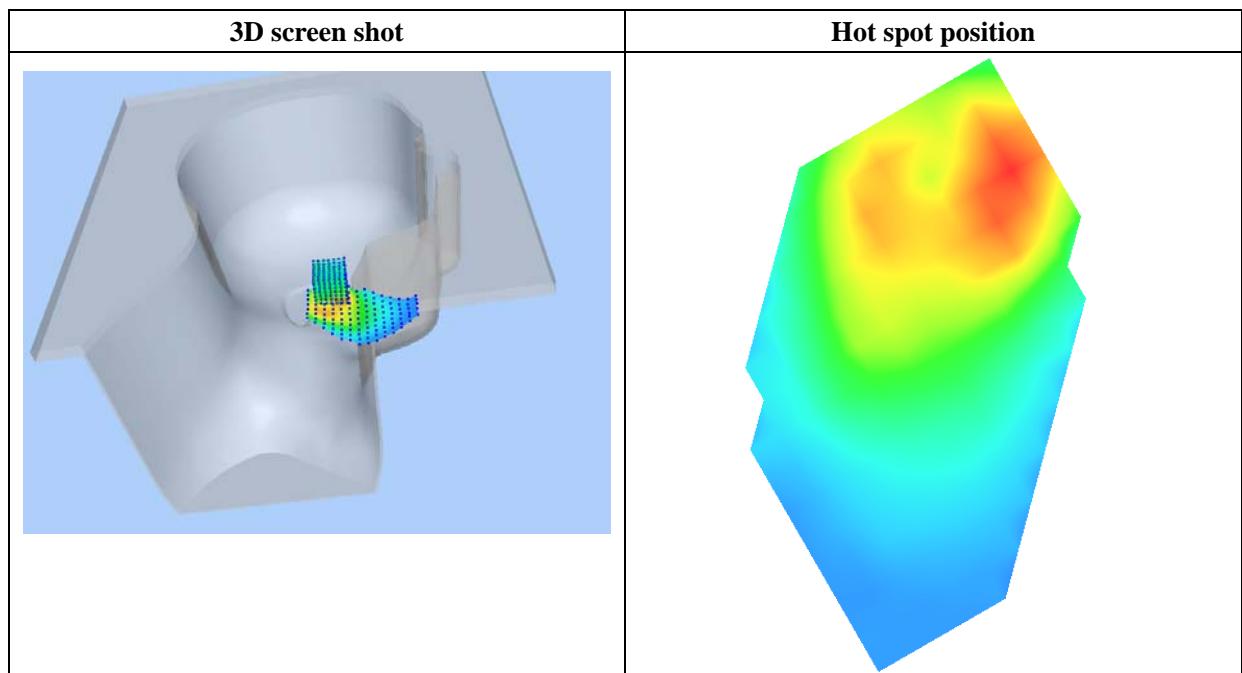
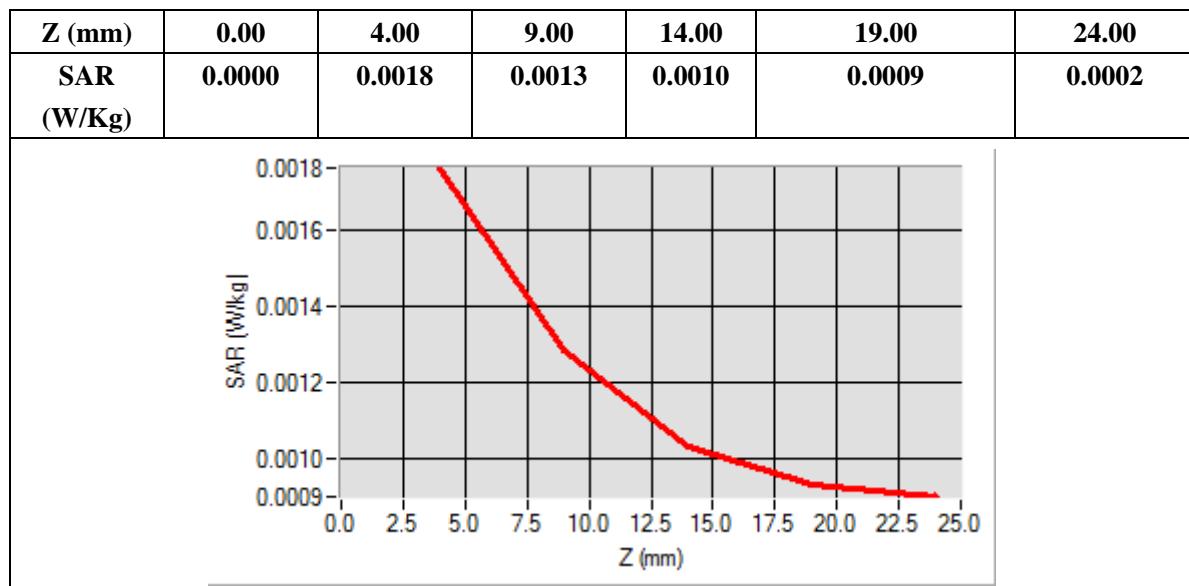
<b>Frequency (MHz)</b>	1880.000000
<b>Relative permittivity (real part)</b>	53.299999
<b>Relative permittivity (imaginary part)</b>	14.560000
<b>Conductivity (S/m)</b>	1.520711
<b>Variation (%)</b>	3.270000



**Maximum location: X=-10.00, Y=-19.00**

<b>SAR 10g (W/Kg)</b>	0.001175
<b>SAR 1g (W/Kg)</b>	0.001632

**Z Axis Scan**



# MEASUREMENT 32

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 31 seconds

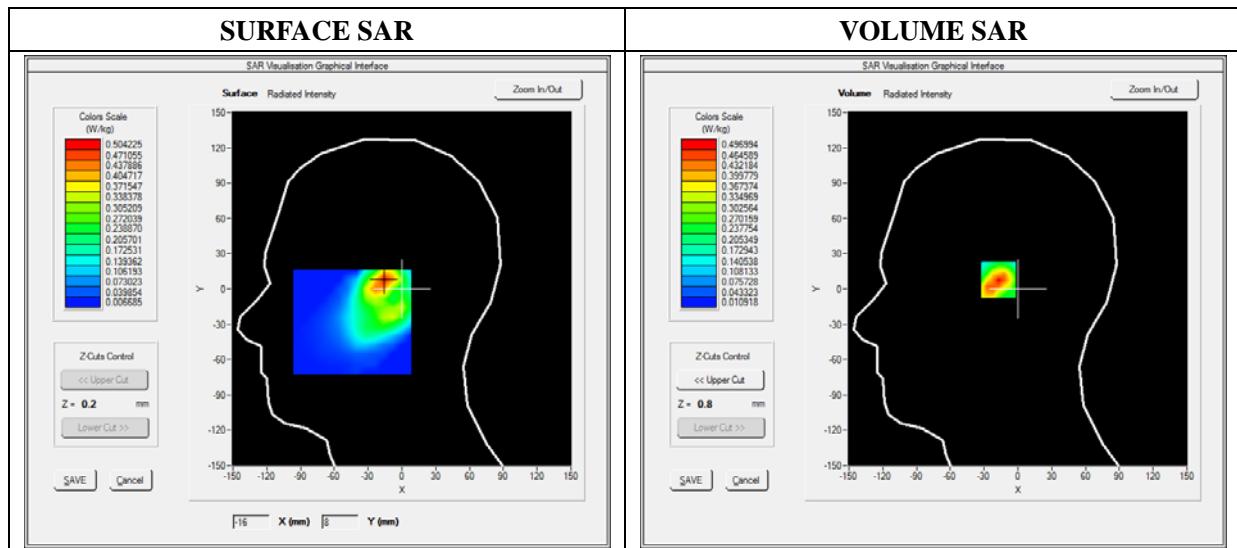
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Left head
<b>Device Position</b>	Tilt
<b>Band</b>	Band 2 WCDMA1900
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

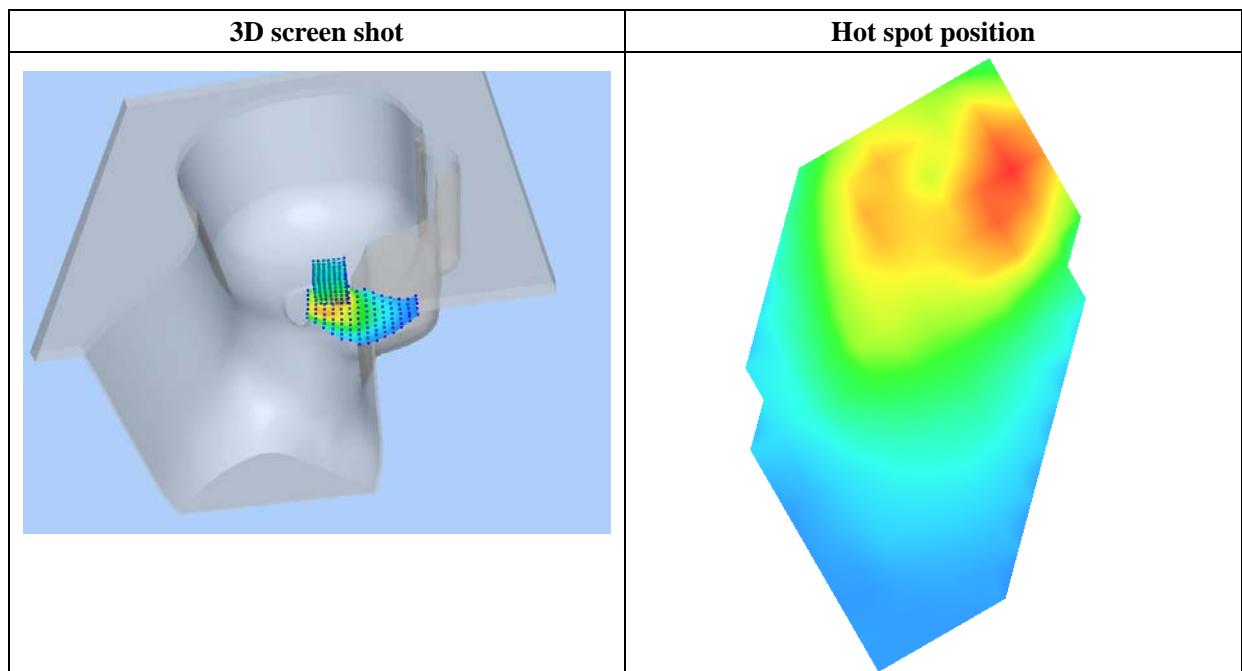
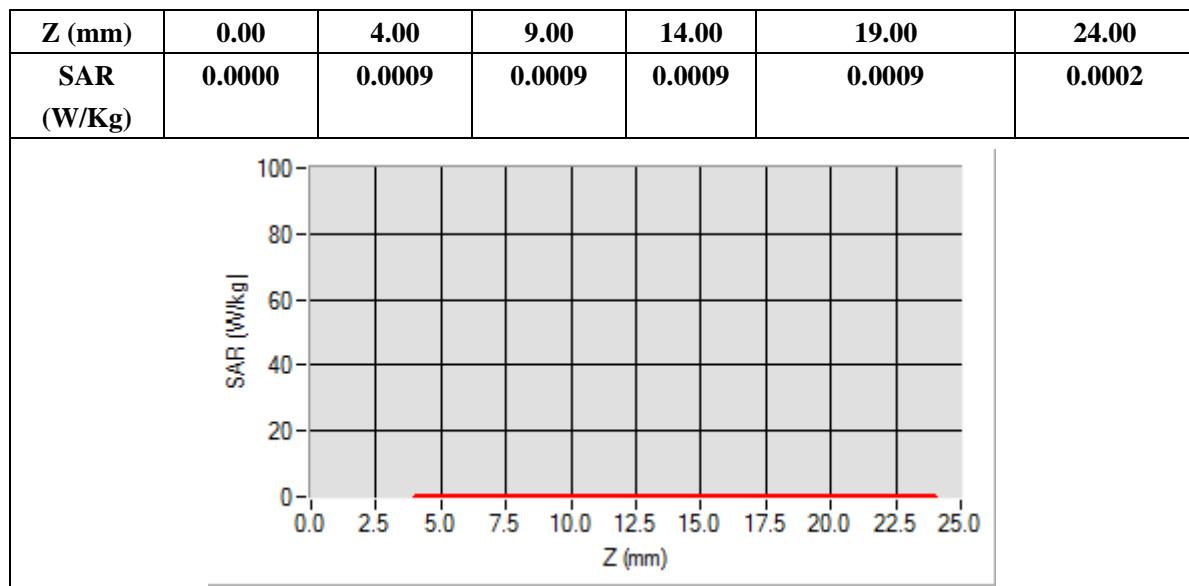
<b>Frequency (MHz)</b>	1880.000000
<b>Relative permittivity (real part)</b>	53.299999
<b>Relative permittivity (imaginary part)</b>	14.560000
<b>Conductivity (S/m)</b>	1.520711
<b>Variation (%)</b>	4.450000



**Maximum location: X=-10.00, Y=-19.00**

<b>SAR 10g (W/Kg)</b>	0.000898
<b>SAR 1g (W/Kg)</b>	0.000898

**Z Axis Scan**



# MEASUREMENT 33

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 19 seconds

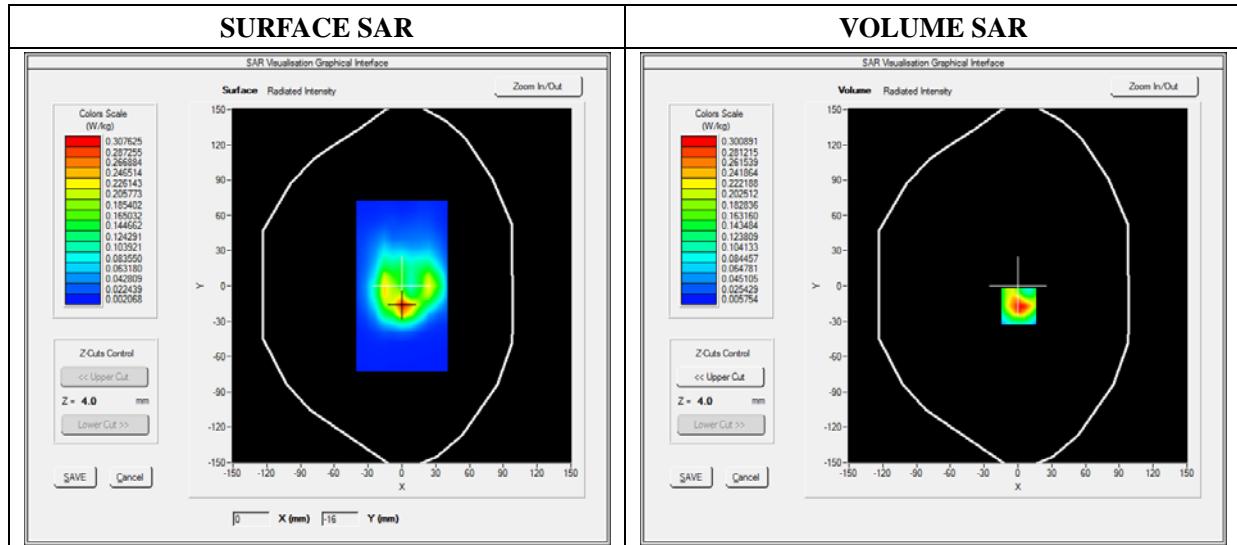
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body front
<b>Band</b>	Band 2 WCDMA1900
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

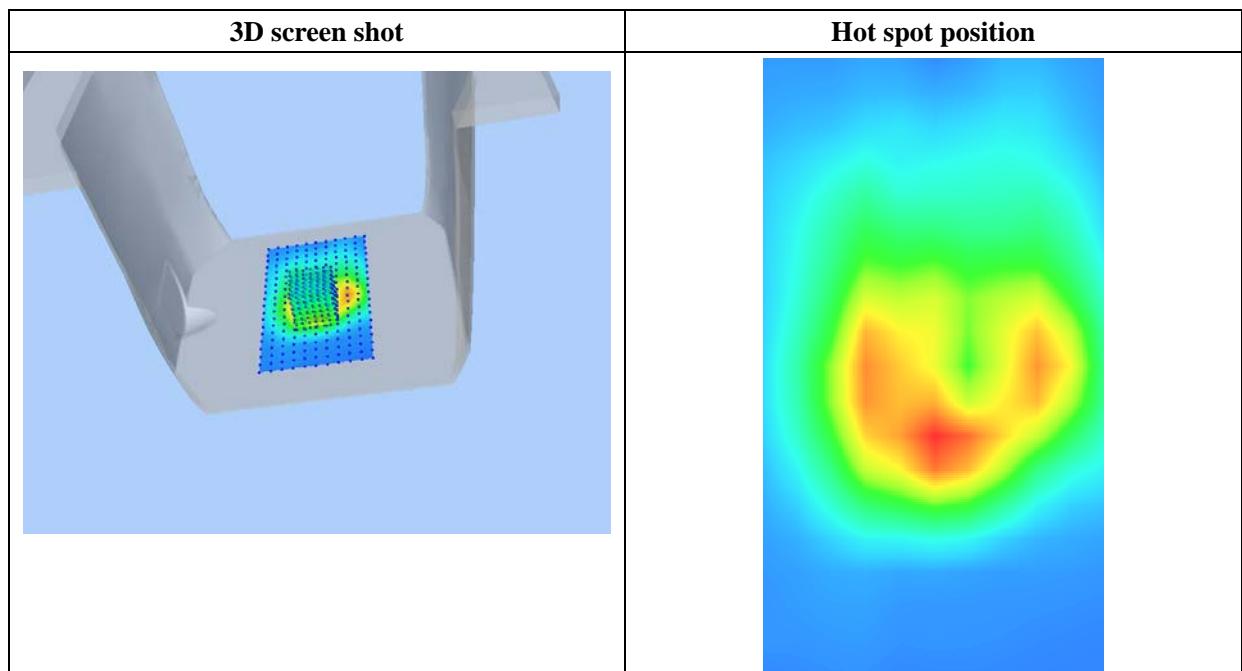
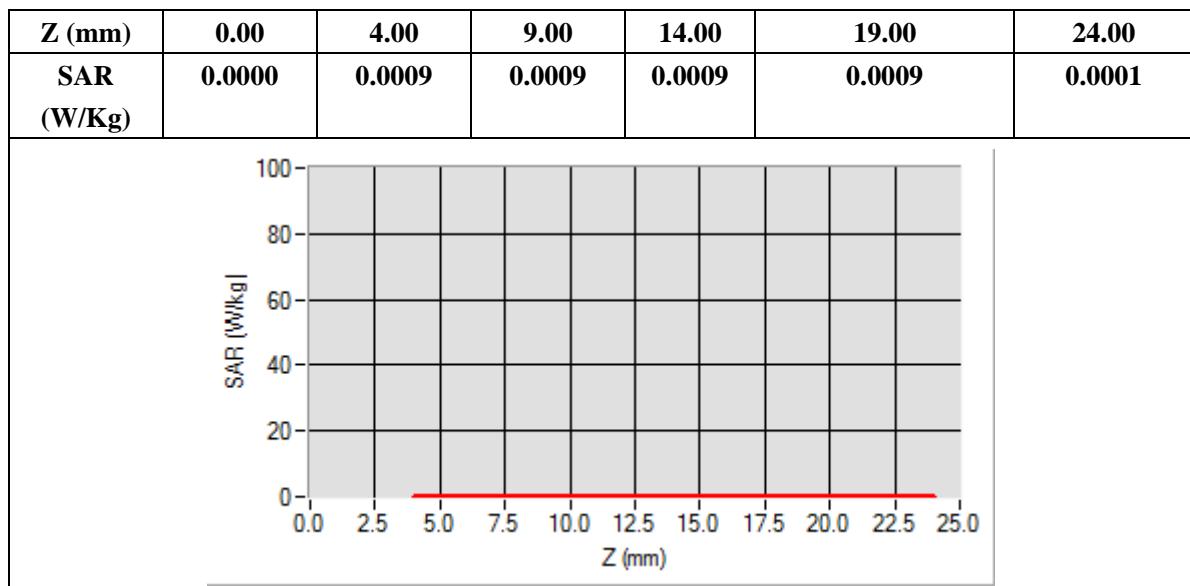
<b>Frequency (MHz)</b>	1880.000000
<b>Relative permittivity (real part)</b>	53.299999
<b>Relative permittivity (imaginary part)</b>	14.560000
<b>Conductivity (S/m)</b>	1.520711
<b>Variation (%)</b>	3.670000



**Maximum location: X=-0.00, Y=-5.00**

<b>SAR 10g (W/Kg)</b>	0.000980
<b>SAR 1g (W/Kg)</b>	0.001050

**Z Axis Scan**



# MEASUREMENT 34

Type: Phone measurement (Complete)

Date of measurement: 29/5/2013

Measurement duration: 12 minutes 25seconds

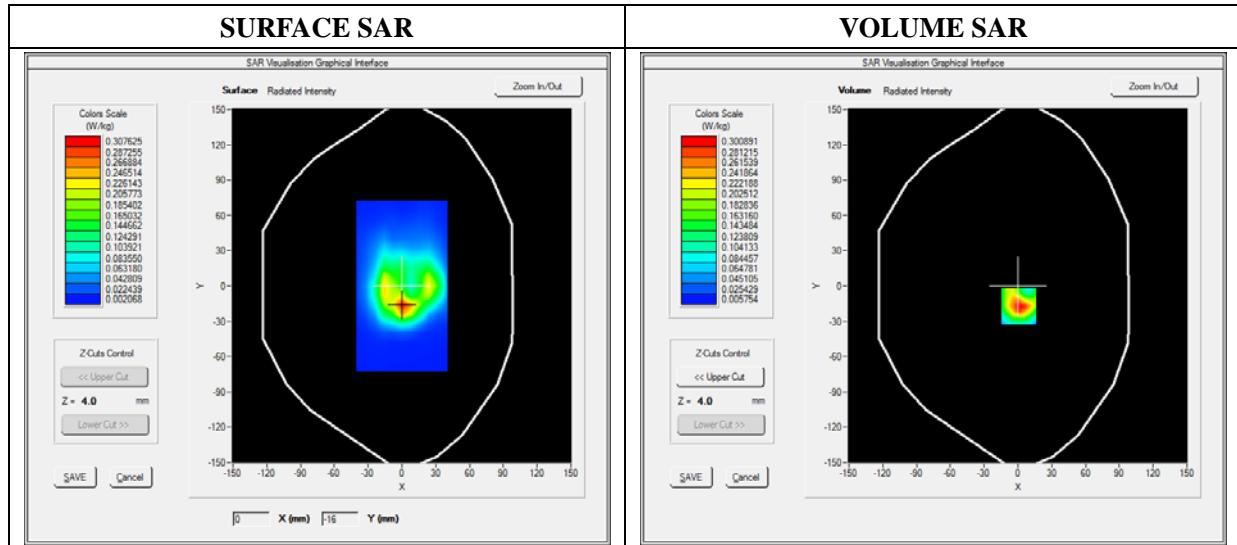
## A. Experimental conditions

<b>Area Scan</b>	sam_direct_droit2_surf8mm.txt
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Body back
<b>Band</b>	Band 2 WCDMA1900
<b>Channels</b>	Middle
<b>Signal</b>	TDMA (Crest factor: 8.0)

## B. SAR Measurement Results

### Lower Band SAR (Channel 975)

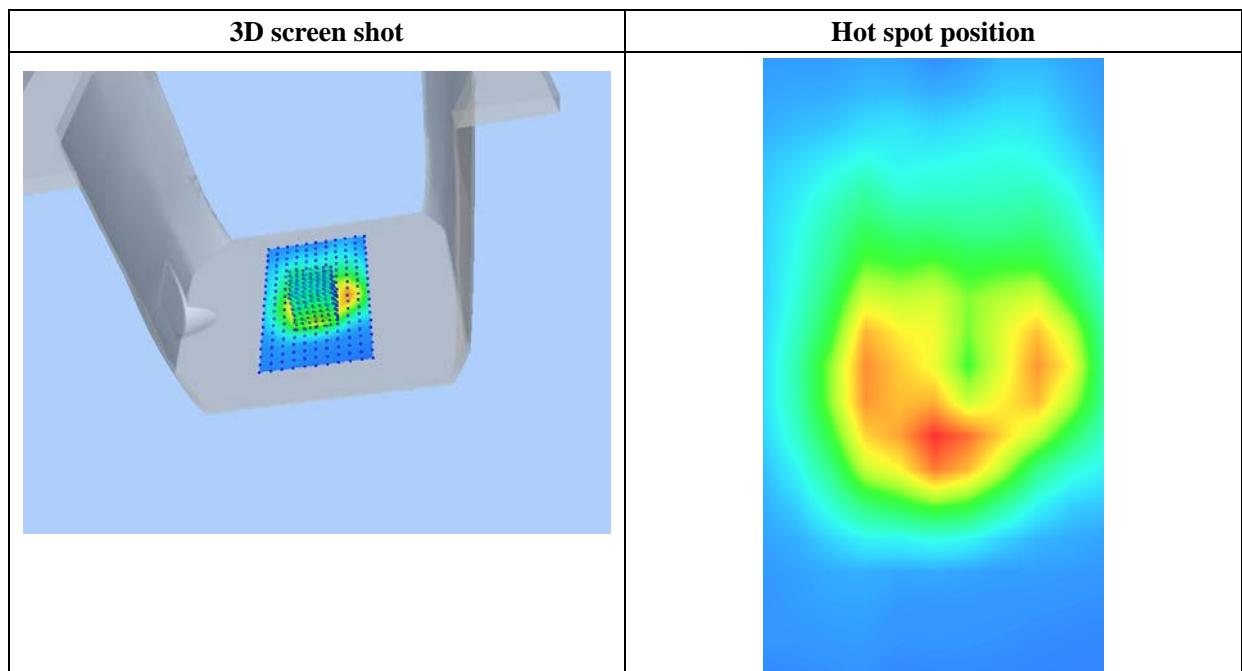
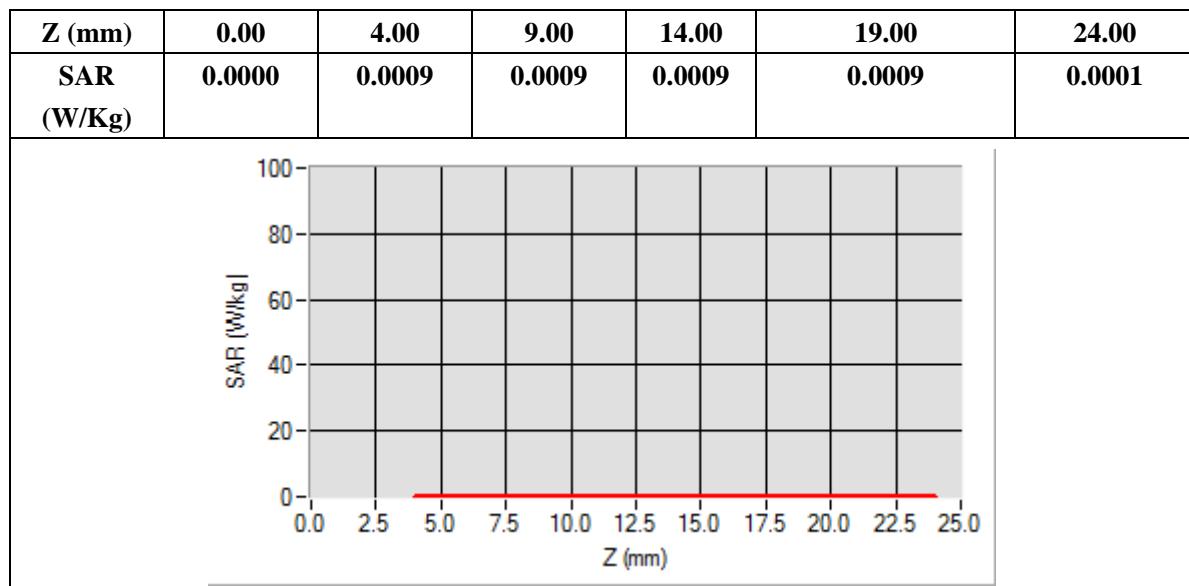
<b>Frequency (MHz)</b>	1880.000000
<b>Relative permittivity (real part)</b>	53.299999
<b>Relative permittivity (imaginary part)</b>	14.560000
<b>Conductivity (S/m)</b>	1.520711
<b>Variation (%)</b>	2.860000



**Maximum location: X=-0.00, Y=-5.00**

<b>SAR 10g (W/Kg)</b>	0.000970
<b>SAR 1g (W/Kg)</b>	0.000970

**Z Axis Scan**



## Annex C. EUT Photos

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### EUT View\_Front



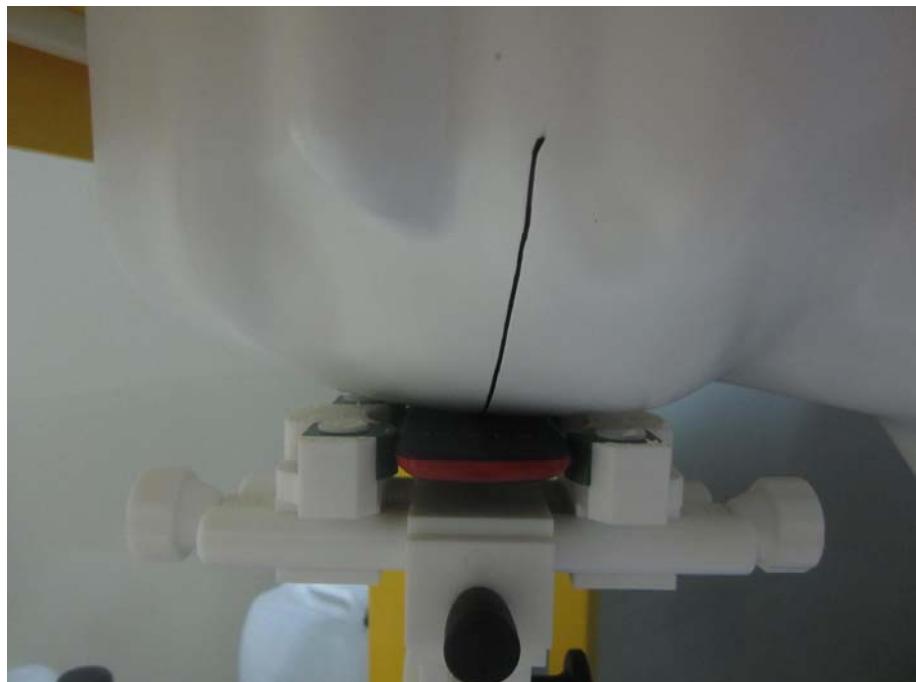
### EUT View\_Back



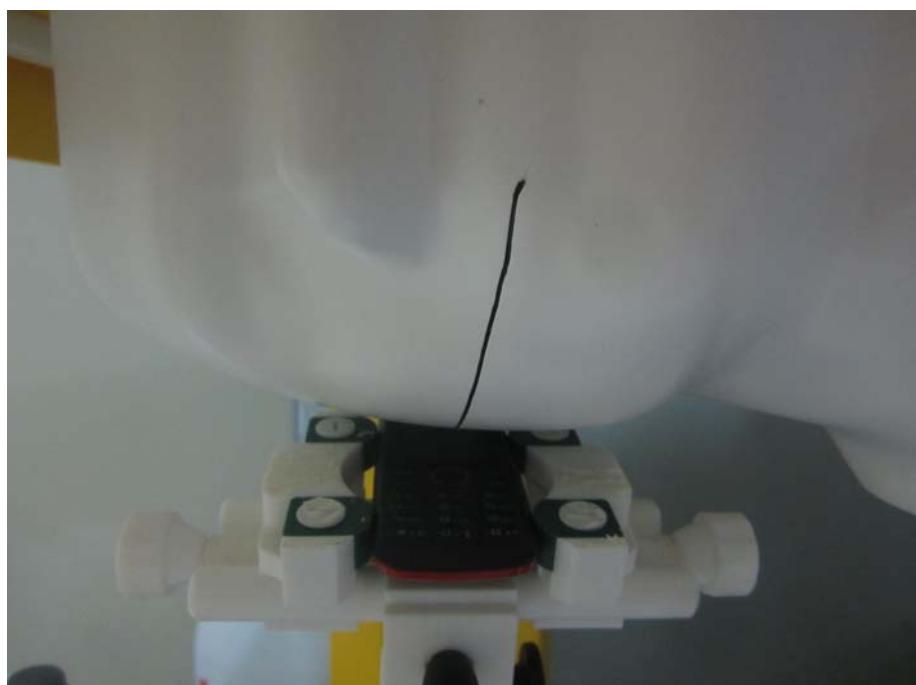
## Annex D. Test Setup Photos

### Test View 1 (Right Head)

Cheek

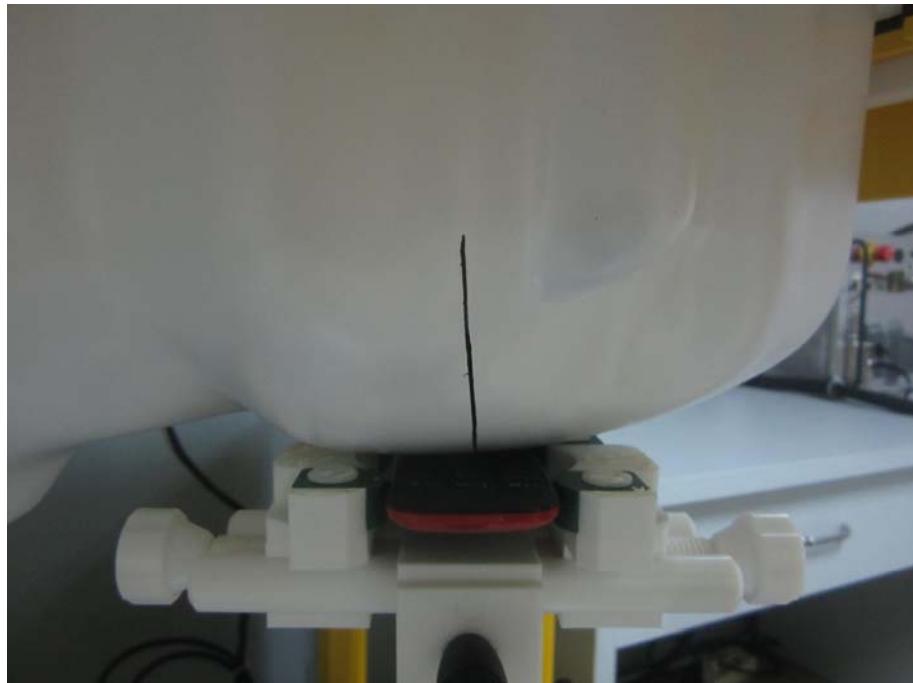


Tilt



**Test View 2 (Left Head)**

**Cheek**

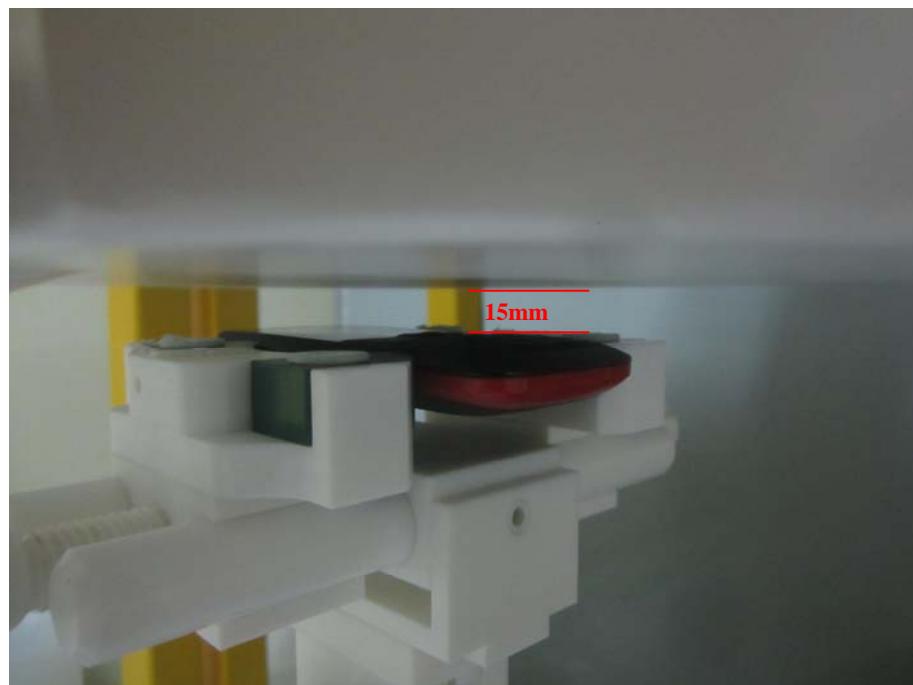


**Tilt**

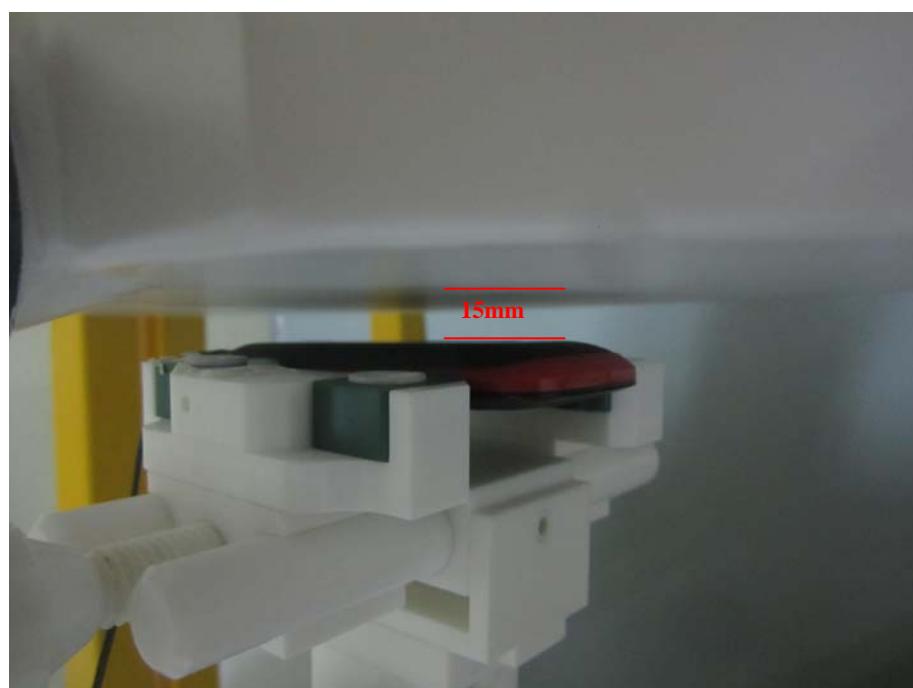


**Test View 3**

**Body front**



**Body back**



## Annex E. Calibration Certificate

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*Please refer to the exhibit for the calibration certificate*

\*\*\*\*\* END OF REPORT \*\*\*\*\*