



Report No.:SZ12090039S01



# SAR TEST REPORT

Issued to

**TCT Mobile Limited**

For

**HSPA USB Modem**

Model Name : One Touch X221F  
 Trade Name : Alcatel  
 Brand Name : Alcatel  
 FCC ID : RAD314  
 Standard : FCC Oet65 Supplement C Jun.2001  
 47CFR 2.1093  
 ANSI C95.1-1999  
 IEEE 1528-2003  
 MAX SAR : Body: 0.684 W/kg  
 Test date : 2012.9.28  
 Issue date : 2012.9.28

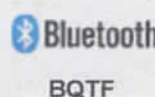


**Shenzhen MORLAB Communication Technology Co., Ltd.**

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 Date 2012.9.28



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Change History		
Issue	Date	Reason for change
1.0	Sep. 29, 2012	First edition

## 1. Testing Laboratory

### 1.1. Identification of the Responsible Testing Laboratory

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

### 1.2. Identification of the Responsible Testing Location

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

### 1.3. Accreditation Certificate

Accredited Testing Laboratory: No. CNAS L3572

### 1.4. List of Test Equipments

No.	Instrument	Type	Cal. Date	Cal. Due
1	PC	Dell (Pentium IV 2.4GHz, SN:X10-23533)	(n.a)	(n.a)
2	Network Emulator	Rohde&Schwarz (CMU200, SN:105894)	2011-9-26	1year
3	Voltmeter	Keithley (2000, SN:1000572)	2011-9-24	1year
4	Signal Generator	Rohde&Schwarz (SMP_02 )	2011-9-24	1year
5	Amplifier	PRANA (Ap32 SV125AZ)	2011-9-24	1year
6	Power Meter	Rohde&Schwarz (NRVD, SN:101066)	2011-9-24	1year
7	Directional coupler	Giga-tronics(SN:1829112)	2011-9-24	1year
8	Probe	Satimo (SN:SN_3708_EP80)	2011-9-24	1year
9	DAE	Satimo (SN 35/08 SUPR31)	2011-9-24	1year
10	Dielectric Probe Kit	Agilent (85033E )	2011-9-24	1year
11	Phantom	Satimo (SN:SN_36_08_SAM62)	2011-9-24	1year
12	Liquid	Satimo (Last Calibration: 2012-9-8)	N/A	N.A
13	Dipole 835MHz	Satimo (SN 36/08 DIPC 99)	2011-9-24	1year
14	Dipole 1900MHz	Satimo (SN 36/08 DIPF 102)	2011-9-24	1year

## 2. Technical Information

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

### 2.1. Identification of Applicant

Company Name: TCT Mobile Limited  
 Address: 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China.

### 2.2. Identification of Manufacturer

Company Name: TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED  
 Address: 70 Huifeng 4rd,ZhongKai Hi-tech Development District, Huizhou, Guangdong 516006 P.R.China

### 2.3. Equipment Under Test (EUT)

Model Name: One Touch X221F  
 Trade Name: Alcatel  
 Brand Name: Alcatel  
 Hardware Version: PIO  
 Software Version: S1\_B15001S\_1110000\_B10001S  
 Frequency Bands: GSM 850MHz / PCS 1900MHz;  
 WCDMA 1900MHz  
 Modulation Mode: GSM/GPRS : GMSK, EDGE : 8PSK  
 WCDMA : QPSK  
 HSDPA : QPSK/16QAM, HSUPA : BPSK  
 Multislot Class GPRS: Multislot Class 12: EDGE: Multislot Class 12  
 GPRS operation mode: Class B  
 HSPA release: Rel-6  
 HS-DSCH categories: Category 8  
 E-DCH categories: Category 6  
 Antenna type: Fixed Internal Antenna  
 Development Stage: Identical prototype

#### 2.3.1. Photographs of the EUT

Please see for photographs of the EUT.

#### 2.3.2. Identification of all used EUTs

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

EUT Identity	Hardware Version	Software Version
1#	PIO	S1_B15001S_1110000_B10001S

## 2.4. Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title
1	<b>47 CFR § 2. 1093</b>	Radiofrequency Radiation Exposure Evaluation: Portable Devices
2	<b>FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01)</b>	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields
3	<b>ANSI C95.1-1999</b>	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 GHz
4	<b>IEEE 1528-2003</b>	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate(SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.

## 2.5. Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

## 2.6. Test Environment/Conditions

Normal Temperature (NT):	20 ... 25 °C
Relative Humidity:	30 ... 75 %
Air Pressure:	980 ... 1020 hPa
Test frequency:	GSM 850MHz , PCS 1900MHz WCDMA 1900MHz
Operation mode:	Call established
Power Level:	GSM 850 MHz Maximum output power(level 5) PCS 1900 MHz Maximum output power(level 0) WCDMA Maximum output power

During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established.

The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 125, 190 and 251 respectively in the case of GSM 850 MHz, or to 512, 661 and 810 respectively in the case of PCS 1900 MHz, or to 9262, 9400 and 9538 respectively in the case of WCDMA 1900MHz. The EUT is commanded to operate at maximum transmitting power.

The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the manufacturer. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the handset.

The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the handset by at least 35 dB.

For SAR testing, EUT is in GPRS/EDGE or WCDMA/HSDPA/HSUPA link mode. In GPRS/EDGE link mode, its crest factor is 2, because EUT is set in GPRS/EDGE multi-slot class 12 with 4 uplink slots. In WCDMA/HSDPA/HSUPA link mode, its crest factor is 1.



### 3. Specific Absorption Rate (SAR)

#### 3.1. Introduction

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

#### 3.2. SAR Definition

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

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

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

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

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

, where C is the specific heat capacity,  $\delta T$  is the temperature rise and  $\delta t$  the exposure duration, or related to the electrical field in the tissue by

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

, 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 Setup

### 4.1. The Measurement System

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

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

The following figure shows the system.



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

### 4.2. Probe

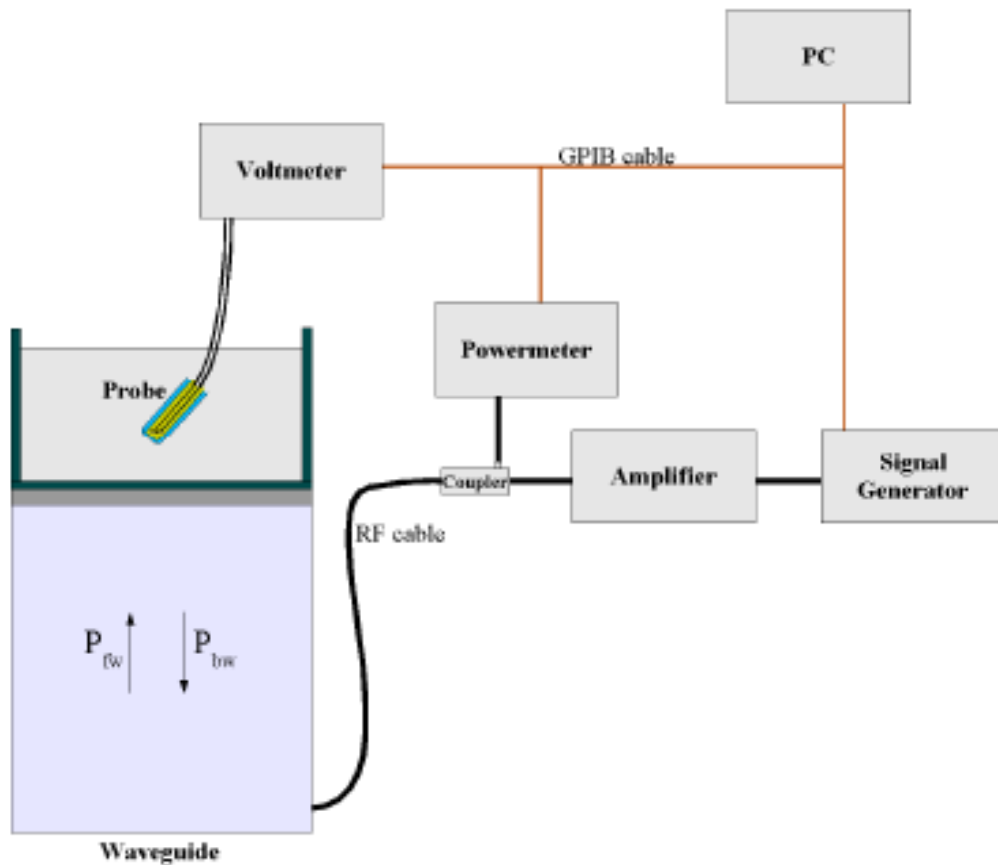
For the measurements the Specific Dosimetric E-Field Probe SN 37/08 EP80 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 6.5 mm
- Distance between probe tip and sensor center: 2.5mm
- Distance between sensor center and the inner phantom surface: 4 mm  
(repeatability better than +/- 1mm)

- Probe linearity: <0.25 dB
- Axial Isotropy: <0.25 dB
- Spherical Isotropy: <0.25 dB
- Calibration range: 835to 2500MHz for head & body simulating liquid.

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

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



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

Where :

$P_{fw}$  = Forward Power

$P_{bw}$  = Backward Power

a and b = Waveguide dimensions

$\delta$  = 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

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

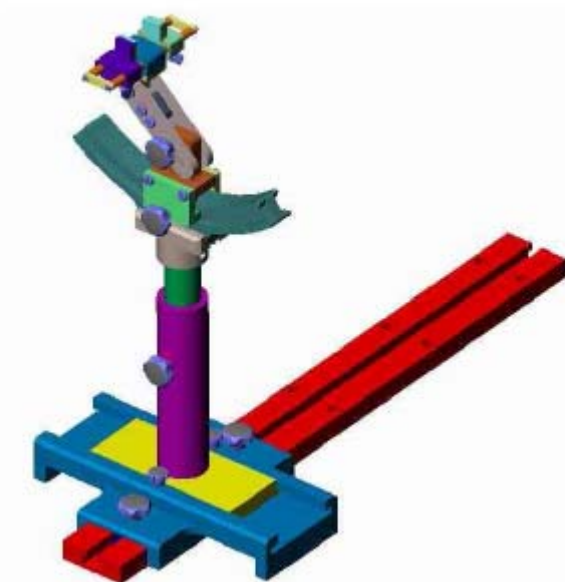
where DCP is the diode compression point in mV.

### 4.3. 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.

### 4.4. Device Holder

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



Device holder

System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

## 5. Tissue Simulating Liquids

Simulant liquids that are used for testing at frequencies of 850MHz and 1900MHz, which are made mainly of sugar, salt and water solutions may be left in the phantoms. Approximately 20litres are needed for an upright head compared to about 25 litres for a horizontal bath phantom. The liquid height from the flat phantom to the liquid top surface (body SAR) is 15cm.

Gives the recipes for one liter of head and body tissue simulating liquid for frequency band 835 MHz and 1900 MHz.

Ingredients (% by weight )	Frequency Band	Frequency Band
	835MHz	1900MHz
Tissue Type	Body	Body
Water	52.4	40.4
Salt(NaCl)	1.4	0.5
Sugar	45.0	58.0
HEC	1.0	1.0
Bactericide	0.1	0.1
Triton	0.0	0.0
DGBE	0.0	0.0
Acticide SPX	0.0	0.0
Dielectric Constant	56.1	54.0
Conductivity (S/m)	0.95	1.45

Recipes for Tissue Simulating Liquid

**Table 2: Dielectric Performance of Body Tissue Simulating Liquid**

<b>Temperature: 22.0~23.8°C, humidity: 54~60%.</b>			
<b>Frequency</b>	<b>Description</b>	<b>Permittivity <math>\epsilon</math></b>	<b>Conductivity <math>\sigma</math> (S/m)</b>
835 MHz	<b>Reference result per OET65 <math>\pm 5\%</math> window</b>	55.2 52.44 to 57.96	0.97 0.9215 to 1.0185
	<b>Reference result per probe calibration <math>\pm 5\%</math> window</b>	56.1 53.295 to 58.905	0.95 0.905 to 0.998
	<b>Validation value (Sep. 8)</b>	55.709999	0.9809033
1900 MHz	<b>Reference result per OET65 <math>\pm 5\%</math> window</b>	53.3 50.635 to 55.965	1.52 1.444 to 1.596
	<b>Reference result per probe calibration <math>\pm 5\%</math> window</b>	54 51.3 to 56.7	1.45 1.378 to 1.523
	<b>Validation value (Sep. 8)</b>	52.548876	1.513978

- Note: 1. The dielectric parameters of the liquids were verified prior to the SAR evaluation using an Agilent 85033E Dielectric Probe Kit and an Agilent Network Analyzer.
2. For body-worn measurements, the device was tested against flat phantom representing the user body. Under measurement phone was put on in the phone holder.
3. Per KDB 450824 D01, tissue used during test are within 5% tolerances of probe calibration report, and also within 5% of the target dielectric parameters for OET65.  
"when the actual tissue dielectric parameters are recorded for the probe calibration, the differences for  $\epsilon$  and  $\sigma$  between probe calibration and routine measurements should each be  $\leq 5\%$  while satisfying the required  $\pm 5\%$  tolerances in target dielectric parameters." (KDB 450824 D01)

## 6. Uncertainty Assessment

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

### 6.1. UNCERTAINTY EVALUATION FOR 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 (+-%)	V i
<b>Measurement System</b>									
Probe calibration	E.2.1	7.0	N	1	1	1	7.00	7.00	
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.01	
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	0.7	0.7	1.62	1.62	
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	
<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 Power drift - SAR drift measurement	6.6.2	2.74	R	$\sqrt{3}$	1	1	1.58	1.58	
<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	
Liquid conductivity - deviation from target value	E.3.2	4.57	R	$\sqrt{3}$	0.64	0.43	1.69	1.13	

Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.20	2.15	M
Liquid permittivity - deviation from target value	E.3.2	3.69	R	$\sqrt{3}$	0.6	0.49	1.28	1.04	
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	1	0.6	0.49	6.00	4.90	M
Combined Standard Uncertainty			RSS				12.52	11.71	
Expanded Uncertainty (95% Confidence interval)			k				25.05	23.42	

## 6.2. UNCERTAINTY FOR SYSTEM PERFORMANCE CHECK

a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+-% )	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	V i
<b>Measurement System</b>									
Probe calibration	E.2.1	7.0	N	1	1	1	7.00	7.00	
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.01	
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	0.7	0.7	1.62	1.62	
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	
<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	2.74	R	$\sqrt{3}$	1	1	1.58	1.58	



<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	
Liquid conductivity - deviation from target value	E.3.2	4.57	R	$\sqrt{3}$	0.64	0.43	1.69	1.13	
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.20	2.15	M
Liquid permittivity - deviation from target value	E.3.2	3.69	R	$\sqrt{3}$	0.6	0.49	1.28	1.04	
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	1	0.6	0.49	6.00	4.90	M
Combined Standard Uncertainty			RSS				11.50	10.61	
Expanded Uncertainty (95% Confidence interval)			k				23.00	21.21	

## 7. SAR Measurement Evaluation

### 7.1. System Setup

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

Equipments :

name	Type and specification
Signal generator	Rohde&Schwarz (SMP_02 )
Directional coupler	Giga-tronics(SN:1829112)
Amplifier	PRANA (Ap32 SV125AZ)
Reference dipole	835MHz:SN 36/08 DIPC 99 1900MHz:SN 36/08 DIPF 102

### 7.2. Validation Results

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

Frequency	835MHz(Body)	1900MHz(Body)
Target value (1g)	9.714 W/Kg	39.890 W/Kg
250 mW input power	2.368 W/Kg	9.736 W/Kg
Test value (1g)	9.472 W/Kg	38.944 W/Kg

**Note:** System checks the specific test data please see page 57-60.

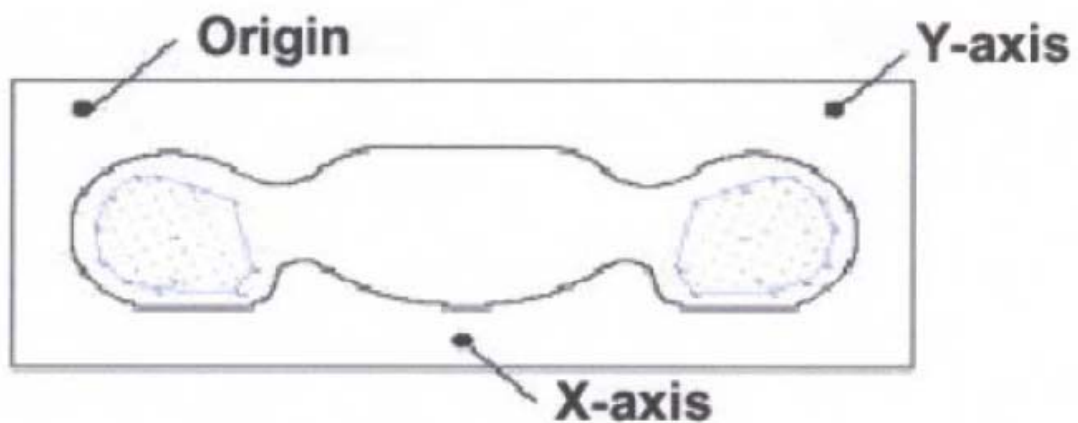
## 8. Operational Conditions During Test

### 8.1. Body-worn Configurations

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

The depth of the body tissue was 15.1cm. The distance between the back of the device and the bottom of the flat phantom is 5mm(taking into account of the IEEE 1528 and the place of the antenna)

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



SAR Measurement Points in Area Scan

### 8.2. Measurement procedure

The following steps are used for each test position

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

### **8.3. Description of interpolation/extrapolation scheme**

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

An extrapolation is 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 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.

## **9. 3G MEASUREMENT PROCEDURES**

### **9.1. Procedures Used To Establish Test Signal**

The handset was placed into a simulated call using a base station simulator in a shielded chamber. Such test signals offer a consistent means for testing SAR and are recommended for evaluating SAR. SAR measurements were taken with a fully charged battery. In order to verify that the device was tested and maintained at full power, this was configured with the base station simulator. The SAR measurement software calculates a reference point at the start and end of the test to check for power drifts. If conducted power deviations of more than 5% occurred, the tests were repeated.

### **9.2. SAR Measurement Conditions for WCDMA**

These procedures were followed according to FCC KDB 941225, October, 2007.

### **9.3. Output Power Verification**

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC(transmit power control) set to all "1s". Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes) should be tabulated in the test report. All configurations that are not supported by the EUT or cannot be measured due to technical or equipment limitations should be clearly identified.

### **9.4. Tablet PC with HSUPA**

Body SAR is also measured for HSUPA when the maximum average output of each RF channel with HSUPA active is at least 1/4 dB higher than that measured without HSUPA using 12.2kbps RMC or the maximum SAR for 12.2kbps RMC is above 75% of the SAR limit. Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2kbps RMC without HSD-PA

## 10. Measurement Of Conducted Peak output power

### 1. WCDMA mode conducted output power values

Item	band	WCDMA 1900		
	ARFCN	9262	9400	9538
	subtest	dBm		
5.2(WCDMA)	non	22.06	23.43	23.02
5.2AA(HSDPA)	1	21.89	23.21	22.85
	2	21.90	23.19	22.80
	3	21.45	22.74	22.29
	4	21.48	22.69	22.26
5.2B(HSUPA)	1	21.75	23.01	22.57
	2	20.01	21.05	20.52
	3	20.85	21.98	21.49
	4	20.05	21.00	20.59
	5	21.69	22.95	22.52

### 2. GSM Conducted peak output power

Band	Channel	Frequency (MHz)	Output Power (dBm)
GSM 850	128	824.2	32.06
	190	836.6	31.45
	251	848.8	31.91
PCS 1900	512	1850.2	30.29
	661	1880.0	29.87
	810	1909.8	29.89

### 3. GPRS Mode Conducted peak output power

Band	Channel	Frequency (MHz)	Output Power(dBm)			
			Slot 1	Slot 2	Slot 3	Slot 4
GSM 850	128	824.2	31.26	28.65	27.15	25.93
	190	836.6	31.23	28.72	27.02	25.88
	251	848.8	31.48	28.87	27.01	26.56
PCS 1900	512	1850.2	30.15	28.12	26.34	25.33
	661	1880.0	29.80	27.92	26.02	24.97
	810	1909.8	29.80	28.11	25.81	24.90

**GPRS Time-based Average Power**

Band	Channel	Frequency (MHz)	Output Power(dBm)			
			Slot 1	Slot 2	Slot 3	Slot 4
GSM 850	128	824.2	22.26	22.63	22.89	22.92
	190	836.6	22.23	22.70	22.76	22.87
	251	848.8	22.48	22.85	22.75	23.55
PCS 1900	512	1850.2	21.15	22.10	22.08	22.32
	661	1880.0	20.80	21.90	21.76	21.96
	810	1909.8	20.80	22.09	21.55	21.89

**Timeslot consignations:**

No. Of Slots	Slot 1	Slot 2	Slot 3	Slot 4
Slot Consignation	1Up4Down	2Up2Down	3Up2Down	4Up1Down
Duty Cycle	1:8	1:4	1:2.67	1:2
Correct Factor	-9.00dB	-6.02dB	-4.26dB	-3.01dB

**4. EDGE Mode Conducted peak output power**

Band	Channel	Frequency (MHz)	Output Power(dBm)			
			Slot 1	Slot 2	Slot 3	Slot 4
GSM 850	128	824.2	28.50	27.13	25.33	24.83
	190	836.6	27.99	26.45	25.81	24.80
	251	848.8	28.01	27.11	25.24	25.49
PCS 1900	512	1850.2	27.31	26.21	25.17	24.23
	661	1880.0	26.92	25.72	24.69	23.81
	810	1909.8	26.74	25.61	24.87	23.63

**EDGE Time-based Average Power**

Band	Channel	Frequency (MHz)	Output Power(dBm)			
			Slot 1	Slot 2	Slot 3	Slot 4
GSM 850	128	824.2	19.50	21.11	21.07	21.82
	190	836.6	18.99	20.43	21.55	21.79
	251	848.8	19.01	21.09	20.98	22.48
PCS 1900	512	1850.2	18.31	20.19	20.91	21.22
	661	1880.0	17.92	19.70	20.43	20.80
	810	1909.8	17.74	19.59	20.61	20.62



## 11. Test Results List

### Summary of Measurement Results (GSM 850MHz Band)

Temperature: 21.0~23.8°C, humidity: 54~60%.					
Phantom Configurations	Device Test Positions	Antenna Positions	SAR(W/Kg), 1g Peak		
			Device Test channel		
			Channel 128	Channel 190	Channel 251
Body (GPRS)	Horizontal-Up	Internal	/	/	0.607
	Horizontal-Down	Internal	/	/	0.684
	Vertical-Front	Internal	/	/	0.488
	Vertical-Back	Internal	/	/	0.294
Body (EDGE)	Horizontal-Down	Internal	/	/	0.530

### Summary of Measurement Results (GSM 1900MHz Band)

Temperature: 21.0~23.8°C, humidity: 54~60%.					
Phantom Configurations	Device Test Positions	Antenna Positions	SAR(W/Kg), 1g Peak		
			Device Test channel		
			Channel 512	Channel 661	Channel 810
Body (GPRS)	Horizontal-Up	Internal	0.563	/	/
	Horizontal-Down	Internal	0.433	/	/
	Vertical-Front	Internal	0.389	/	/
	Vertical-Back	Internal	0.393	/	/
Body (EDGE)	Horizontal-Up	Internal	0.516	/	/

### Summary of Measurement Results (WCDMA Band II)

Temperature: 21.0~23.8°C, humidity: 54~60%.					
Phantom Configurations	Device Test Positions	Antenna Positions	SAR(W/Kg), 1g Peak		
			Device Test channel		
			Channel 9262	Channel 9400	Channel 9538
Body	Horizontal-Up	Internal	/	0.314	/
	Horizontal-Down	Internal	/	0.318	/
	Vertical-Front	Internal	/	0.217	/
	Vertical-Back	Internal	/	0.142	/

#### Note:

1. Per KDB 447498, when the SAR procedures require multiple channels to be tested and the 1-g SAR for the highest output channel is less than 0.8 W/kg and peak SAR is less than 1.6W/kg, where the transmission band corresponding to all channels is  $\leq 100$  MHz, testing for the other channels is not required.

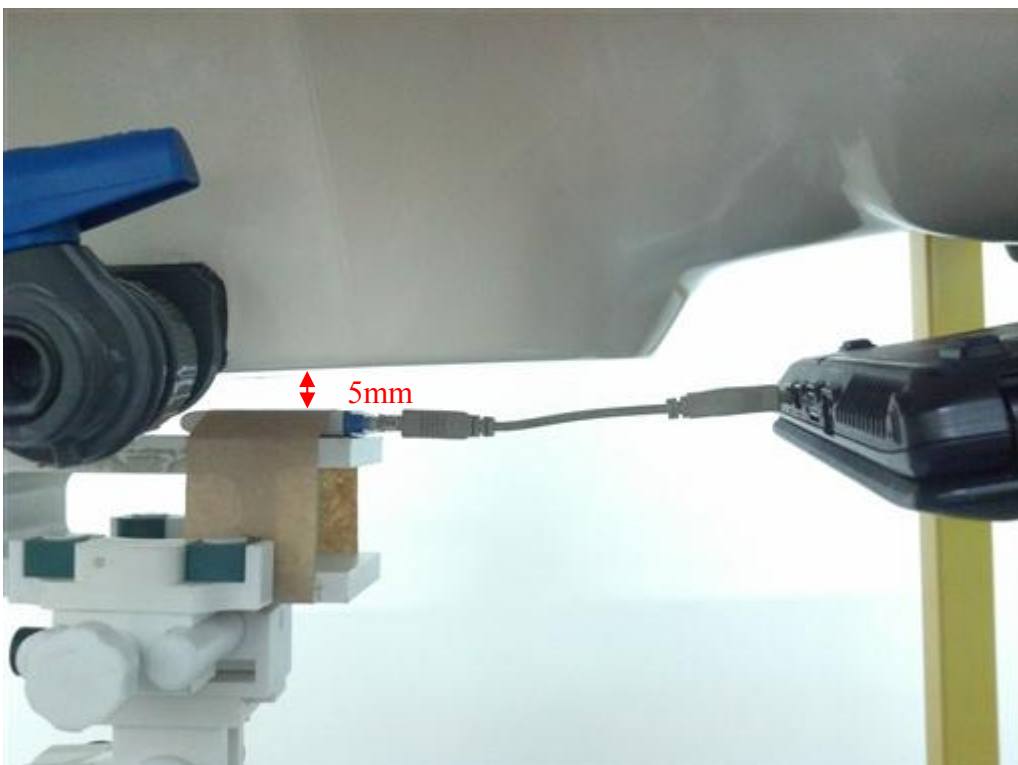
2. Maximum SAR for 12.2kbps RMC is  $0.314 \text{ W/Kg} \leq 75\%$  of the SAR limit (i.e.  $1.2 \text{ W/Kg}$  1g) and maximum average output of each RF channel with HSUPA/HSDPA active is less than 1/4 dB higher than that measured without HSUPA/HSDPA using 12.2kbps RMC (refer to Page 24 of the report), according to KDB 941225D01v02, SAR is not required for this handset with HSPA capabilities.

## Annex A Photographs of the EUT

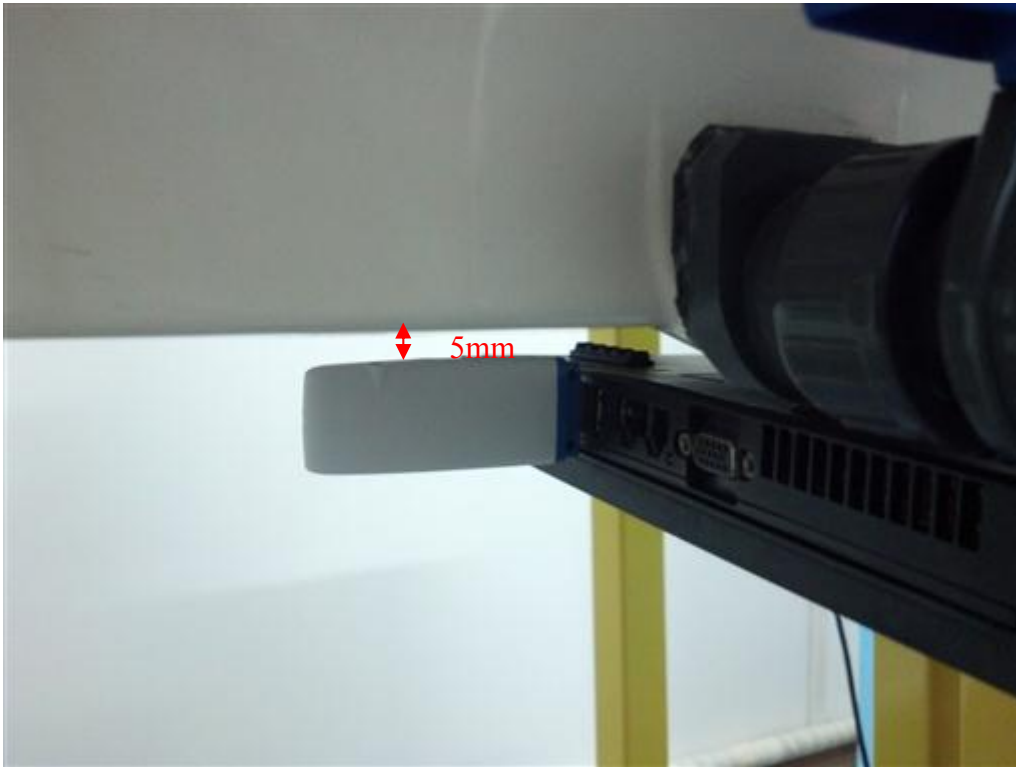
### 1 EUT Horizontal-Up



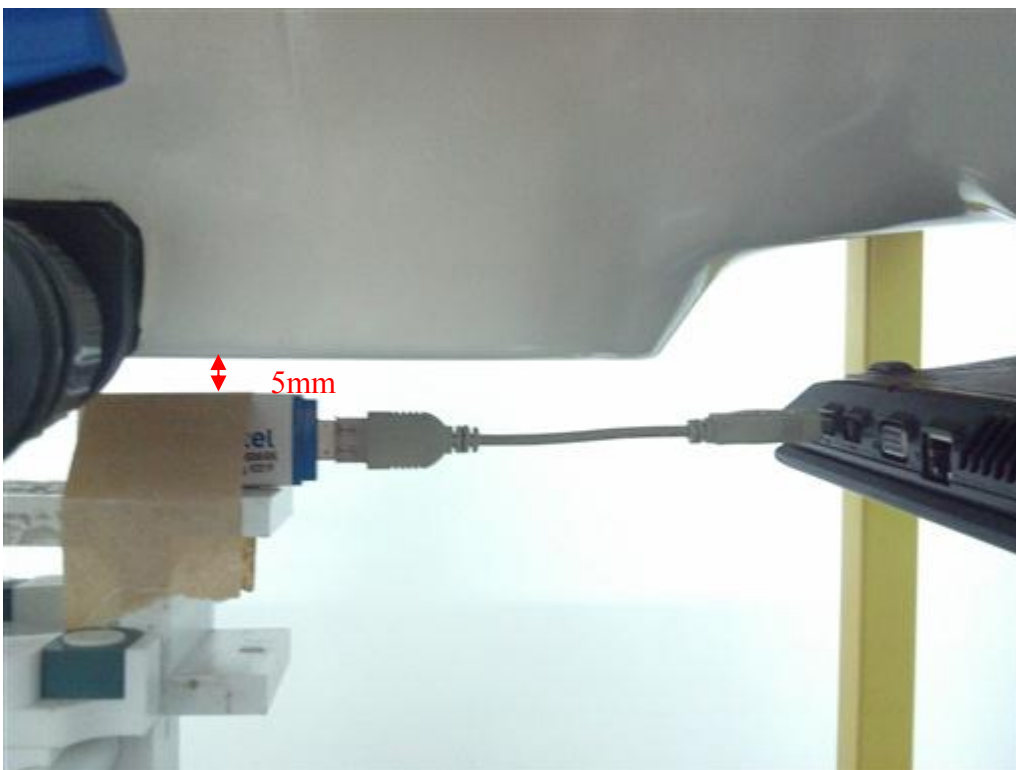
### 2 EUT Horizontal-Down



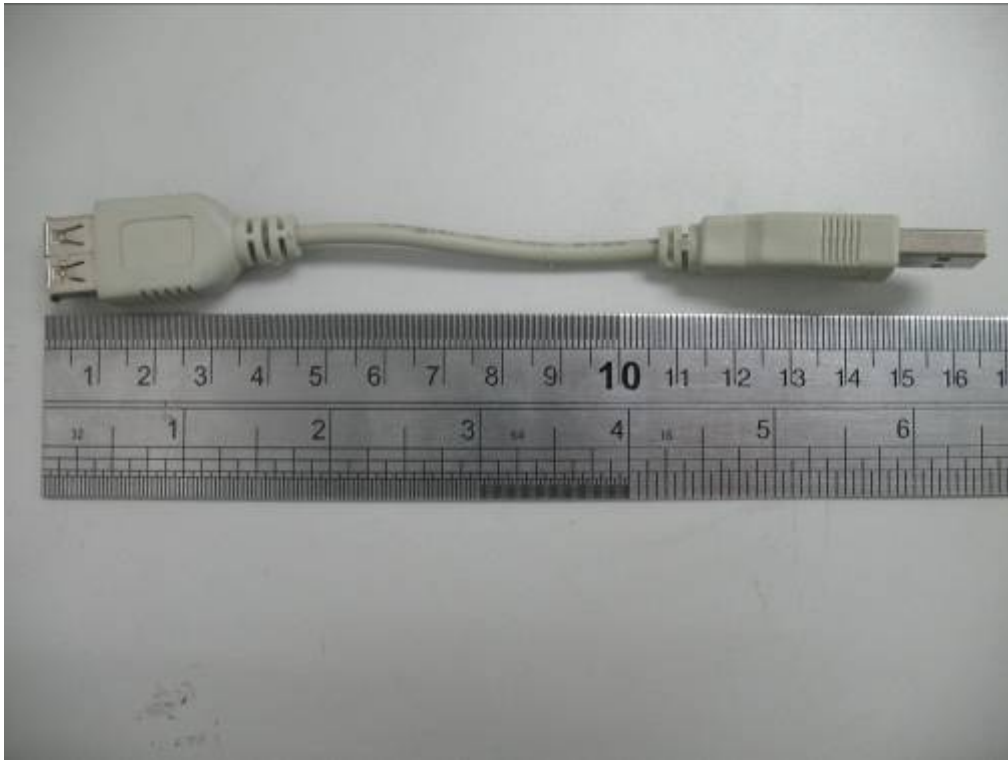
## 3 EUT Vertical-Front



## 4 EUT Vertical-Back



## 6 Data line



## Liquid Level Photo



## Annex B Graph Test Results

<b>BAND</b>	<b><u>PARAMETERS</u></b>
<b><u>GSM850</u></b>	<p><u>Measurement 1:</u> Flat Plane with EUT on High Channel in GPRS mode <b>Horizontal-Up</b></p> <p><u>Measurement 2:</u> Flat Plane with EUT on High Channel in GPRS mode <b>Horizontal-Down</b></p> <p><u>Measurement 3:</u> Flat Plane with EUT on High Channel in GPRS mode <b>Vertical-Front</b></p> <p><u>Measurement 4:</u> Flat Plane with EUT on High Channel in GPRS mode <b>Vertical-Back</b></p> <p><u>Measurement 5:</u> Flat Plane with EUT on High Channel in EDGE mode <b>Horizontal-Down</b></p>
<b><u>GSM1900</u></b>	<p><u>Measurement 6:</u> Flat Plane with EUT on Low Channel in GPRS mode <b>Horizontal-Up</b></p> <p><u>Measurement 7:</u> Flat Plane with EUT on Low Channel in GPRS mode <b>Horizontal-Down</b></p> <p><u>Measurement 8:</u> Flat Plane with EUT on Low Channel in GPRS mode <b>Vertical-Front</b></p> <p><u>Measurement 9:</u> Flat Plane with EUT on Low Channel in GPRS mode <b>Vertical-Back</b></p> <p><u>Measurement 10:</u> Flat Plane with EUT on Low Channel in EDGE mode <b>Horizontal-Up</b></p>
<b><u>WCDMA 1900</u></b>	<p><u>Measurement 11:</u> Flat Plane with EUT on Middle Channel in WCDMA mode <b>Horizontal-Up</b></p> <p><u>Measurement 12:</u> Flat Plane with EUT on Middle Channel in WCDMA mode <b>Horizontal-Down</b></p> <p><u>Measurement 13:</u> Flat Plane with EUT on Middle Channel in WCDMA mode <b>Vertical-Front</b></p> <p><u>Measurement 14:</u> Flat Plane with EUT on Middle Channel in WCDMA mode <b>Vertical-Back</b></p>

# MEASUREMENT 1

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 12 minutes 9 seconds

## A. Experimental conditions.

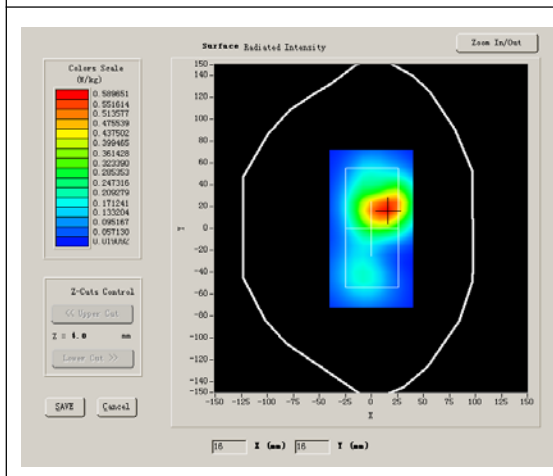
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	GSM850
<b>Channels</b>	High
<b>Signal</b>	GPRS

## B. SAR Measurement Results

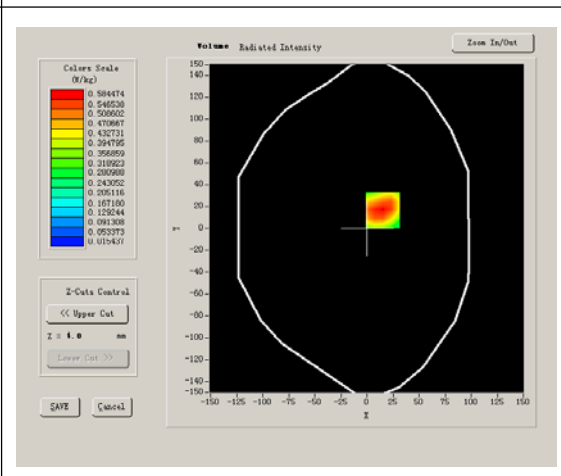
Higher Band SAR (Channel 251):

<b>Frequency (MHz)</b>	848.800000
<b>Relative permittivity (real part)</b>	55.750417
<b>Relative permittivity</b>	21.284550
<b>Conductivity (S/m)</b>	0.945961
<b>Variation (%)</b>	-1.870000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.9°C
<b>ConvF:</b>	28.479,25.214,27.196
<b>Crest factor:</b>	1:2

### SURFACE SAR



### VOLUME SAR





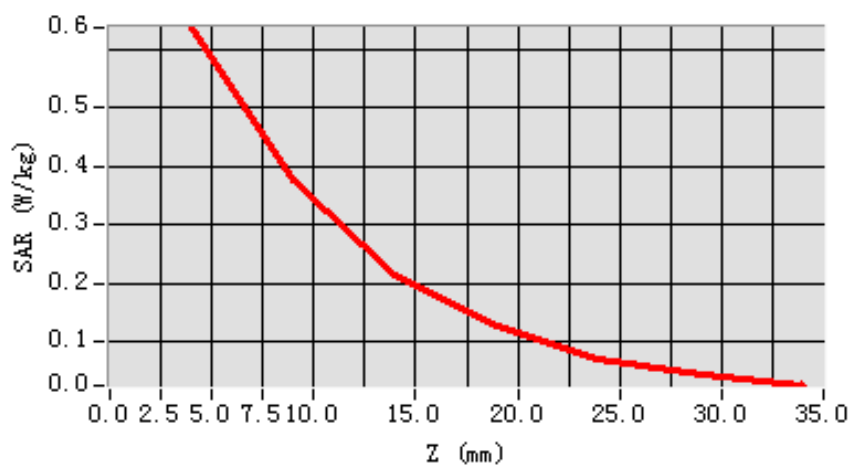
**Maximum location: X=15.00, Y=17.00**

<b>SAR 10g (W/Kg)</b>	0.349839
<b>SAR 1g (W/Kg)</b>	0.606770

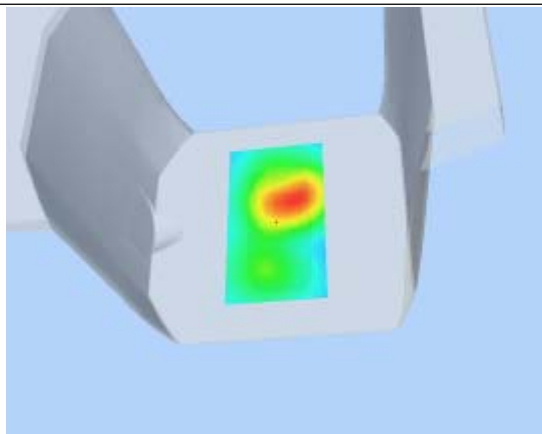
**Z Axis Scan**

<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>0.6364</b>	<b>0.3758</b>	<b>0.2145</b>	<b>0.1275</b>	<b>0.0715</b>	<b>0.0440</b>

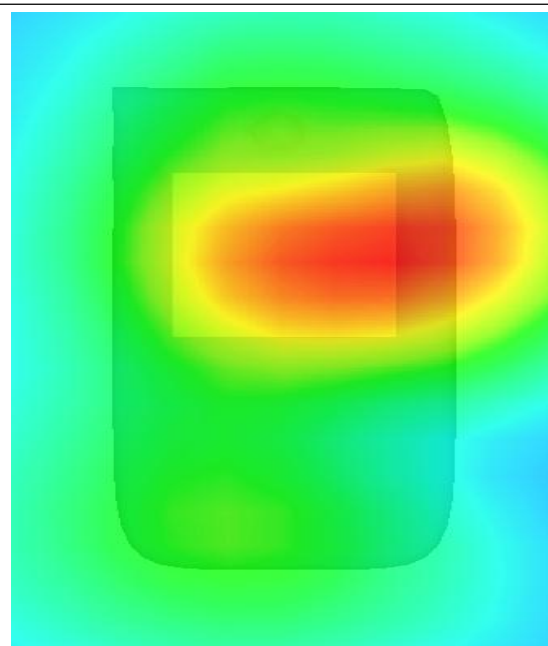
**SAR, Z Axis Scan (X = 15, Y = 17)**



**3D scen shot**



**Hot spot position**



## MEASUREMENT 2

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 10 seconds

### A. Experimental conditions.

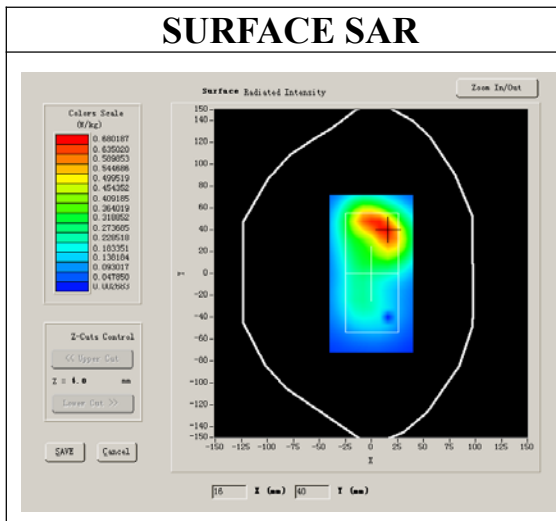
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	GSM850
<b>Channels</b>	High
<b>Signal</b>	GPRS

### B. SAR Measurement Results

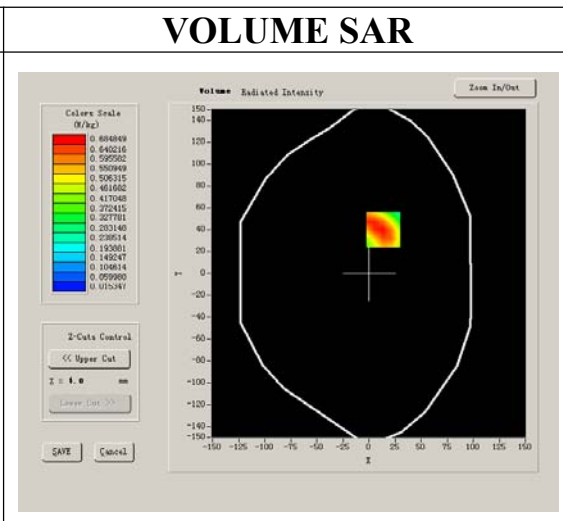
Higher Band SAR (Channel 251):

<b>Frequency (MHz)</b>	848.800000
<b>Relative permittivity (real part)</b>	55.750417
<b>Relative permittivity</b>	21.709999
<b>Conductivity (S/m)</b>	0.945961
<b>Variation (%)</b>	-1.720000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.9°C
<b>ConvF:</b>	28.479,25.214,27.196
<b>Crest factor:</b>	1:2

#### SURFACE SAR



#### VOLUME SAR



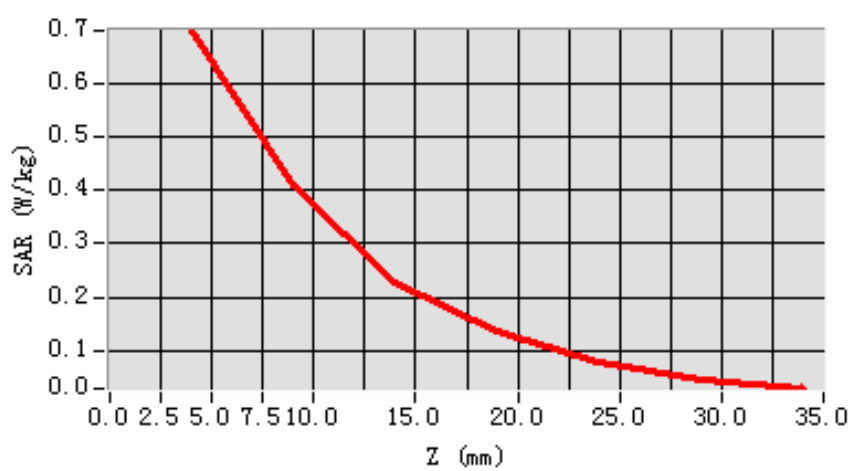
**Maximum location: X=14.00, Y=40.00**

<b>SAR 10g (W/Kg)</b>	0.388984
<b>SAR 1g (W/Kg)</b>	0.683871

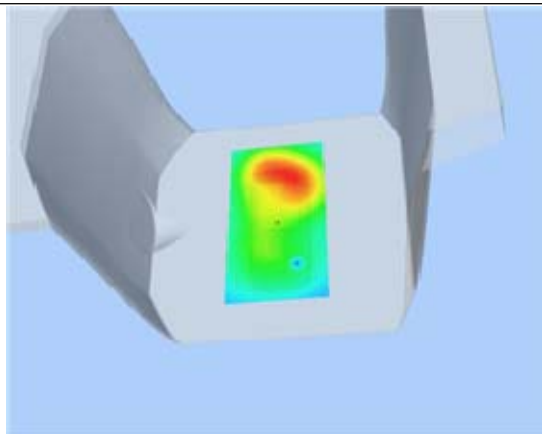
**Z Axis Scan**

<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>0.7008</b>	<b>0.4081</b>	<b>0.2278</b>	<b>0.1357</b>	<b>0.0793</b>	<b>0.0462</b>

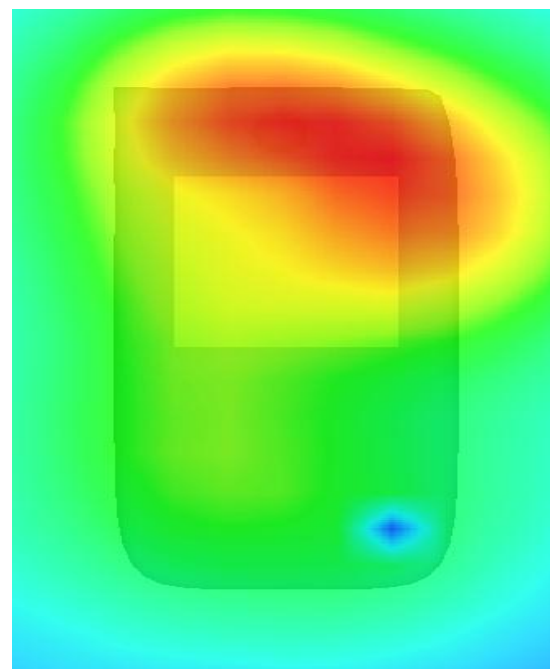
**SAR, Z Axis Scan (X = 14, Y = 40)**



**3D scen shot**



**Hot spot position**



## MEASUREMENT 3

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 9 seconds

### A. Experimental conditions.

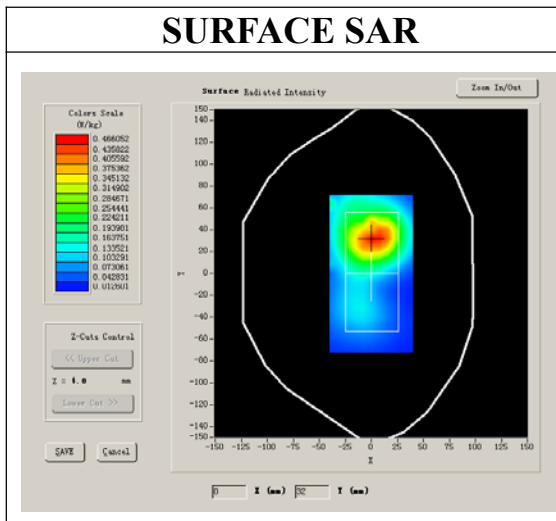
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	GSM850
<b>Channels</b>	High
<b>Signal</b>	GPRS

### B. SAR Measurement Results

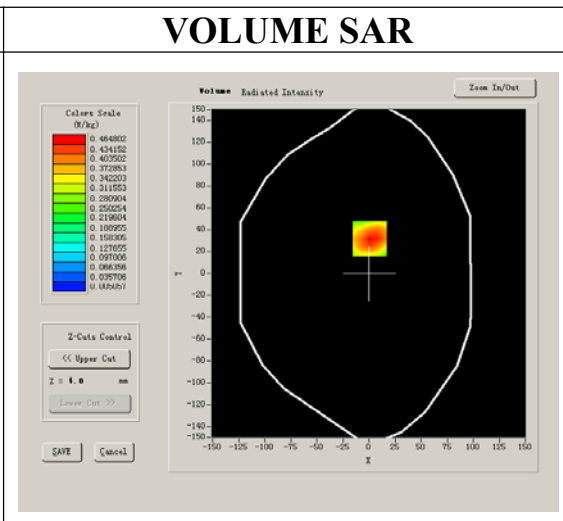
Higher Band SAR (Channel 251):

<b>Frequency (MHz)</b>	848.799988
<b>Relative permittivity (real part)</b>	55.750417
<b>Relative permittivity</b>	21.332850
<b>Conductivity (S/m)</b>	0.945961
<b>Variation (%)</b>	1.000000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.9°C
<b>ConvF:</b>	28.479,25.214,27.196
<b>Crest factor:</b>	1:2

#### SURFACE SAR



#### VOLUME SAR



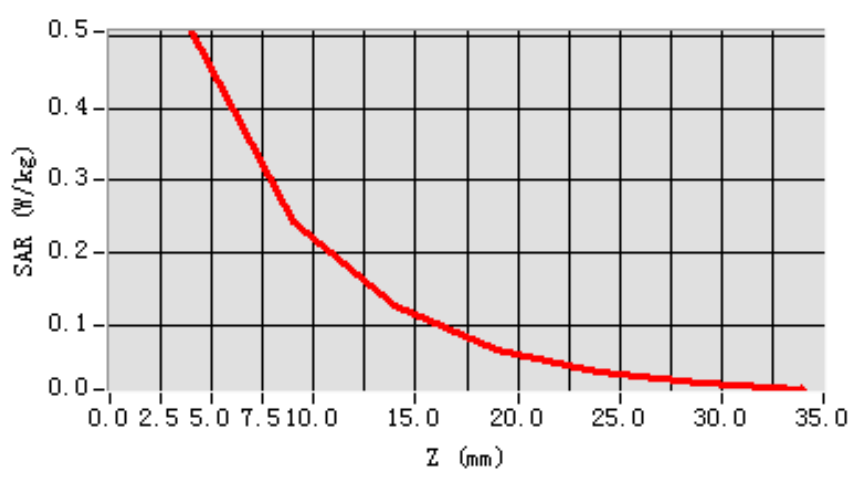
**Maximum location: X=1.00, Y=32.00**

<b>SAR 10g (W/Kg)</b>	0.260819
<b>SAR 1g (W/Kg)</b>	0.488244

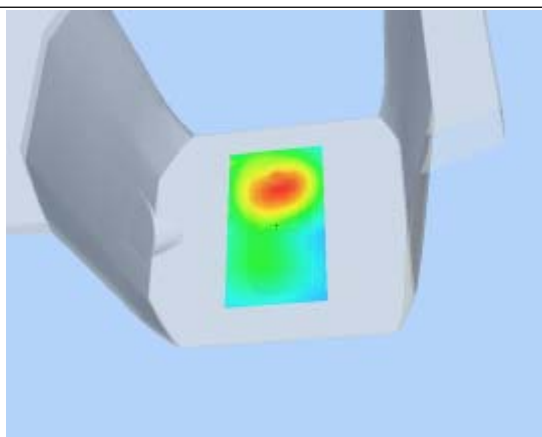
**Z Axis Scan**

<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>0.5061</b>	<b>0.2432</b>	<b>0.1248</b>	<b>0.0635</b>	<b>0.0345</b>	<b>0.0194</b>

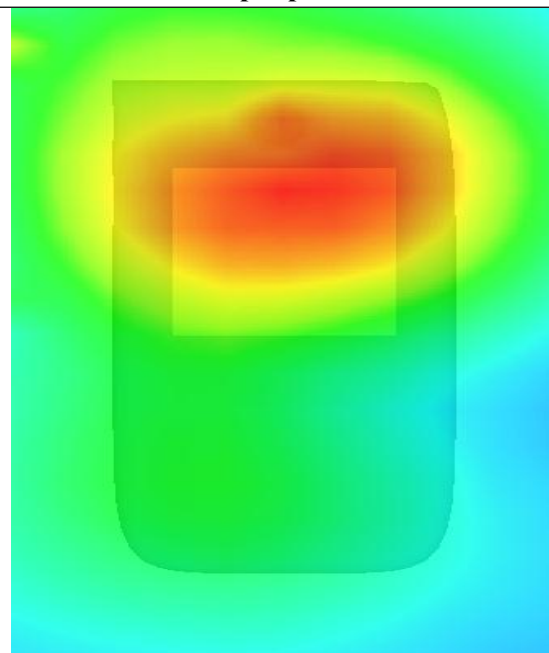
**SAR, Z Axis Scan (X = 1, Y = 32)**



**3D scen shot**



**Hot spot position**



## MEASUREMENT 4

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 9 seconds

### A. Experimental conditions.

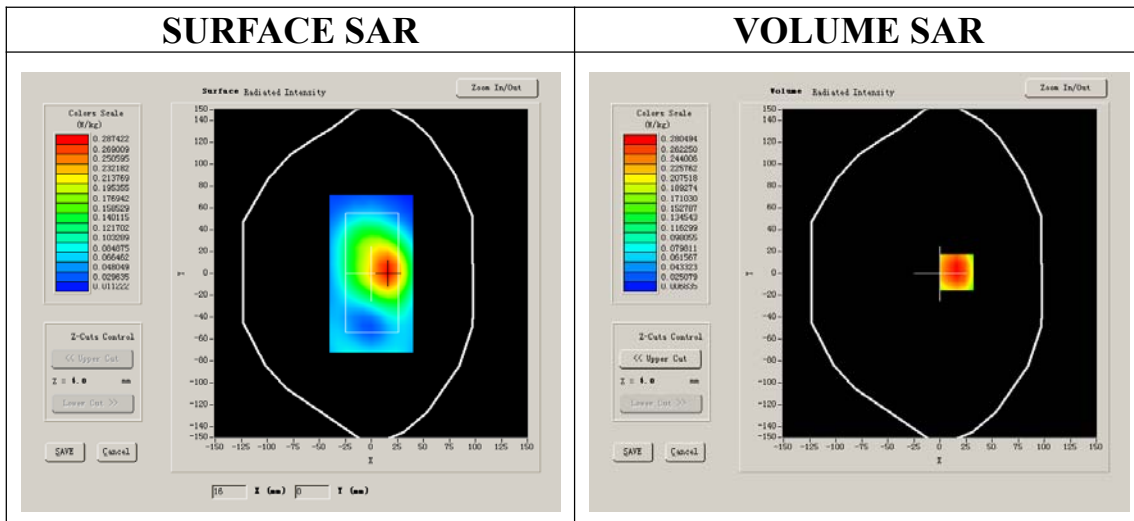
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	GSM850
<b>Channels</b>	High
<b>Signal</b>	GPRS

### B. SAR Measurement Results

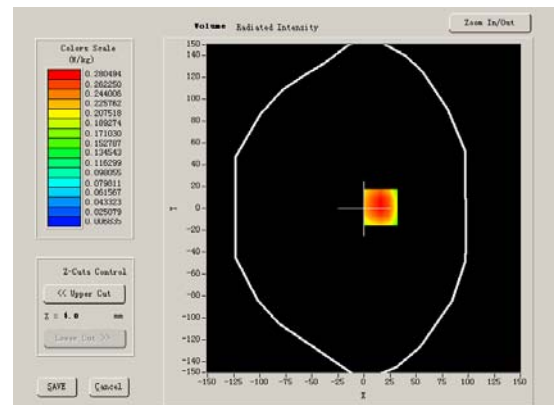
Higher Band SAR (Channel 251):

<b>Frequency (MHz)</b>	848.800000
<b>Relative permittivity (real part)</b>	55.750417
<b>Relative permittivity</b>	21.284550
<b>Conductivity (S/m)</b>	0.945961
<b>Variation (%)</b>	-2.370000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.9°C
<b>ConvF:</b>	28.479,25.214,27.196
<b>Crest factor:</b>	1:2

#### SURFACE SAR



#### VOLUME SAR



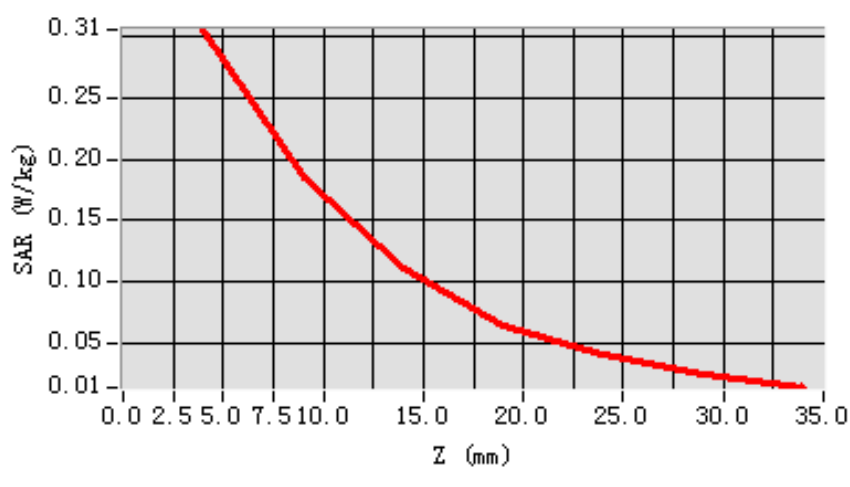
**Maximum location: X=16.00, Y=1.00**

<b>SAR 10g (W/Kg)</b>	0.176005
<b>SAR 1g (W/Kg)</b>	0.294389

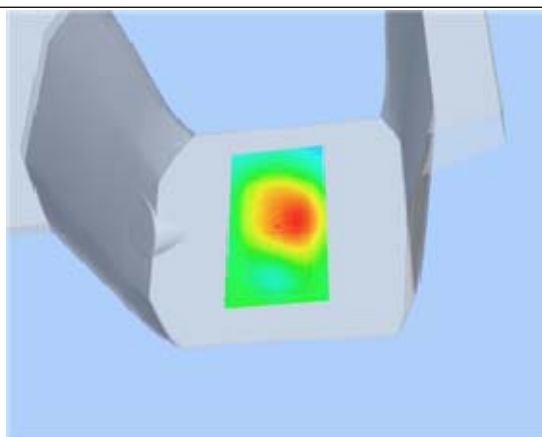
**Z Axis Scan**

<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>0.3054</b>	<b>0.1847</b>	<b>0.1109</b>	<b>0.0647</b>	<b>0.0404</b>	<b>0.0252</b>

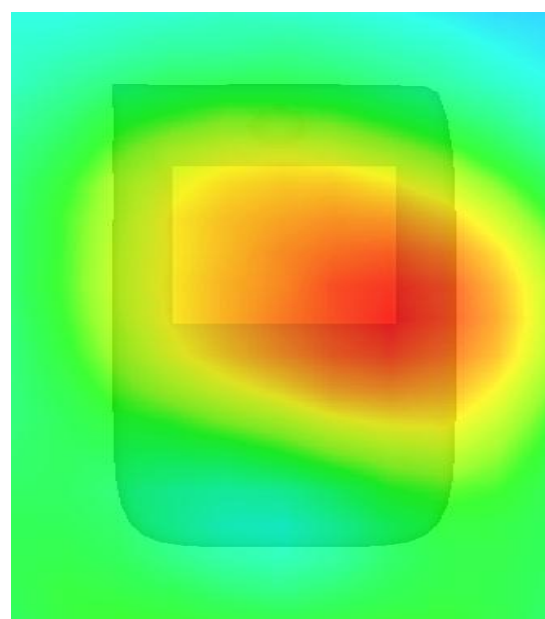
**SAR, Z Axis Scan (X = 16, Y = 1)**



**3D scen shot**



**Hot spot position**





## MEASUREMENT 5

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 11 seconds

### A. Experimental conditions.

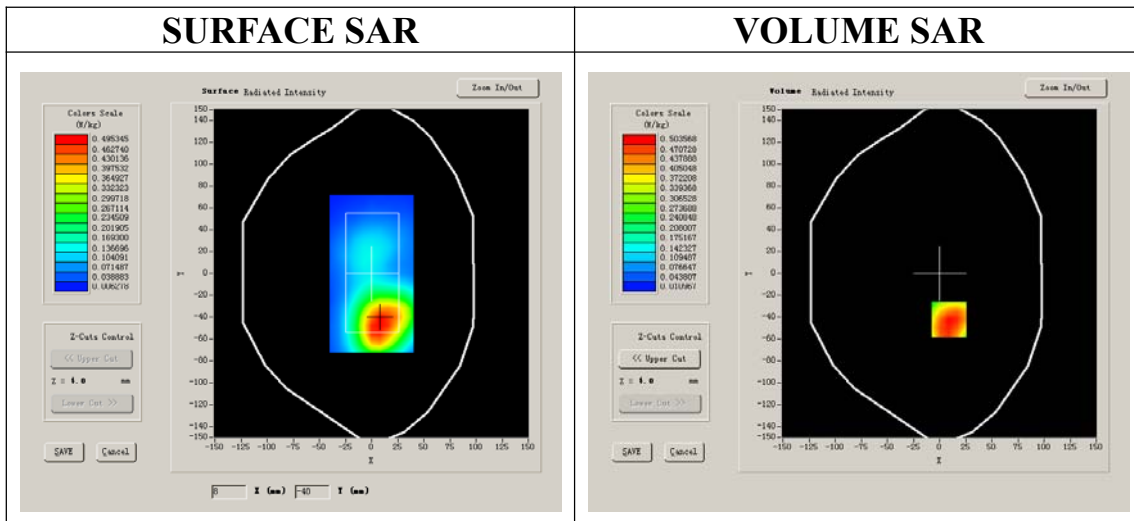
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	GSM850
<b>Channels</b>	High
<b>Signal</b>	EDGE

### B. SAR Measurement Results

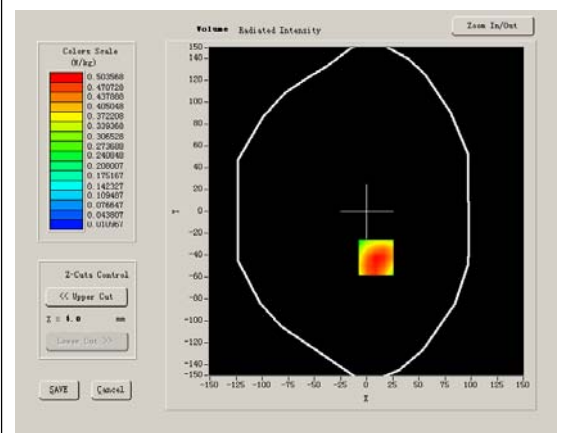
Higher Band SAR (Channel 251):

<b>Frequency (MHz)</b>	848.800000
<b>Relative permittivity (real part)</b>	55.750417
<b>Relative permittivity</b>	21.284550
<b>Conductivity (S/m)</b>	0.945961
<b>Variation (%)</b>	-0.170000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.9°C
<b>ConvF:</b>	28.479,25.214,27.196
<b>Crest factor:</b>	1:2

#### SURFACE SAR



#### VOLUME SAR



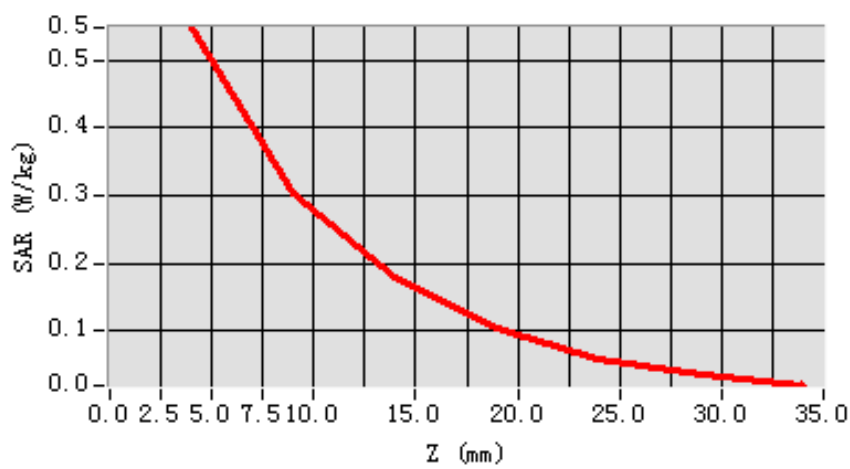
**Maximum location: X=9.00, Y=-42.00**

<b>SAR 10g (W/Kg)</b>	0.308673
<b>SAR 1g (W/Kg)</b>	0.530108

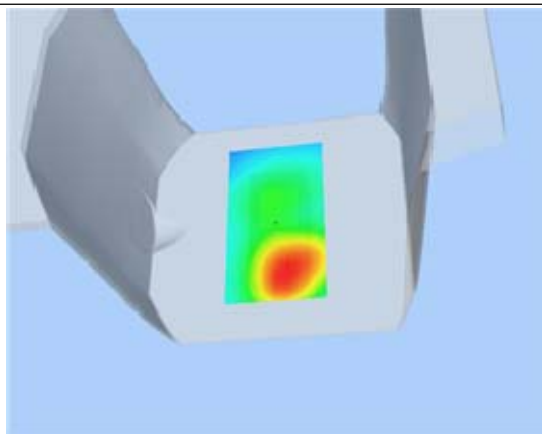
**Z Axis Scan**

<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>0.5483</b>	<b>0.3043</b>	<b>0.1804</b>	<b>0.1059</b>	<b>0.0584</b>	<b>0.0350</b>

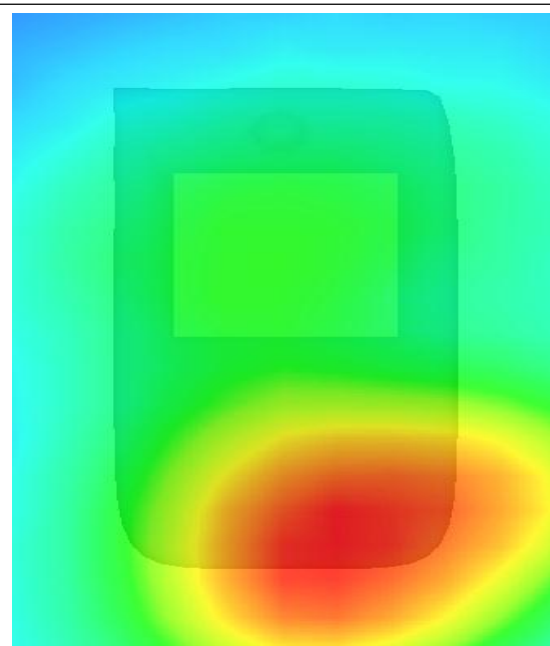
**SAR, Z Axis Scan (X = 9, Y = -42)**



**3D scen shot**



**Hot spot position**



## MEASUREMENT 6

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 11 seconds

### A. Experimental conditions.

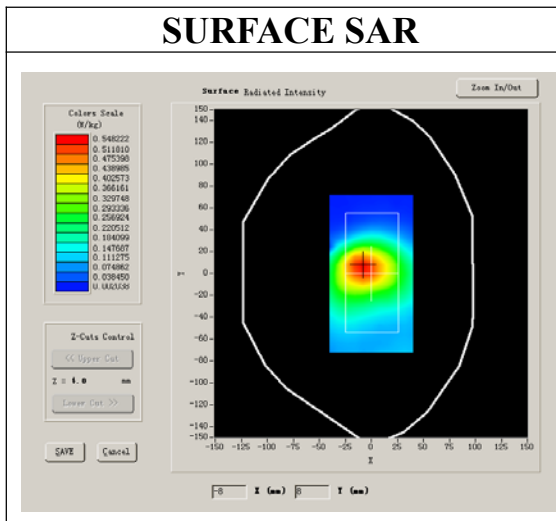
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	GSM1900
<b>Channels</b>	Low
<b>Signal</b>	GPRS

### B. SAR Measurement Results

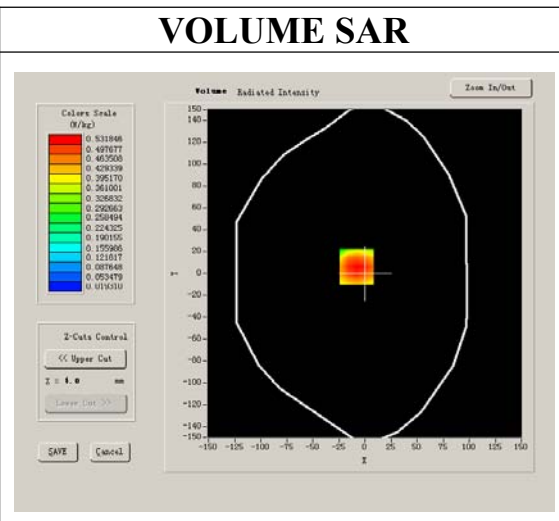
Lower Band SAR (Channel 512):

<b>Frequency (MHz)</b>	1850.199951
<b>Relative permittivity (real part)</b>	53.148041
<b>Relative permittivity</b>	14.070000
<b>Conductivity (S/m)</b>	1.453671
<b>Variation (%)</b>	-0.800000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.6°C
<b>ConvF:</b>	40.136,34.843,38.721
<b>Crest factor:</b>	1:2

#### SURFACE SAR



#### VOLUME SAR



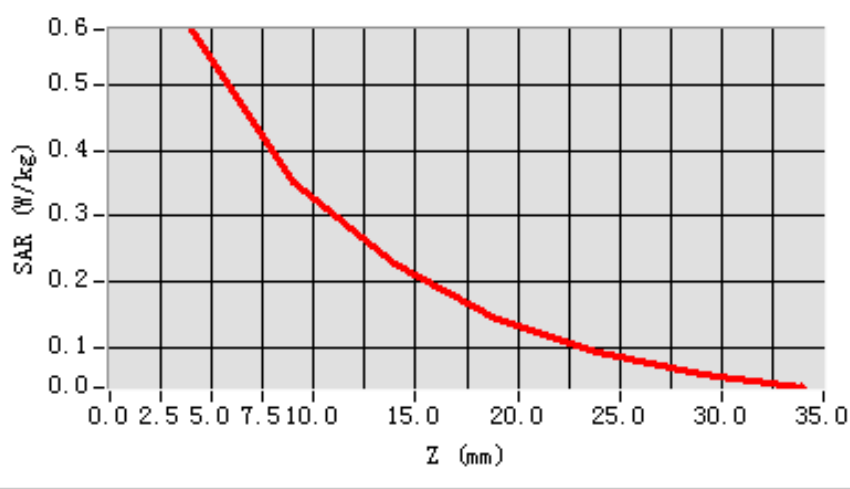
**Maximum location: X=-8.00, Y=6.00**

<b>SAR 10g (W/Kg)</b>	0.348863
<b>SAR 1g (W/Kg)</b>	0.563220

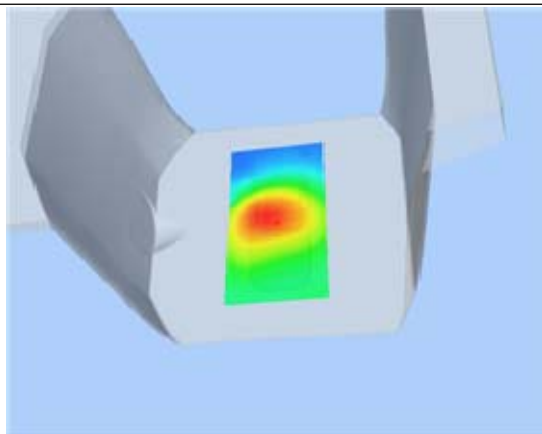
**Z Axis Scan**

<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>0.5839</b>	<b>0.3533</b>	<b>0.2260</b>	<b>0.1421</b>	<b>0.0929</b>	<b>0.0600</b>

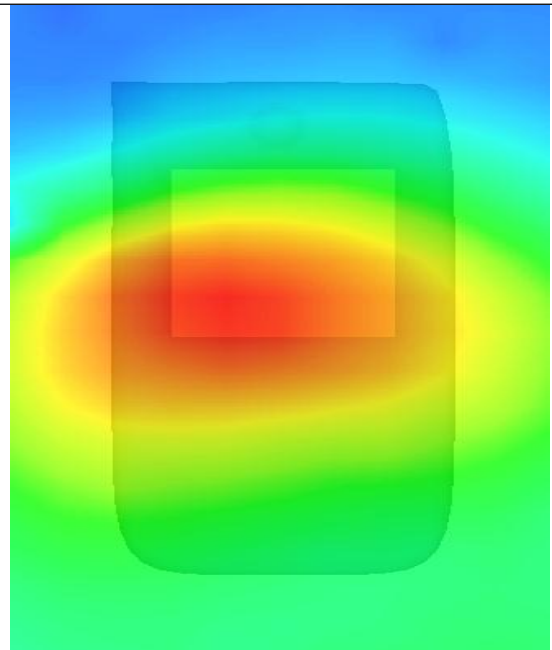
**SAR, Z Axis Scan (X = -8, Y = 6)**



**3D scen shot**



**Hot spot position**



# MEASUREMENT 7

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 7 seconds

## A. Experimental conditions.

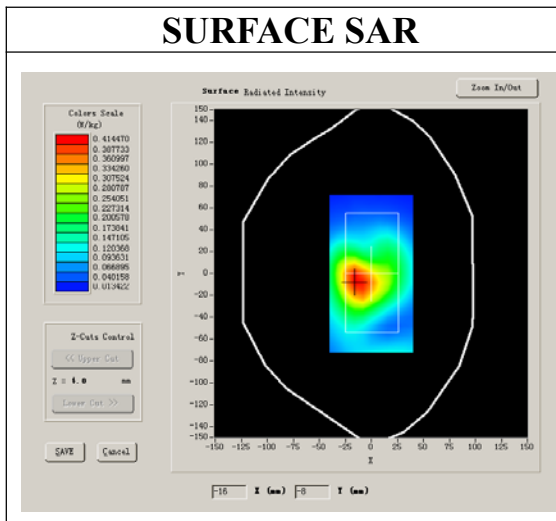
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	GSM1900
<b>Channels</b>	Low
<b>Signal</b>	GPRS

## B. SAR Measurement Results

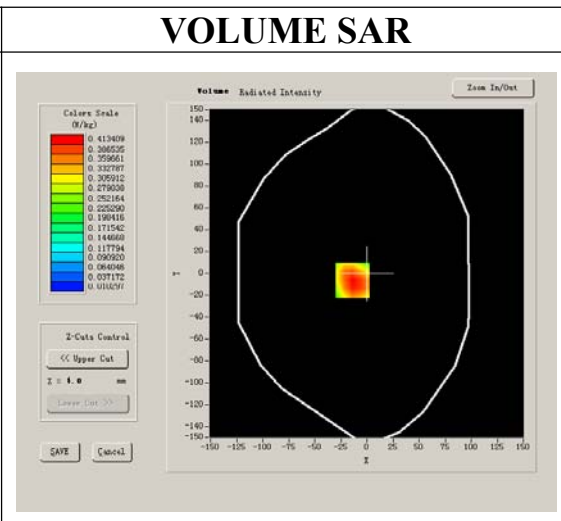
Lower Band SAR (Channel 512):

<b>Frequency (MHz)</b>	1850.199951
<b>Relative permittivity (real part)</b>	53.148041
<b>Relative permittivity</b>	14.070000
<b>Conductivity (S/m)</b>	1.453671
<b>Variation (%)</b>	-1.610000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.6°C
<b>ConvF:</b>	40.136,34.843,38.721
<b>Crest factor:</b>	1:2

### SURFACE SAR



### VOLUME SAR



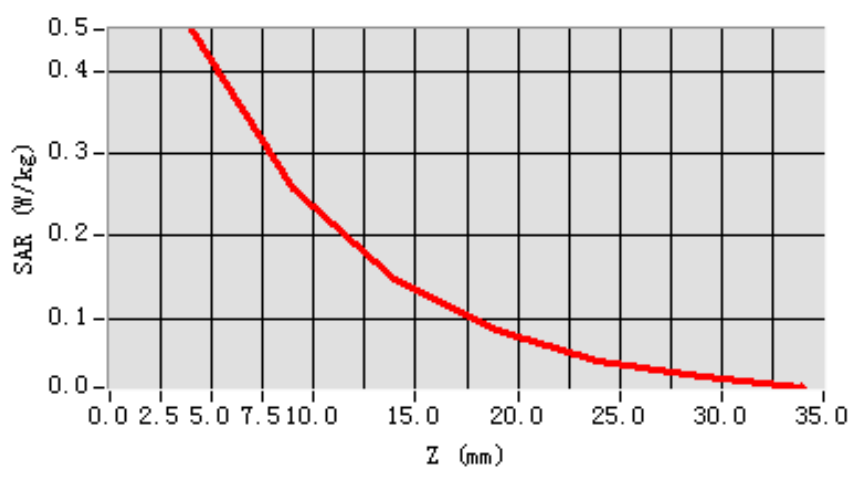
**Maximum location: X=-14.00, Y=-6.00**

<b>SAR 10g (W/Kg)</b>	0.254347
<b>SAR 1g (W/Kg)</b>	0.433479

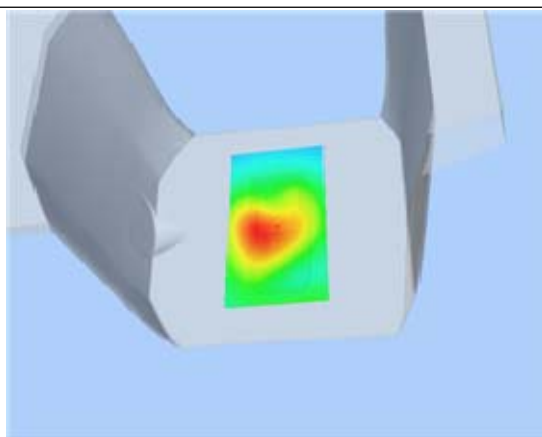
**Z Axis Scan**

<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>0.4502</b>	<b>0.2578</b>	<b>0.1474</b>	<b>0.0858</b>	<b>0.0493</b>	<b>0.0295</b>

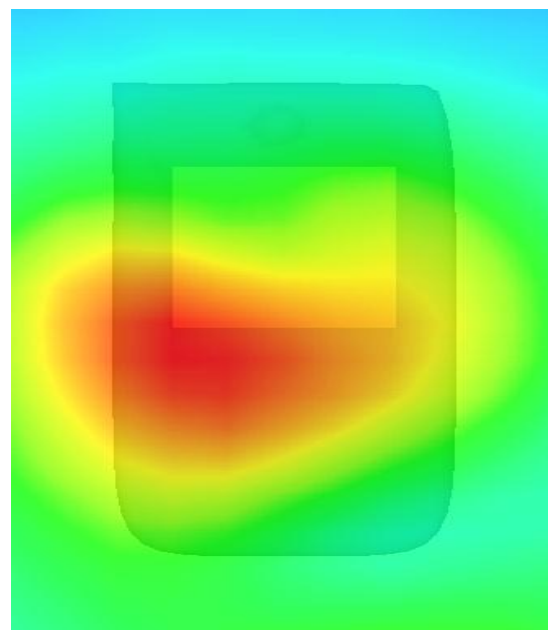
**SAR, Z Axis Scan (X = -14, Y = -6)**



**3D scen shot**



**Hot spot position**



## MEASUREMENT 8

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 7 seconds

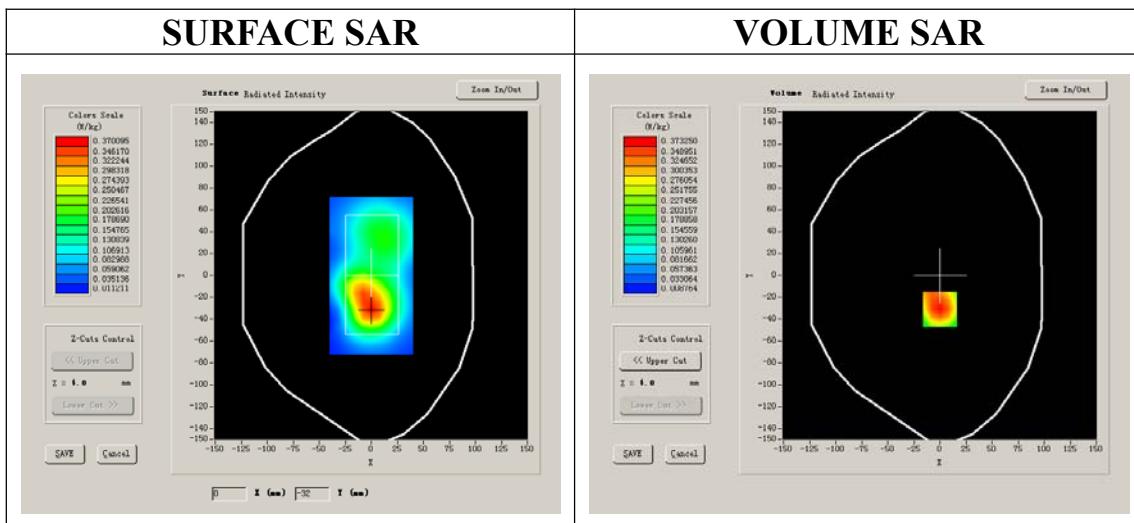
### A. Experimental conditions.

<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	GSM1900
<b>Channels</b>	Low
<b>Signal</b>	GPRS

### B. SAR Measurement Results

Lower Band SAR (Channel 512):

<b>Frequency (MHz)</b>	1850.199951
<b>Relative permittivity (real part)</b>	53.148041
<b>Relative permittivity</b>	14.070000
<b>Conductivity (S/m)</b>	1.453671
<b>Variation (%)</b>	0.080000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.6°C
<b>ConvF:</b>	40.136,34.843,38.721
<b>Crest factor:</b>	1:2



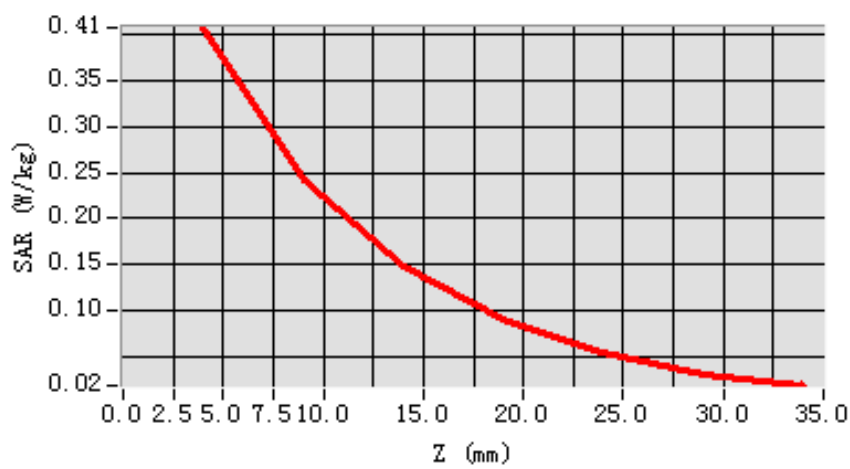
**Maximum location: X=0.00, Y=-31.00**

<b>SAR 10g (W/Kg)</b>	0.231203
<b>SAR 1g (W/Kg)</b>	0.388731

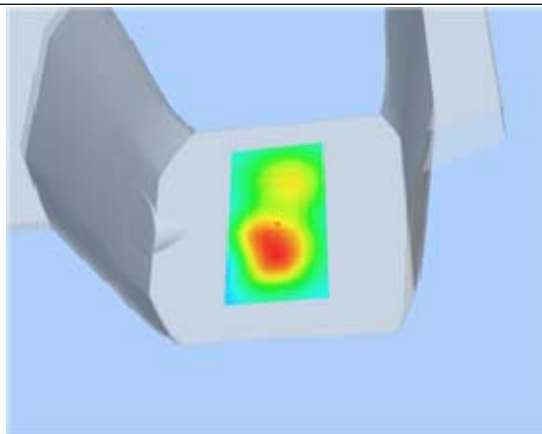
**Z Axis Scan**

<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>0.4064</b>	<b>0.2413</b>	<b>0.1486</b>	<b>0.0922</b>	<b>0.0553</b>	<b>0.0318</b>

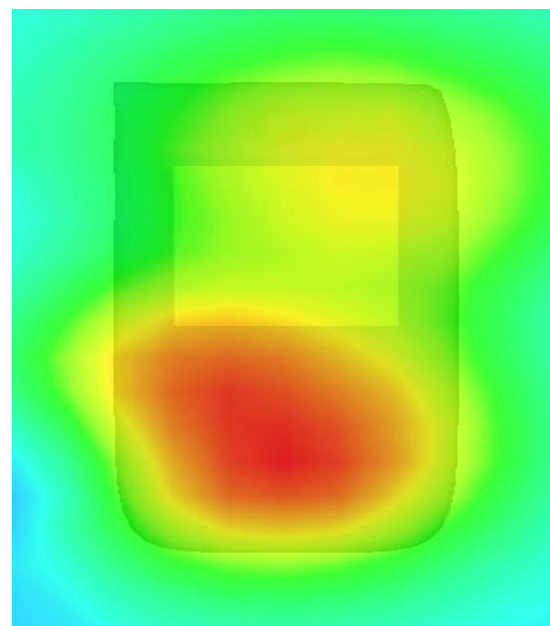
**SAR, Z Axis Scan (X = 0, Y = -31)**



**3D scen shot**



**Hot spot position**





## MEASUREMENT 9

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 7 seconds

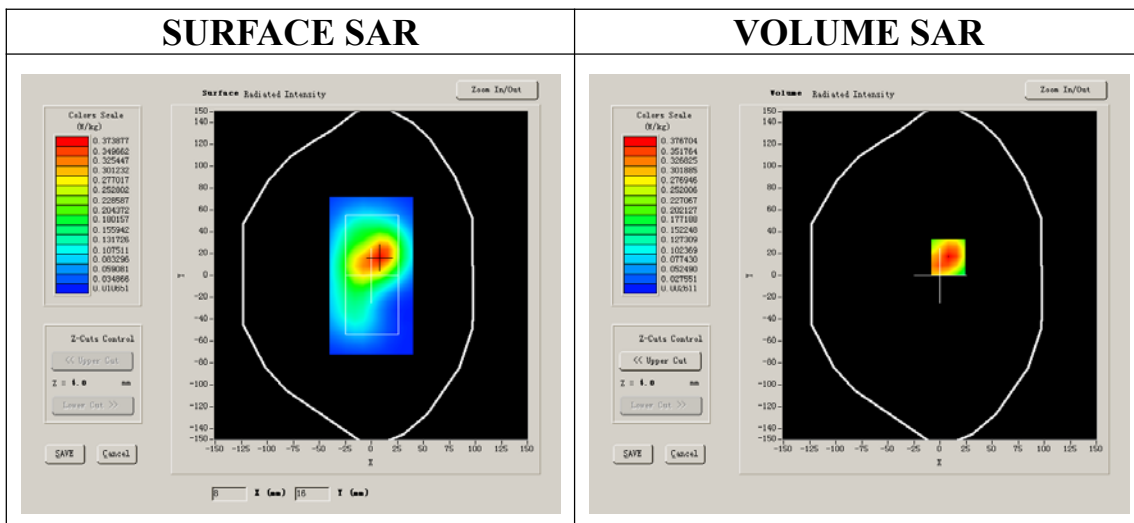
### A. Experimental conditions.

<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	GSM1900
<b>Channels</b>	Low
<b>Signal</b>	GPRS

### B. SAR Measurement Results

Lower Band SAR (Channel 512):

<b>Frequency (MHz)</b>	1850.199951
<b>Relative permittivity (real part)</b>	53.148041
<b>Relative permittivity</b>	14.070000
<b>Conductivity (S/m)</b>	1.453671
<b>Variation (%)</b>	-2.480000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.6°C
<b>ConvF:</b>	40.136,34.843,38.721
<b>Crest factor:</b>	1:2



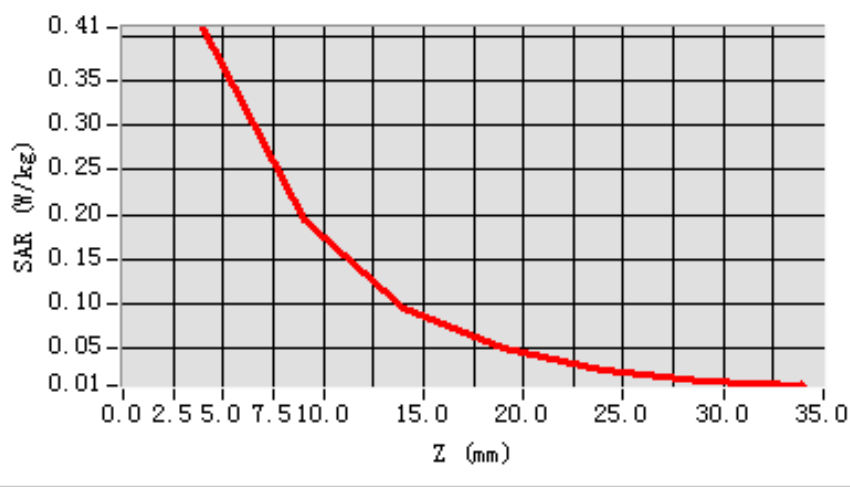
**Maximum location: X=8.00, Y=17.00**

<b>SAR 10g (W/Kg)</b>	0.205981
<b>SAR 1g (W/Kg)</b>	0.393367

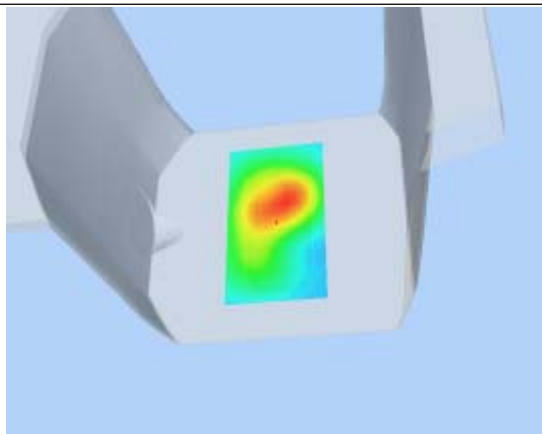
**Z Axis Scan**

<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>0.4102</b>	<b>0.1936</b>	<b>0.0951</b>	<b>0.0496</b>	<b>0.0237</b>	<b>0.0126</b>

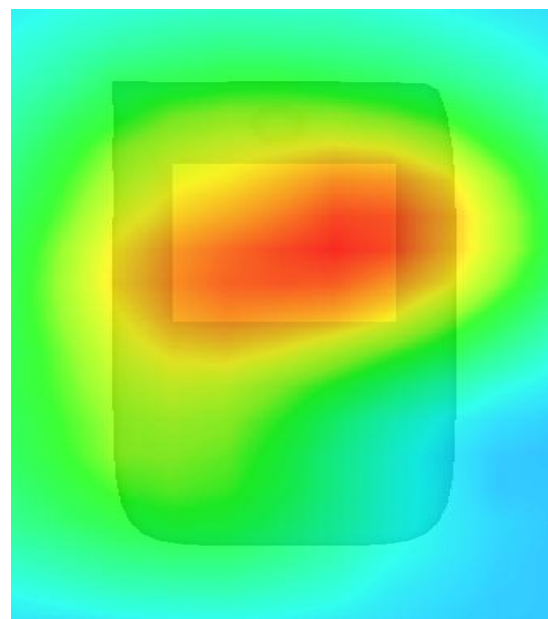
**SAR, Z Axis Scan (X = 8, Y = 17)**



**3D scen shot**



**Hot spot position**



# MEASUREMENT 10

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 11 seconds

## A. Experimental conditions.

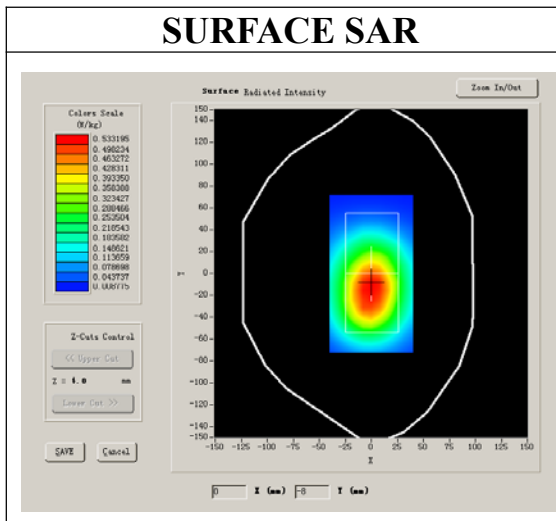
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	GSM1900
<b>Channels</b>	Low
<b>Signal</b>	EDGE

## B. SAR Measurement Results

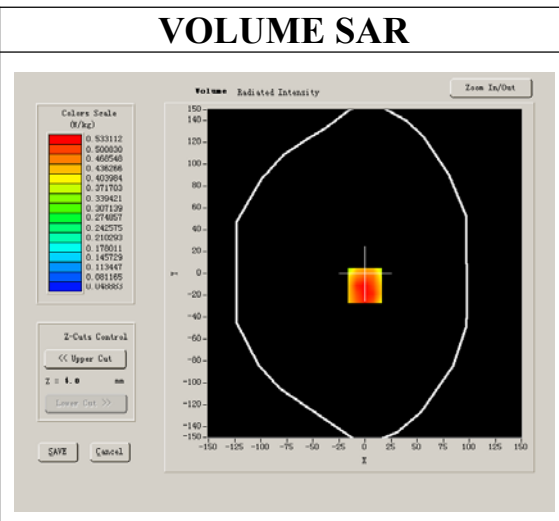
Lower Band SAR (Channel 512):

<b>Frequency (MHz)</b>	1850.199951
<b>Relative permittivity (real part)</b>	53.148041
<b>Relative permittivity</b>	14.070000
<b>Conductivity (S/m)</b>	1.453671
<b>Variation (%)</b>	-0.800000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.6°C
<b>ConvF:</b>	40.136,34.843,38.721
<b>Crest factor:</b>	1:2

### SURFACE SAR



### VOLUME SAR



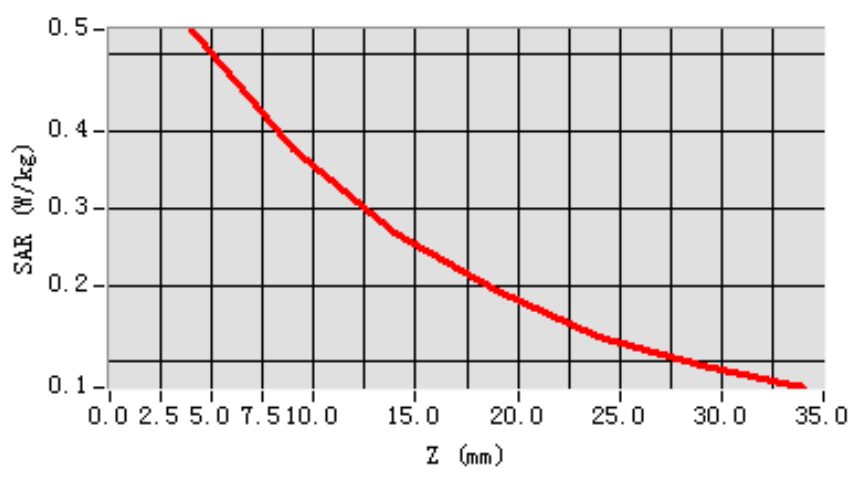
**Maximum location: X=0.00, Y=-11.00**

<b>SAR 10g (W/Kg)</b>	0.351180
<b>SAR 1g (W/Kg)</b>	0.516075

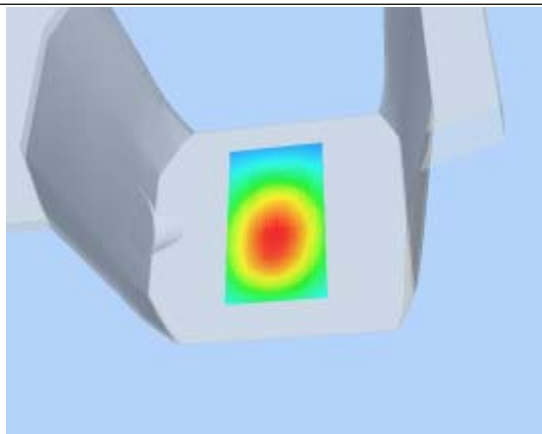
**Z Axis Scan**

<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>0.5331</b>	<b>0.3779</b>	<b>0.2672</b>	<b>0.1929</b>	<b>0.1326</b>	<b>0.0946</b>

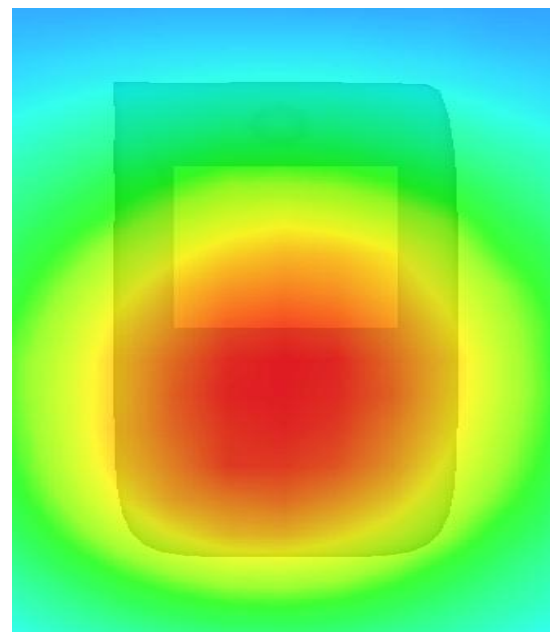
**SAR, Z Axis Scan (X = 0, Y = -11)**



**3D scen shot**



**Hot spot position**



# MEASUREMENT 11

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 9 seconds

## A. Experimental conditions.

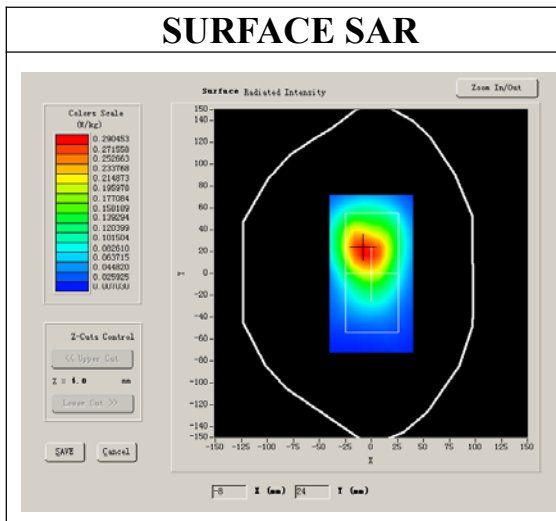
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	WCDMA
<b>Channels</b>	Middle
<b>Signal</b>	CDMA

## B. SAR Measurement Results

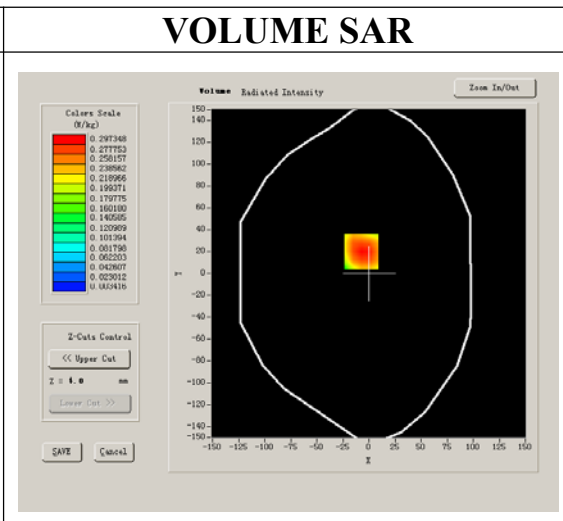
Middle Band SAR (Channel 9400):

<b>Frequency (MHz)</b>	1880.000000
<b>Relative permittivity (real part)</b>	53.148041
<b>Relative permittivity</b>	15.877050
<b>Conductivity (S/m)</b>	1.453671
<b>Variation (%)</b>	-1.310000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.6°C
<b>ConvF:</b>	40.136,34.843,38.721
<b>Crest factor:</b>	1:1

### SURFACE SAR



### VOLUME SAR



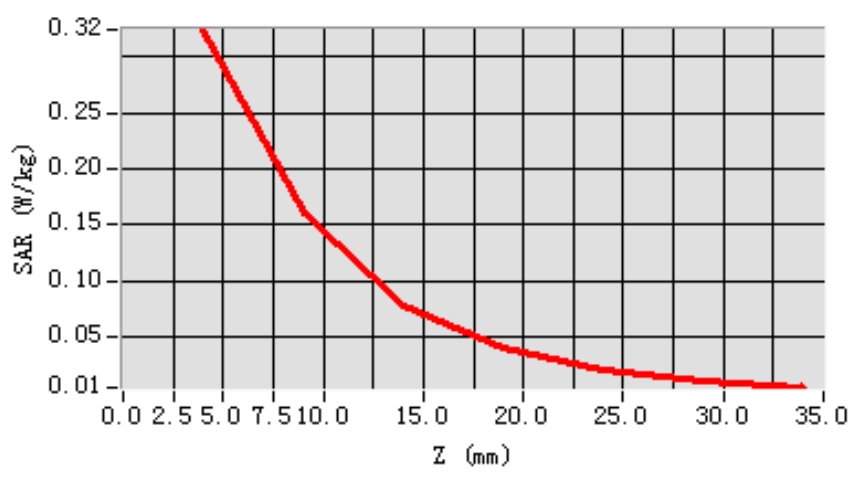
**Maximum location: X=-7.00, Y=20.00**

<b>SAR 10g (W/Kg)</b>	0.171788
<b>SAR 1g (W/Kg)</b>	0.313696

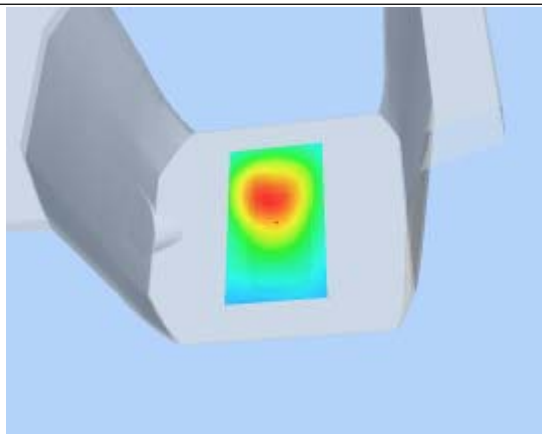
**Z Axis Scan**

<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>0.3238</b>	<b>0.1598</b>	<b>0.0790</b>	<b>0.0406</b>	<b>0.0218</b>	<b>0.0114</b>

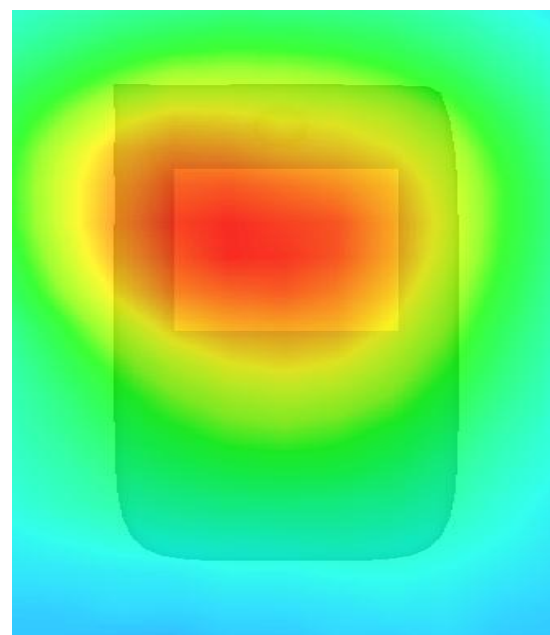
**SAR, Z Axis Scan (X = -7, Y = 20)**



**3D scen shot**



**Hot spot position**



## MEASUREMENT 12

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 7 seconds

### A. Experimental conditions.

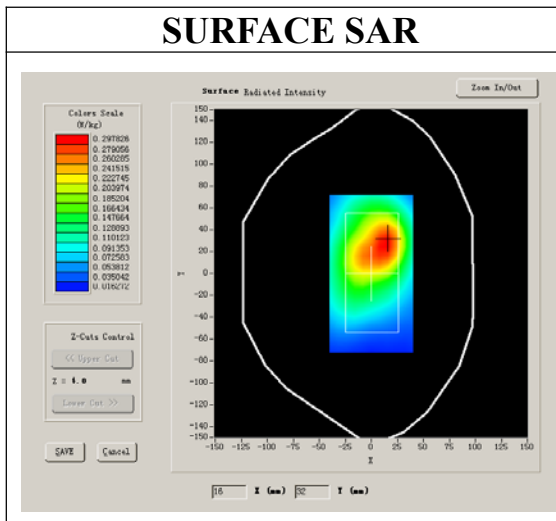
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	WCDMA
<b>Channels</b>	Middle
<b>Signal</b>	CDMA

### B. SAR Measurement Results

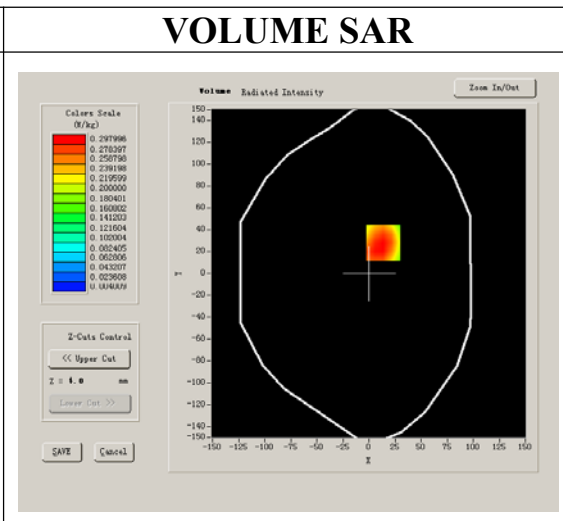
Middle Band SAR (Channel 9400):

<b>Frequency (MHz)</b>	1880.000000
<b>Relative permittivity (real part)</b>	53.148041
<b>Relative permittivity</b>	15.877050
<b>Conductivity (S/m)</b>	1.453671
<b>Variation (%)</b>	-1.070000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.6°C
<b>ConvF:</b>	40.136,34.843,38.721
<b>Crest factor:</b>	1:1

#### SURFACE SAR



#### VOLUME SAR



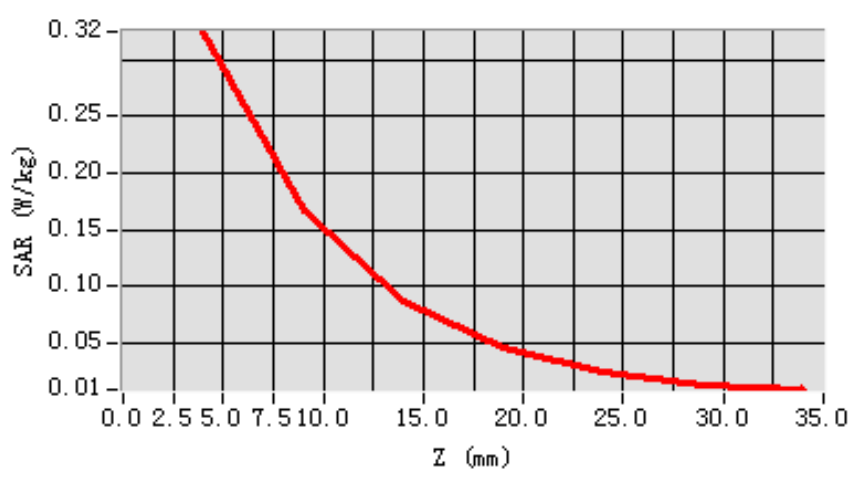
**Maximum location: X=14.00, Y=28.00**

<b>SAR 10g (W/Kg)</b>	0.177560
<b>SAR 1g (W/Kg)</b>	0.318499

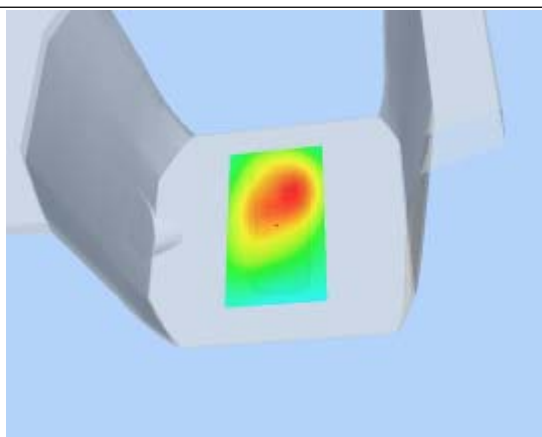
**Z Axis Scan**

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
<b>SAR (W/Kg)</b>	0.0000	0.3245	0.1669	0.0879	0.0455	0.0245	0.0129

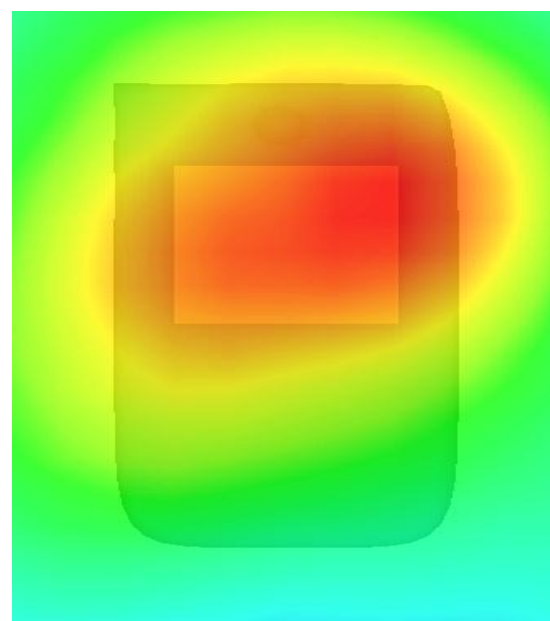
**SAR, Z Axis Scan (X = 14, Y = 28)**



**3D scen shot**



**Hot spot position**





## MEASUREMENT 13

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 15 seconds

### A. Experimental conditions.

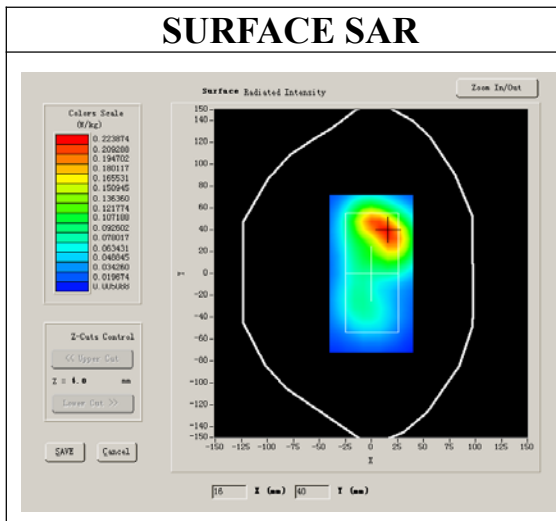
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	WCDMA
<b>Channels</b>	Middle
<b>Signal</b>	CDMA

### B. SAR Measurement Results

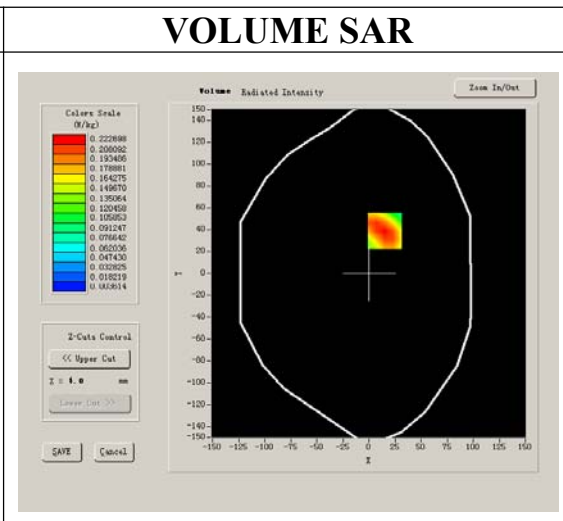
Middle Band SAR (Channel 9400):

<b>Frequency (MHz)</b>	1880.000000
<b>Relative permittivity (real part)</b>	53.148041
<b>Relative permittivity</b>	15.877050
<b>Conductivity (S/m)</b>	1.453671
<b>Variation (%)</b>	-0.390000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.6°C
<b>ConvF:</b>	40.136,34.843,38.721
<b>Crest factor:</b>	1:1

#### SURFACE SAR



#### VOLUME SAR



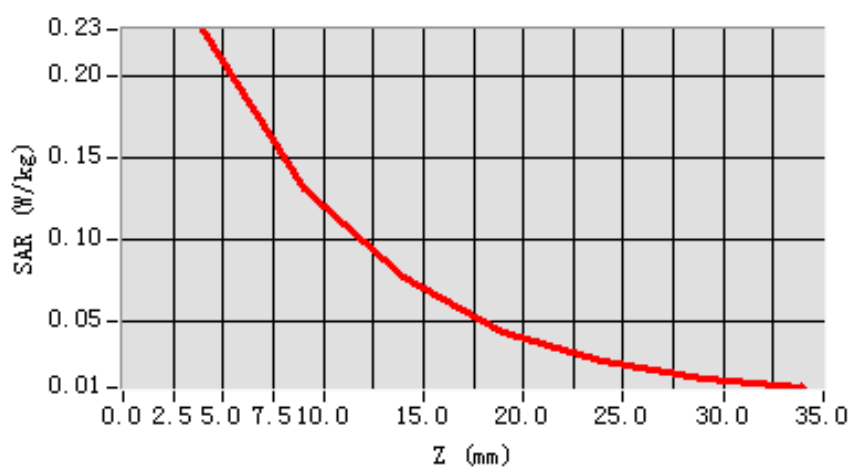
**Maximum location: X=15.00, Y=39.00**

<b>SAR 10g (W/Kg)</b>	0.126936
<b>SAR 1g (W/Kg)</b>	0.216561

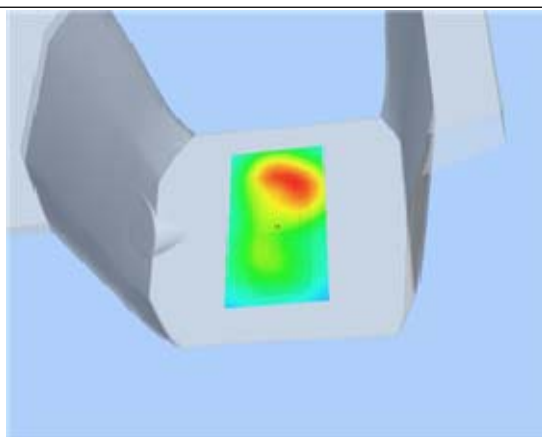
**Z Axis Scan**

<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>0.2279</b>	<b>0.1310</b>	<b>0.0773</b>	<b>0.0440</b>	<b>0.0265</b>	<b>0.0159</b>

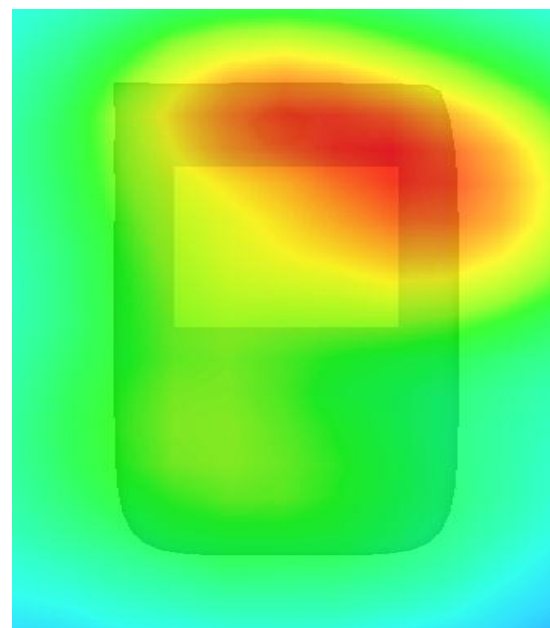
**SAR, Z Axis Scan (X = 15, Y = 39)**



**3D scen shot**



**Hot spot position**



# MEASUREMENT 14

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 4 seconds

## A. Experimental conditions.

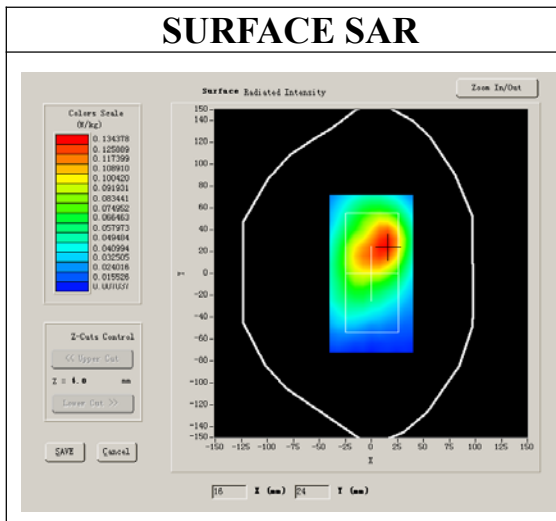
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Body
<b>Band</b>	WCDMA
<b>Channels</b>	Middle
<b>Signal</b>	CDMA

## B. SAR Measurement Results

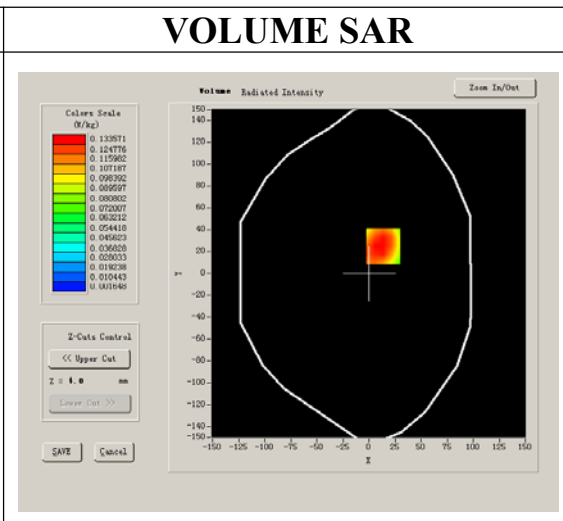
Middle Band SAR (Channel 9400):

<b>Frequency (MHz)</b>	1880.000000
<b>Relative permittivity (real part)</b>	53.148041
<b>Relative permittivity</b>	15.877050
<b>Conductivity (S/m)</b>	1.453671
<b>Variation (%)</b>	-0.420000
<b>Ambient Temperature:</b>	23.2°C
<b>Liquid Temperature:</b>	22.6°C
<b>ConvF:</b>	40.136,34.843,38.721
<b>Crest factor:</b>	1:1

### SURFACE SAR



### VOLUME SAR



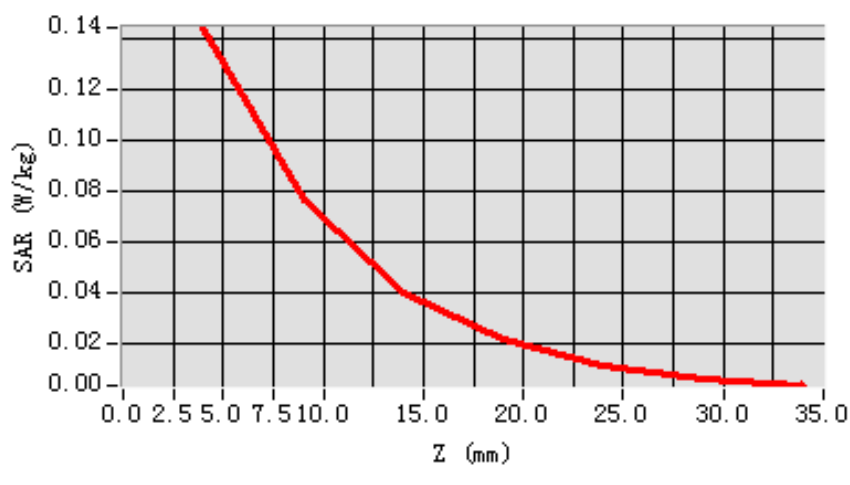
**Maximum location: X=14.00, Y=25.00**

<b>SAR 10g (W/Kg)</b>	0.079938
<b>SAR 1g (W/Kg)</b>	0.142478

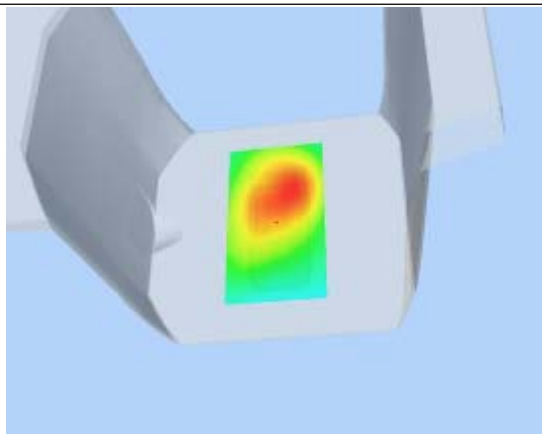
**Z Axis Scan**

<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>0.1447</b>	<b>0.0763</b>	<b>0.0395</b>	<b>0.0211</b>	<b>0.0111</b>	<b>0.0060</b>

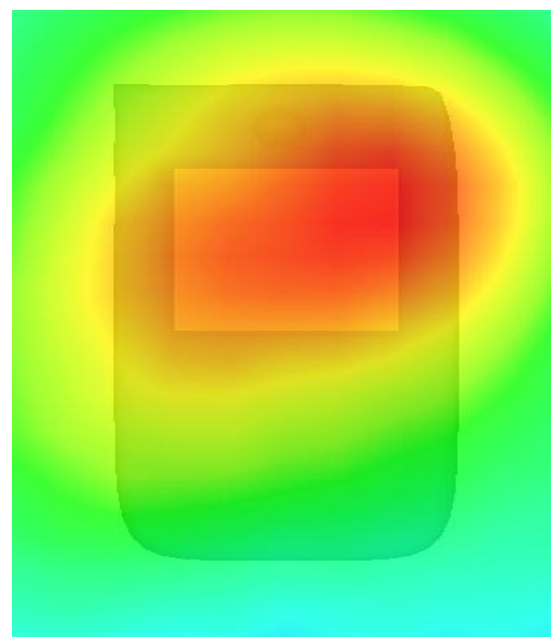
**SAR, Z Axis Scan (X = 14, Y = 25)**



**3D scen shot**



**Hot spot position**



## System Performance Check Data(Body)

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 27 seconds

### A. Experimental conditions.

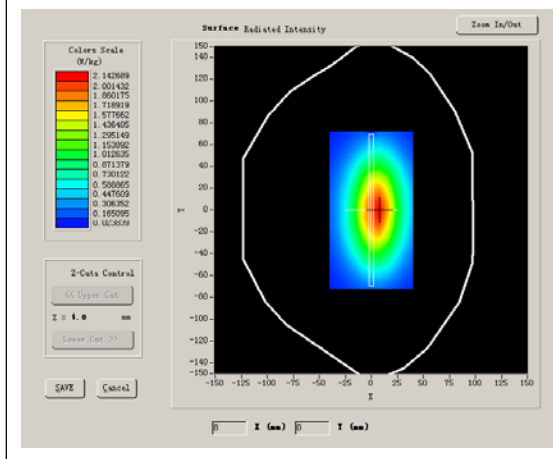
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	
<b>Band</b>	835MHz
<b>Channels</b>	
<b>Signal</b>	CW

### B. SAR Measurement Results

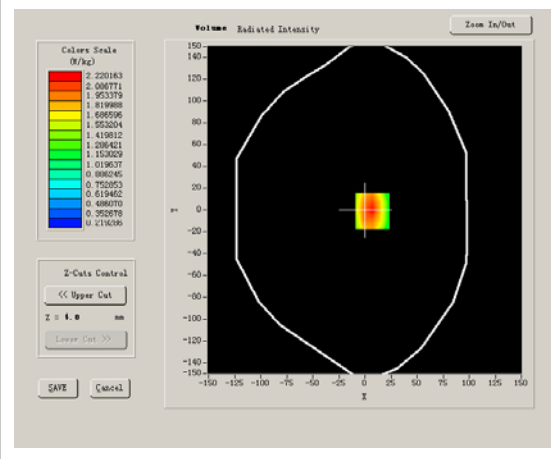
#### Band SAR

<b>Frequency (MHz)</b>	835.000000
<b>Relative permittivity (real part)</b>	55.750417
<b>Relative permittivity</b>	21.709999
<b>Conductivity (S/m)</b>	0.945961
<b>Power drift (%)</b>	-0.170000
<b>Ambient Temperature:</b>	22.4°C
<b>Liquid Temperature:</b>	21.5°C
<b>ConvF:</b>	28.559,25.681,27.588
<b>Crest factor:</b>	1:1

#### SURFACE SAR



#### VOLUME SAR



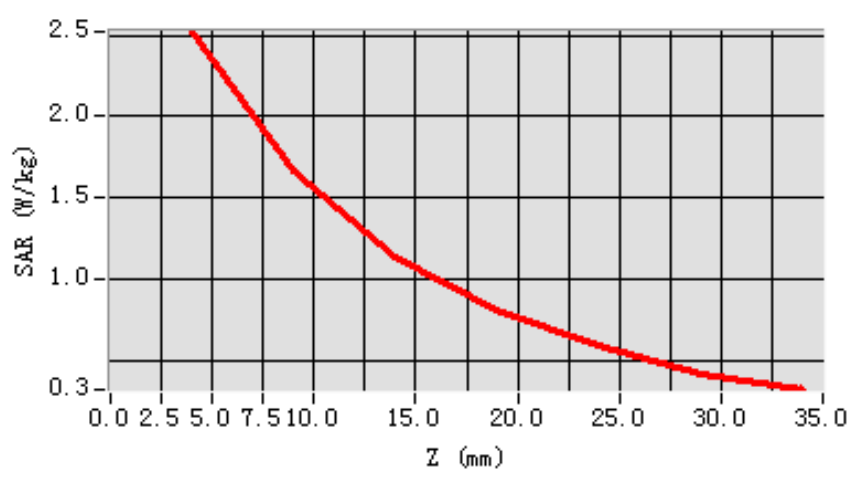
**Maximum location: X=7.00, Y=-1.00**

<b>SAR 10g (W/Kg)</b>	1.539476
<b>SAR 1g (W/Kg)</b>	2.367979

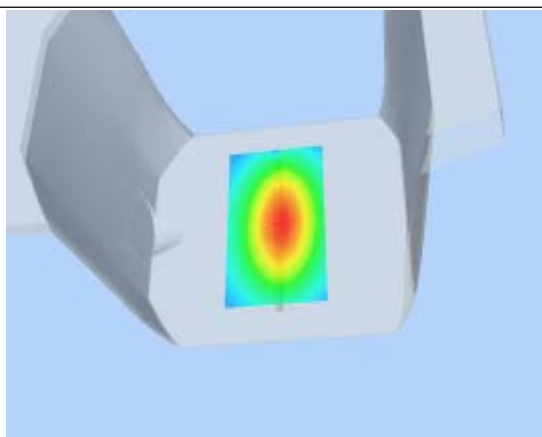
**Z Axis Scan**

<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>2.5209</b>	<b>1.6629</b>	<b>1.1437</b>	<b>0.8075</b>	<b>0.5889</b>	<b>0.4143</b>

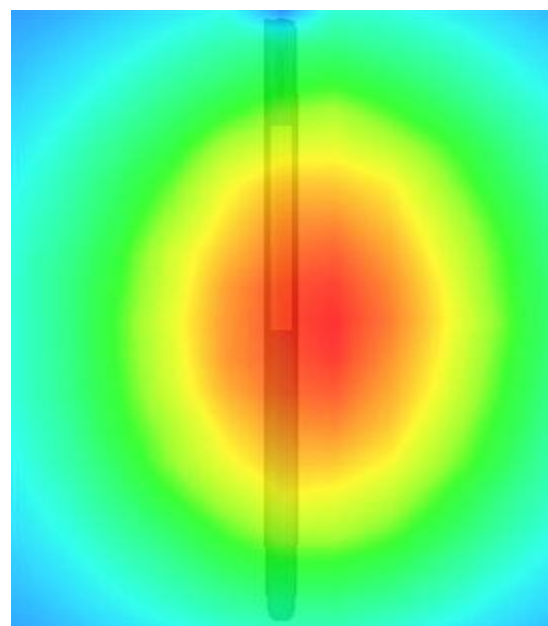
**SAR, Z Axis Scan (X = 7, Y = -1)**



**3D scen shot**



**Hot spot position**



## System Performance Check Data(Body)

Type: Phone measurement (Complete)

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

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

Date of measurement: 8/9/2012

Measurement duration: 13 minutes 26 seconds

### A. Experimental conditions.

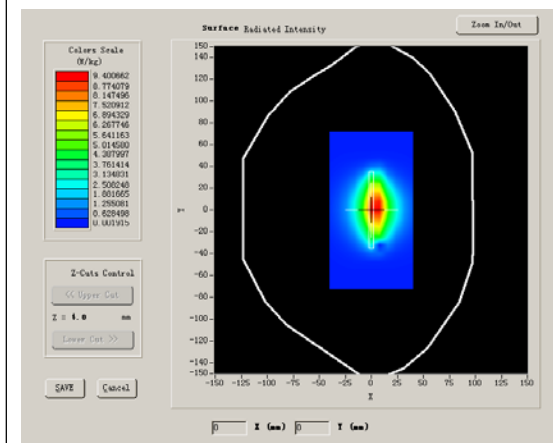
<b>Phantom File</b>	surf_sam_plan.txt
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	
<b>Band</b>	1900MHz
<b>Channels</b>	
<b>Signal</b>	CW

### B. SAR Measurement Results

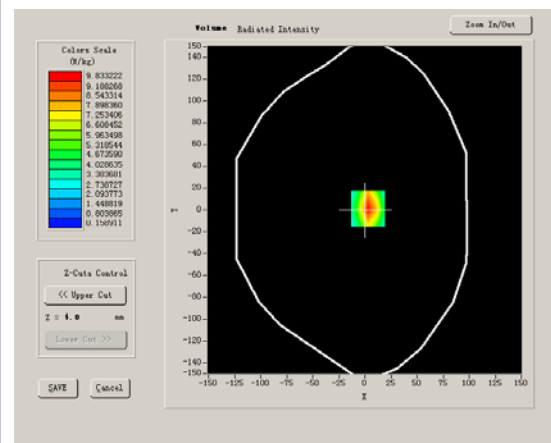
#### Band SAR

<b>Frequency (MHz)</b>	1900.000000
<b>Relative permittivity (real part)</b>	53.148041
<b>Relative permittivity</b>	14.070000
<b>Conductivity (S/m)</b>	1.453671
<b>Power drift (%)</b>	-0.030000
<b>Ambient Temperature:</b>	22.3°C
<b>Liquid Temperature:</b>	22.6°C
<b>ConvF:</b>	40.625,34.773,38.535
<b>Crest factor:</b>	1:1

#### SURFACE SAR



#### VOLUME SAR



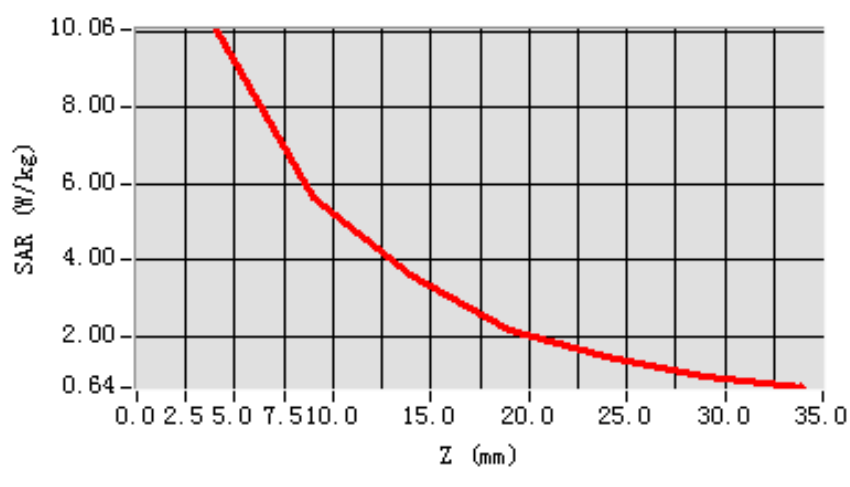
**Maximum location: X=3.00, Y=1.00**

<b>SAR 10g (W/Kg)</b>	4.981611
<b>SAR 1g (W/Kg)</b>	9.736177

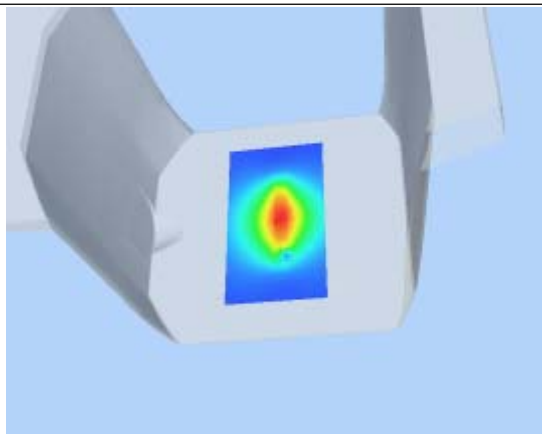
**Z Axis Scan**

<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>10.0621</b>	<b>5.6445</b>	<b>3.6226</b>	<b>2.1642</b>	<b>1.4521</b>	<b>0.9078</b>

**SAR, Z Axis Scan (X = 3, Y = 1)**



**3D scen shot**



**Hot spot position**

