



Report No.: SZ121000033S01



SAR TEST REPORT

Issued to

Verykool USA Inc

For

GSM/GPRS Dual-band Mobile Phone

Model Name : R25
Trade Name : verykool
Brand Name : verykool
FCC ID : WA6R25
Standard : FCC Oet65 Supplement C Jun.2001
47CFR 2.1093
ANSI C95.1-1999
IEEE 1528-2003
MAX SAR : Head: 0.610W/kg
Body: 0.728 W/kg
Test date : 2012.10.23
Issue date : 2012.10.23



Shenzhen MORLAB Communication Technology Co., Ltd.

Tested by Zhu Zhan
Zhu Zhan
Date 2012.10.23

Approved by Wu Xuewen
Wu Xuewen
Date 2012.10.23

Review by Samuel Peng
Samuel Peng
Date 2012.10.23

CTIA Authorized Test Lab
LAB CODE 20081223-00
IEEE 1725

OFTA
OTA
電信管理局



GCF
Official Observer of
Global Certification Forum

Bluetooth
BQTF

FCC
Reg. No.
741109

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

DIRECTORY

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

7. SAR MEASUREMENT EVALUATION.....	18
7.1. System Setup.....	18
7.2. Validation Results.....	19
8. OPERATIONAL CONDITIONS DURING TEST.....	20
8.1. Informations on the testing.....	20
8.2. Body-worn Configurations.....	21
8.3. Measurement procedure.....	21
8.4. Description of interpolation/extrapolation scheme.....	22
9. MEASUREMENT OF CONDUCTED PEAK OUTPUT POWER.....	23
10. TEST RESULTS LIST.....	25
11. MULTIPLE TRANSMITTERS EVALUATION.....	26
ANNEX A EUT SETUP PHOTOS.....	27
ANNEX B GRAPH TEST RESULTS.....	31

Change History		
Issue	Date	Reason for change
1.0	Oct. 23, 2012	First edition

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)	2012-9-26	1year
3	Voltmeter	Keithley (2000, SN:1000572)	2012-9-24	1year
4	Signal Generator	Rohde&Schwarz (SMP_02)	2012-9-24	1year
5	Amplifier	PRANA (Ap32 SV125AZ)	2012-9-24	1year
6	Power Meter	Rohde&Schwarz (NRVD, SN:101066)	2012-9-24	1year
7	Directional coupler	Giga-tronics(SN:1829112)	2012-9-24	1year
8	Probe	Satimo (SN:SN_3708_EP80)	2012-10-4	1year
9	DAE	Satimo (SN 35/08 SUPR31)	2012-9-24	1year
10	Dielectric Probe Kit	Agilent (85033E)	2012-9-24	1year
11	Phantom	Satimo (SN:SN_36_08_SAM62)	2012-9-24	1year
12	Liquid	Satimo (Last Calibration: 2012-10-17)	N/A	N.A
13	Dipole 835MHz	Satimo (SN 36/08 DIPC 99)	2012-10-5	1year
14	Dipole 1900MHz	Satimo (SN 36/08 DIPF 102)	2012-10-5	1year

2. Technical Information

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

2.1. Identification of Applicant

Company Name: Verykool USA Inc
Address: 3636 Nobel Drive, Suite 325, San Diego, CA 92122 USA

2.2. Identification of Manufacturer

Company Name: Verykool Wireless Technology Ltd.
Address: Room 1701, Reward Building C, No.203, 2nd Section of WangJing,
Li Ze Zhong Yuan, ChaoYang District, Beijing, P.R. of China 100102

2.3. Equipment Under Test (EUT)

Model Name: R25
Trade Name: verykool
Brand Name: verykool
Hardware Version: N/A
Software Version: N/A
Frequency Bands: GSM 850MHz / PCS 1900MHz;
Bluetooth;
Modulation Mode: GSM/GPRS: GMSK;
BT: GFSK/Π/4-DQPSK/8-DPSK
Multislot Class: GPRS:Class 12;
Antenna type: Fixed Internal Antenna
Development Stage: Identical prototype
Battery Model: 553450AR
Battery specification: 1050mAh3.7V

2.3.1. Photographs of the EUT

Please see for photographs of the EUT.

2.3.2. Identification of all used EUT

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

EUT Identity	Hardware Version	Software Version
1#	N/A	N/A

2.4. Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title
1	47 CFR§2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
2	FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01)	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields
3	ANSI C95.1-1999	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300 GHz
4	IEEE 1528-2003	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate(SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.
5	KDB 648474 D1	SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas
6	KDB 450824 D1	SAR Probe Calibration and System Verification Considerations for Measurements at 150MHz-3GHz

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;
Operation mode:	Call established
Power Level:	GSM 850 MHz Maximum output power(level 5) PCS 1900 MHz Maximum output power(level 0)

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. 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 mode. In GPRS link mode, its crest factor is 2, because EUT is set in GPRS multi-slot class 12 with 4 uplink slots.

3. Specific Absorption Rate (SAR)

3.1. Introduction

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

3.2. SAR Definition

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

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

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

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

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

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

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

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

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

4. SAR Measurement Setup

4.1. The Measurement System

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

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

The following figure shows the system.



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

4.2. Probe

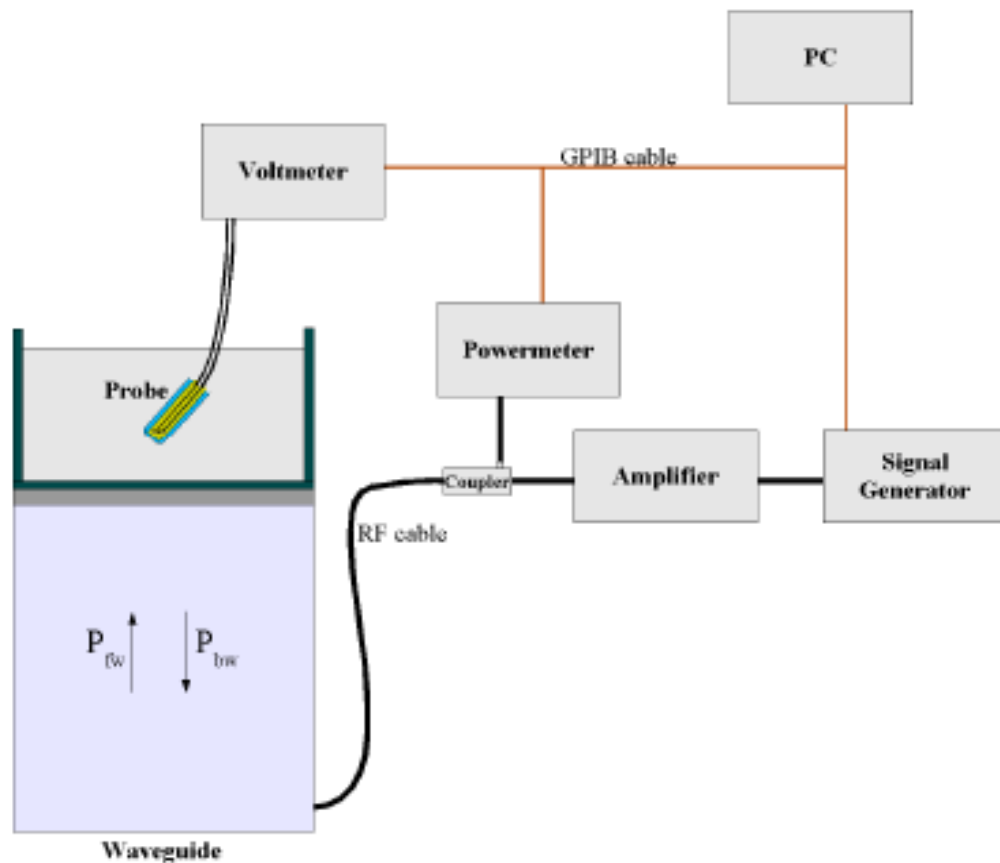
For the measurements the Specific Dosimetric E-Field Probe SN 37/08 EP80 with following specifications is used

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

- Probe linearity: <0.25 dB
- Axial Isotropy: <0.25 dB
- Spherical Isotropy: <0.25 dB
- Calibration range: 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, Antennessa proprietary calibration system. The calibration is performed with the EN 622091 annexe technique using reference guide at the five frequencies.



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

Where :

P_{fw} = Forward Power

P_{bw} = Backward Power

a and b = Waveguide dimensions

δ = Skin depth

Keithley configuration:

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

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

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

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

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

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

where DCP is the diode compression point in mV.

4.3. Probe Calibration Process

4.3.1 Dosimetric Assessment Procedure

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

4.3.2 Free Space Assessment Procedure

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

4.3.2 Temperature Assessment Procedure

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

Where:

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

Δt = exposure time (30 seconds),

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

ΔT = temperature increase due to RF exposure.

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

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

Where:

σ = simulated tissue conductivity,

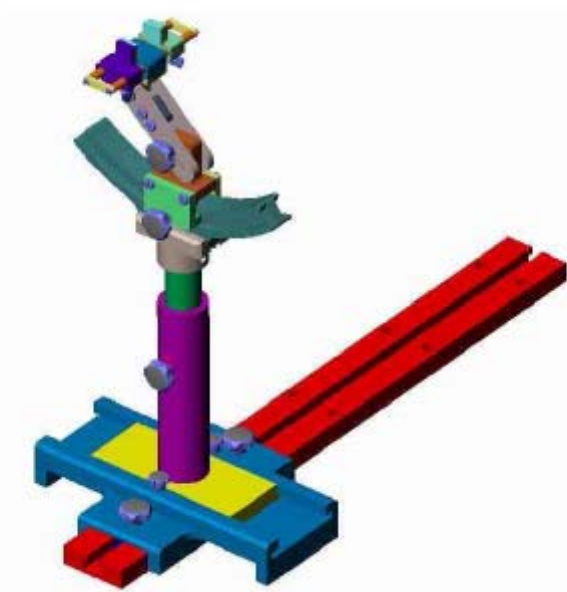
ρ = Tissue density (1.25 g/cm³ for brain tissue)

4.4. Phantom

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.

4.5. Device Holder

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



Device holder

System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

5. Tissue Simulating Liquids

Simulant liquids used for testing at frequencies of 835MHz and 1900MHz, are made mainly of sugar, salt and water solutions may be left in the phantoms. Approximately 20litres are needed for an upright head compared to about 25 litres for a horizontal bath phantom. The liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is or from the flat phantom to the liquid top surface is 15cm.

Following are the recipes for 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	Head	Body	Head	Body
Water	41.45	52.4	54.9	40.4
Salt(NaCl)	1.45	1.4	0.18	0.5
Sugar	56.0	45.0	0.0	58.0
HEC	1.0	1.0	0.0	1.0
Bactericide	0.1	0.1	0.0	0.1
Triton	0.0	0.0	0.0	0.0
DGBE	0.0	0.0	44.92	0.0
Acticide SPX	0.0	0.0	0.0	0.0
Dielectric Constant	42.45	56.1	39.9	54.0
Conductivity (S/m)	0.91	0.95	1.42	1.45

Recipes for Tissue Simulating Liquid

Table 1: Dielectric Performance of Head Tissue Simulating Liquid

Temperature: 22.0~23.8°C, humidity: 54~60%.			
Frequency	Description	Permittivity ϵ	Conductivity σ (S/m)
835 MHz	Reference result per OET65 $\pm 5\%$ window	41.5 39.425 to 43.575	0.90 0.855 to 0.945
	Reference result per probe calibration $\pm 5\%$ window	41.5 39.425 to 43.575	0.90 0.855 to 0.945
	Validation value (Oct. 17)	41.675999	0.894409
1900 MHz	Reference result per OET65 $\pm 5\%$ window	40 38 to 42	1.40 1.33 to 1.47
	Reference result per probe calibration $\pm 5\%$ window	42 39.9 to 44.1	1.40 1.33 to 1.47
	Validation value (Oct. 17)	40.509998	1.436111

Table 2: Dielectric Performance of Body Tissue Simulating Liquid

Temperature: 22.0~23.8°C, humidity: 54~60%.			
Frequency	Description	Permittivity ϵ	Conductivity σ (S/m)
835 MHz	Reference result per OET65 $\pm 5\%$ window	55.2 52.44 to 57.96	0.97 0.9215 to 1.0185
	Reference result per probe calibration $\pm 5\%$ window	56.1 53.295 to 58.905	0.95 0.905 to 0.998
	Validation value (Oct. 17)	55.709999	0.9809033
1900 MHz	Reference result per OET65 $\pm 5\%$ window	53.3 50.635 to 55.965	1.52 1.444 to 1.596
	Reference result per probe calibration $\pm 5\%$ window	54 51.3 to 56.7	1.45 1.378 to 1.523
	Validation value (Oct. 17)	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 ϵ and σ 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)	lg Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	4.76	N	1	1	1	4.76	4.76	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.01	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	0.7	0.7	1.62	1.62	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Test sample Related									
Test sample positioning	E.4.2.1	0.03	N	1	1	1	0.03	0.03	N-1
Device Holder Uncertainty	E.4.1.1	5.00	N	1	1	1	5.00	5.00	N-1
Output power Power drift - SAR drift measurement	6.6.2	4.04	R	$\sqrt{3}$	1	1	2.33	2.33	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞

Liquid conductivity - deviation from target value	E.3.2	4.57	R	$\sqrt{3}$	0.64	0.43	1.69	1.13	∞
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.20	2.15	M
Liquid permittivity - deviation from target value	E.3.2	3.69	R	$\sqrt{3}$	0.6	0.49	1.28	1.04	∞
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	1	0.6	0.49	6.00	4.90	M
Combined Standard Uncertainty			RSS				11.55	10.67	
Expanded Uncertainty (95% Confidence interval)			K=2				23.11	21.33	

6.2. UNCERTAINTY FOR SYSTEM PERFORMANCE CHECK

a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+-%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	4.76	N	1	1	1	4.76	4.76	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.01	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	0.7	0.7	1.62	1.62	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Dipole									
Dipole axis to liquid Distance	8,E.4.2	1.00	N	$\sqrt{3}$	1	1	0.58	0.58	∞

Input power and SAR drift measurement	8,6.6.2	4.04	R	$\sqrt{3}$	1	1	2.33	2.33	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Liquid conductivity - deviation from target value	E.3.2	4.57	R	$\sqrt{3}$	0.64	0.43	1.69	1.13	∞
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	$\sqrt{3}$	0.64	0.43	1.85	1.24	M
Liquid permittivity - deviation from target value	E.3.2	3.69	R	$\sqrt{3}$	0.6	0.49	1.28	1.04	∞
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	$\sqrt{3}$	0.6	0.49	3.46	2.83	M
Combined Standard Uncertainty			RSS				8.83	8.37	
Expanded Uncertainty (95% Confidence interval)			K=2				17.66	16.73	

7. SAR Measurement Evaluation

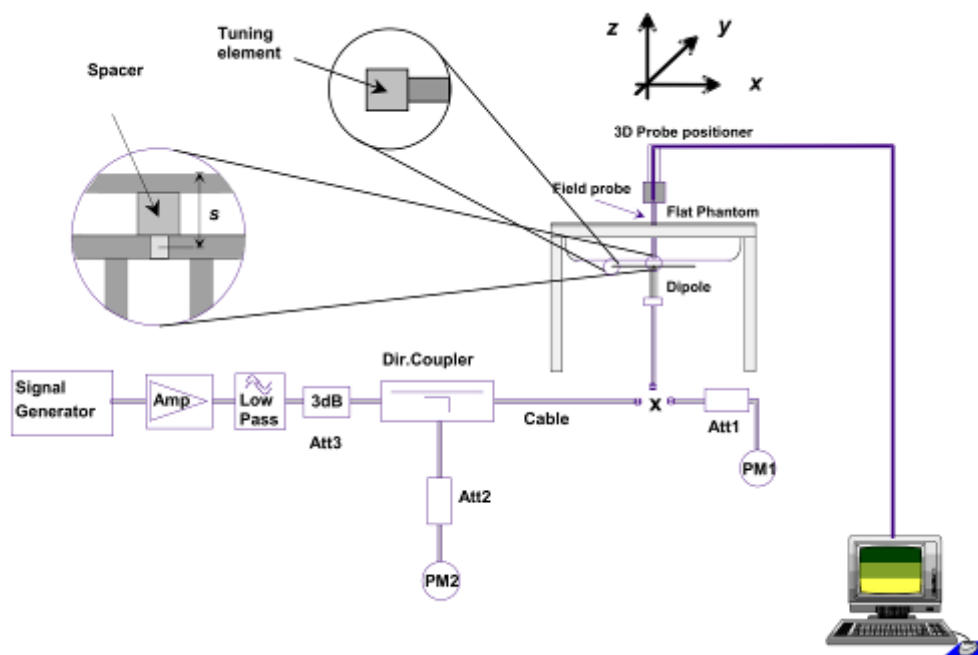
7.1. System Setup

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

System Verification Setup Block Diagram



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(Head)	835MHz(Body)	1900MHz(Head)	1900MHz(Body)
Target value (1g)	9.740 W/Kg	9.880 W/Kg	40.320W/Kg	38.530 W/Kg
250 mW input power	2.478 W/Kg	2.386 W/Kg	9.884 W/Kg	9.740 W/Kg
Test value (1g)	9.912 W/Kg	9.544W/Kg	39.536 W/Kg	38.960 W/Kg

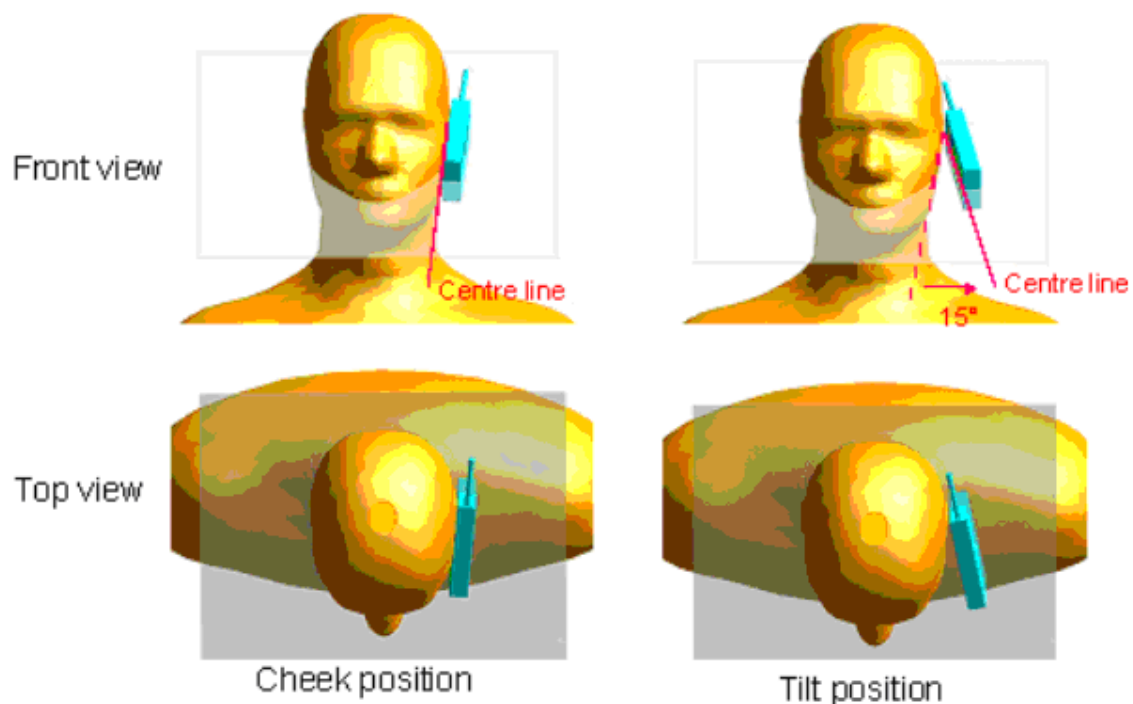
Note: System checks the specific test data please see page 63~71

8. Operational Conditions During Test

8.1. Informations on the testing

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

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



Description of the “cheek” position:

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

Description of the “tilted” position:

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

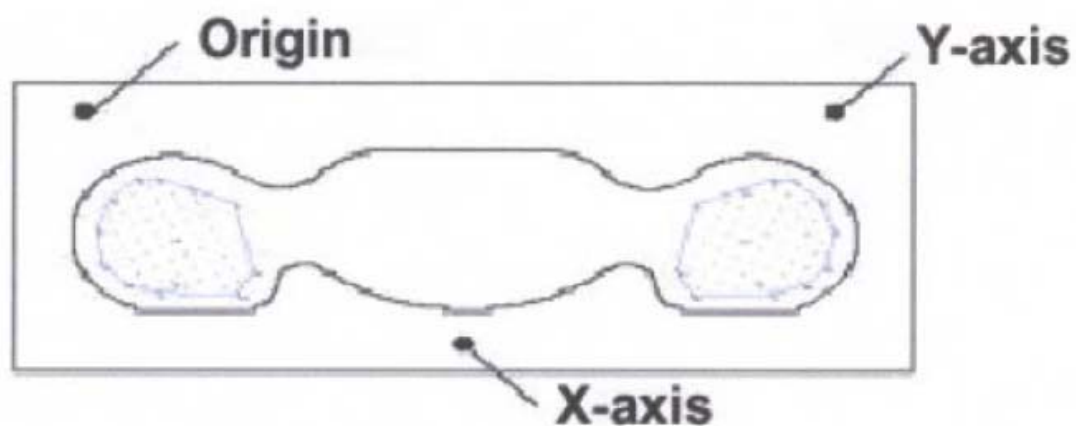
Remark: Please refer to Appendix B for the test setup photos.

8.2. Body-worn Configurations

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

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

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



SAR Measurement Points in Area Scan

8.3. Measurement procedure

The following steps are used for each test position

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

8.4. Description of interpolation/extrapolation scheme

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

An extrapolation is 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. Measurement Of Conducted Peak output power

1. GSM Conducted peak output power

Band	Channel	Frequency (MHz)	Output Power (dBm)
GSM 850	128	824.2	32.49
	190	836.6	32.47
	251	848.8	32.41
PCS 1900	512	1850.2	30.52
	661	1880.0	30.25
	810	1909.8	29.81

2. 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	32.62	31.98	30.37	29.22
	190	836.6	32.60	31.94	30.30	29.15
	251	848.8	32.56	31.90	30.23	29.08
PCS 1900	512	1850.2	30.59	30.02	28.38	27.17
	661	1880.0	30.36	29.66	27.93	26.78
	810	1909.8	29.86	29.12	27.25	26.17

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	23.62	25.96	26.11	26.21
	190	836.6	23.60	25.92	26.04	26.14
	251	848.8	23.56	25.88	25.97	26.07
PCS 1900	512	1850.2	21.59	24.00	24.12	24.16
	661	1880.0	21.36	23.64	23.67	23.77
	810	1909.8	20.86	23.10	22.99	23.16

3. Bluetooth peak output power

Band	Channel	Frequency (MHz)	Output Power(dBm)
BT	0	2402	2.298
	38	2441	2.168
	79	2480	1.764

10. 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
Right Side Of Head	Cheek/Touch	Internal	0.531	/	/
	Ear/Tilt	Internal	0.399	/	/
Left Side Of Head	Cheek/Touch	Internal	0.610	/	/
	Ear/Tilt	Internal	0.455	/	/
Body (15mm Separation)	GSM	Back upward	0.627	/	/
		Face Upward	0.366	/	/
	GPRS	Back upward	0.728	/	/
		Face Upward	0.537	/	/

Summary of Measurement Results (GSM 1900MHz Band)

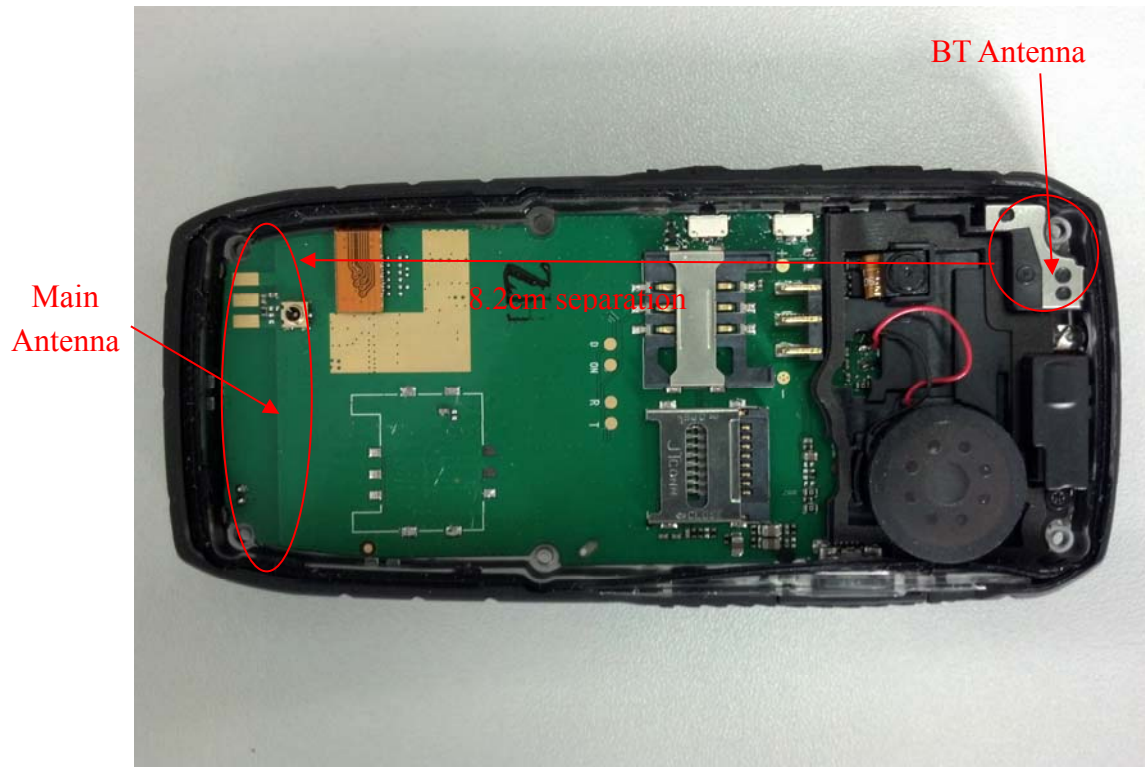
Temperature: 21.0~23.8°C, humidity: 54~60%.					
Phantom Configurations	Device Test Positions	Antenna Positions	SAR(W/Kg), 1g Peak		
			Device Test channel,		
			Channel 512	Channel 661	Channel 810
Right Side Of Head	Cheek/Touch	Internal	0.224	/	/
	Ear/Tilt	Internal	0.059	/	/
Left Side Of Head	Cheek/Touch	Internal	0.274	/	/
	Ear/Tilt	Internal	0.083	/	/
Body (15mm Separation)	GSM	Back upward	0.205	/	/
		Face Upward	0.113	/	/
	GPRS	Back upward	0.473	/	/
		Face Upward	0.330	/	/

Note:

The SAR test shall be performed at the high, middle and low frequency channels of each operating mode, when the SAR of highest power channel of each configurations is less than 0.8 W/kg, refer to KDB 648474, testing for the other channels is not required.

11. Multiple Transmitters Evaluation

The are three transmitters build in EUT, As followed:



Stand-alone SAR

The BT Max. Peak output power is $2\text{mW} < 2 \times \text{Pref}$ ($\text{Pref} = 12\text{mW}$), and the distance between BT antenna and main antenna is $8.2\text{cm} > 5\text{cm}$, standalone SAR evaluation is not required for Bluetooth antenna.

Simultaneous SAR

The BT and Wifi can't simultaneous transmitting.

Test Position	GSM SAR _{Max} (W/Kg)	Bluetooth SAR(W/Kg)	$\sum 1\text{-gSAR}_{\text{Max}}$ (W/Kg)
			BT&Main Ant
Head SAR	0.610	0	0.610
Body SAR	0.728	0	0.728

Simultaneous Transmission SAR evaluation is not required for BT and GSM, because the sum of $1\text{g SAR}_{\text{Max}}$ is $0.728\text{W/Kg} < 1.6\text{W/Kg}$ for BT and GSM.

Annex A EUT Setup Photos

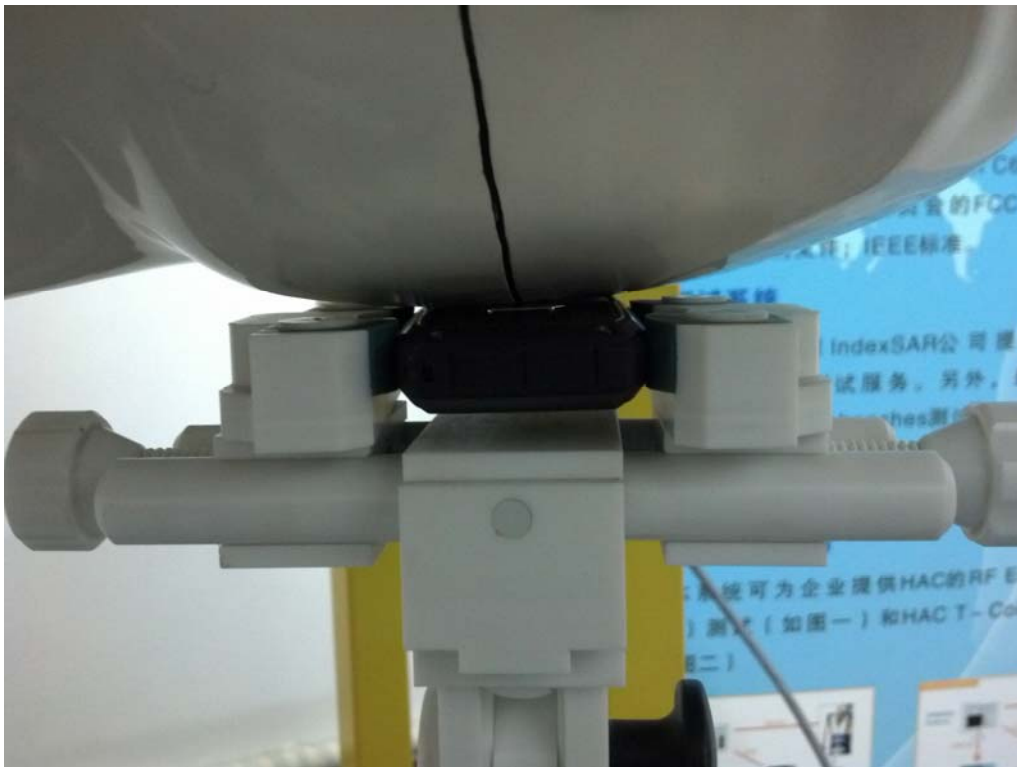
1 EUT Right Head Touch Cheek Position



2 EUT Right Head Tilt15 Position



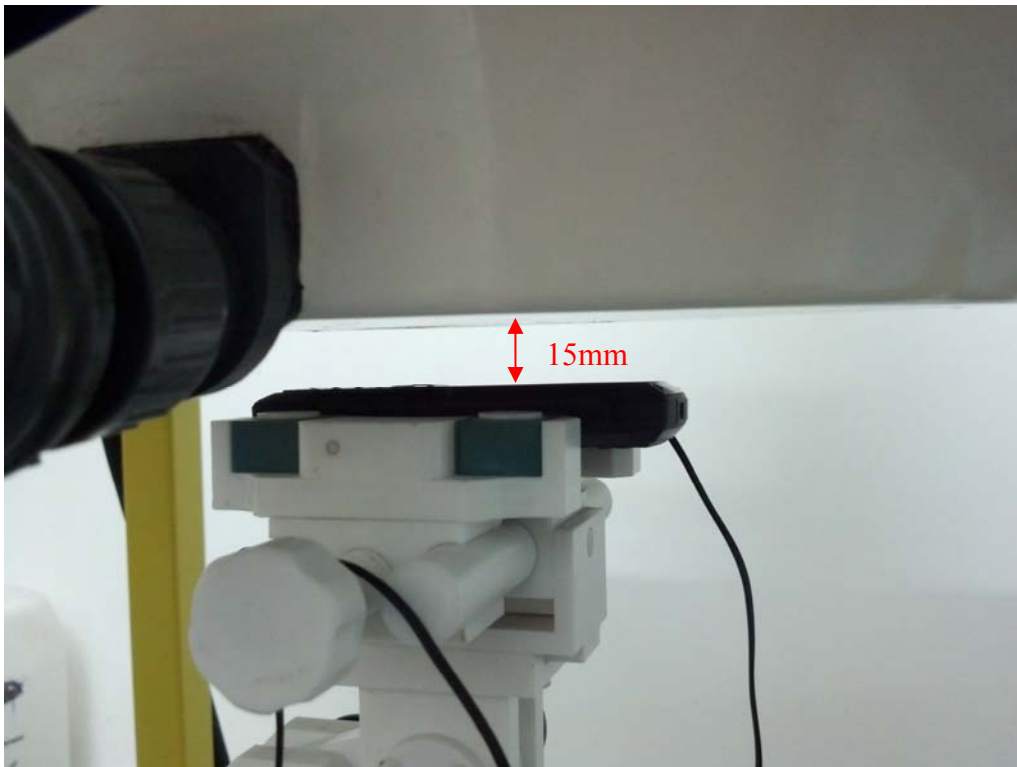
3 EUT Left Head Touch Cheek Position



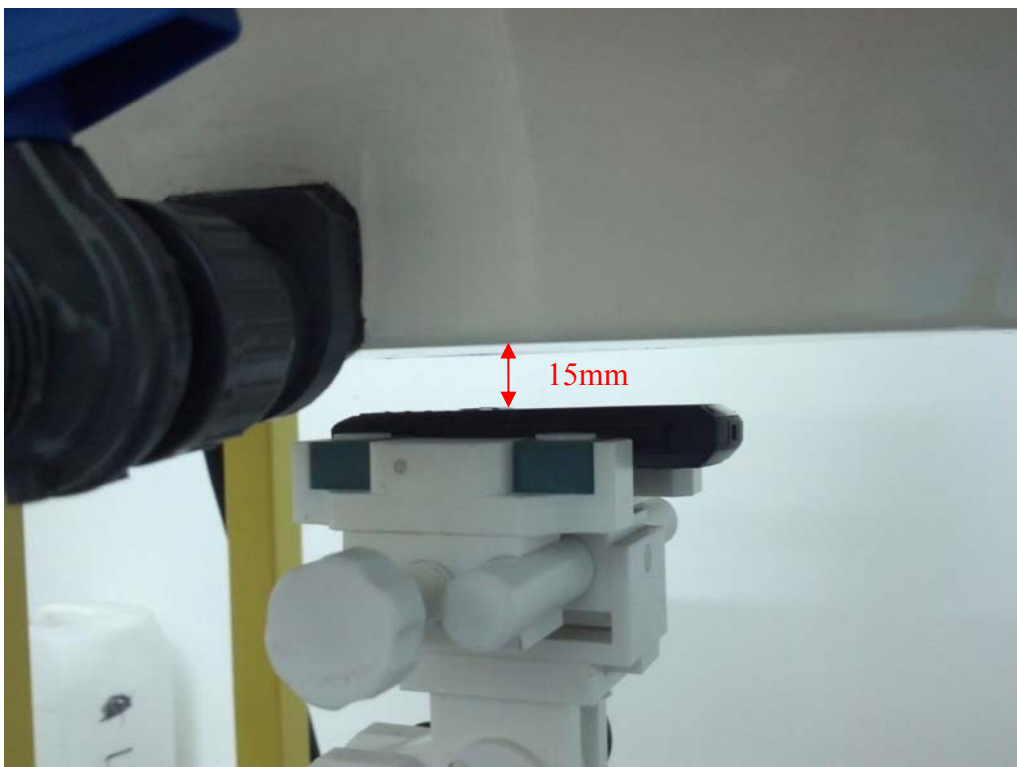
4 EUT Left Head Tilt15 Position



5 Side Position with earphone



6 Side Position



Liquid Level Photo



Annex B Graph Test Results

BAND	PARAMETERS
<u>GSM850</u>	<p><u>Measurement 1:</u> Right Head with Cheek device position on Low Channel in GSM mode</p> <p><u>Measurement 2:</u> Right Head with Tilt device position on Low Channel in GSM mode</p> <p><u>Measurement 3:</u> Left Head with Cheek device position on Low Channel in GSM mode</p> <p><u>Measurement 4:</u> Left Head with Tilt device position on Low Channel in GSM mode</p> <p><u>Measurement 5:</u> Flat Plane with Body device position on Low Channel in GSM mode</p> <p><u>Measurement 6:</u> Flat Plane with Body device position on Low Channel in GSM mode</p> <p><u>Measurement 7:</u> Flat Plane with Body device position on Low Channel in GPRS mode</p> <p><u>Measurement 8:</u> Flat Plane with Body device position on Low Channel in GPRS mode</p>
<u>GSM1900</u>	<p><u>Measurement 9:</u> Right Head with Cheek device position on Low Channel in GSM mode</p> <p><u>Measurement 10:</u> Right Head with Tilt device position on Low Channel in GSM mode</p> <p><u>Measurement 11:</u> Left Head with Cheek device position on Low Channel in GSM mode</p> <p><u>Measurement 12:</u> Left Head with Tilt device position on Low Channel in GSM mode</p> <p><u>Measurement 13:</u> Flat Plane with Body device position on Low Channel in GSM mode</p> <p><u>Measurement 14:</u> Flat Plane with Body device position on Low Channel in GSM mode</p> <p><u>Measurement 15:</u> Flat Plane with Body device position on Low Channel in GPRS mode</p> <p><u>Measurement 16:</u> Flat Plane with Body device position on Low Channel in GPRS mode</p>

MEASUREMENT 1

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 7 minutes 49 seconds

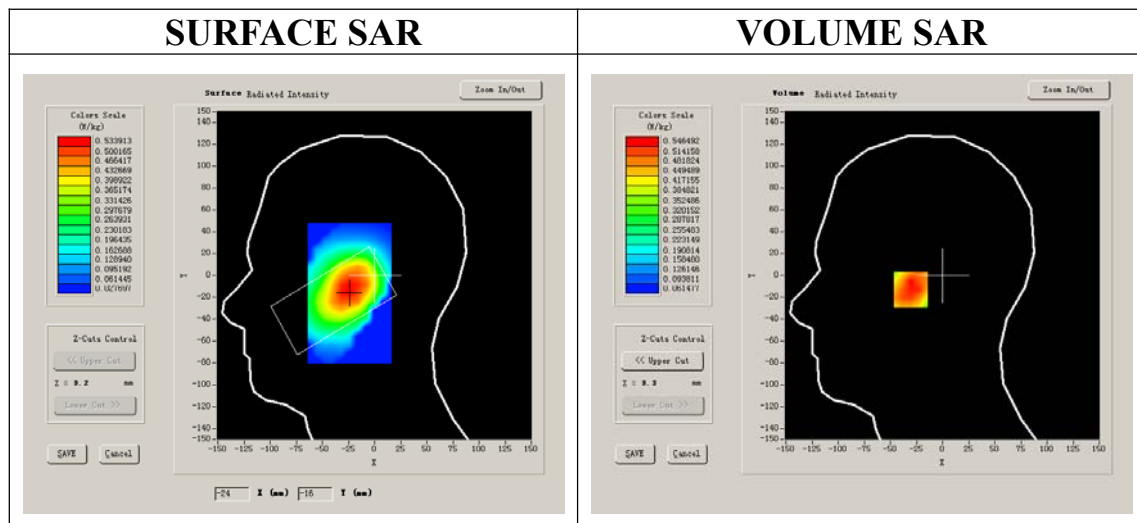
A. Experimental conditions.

Phantom File	sam_direct_droit2_surf8mm.txt
Phantom	Right head
Device Position	Cheek
Band	GSM850
Channels	Low
Signal	GSM

B. SAR Measurement Results

Lower Band SAR (Channel 128):

Frequency (MHz)	824.200000
Relative permittivity (real part)	41.675999
Relative permittivity	15.070000
Conductivity (S/m)	0.894409
Power drift(%)	-1.210000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.6°C
ConvF:	28.479,25.214,27.19
Crest factor:	1:8



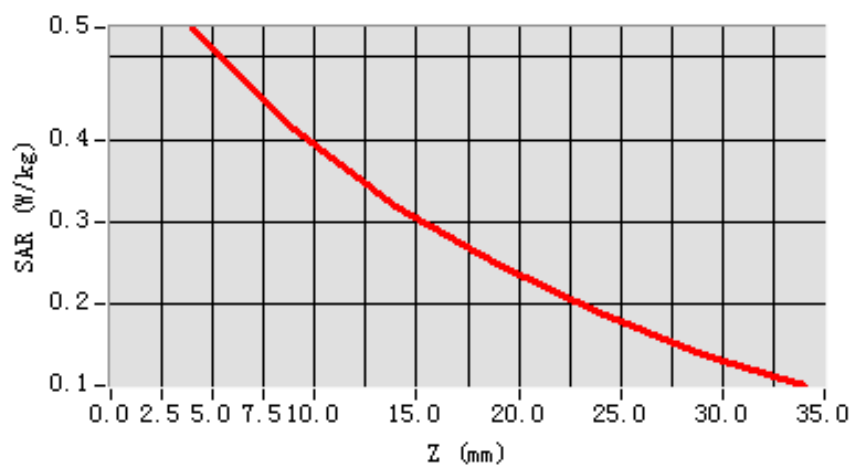
Maximum location: X=-25.00, Y=-13.00

SAR 10g (W/Kg)	0.383482
SAR 1g (W/Kg)	0.530661

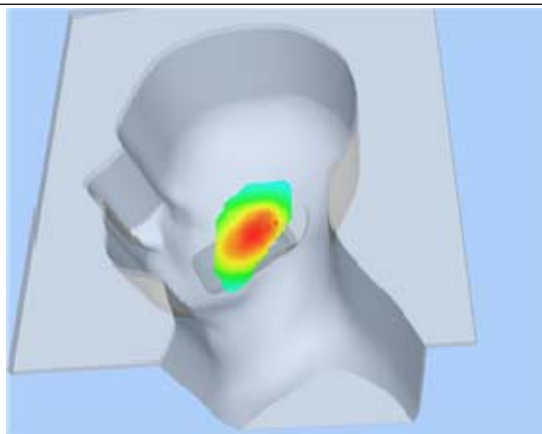
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.5351	0.4123	0.3177	0.2489	0.1903	0.1406

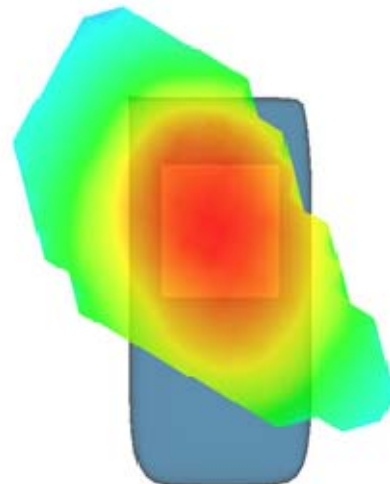
SAR, Z Axis Scan (X = -25, Y = -13)



3D scene shot



Hot spot position



MEASUREMENT 2

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 7 minutes 33 seconds

A. Experimental conditions.

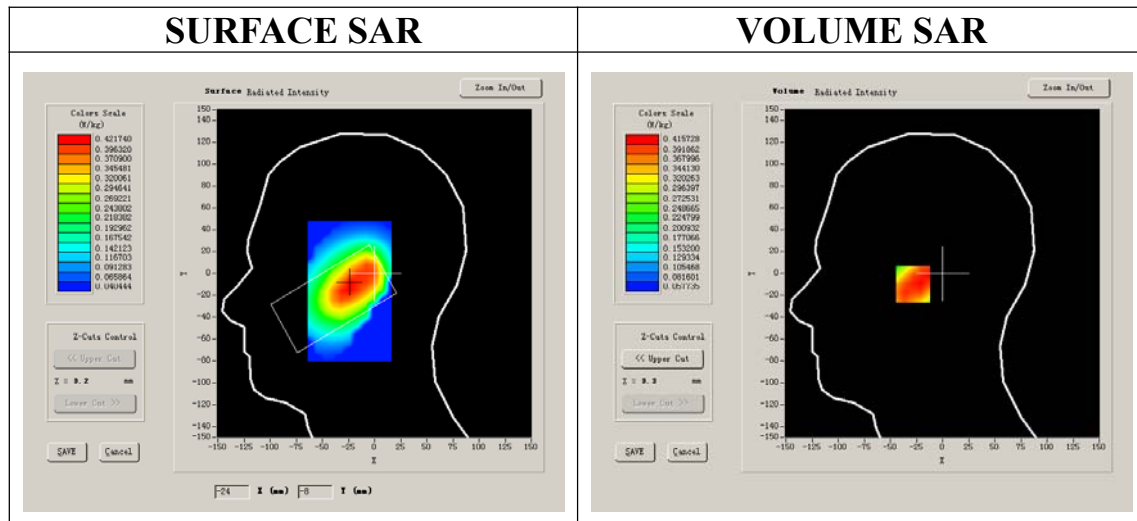
Phantom File	sam_direct_droit2_surf8mm.txt
Phantom	Right head
Device Position	Tilt
Band	GSM850
Channels	Low
Signal	GSM

B. SAR Measurement Results

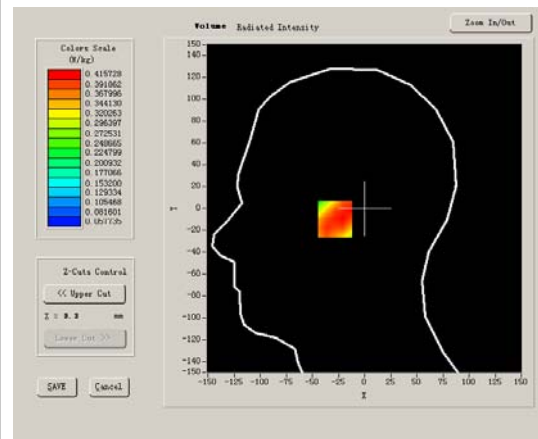
Lower Band SAR (Channel 128):

Frequency (MHz)	824.200000
Relative permittivity (real part)	41.675999
Relative permittivity	19.120001
Conductivity (S/m)	0.894409
Power drift(%)	-1.510000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.6°C
ConvF:	28.479,25.214,27.19
Crest factor:	1:8

SURFACE SAR



VOLUME SAR



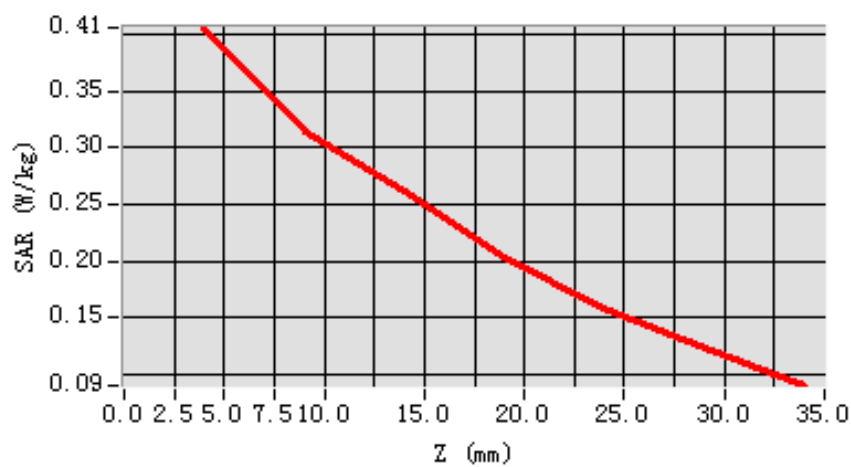
Maximum location: X=-23.00, Y=-10.00

SAR 10g (W/Kg)	0.303558
SAR 1g (W/Kg)	0.399388

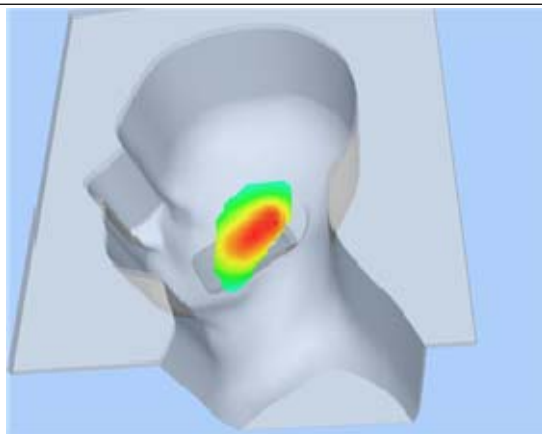
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.4056	0.3138	0.2618	0.2042	0.1579	0.1233

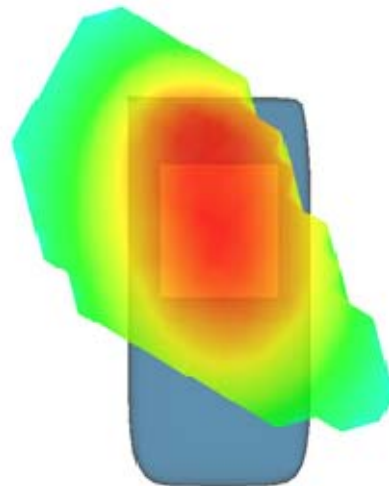
SAR, Z Axis Scan (X = -23, Y = -10)



3D scene shot



Hot spot position



MEASUREMENT 3

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 7 minutes 47 seconds

A. Experimental conditions.

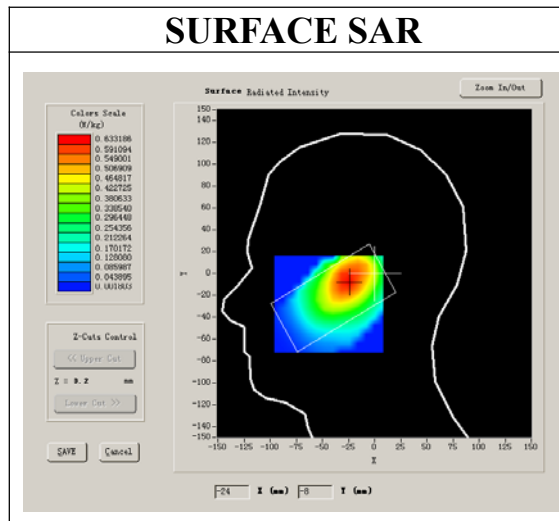
Phantom File	sam_direct_droit2_surf8mm.txt
Phantom	Left head
Device Position	Cheek
Band	GSM850
Channels	Low
Signal	GSM

B. SAR Measurement Results

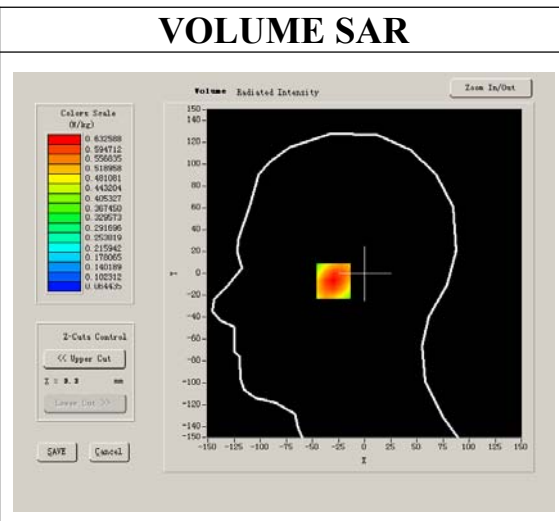
Lower Band SAR (Channel 128):

Frequency (MHz)	824.200000
Relative permittivity (real part)	41.675999
Relative permittivity	19.120001
Conductivity (S/m)	0.894409
Power drift(%)	-2.130000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.6°C
ConvF:	28.479,25.214,27.19
Crest factor:	1:8

SURFACE SAR



VOLUME SAR



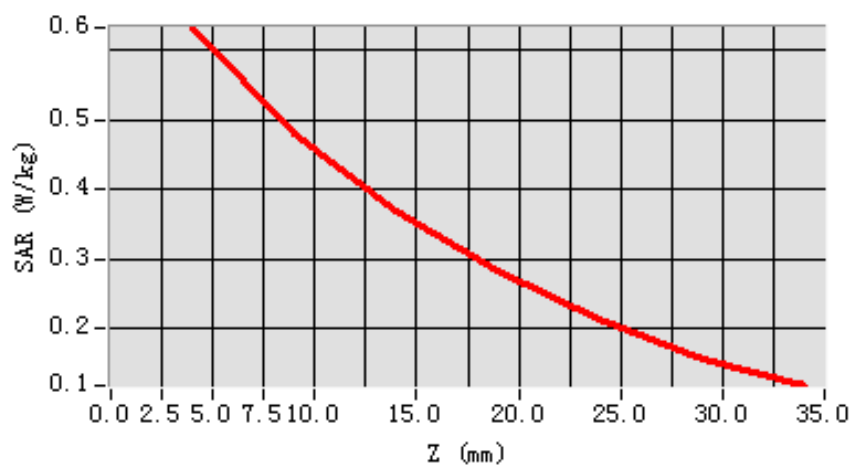
Maximum location: X=-25.00, Y=-7.00

SAR 10g (W/Kg)	0.439263
SAR 1g (W/Kg)	0.609707

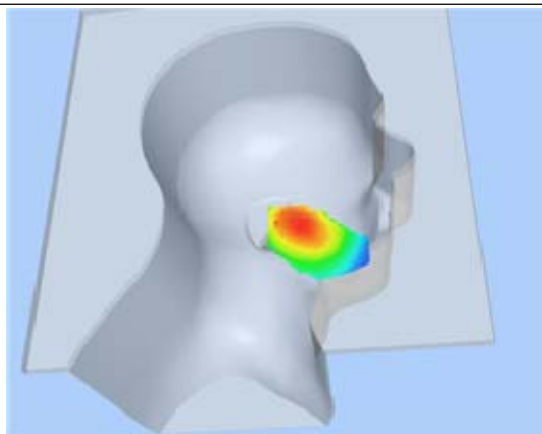
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.6326	0.4793	0.3705	0.2842	0.2130	0.1582

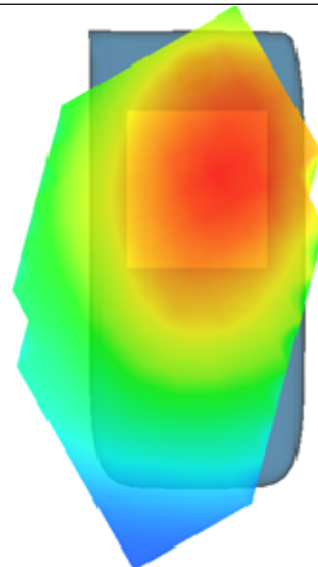
SAR, Z Axis Scan (X = -25, Y = -7)



3D scene shot



Hot spot position



MEASUREMENT 4

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 7 minutes 33 seconds

A. Experimental conditions.

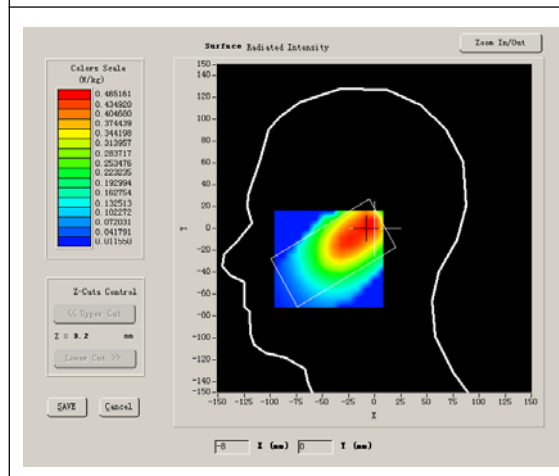
Phantom File	sam_direct_droit2_surf8mm.txt
Phantom	Left head
Device Position	Tilt
Band	GSM850
Channels	Low
Signal	GSM

B. SAR Measurement Results

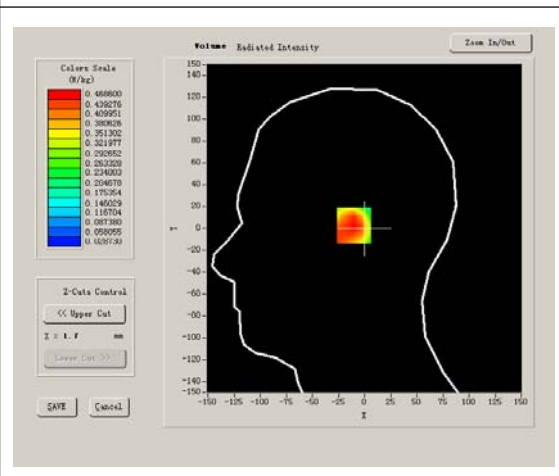
Lower Band SAR (Channel 128):

Frequency (MHz)	824.200000
Relative permittivity (real part)	41.675999
Relative permittivity	19.120001
Conductivity (S/m)	0.894409
Power drift(%)	-1.480000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.6°C
ConvF:	28.479,25.214,27.19
Crest factor:	1:8

SURFACE SAR



VOLUME SAR



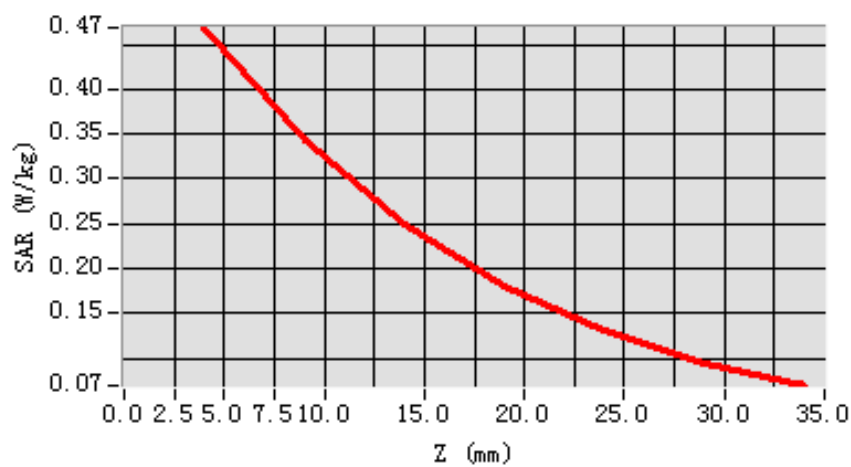
Maximum location: X=-5.00, Y=3.00

SAR 10g (W/Kg)	0.325963
SAR 1g (W/Kg)	0.455097

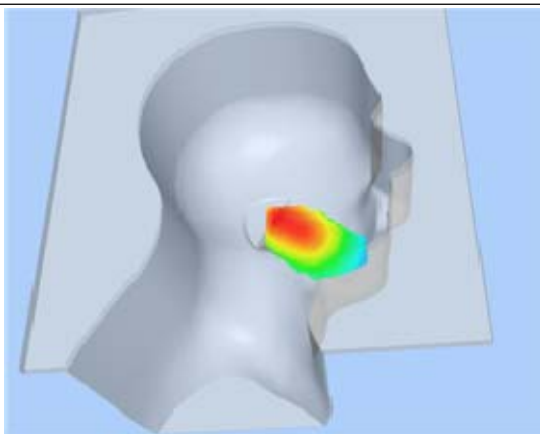
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.4686	0.3440	0.2491	0.1792	0.1315	0.0940

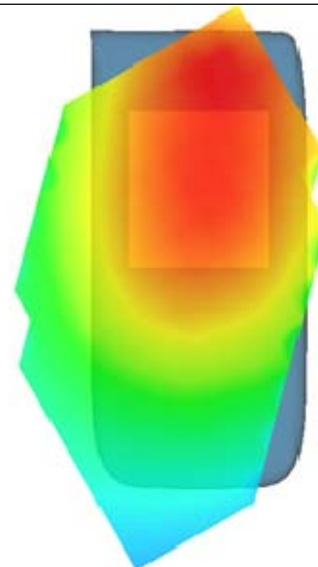
SAR, Z Axis Scan (X = -5, Y = 3)



3D sceen shot



Hot spot position



MEASUREMENT 5

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 9 minutes 11 seconds

A. Experimental conditions.

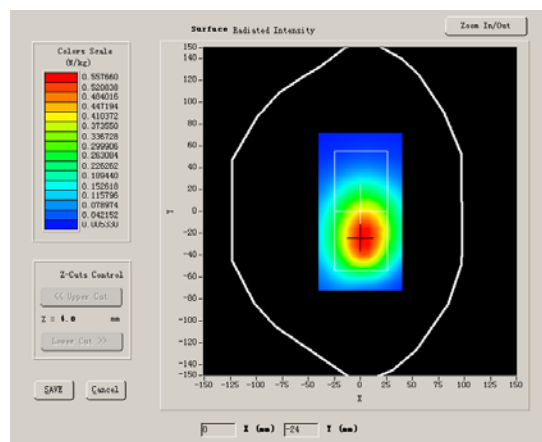
Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM850
Channels	Low
Signal	GSM

B. SAR Measurement Results

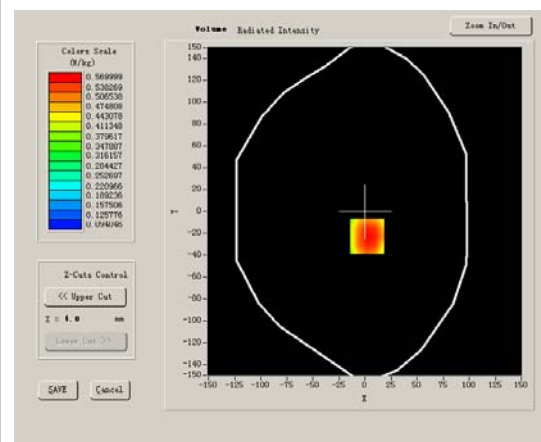
Lower Band SAR (Channel 128):

Frequency (MHz)	824.200000
Relative permittivity (real part)	55.709999
Relative permittivity	21.709999
Conductivity (S/m)	0.9809033
Power drift(%)	-1.310000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.6°C
ConvF:	28.559,25.681,27.588
Crest factor:	1:8

SURFACE SAR



VOLUME SAR



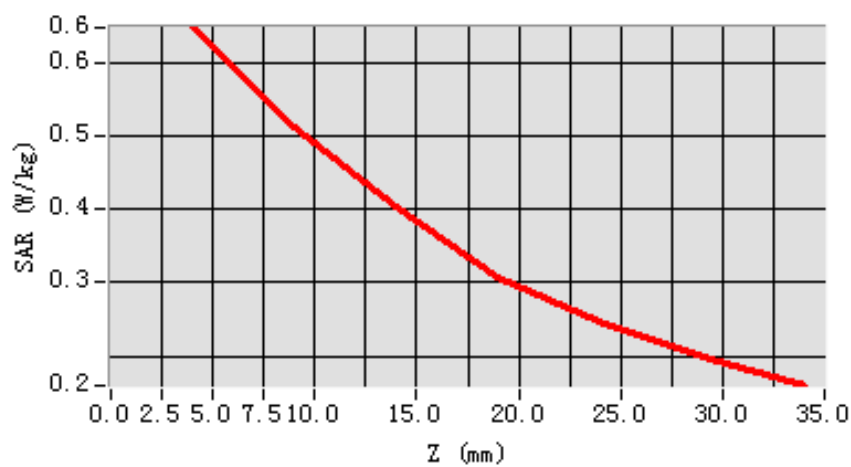
Maximum location: X=2.00, Y=-23.00

SAR 10g (W/Kg)	0.465997
SAR 1g (W/Kg)	0.627312

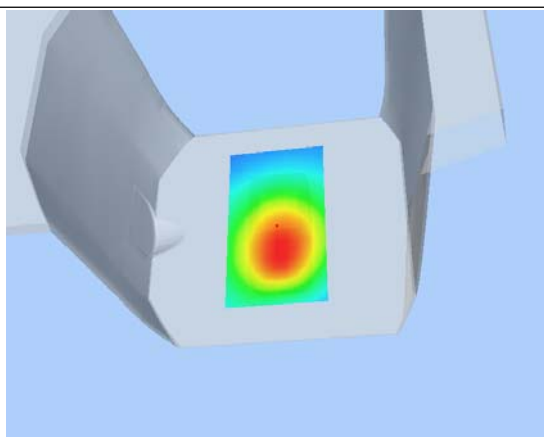
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.6472	0.5127	0.4041	0.3080	0.2458	0.1999

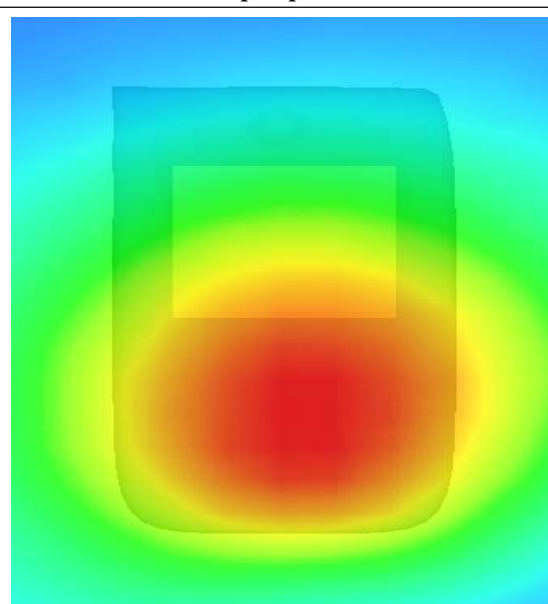
SAR, Z Axis Scan (X = 2, Y = -23)



3D scene shot



Hot spot position



MEASUREMENT 6

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 9 minutes 10 seconds

A. Experimental conditions.

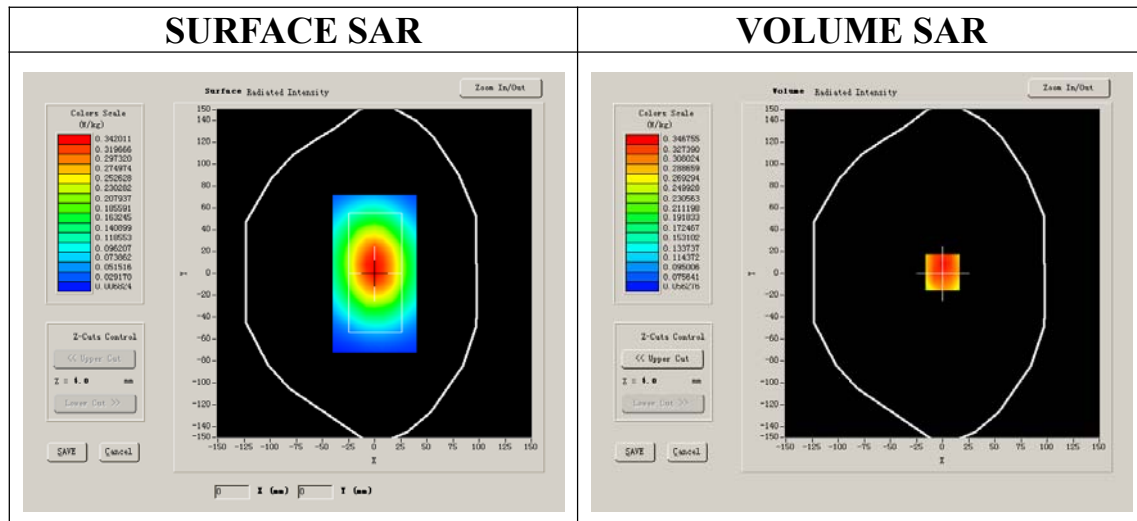
Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM850
Channels	Low
Signal	GSM

B. SAR Measurement Results

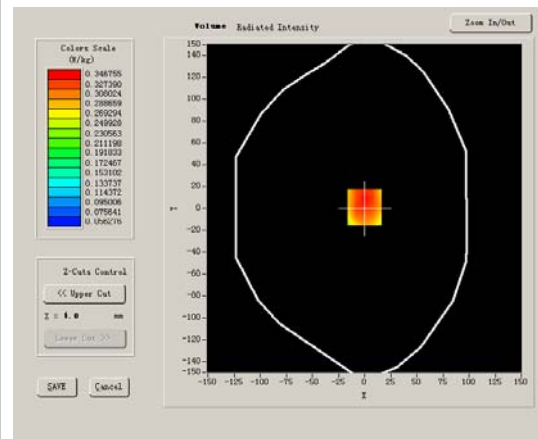
Lower Band SAR (Channel 128):

Frequency (MHz)	824.200000
Relative permittivity (real part)	55.709999
Relative permittivity	21.709999
Conductivity (S/m)	0.9809033
Power drift(%)	-0.790000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.6°C
ConvF:	28.559,25.681,27.588
Crest factor:	1:8

SURFACE SAR



VOLUME SAR



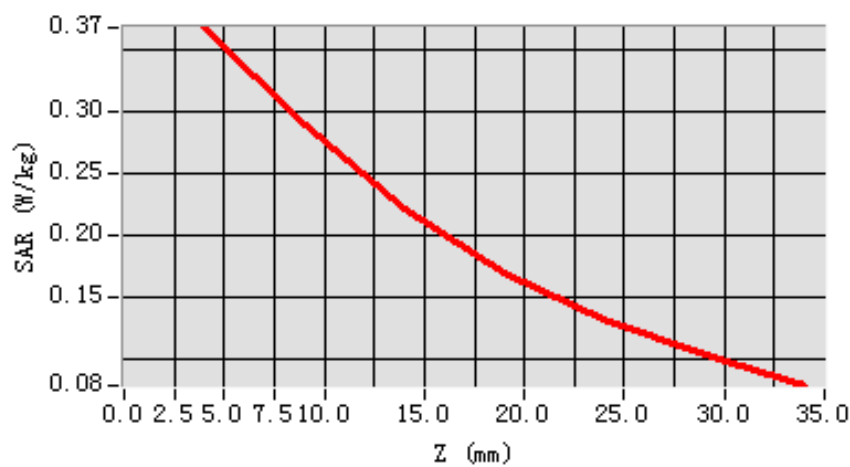
Maximum location: X=0.00, Y=1.00

SAR 10g (W/Kg)	0.270836
SAR 1g (W/Kg)	0.365677

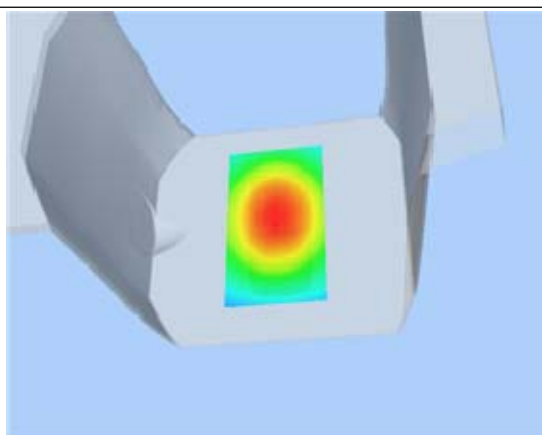
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.3680	0.2899	0.2221	0.1700	0.1326	0.1034

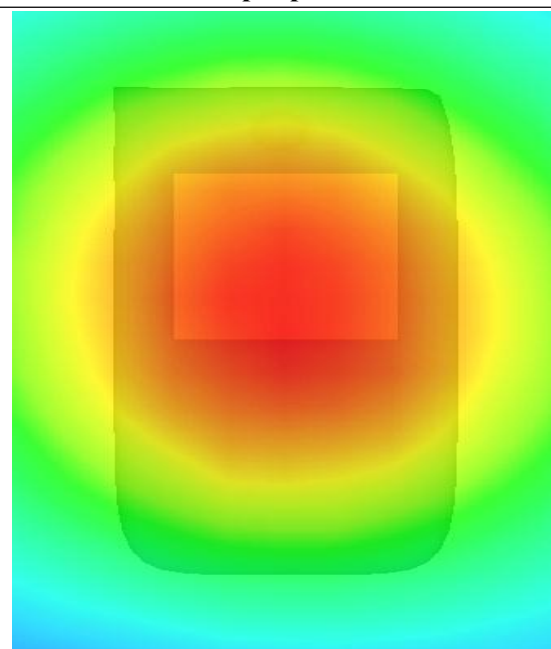
SAR, Z Axis Scan (X = 0, Y = 1)



3D scene shot



Hot spot position



MEASUREMENT 7

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 9 minutes 11 seconds

A. Experimental conditions.

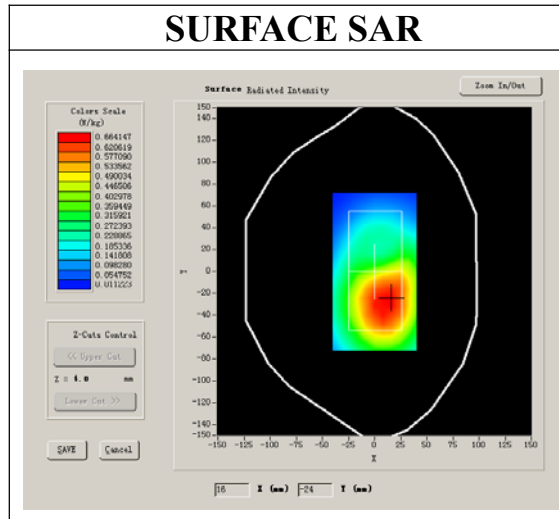
Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM850
Channels	Low
Signal	GPRS

B. SAR Measurement Results

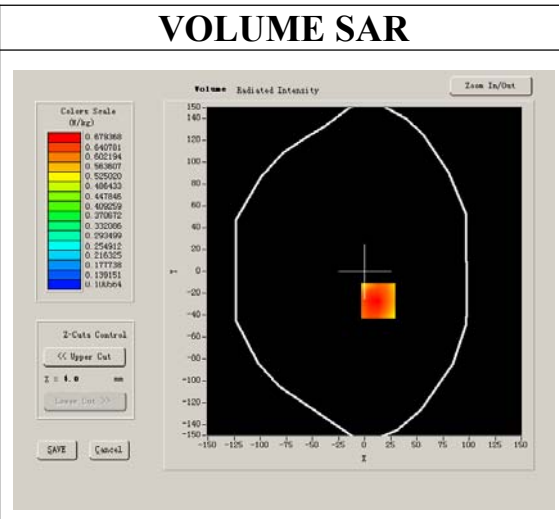
Lower Band SAR (Channel 128):

Frequency (MHz)	824.200000
Relative permittivity (real part)	55.709999
Relative permittivity	21.709999
Conductivity (S/m)	0.9809033
Power drift(%)	-0.810000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.6°C
ConvF:	28.559,25.681,27.588
Crest factor:	1:2

SURFACE SAR



VOLUME SAR



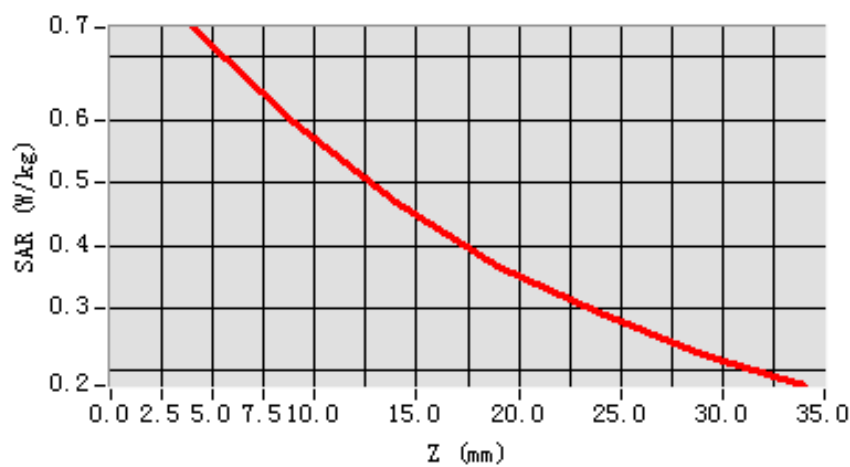
Maximum location: X=13.00, Y=-27.00

SAR 10g (W/Kg)	0.549259
SAR 1g (W/Kg)	0.727741

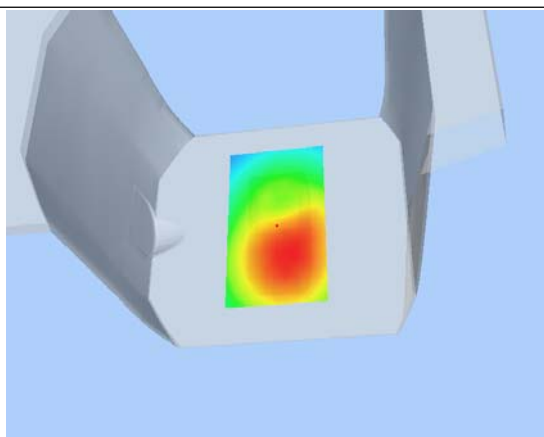
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.7458	0.5933	0.4698	0.3660	0.2931	0.2253

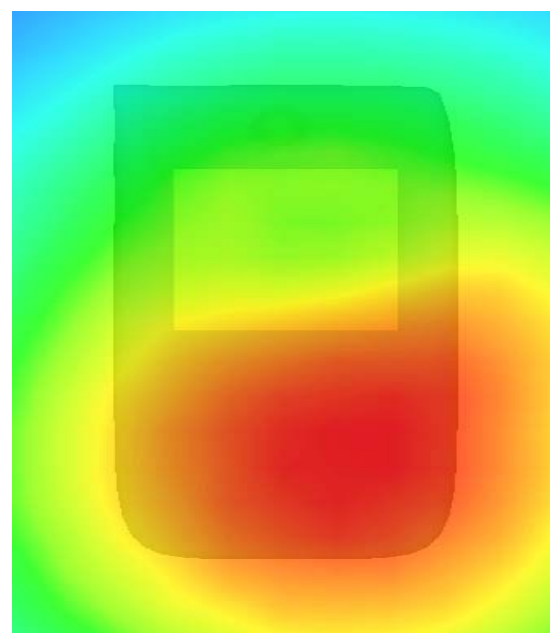
SAR, Z Axis Scan (X = 13, Y = -27)



3D scene shot



Hot spot position



MEASUREMENT 8

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 9 minutes 10 seconds

A. Experimental conditions.

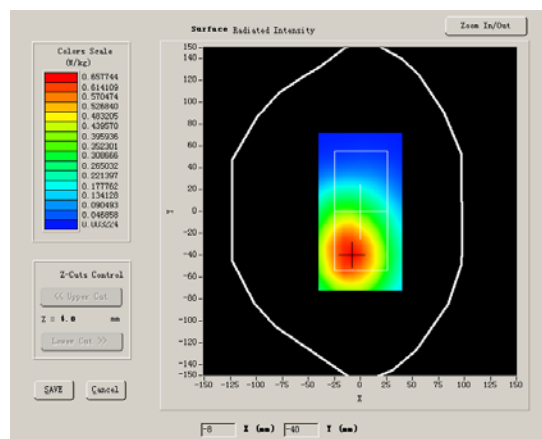
Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM850
Channels	Low
Signal	GPRS

B. SAR Measurement Results

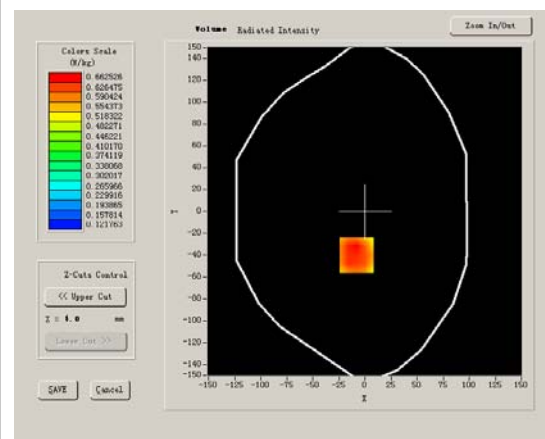
Lower Band SAR (Channel 128):

Frequency (MHz)	824.200000
Relative permittivity (real part)	55.709999
Relative permittivity	21.709999
Conductivity (S/m)	0.9809033
Power drift(%)	-0.590000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.6°C
ConvF:	28.559,25.681,27.588
Crest factor:	1:2

SURFACE SAR



VOLUME SAR



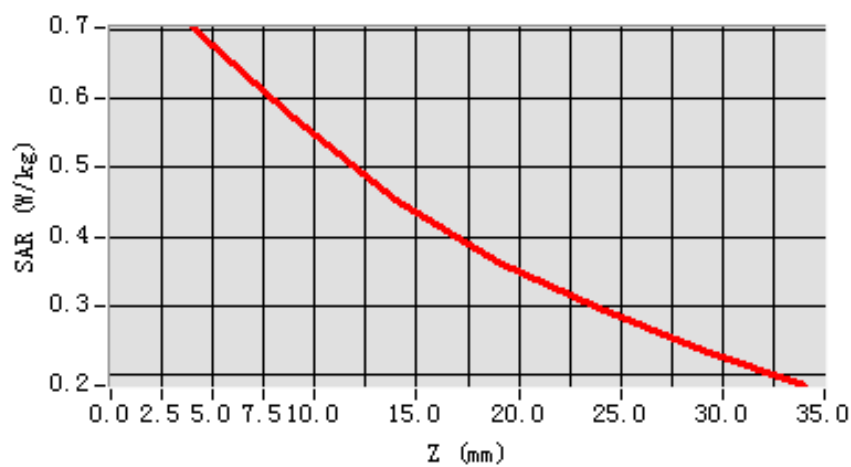
Maximum location: X=-8.00, Y=-40.00

SAR 10g (W/Kg)	0.314551
SAR 1g (W/Kg)	0.573457

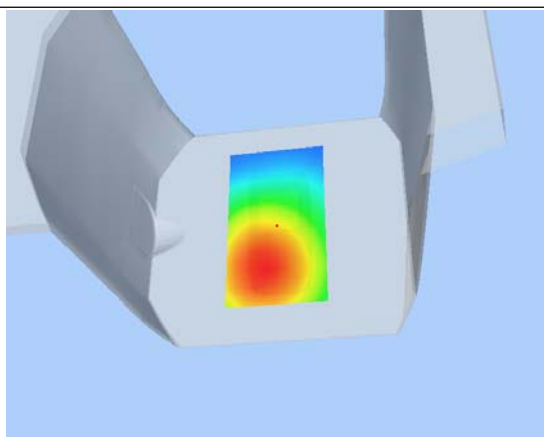
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.7026	0.5728	0.4537	0.3647	0.2978	0.2363

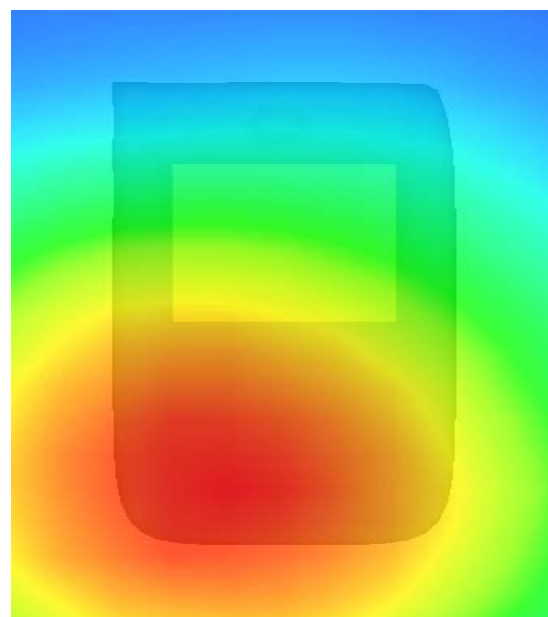
SAR, Z Axis Scan (X = -8, Y = -40)



3D scene shot



Hot spot position



MEASUREMENT 9

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 8 minutes 33 seconds

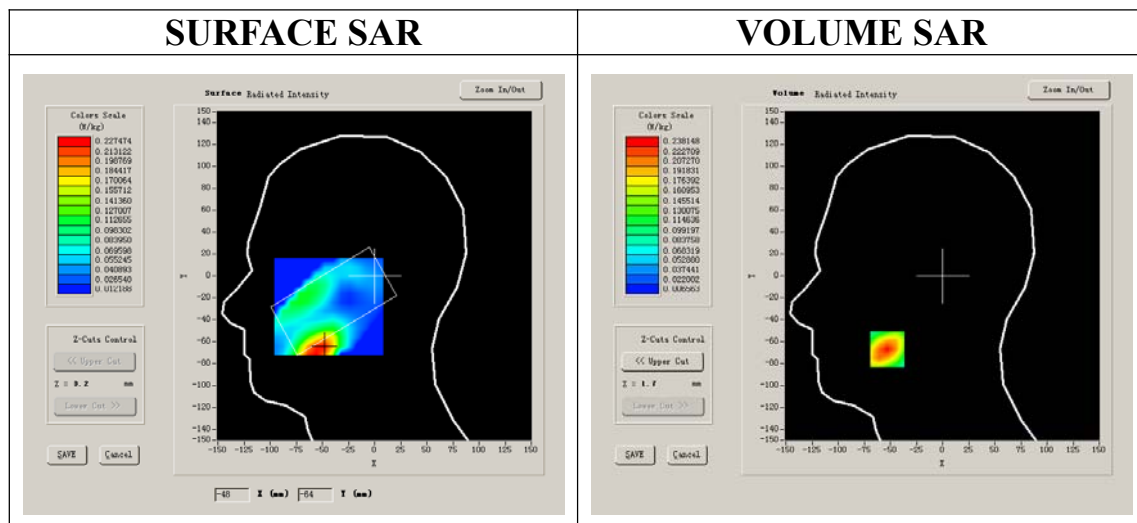
A. Experimental conditions.

Phantom File	sam_direct_droit2_surf8mm.txt
Phantom	Right head
Device Position	Cheek
Band	GSM1900
Channels	Low
Signal	GSM

B. SAR Measurement Results

Lower Band SAR (Channel 512):

Frequency (MHz)	1850.200000
Relative permittivity (real part)	40.509998
Relative permittivity	15.070000
Conductivity (S/m)	1.436111
Power drift(%)	-1.160000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.6°C
ConvF:	40.136,34.843,38.721
Crest factor:	1:8



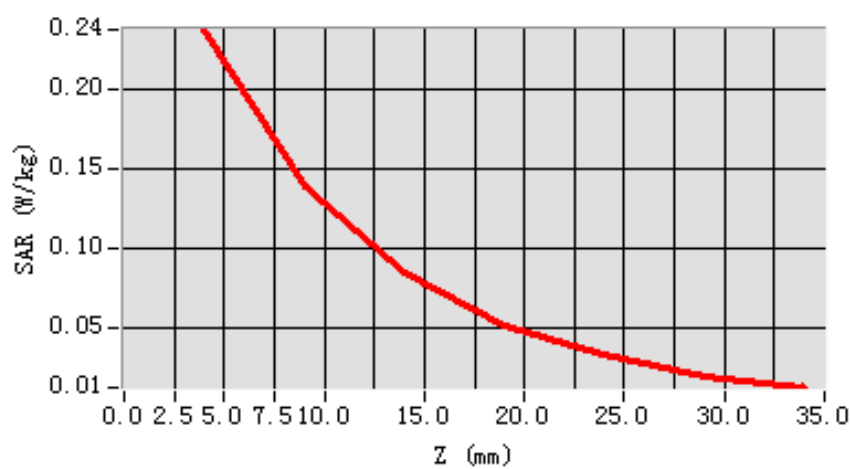
Maximum location: X=-53.00, Y=-67.00

SAR 10g (W/Kg)	0.127708
SAR 1g (W/Kg)	0.223655

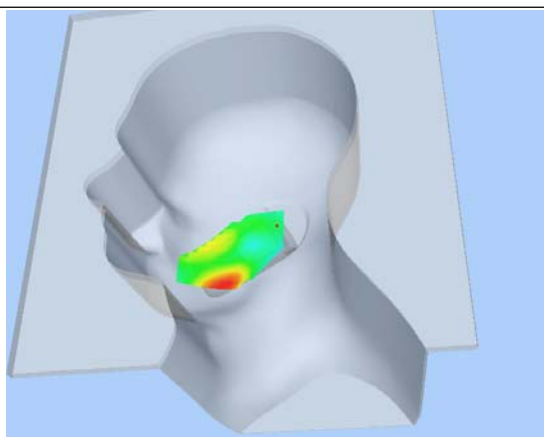
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.2381	0.1391	0.0855	0.0515	0.0337	0.0199

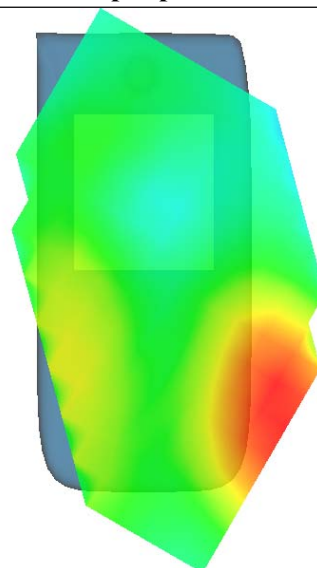
SAR, Z Axis Scan (X = -53, Y = -67)



3D scene shot



Hot spot position



MEASUREMENT 10

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 8 minutes 33 seconds

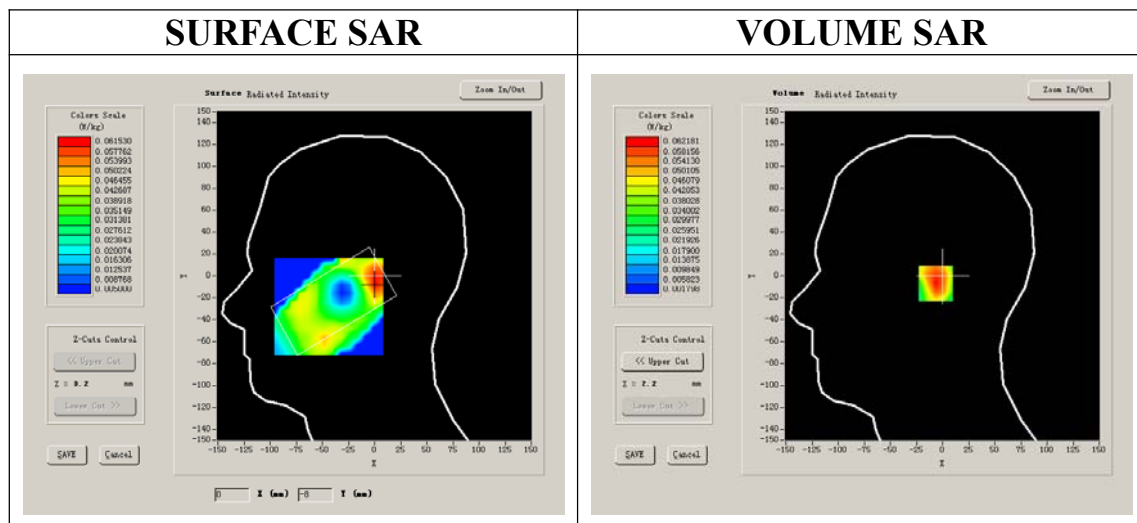
A. Experimental conditions.

Phantom File	sam_direct_droit2_surf8mm.txt
Phantom	Right head
Device Position	Tilt
Band	GSM1900
Channels	Low
Signal	GSM

B. SAR Measurement Results

Lower Band SAR (Channel 512):

Frequency (MHz)	1850.200000
Relative permittivity (real part)	40.509998
Relative permittivity	15.070000
Conductivity (S/m)	1.436111
Power drift(%)	-2.170000
Ambient Temperature:	22.8°C
Liquid Temperature:	22.6°C
ConvF:	40.136,34.843,38.721
Crest factor:	1:8



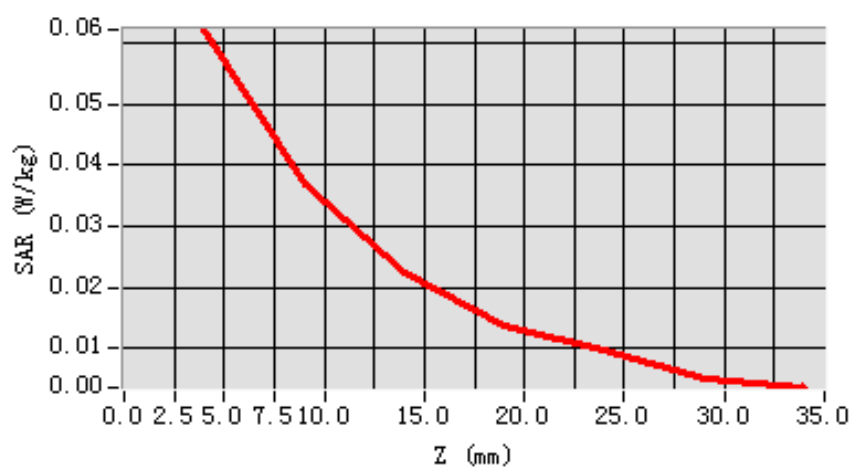
Maximum location: X=1.00, Y=-7.00

SAR 10g (W/Kg)	0.035076
SAR 1g (W/Kg)	0.059410

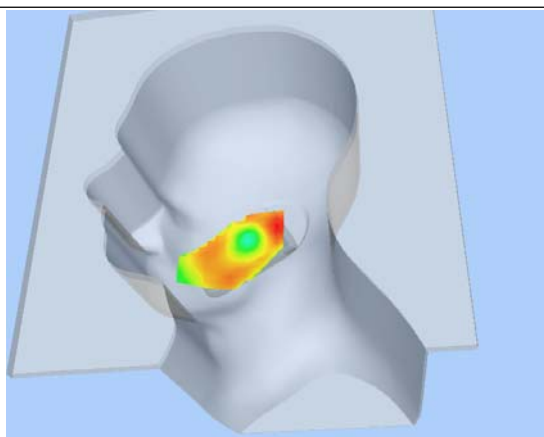
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.0622	0.0370	0.0223	0.0137	0.0096	0.0050

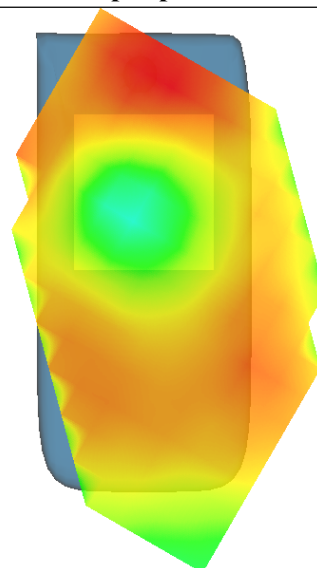
SAR, Z Axis Scan (X = 1, Y = -7)



3D sceen shot



Hot spot position



MEASUREMENT 11

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 7 minutes 57 seconds

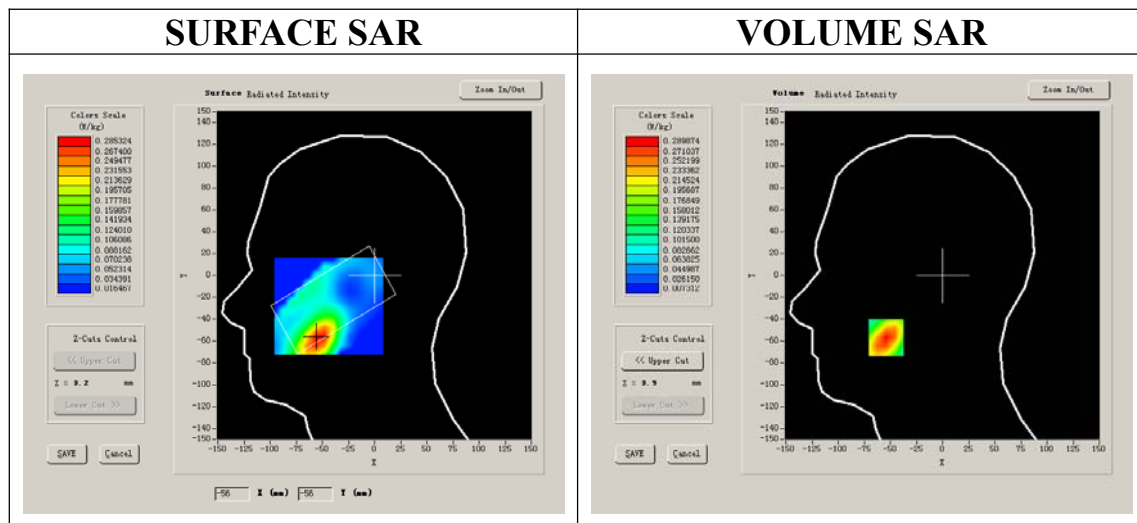
A. Experimental conditions.

Phantom File	sam_direct_droit2_surf8mm.txt
Phantom	Left head
Device Position	Cheek
Band	GSM1900
Channels	Low
Signal	GSM

B. SAR Measurement Results

Lower Band SAR (Channel 512):

Frequency (MHz)	1850.200000
Relative permittivity (real part)	40.509998
Relative permittivity	15.070000
Conductivity (S/m)	1.436111
Power drift(%)	-0.310000
Ambient Temperature:	22.6°C
Liquid Temperature:	22.7°C
ConvF:	40.136,34.843,38.721
Crest factor:	1:8

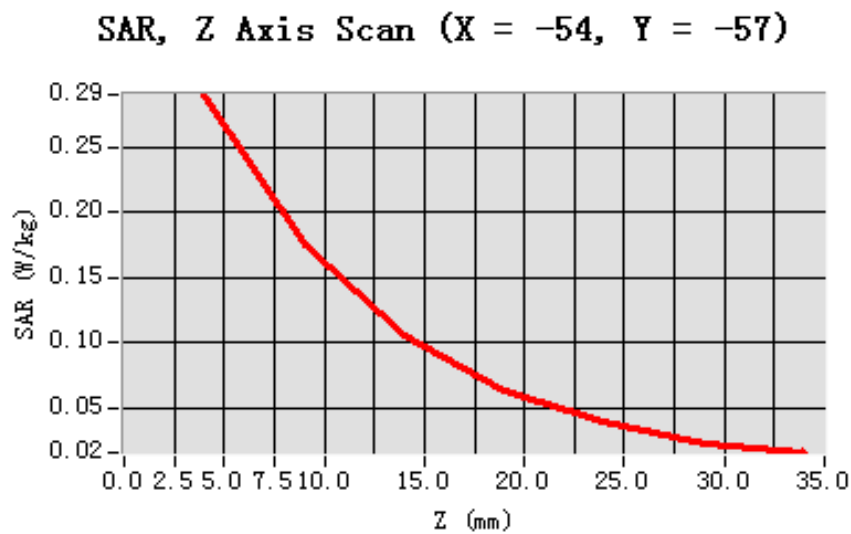


Maximum location: X=-54.00, Y=-57.00

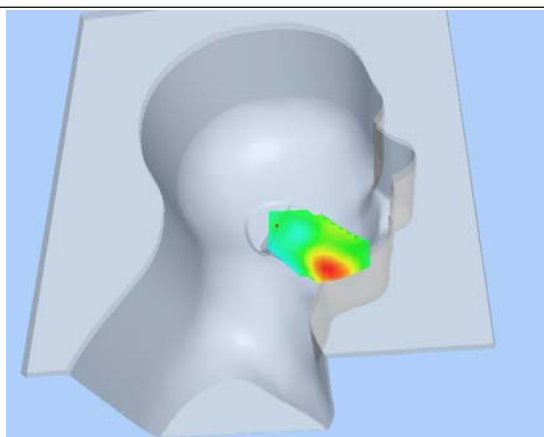
SAR 10g (W/Kg)	0.157505
SAR 1g (W/Kg)	0.274234

Z Axis Scan

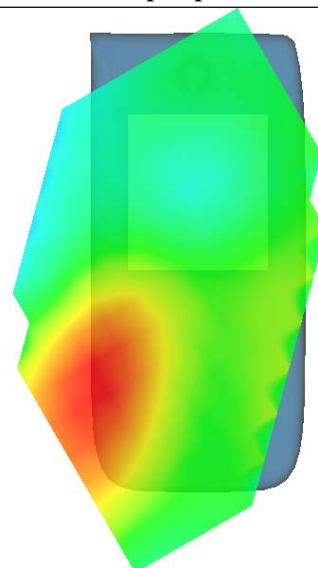
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.2899	0.1747	0.1050	0.0630	0.0398	0.0227



3D sceen shot



Hot spot position



MEASUREMENT 12

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 7 minutes 18 seconds

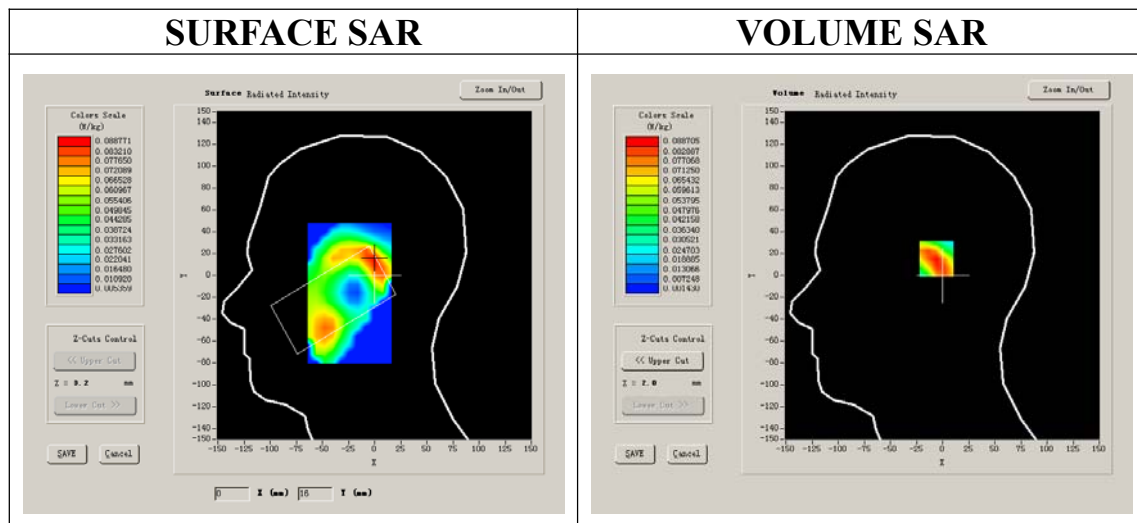
A. Experimental conditions.

Phantom File	sam_direct_droit2_surf8mm.txt
Phantom	Left head
Device Position	Tilt
Band	GSM1900
Channels	Low
Signal	GSM

B. SAR Measurement Results

Lower Band SAR (Channel 512):

Frequency (MHz)	1850.200000
Relative permittivity (real part)	40.509998
Relative permittivity	15.070000
Conductivity (S/m)	1.436111
Power drift(%)	-0.620000
Ambient Temperature:	22.6°C
Liquid Temperature:	22.7°C
ConvF:	40.136,34.843,38.721
Crest factor:	1:8



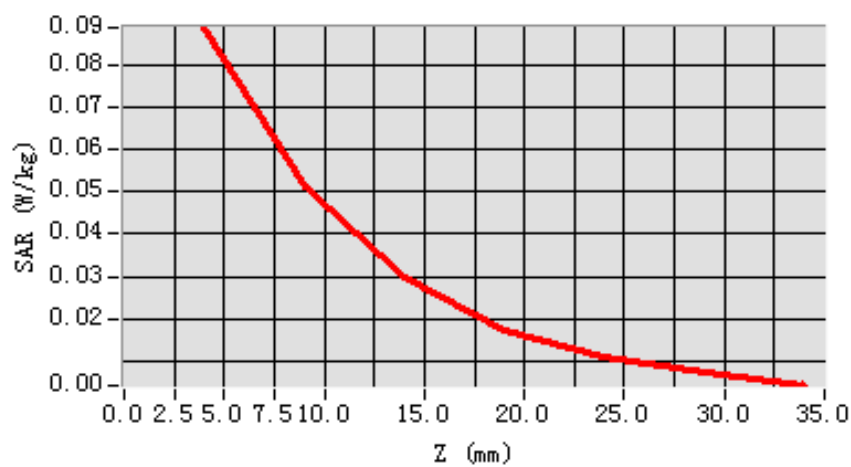
Maximum location: X=-1.00, Y=15.00

SAR 10g (W/Kg)	0.047005
SAR 1g (W/Kg)	0.083084

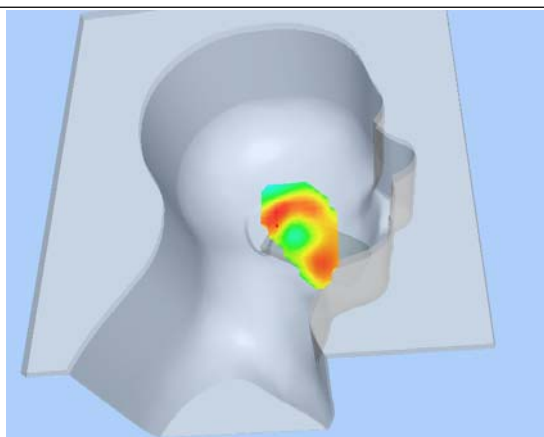
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.0887	0.0515	0.0300	0.0174	0.0109	0.0074

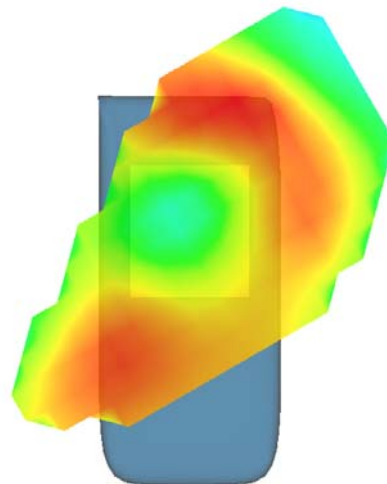
SAR, Z Axis Scan (X = -1, Y = 15)



3D scene shot



Hot spot position



MEASUREMENT 13

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 9 minutes 8 seconds

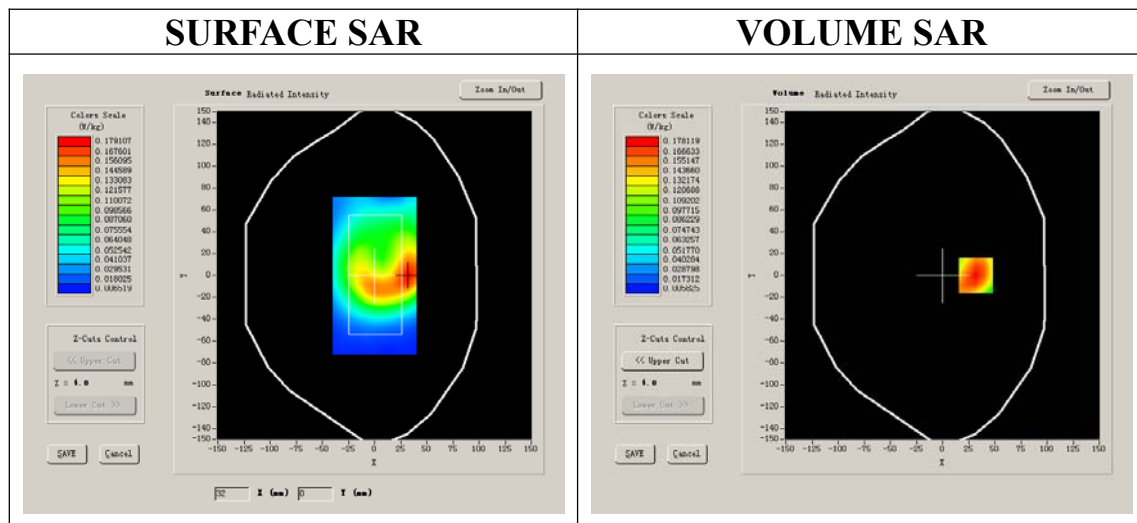
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM1900
Channels	Low
Signal	GSM

B. SAR Measurement Results

Lower Band SAR (Channel 512):

Frequency (MHz)	1850.2200000
Relative permittivity (real part)	52.548876
Relative permittivity	14.070000
Conductivity (S/m)	1.513978
Power drift(%)	-0.480000
Ambient Temperature:	22.6°C
Liquid Temperature:	22.7°C
ConvF:	40.625,34.773,38.535
Crest factor:	1:8



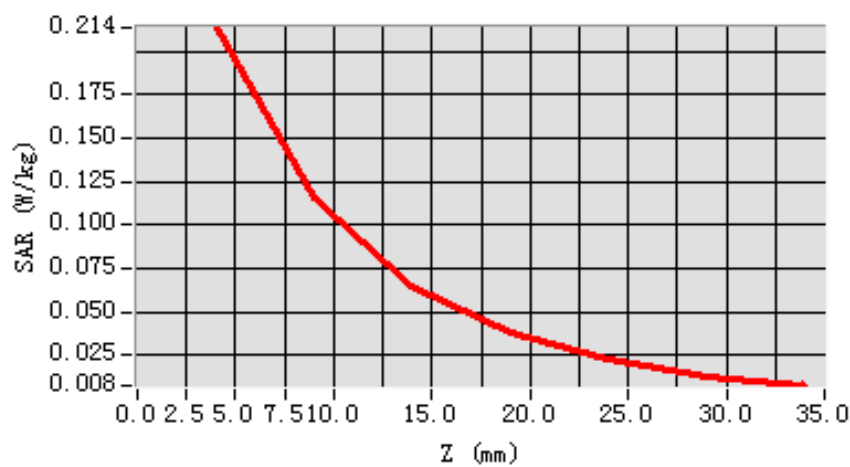
Maximum location: X=32.00, Y=0.00

SAR 10g (W/Kg)	0.117226
SAR 1g (W/Kg)	0.204946

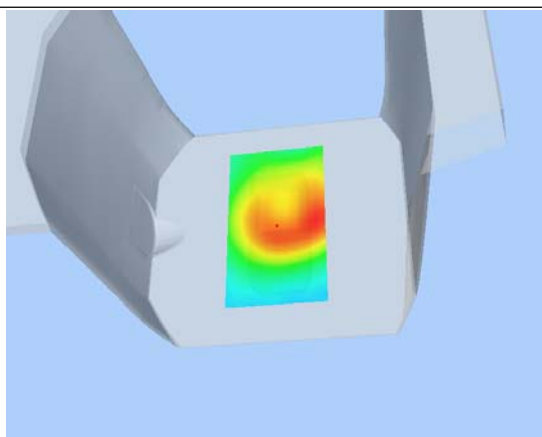
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.2138	0.1164	0.0651	0.0376	0.0231	0.0123

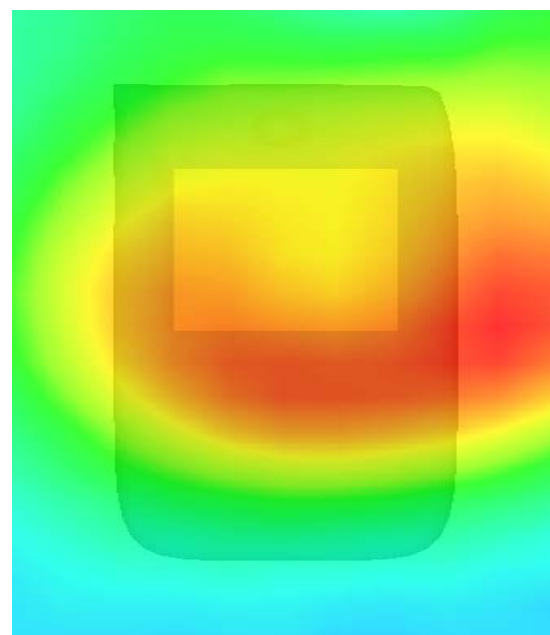
SAR, Z Axis Scan (X = 32, Y = 0)



3D scene shot



Hot spot position



MEASUREMENT 14

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 9 minutes 9 seconds

A. Experimental conditions.

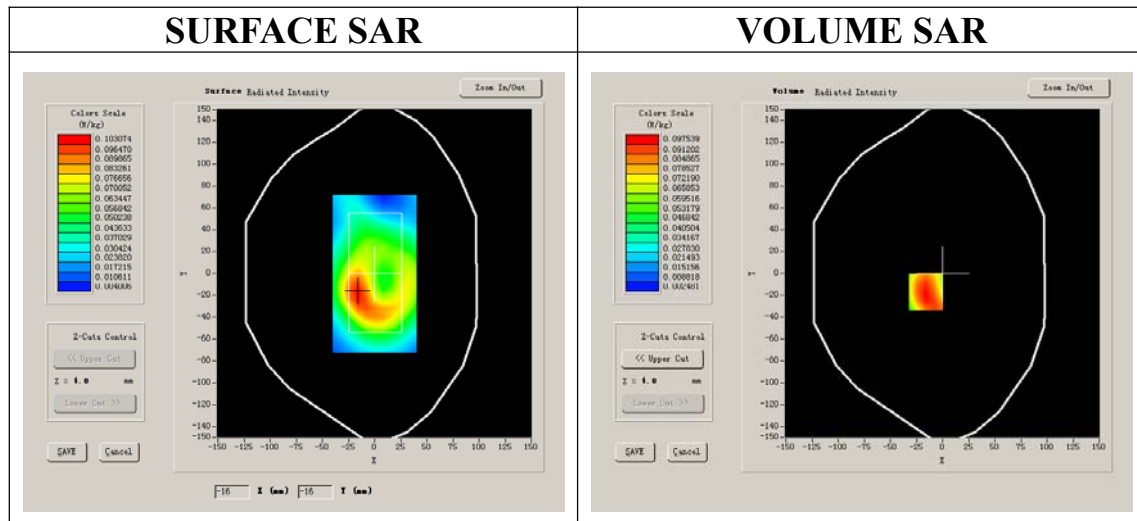
Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM1900
Channels	Low
Signal	GSM

B. SAR Measurement Results

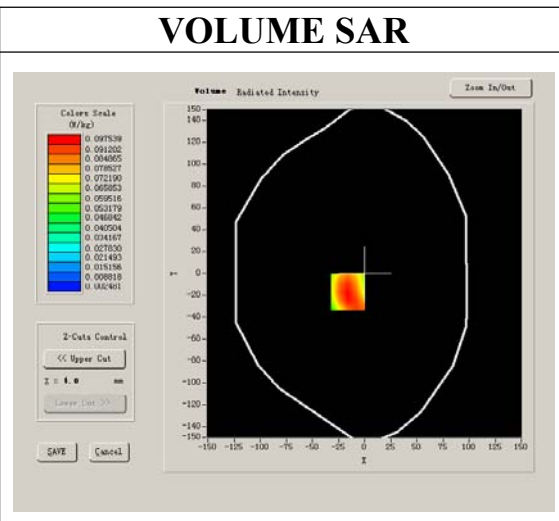
Lower Band SAR (Channel 810):

Frequency (MHz)	1850.200000
Relative permittivity (real part)	52.548876
Relative permittivity	14.070000
Conductivity (S/m)	1.513978
Power drift(%)	-0.240000
Ambient Temperature:	22.6°C
Liquid Temperature:	22.7°C
ConvF:	40.625,34.773,38.535
Crest factor:	1:8

SURFACE SAR



VOLUME SAR



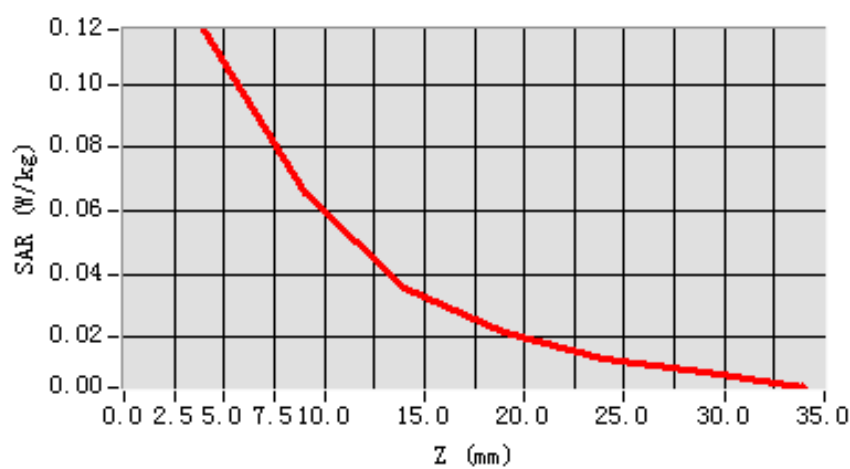
Maximum location: X=-16.00, Y=-17.00

SAR 10g (W/Kg)	0.065076
SAR 1g (W/Kg)	0.113400

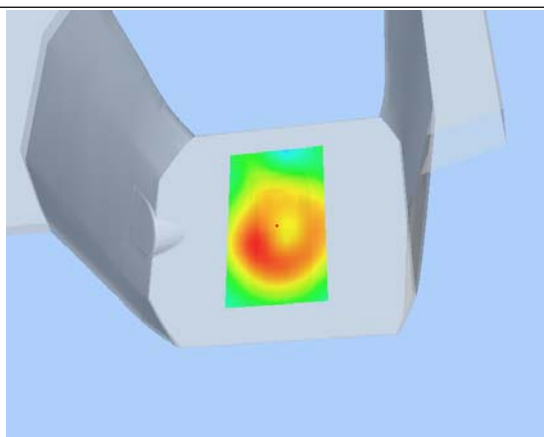
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.1171	0.0658	0.0359	0.0215	0.0130	0.0089

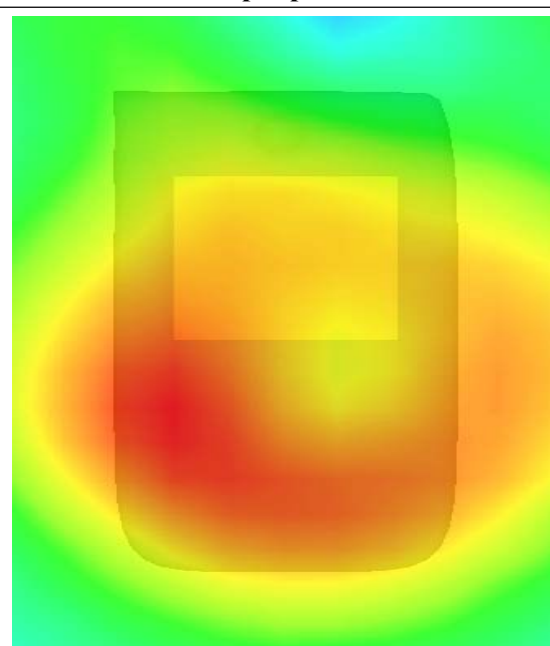
SAR, Z Axis Scan (X = -16, Y = -17)



3D scene shot



Hot spot position



MEASUREMENT 15

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 9 minutes 8 seconds

A. Experimental conditions.

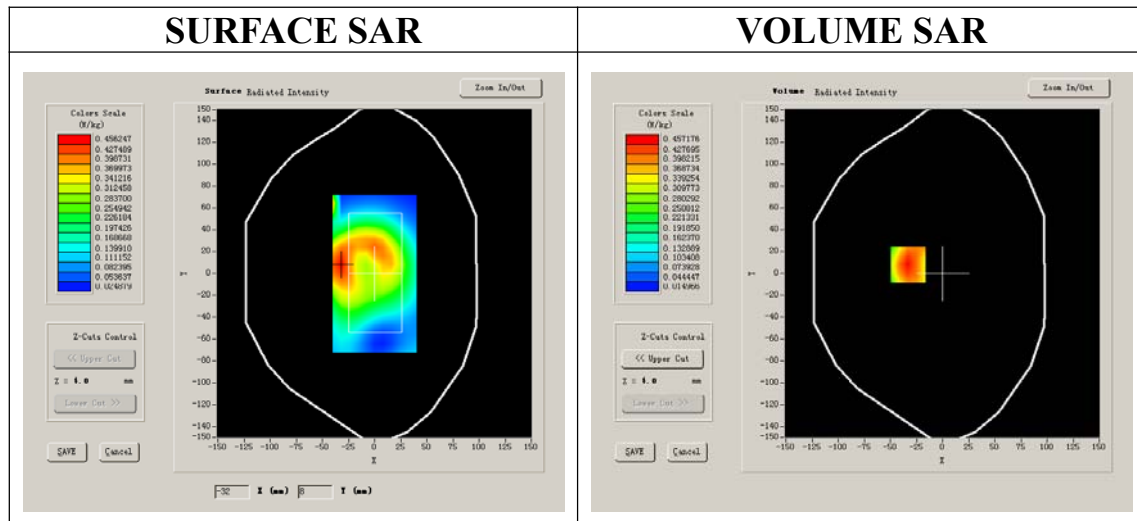
Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM1900
Channels	Low
Signal	GPRS

B. SAR Measurement Results

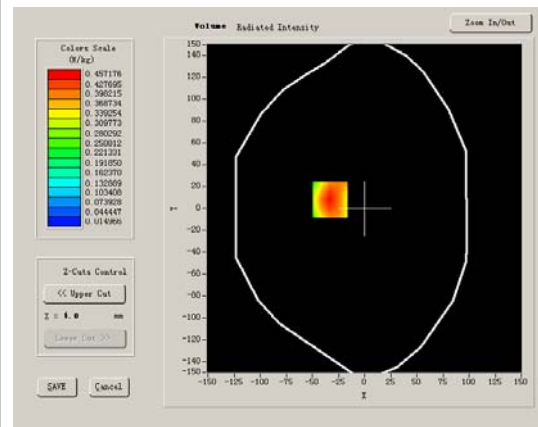
Lower Band SAR (Channel 512):

Frequency (MHz)	1850.200000
Relative permittivity (real part)	52.548876
Relative permittivity	14.070000
Conductivity (S/m)	1.513978
Power drift(%)	-1.500000
Ambient Temperature:	22.6°C
Liquid Temperature:	22.7°C
ConvF:	40.625,34.773,38.535
Crest factor:	1:2

SURFACE SAR



VOLUME SAR



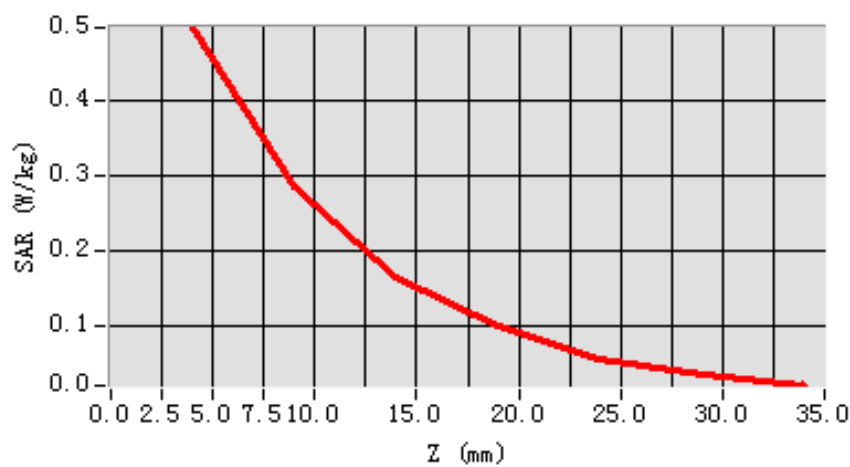
Maximum location: X=-33.00, Y=8.00

SAR 10g (W/Kg)	0.276314
SAR 1g (W/Kg)	0.472516

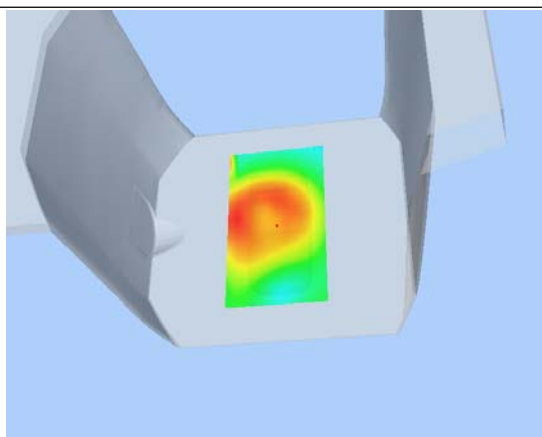
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.4978	0.2848	0.1662	0.1010	0.0567	0.0354

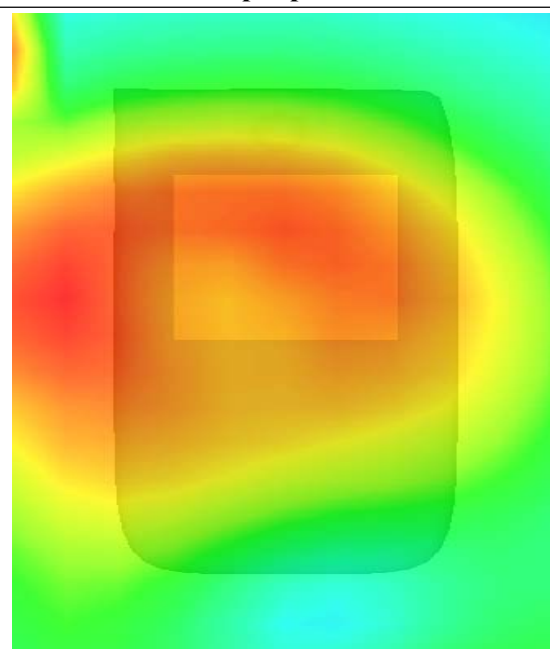
SAR, Z Axis Scan (X = -33, Y = 8)



3D scene shot



Hot spot position



MEASUREMENT 16

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 9 minutes 9 seconds

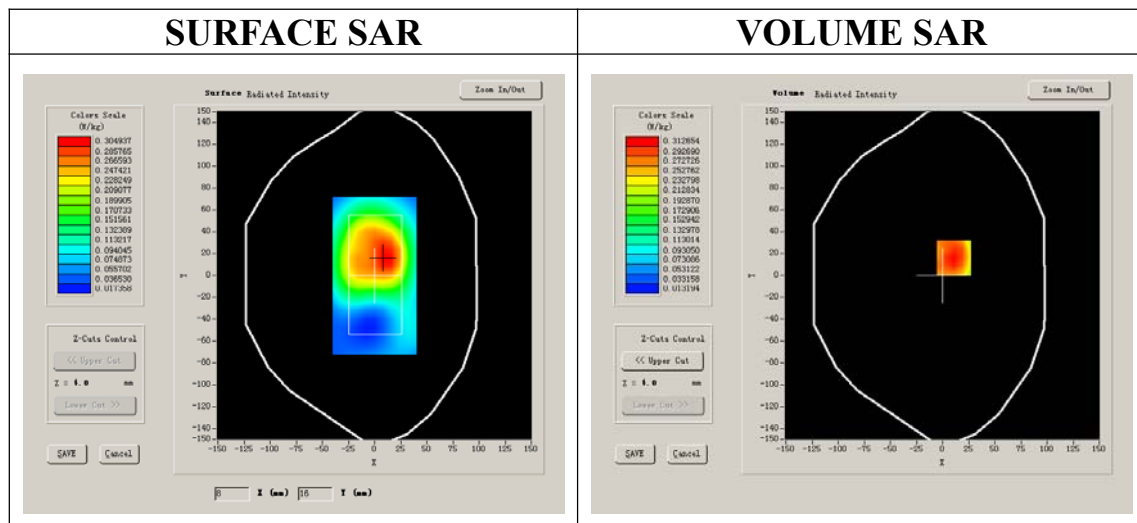
A. Experimental conditions.

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

B. SAR Measurement Results

Lower Band SAR (Channel 512):

Frequency (MHz)	1850.200000
Relative permittivity (real part)	52.548876
Relative permittivity	14.070000
Conductivity (S/m)	1.513978
Power drift(%)	-0.930000
Ambient Temperature:	22.6°C
Liquid Temperature:	22.7°C
ConvF:	40.625,34.773,38.535
Crest factor:	1:2



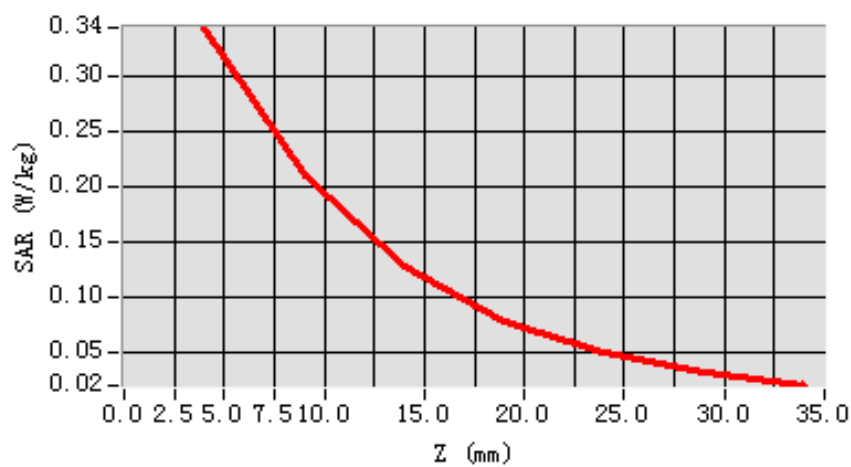
Maximum location: X=11.00, Y=16.00

SAR 10g (W/Kg)	0.202491
SAR 1g (W/Kg)	0.329821

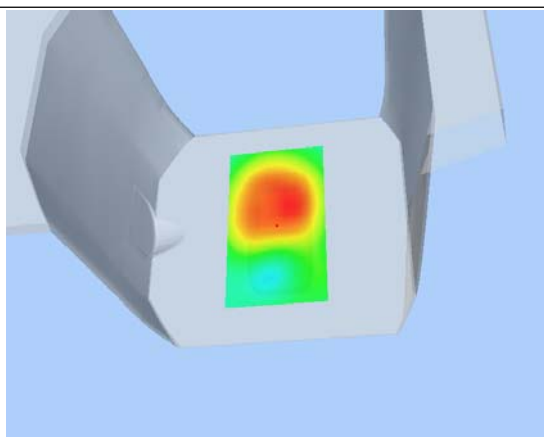
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.3432	0.2091	0.1278	0.0785	0.0491	0.0319

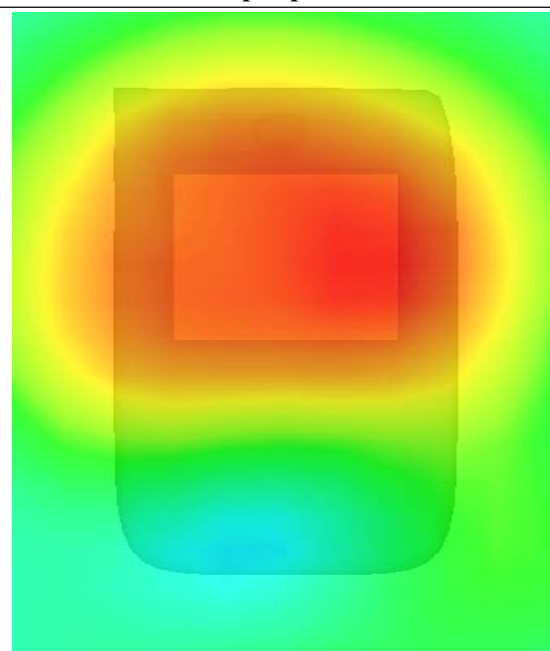
SAR, Z Axis Scan (X = 11, Y = 16)



3D scene shot



Hot spot position



System Performance Check Data(Head)

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 13 minutes 27 seconds

A. Experimental conditions.

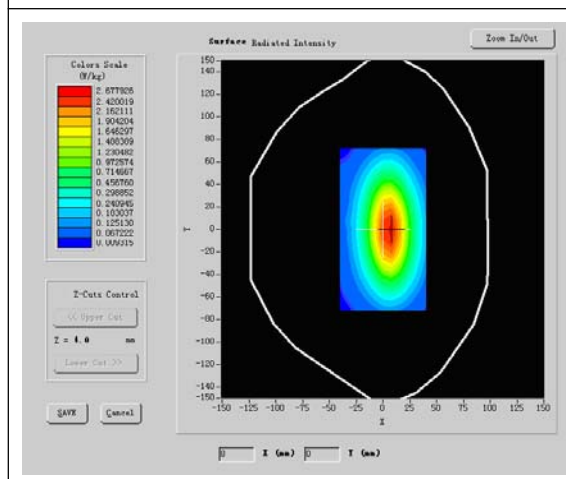
Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	
Band	835MHz
Channels	
Signal	CW

B. SAR Measurement Results

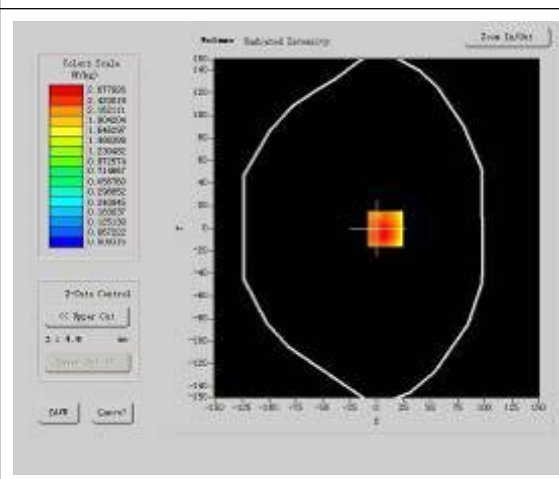
Band SAR

Frequency (MHz)	835.000000
Relative permittivity (real part)	41.675999
Relative permittivity	15.070000
Conductivity (S/m)	0.894409
Power drift (%)	-0.050000
Ambient Temperature:	22.4°C
Liquid Temperature:	21.5°C
ConvF:	28.479,25.214,27.196
Crest factor:	1:1

SURFACE SAR



VOLUME SAR



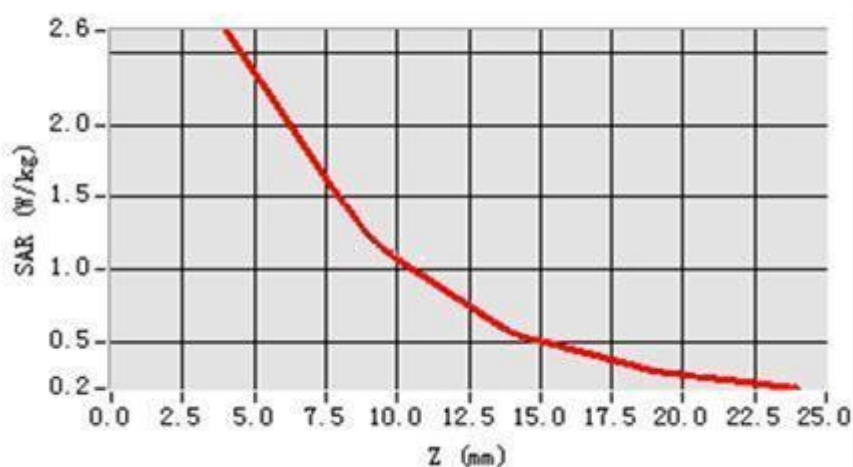
Maximum location: X=5.00, Y=1.00

SAR 10g (W/Kg)	1.685732
SAR 1g (W/Kg)	2.478462

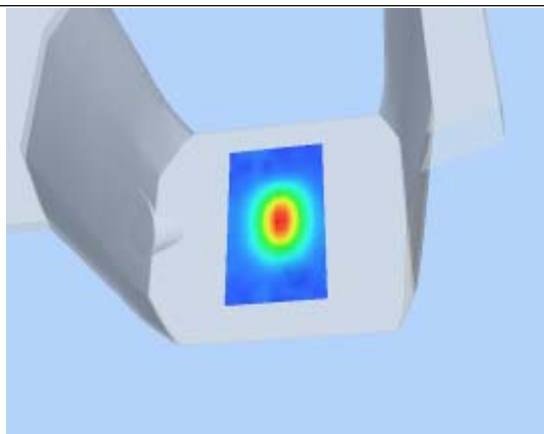
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0000	2.4754	1.2251	0.5257	0.2114

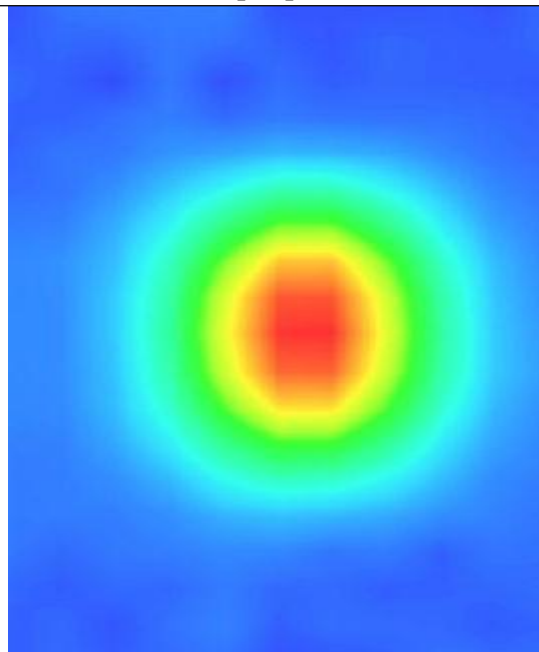
SAR, Z Axis Scan (X = 5, Y = 1)



3D scene 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: 17/10/2012

Measurement duration: 13 minutes 27 seconds

A. Experimental conditions.

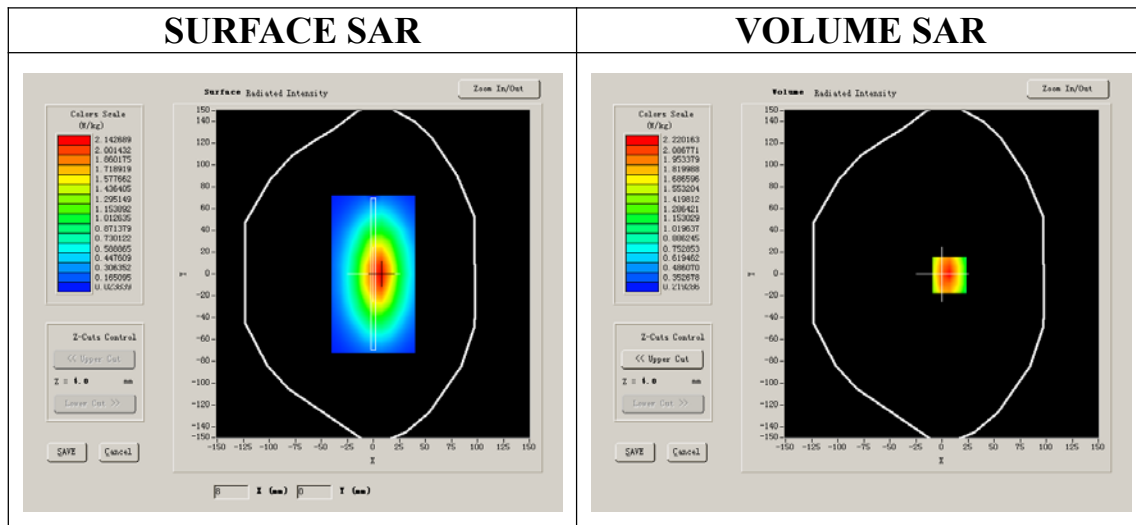
Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	
Band	835MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

Frequency (MHz)	835.000000
Relative permittivity (real part)	55.709999
Relative permittivity	21.709999
Conductivity (S/m)	0.9809033
Power drift (%)	-0.170000
Ambient Temperature:	22.4°C
Liquid Temperature:	21.5°C
ConvF:	28.559,25.681,27.588
Crest factor:	1:1

SURFACE SAR



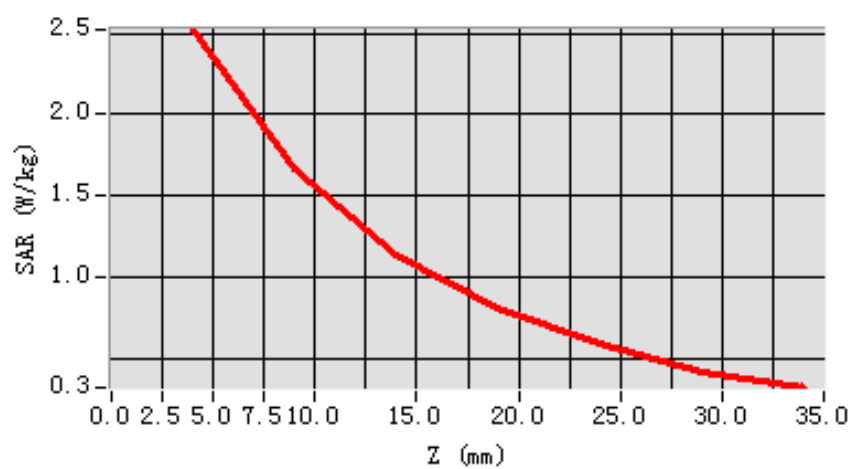
Maximum location: X=7.00, Y=-1.00

SAR 10g (W/Kg)	1.539476
SAR 1g (W/Kg)	2.385979

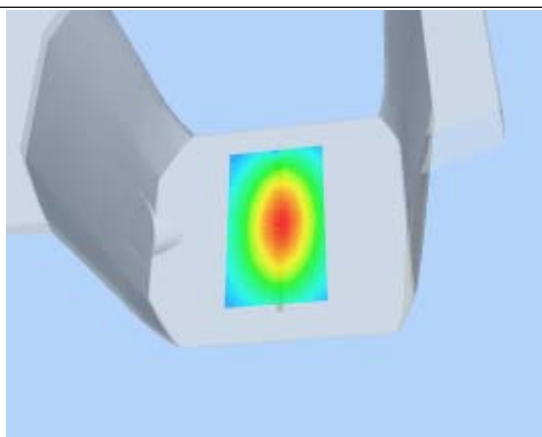
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	2.5209	1.6629	1.1437	0.8075	0.5889	0.4143

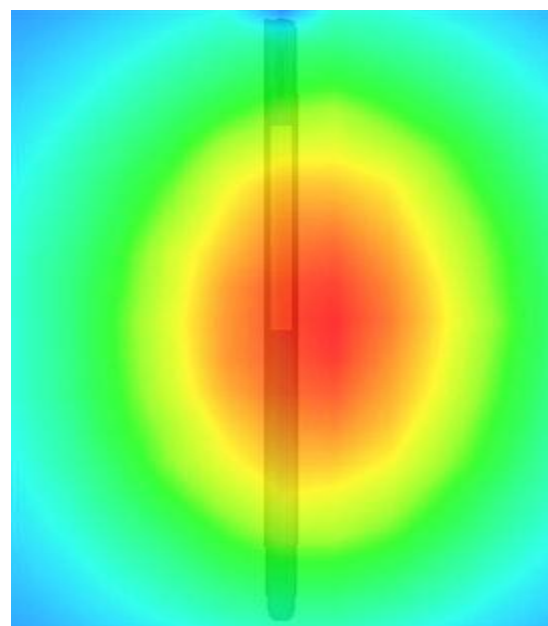
SAR, Z Axis Scan (X = 7, Y = -1)



3D scene shot



Hot spot position



System Performance Check Data(Head)

Type: Phone measurement (Complete)

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

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

Date of measurement: 17/10/2012

Measurement duration: 13 minutes 27 seconds

A. Experimental conditions.

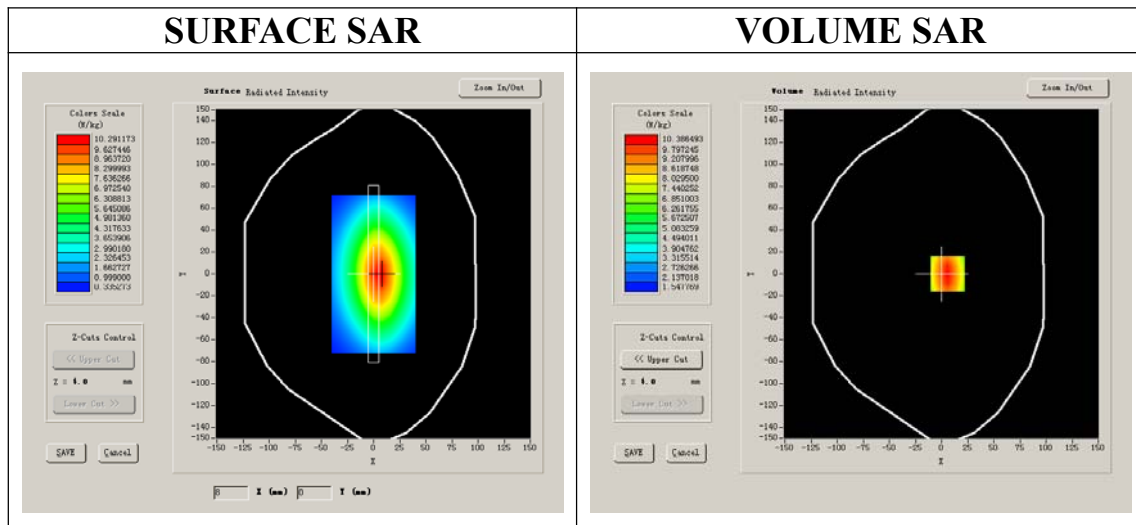
Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	
Band	1900MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

Frequency (MHz)	1900.000000
Relative permittivity (real part)	40.509998
Relative permittivity	15.070000
Conductivity (S/m)	1.436111
Power drift (%)	-0.140000
Ambient Temperature:	22.3°C
Liquid Temperature:	22.6°C
ConvF:	40.136,34.843,38.721
Crest factor:	1:1

SURFACE SAR



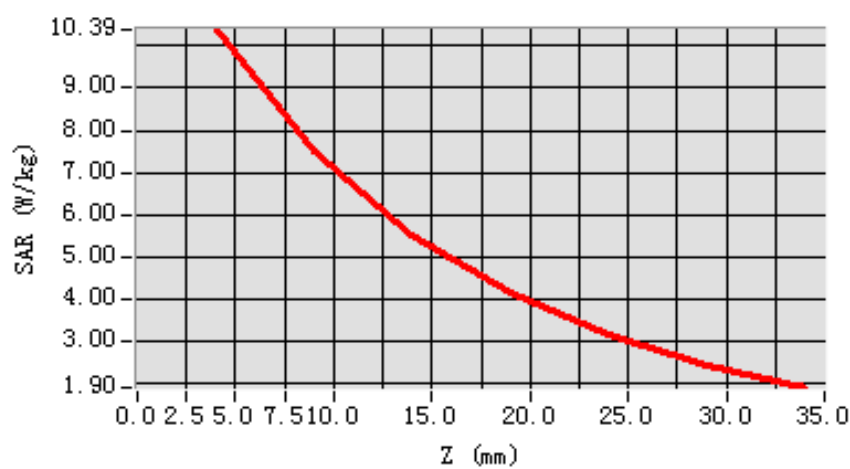
Maximum location: X=6.00, Y=0.00

SAR 10g (W/Kg)	6.909945
SAR 1g (W/Kg)	9.883835

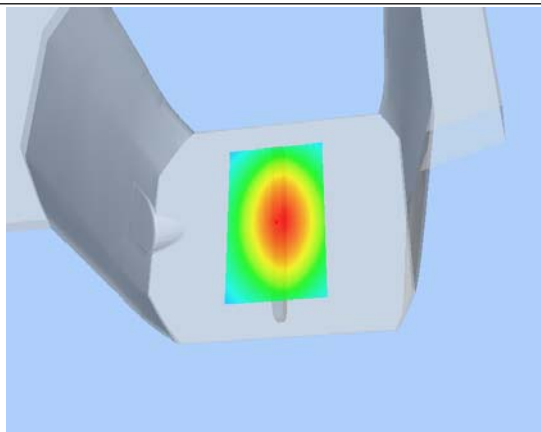
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	10.3865	7.5004	5.5370	4.1568	3.1632	2.4391

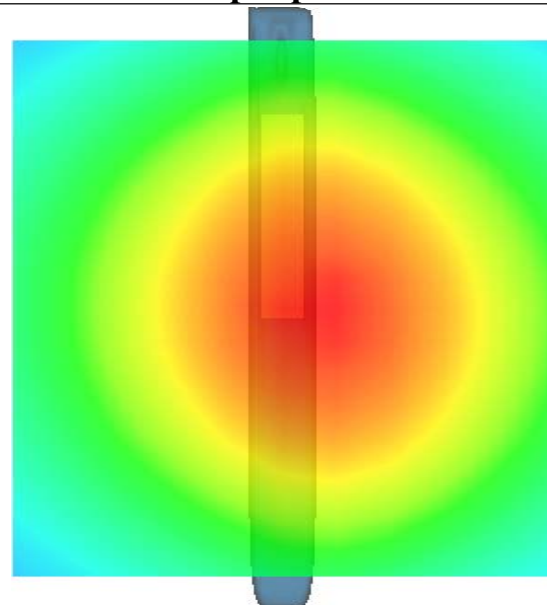
SAR, Z Axis Scan (X = 6, Y = 0)



3D sceen 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: 17/10/2012

Measurement duration: 13 minutes 26 seconds

A. Experimental conditions.

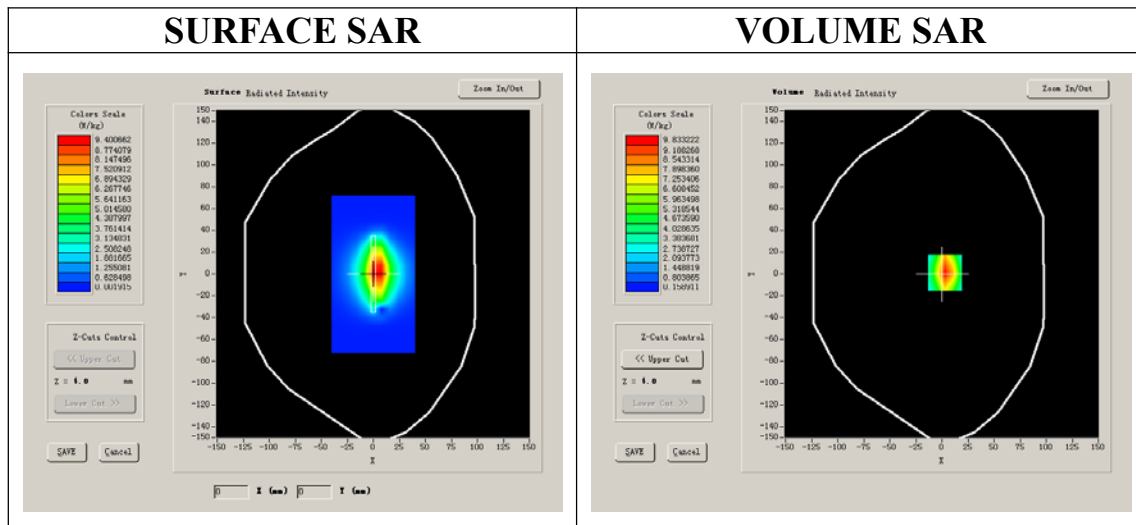
Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	
Band	1900MHz
Channels	
Signal	CW

B. SAR Measurement Results

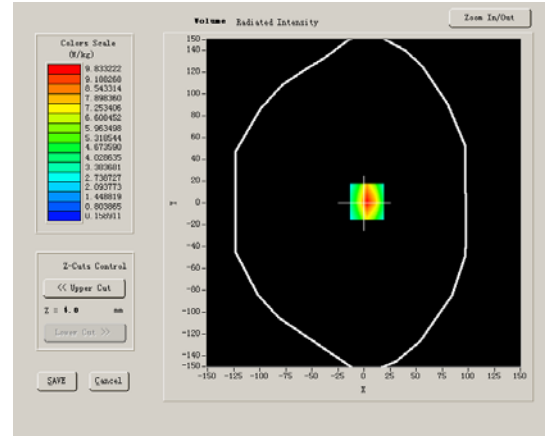
Band SAR

Frequency (MHz)	1900.000000
Relative permittivity (real part)	52.548876
Relative permittivity	14.070000
Conductivity (S/m)	1.513978
Power drift (%)	-0.030000
Ambient Temperature:	22.3°C
Liquid Temperature:	22.6°C
ConvF:	40.625,34.773,38.535
Crest factor:	1:1

SURFACE SAR



VOLUME SAR



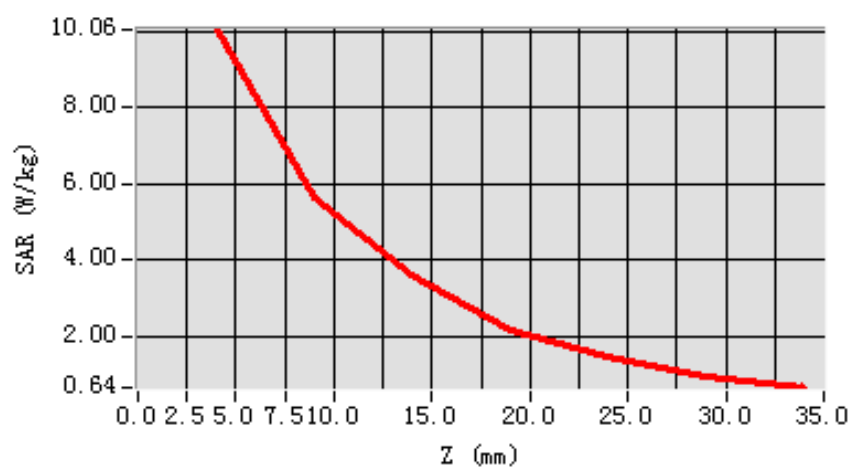
Maximum location: X=3.00, Y=1.00

SAR 10g (W/Kg)	4.981611
SAR 1g (W/Kg)	9.740177

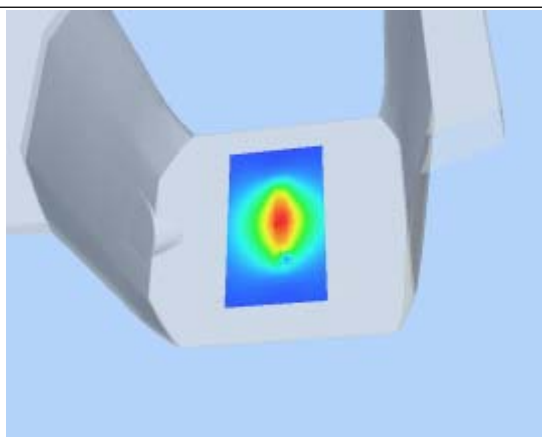
Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	10.0621	5.6445	3.6226	2.1642	1.4521	0.9078

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



3D scene shot



Hot spot position

