Report No.: SZ1301002301

SAR TEST REPORT

Issued to

Qingdao Haier Telecom Co.,Ltd

For

CDMA Ix +gsm double mode handset

Model Name	:	HC-CG300
Trade Name	:	Haier
Brand Name	:	Haier
FCC ID	:	SG71301HC-CG300
Standard	:	FCC Oet65 Supplement C Jun.2001 47CFR 2.1093 ANSI C95.1-1999 IEEE 1528-2003
MAX SAR	:	Head: 0.793 W/kg Body: 0.895 W/kg
Test date	:	2013-2-21
Issue date	:	2013-2-26

Shenzhen MORLAB Communication Technology Co., Ltd.

Tested by Zhu Zhan	*Approved by* Wu Xuewen	*Review by* Samuel Peng
Zhu Zhan	Wu Xuewen	Samuel Peng
(Test Engineer)	*(Department Manager)*	(SAR *Manager*)
Date 2013.2.26	*Date* 2013.02.26	*Date* 2013.2.26

Shenzhen MORLAB Communication Technology Co., Ltd. Tel: +86 755 36698525 Fax: +86 755 36698525
FL.3, Building A, FeiYang Science Park, No.8 LongChang Road,Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China 518101

DIRECTORY

Change History		
Issue	Date	Reason for change
1.0	Feb. 26, 2013	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:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China 518101
Responsible Test Lab Manager:	Mr. Shu Luan
Telephone:	+86 755 36698525
Facsimile:	+86 755 36698525

1.2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China 518101
FCC Registration Number:	695796

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	Aglient (8960, SN:10752)	2012-9-26	1year
3	Network Analyzer	Agilent(E5071B ,SN:MY42404762)	2012-9-26	1year
4	Voltmeter	Keithley (2000, SN:1000572)	2012-9-24	1year
5	Signal Generator	Rohde&Schwarz (SMP_02)	2012-9-24	1year
6	Power Amplifier	PRANA (Ap32 SV125AZ)	2012-9-24	1year
7	Power Meter	Agilent (E4416A, SN:MY45102093)	2012-5-07	1year
8	Power Sensor	Agilent (N8482A, SN:MY41091706)	2012-5-07	1year
9	Directional coupler	Giga-tronics(SN:1829112)	2012-9-24	1year
10	Probe	Satimo (SN:SN_3708_EP80)	2012-10-04	1year
11	Dielectric Probe Kit	Agilent (85033E)	2012-9-24	1year
12	Phantom	Satimo (SN:SN_36_08_SAM62)	2012-9-24	1year
13	Liquid	Satimo(Last Calibration: 2013-1-27)	N/A	N/A
14	Dipole 835MHz	Satimo (SN 36/08 DIPC 99)	2012-10-05	1year

2. Technical Information

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

2.1. Identification of Applicant

Company Name:	Qingdao Haier Telecom Co.,Ltd
Address:	No.1,Haier Road, Hi-tech Zone, Qingdao, 266101, P.R.China

2.2. Identification of Manufacturer

Company Name:	Qingdao Haier Telecom Co.,Ltd
Address:	No.1,Haier Road, Hi-tech Zone, Qingdao, 266101, P.R.China

2.3. Equipment Under Test (EUT)

Model Name:	HC-CG300
Trade Name:	Haier
Brand Name:	Haier
Hardware Version:	SP
Software Version:	N/A
Frequency Bands:	CDMA 800MHz; Bluetooth;
Modulation Mode:	CDMA: CDMA; BT: GFSK/∏/4-DQPSK /8-DPSK
3GPP2 Version:	CDMA 2000 1x
DTM:	Not support
Antenna type:	Fixed Internal Antenna
Development Stage:	Identical prototype
Battery Model:	H11169
Battery specification:	1000mAh
Hotspot function:	Not Support

Note: This mobile phone supports GSM 900 and PCS1800 band for EU market. No USA band.

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 folHighing two numerical characters indicate the software version of the test sample.

EUT Identity	Hardware Version	Software Version
1#	SP	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 447498 D1**	General RF Exposure Guidance v05
6	**KDB 648474 D1**	SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas
7	**KDB 941225 D1**	SAR Measurement Procedures for 3G Devices
8	**KDB 865664 D1**	SAR Measurement 100 MHz to 6 GHz v01
9	**KDB 865664 D2**	SAR Reporting v01

2.5. Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is 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:	CDMA 800MHz;
Operation mode:	Call established
Power Level:	CDMA 800MHz Maximum output power(All up bits)

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 1013, 384 and 777 respectively in the case of CDMA 800 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 Higher than the output power level of the handset by at least 35 dB.

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 beHigh:

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

SAR is expressed in units of Watts per kilogram (W/kg)
SAR measurement can be either related to the temperature elevation in tissue by

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

, where C is the specific head capacity, δ T is the temperature rise and δ t the exposure duration, or related to the electrical field in the tissue by

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

, 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 High 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 folHighing items:

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

The folHighing 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

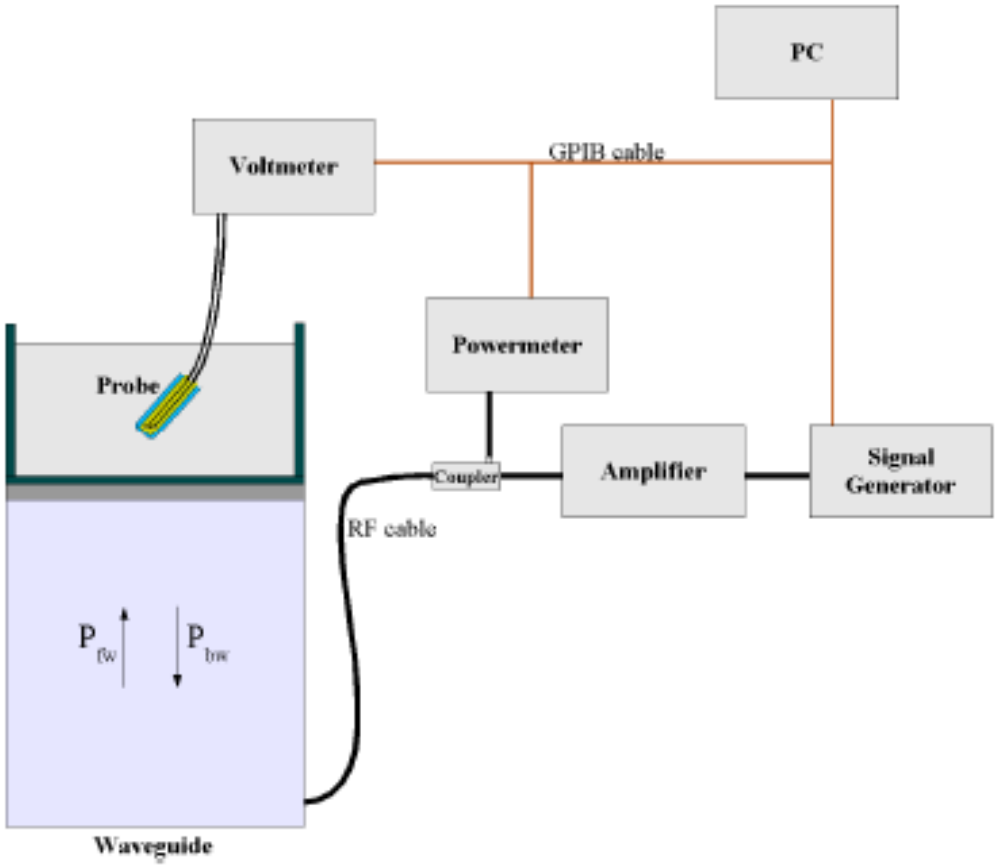
For the measurements the Specific Dosimetric E-Field Probe SN 37/08 EP80 with folHighing specifications is used

- 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 surFront: 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 suFront normal line:1ess than 30°

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



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

Where :
Pfw = Forward Power
Pbw = Backward Power
a and b = Waveguide dimensions
ı = 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)/Vlin(N) (N=1,2,3)

The linearised output voltage Vlin(N) is obtained from the displayed output voltage V(N) using

Vlin(N)=V(N)*(1+V(N)/DCP(N)) (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 beHigh 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.

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

Where:

Δ t = exposure time (30 seconds),

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

Δ T = temperature increase due to RF exposure.

SAR is proportional to Δ T/ Δ 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,

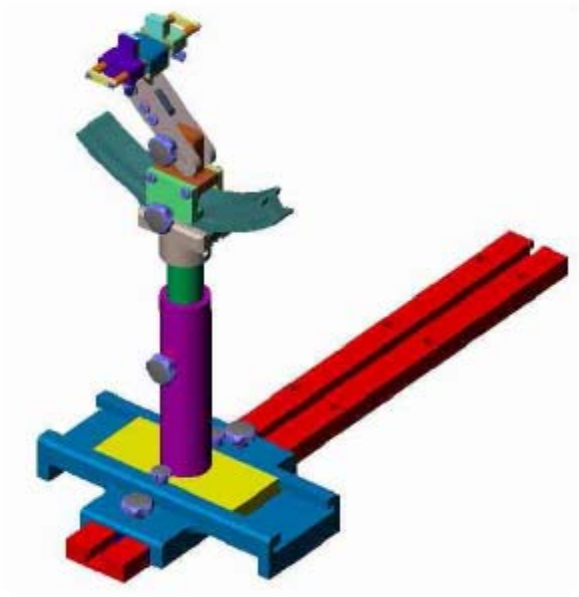
ρ = Tissue density (1.25 g/cm3 for brain tissue)

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 alHighs obtaining cheek and tilting position with a very good accuracy. In compliance with CENELEC, the tilt angle uncertainty is Higher than 1°.



Device holder

System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

5. Tissue Simulating Liquids

Simulating liquid used for testing at frequencies of 835MHz is mainly made of sugar, salt and water. Approximately 20litres are needed for an upright head compared to about 25 liter for a horizontal bath phantom. The liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is (head SAR)or from the flat phantom to the liquid top surface (body SAR) is 15cm. Following are the recipes for one liter of head tissue simulating liquid for frequency band 835 MHz.

Ingredients (% by weight)	Frequency Band 835MHz	
Tissue Type	Head	Body
Water	41.45	52.4
Salt(NaCl)	1.45	1.4
Sugar	56.0	45.0
HEC	1.0	1.0
Bactericide	0.1	0.1
Triton X-100	0.0	0.0
DGBE	0.0	0.0
Acticide SPX	0.0	0.0
Dielectric Constant	42.45	56.1
Conductivity (S/m)	0.91	0.95

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**	41.5	0.90
	±5% window	39.425 to 43.575	0.855 to 0.945
	Reference result per probe calibration	41.5	0.90
	±5% window	39.425 to 43.575	0.855 to 0.945
	Validation value (Jan. 27)	41.631854	0.912487

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**	55.2	0.97
	±5% window	52.44 to 57.96	0.9215 to 1.0185
	Reference result per probe calibration	56.1	0.95
	±5% window	53.295 to 58.905	0.905 to 0.998
	Validation value (Jan. 27)	55.016124	0.951510

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 ≤ 5% while satisfying the required ±5% tolerances in target dielectric parameters. "(KDB 450824 D01)

6. Uncertainty Assessment

The folHighing 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 (+- %)	Vi
Measurement System									
Probe calibration	E.2.1	4.76	N	1	1	1	4.76	4.76	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.01	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	0.7	0.7	1.62	1.62	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Test sample Related									
Test sample positioning	E.4.2.1	0.03	N	1	1	1	0.03	0.03	N-1
Device Holder Uncertainty	E.4.1.1	5.00	N	1	1	1	5.00	5.00	N-1
Output power Power drift - SAR drift measurement	6.6.2	4.04	R	$\sqrt{3}$	1	1	2.33	2.33	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞

Liquid conductivity - deviation from target value	E.3.2	4.57	R	$\sqrt{3}$	0.64	0.43	1.69	1.13	∞
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.20	2.15	M
Liquid permittivity - deviation from target value	E.3.2	3.69	R	$\sqrt{3}$	0.6	0.49	1.28	1.04	∞
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	1	0.6	0.49	6.00	4.90	M
Combined Standard Uncertainty			RSS				11.55	10.67	
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 Algoritms 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

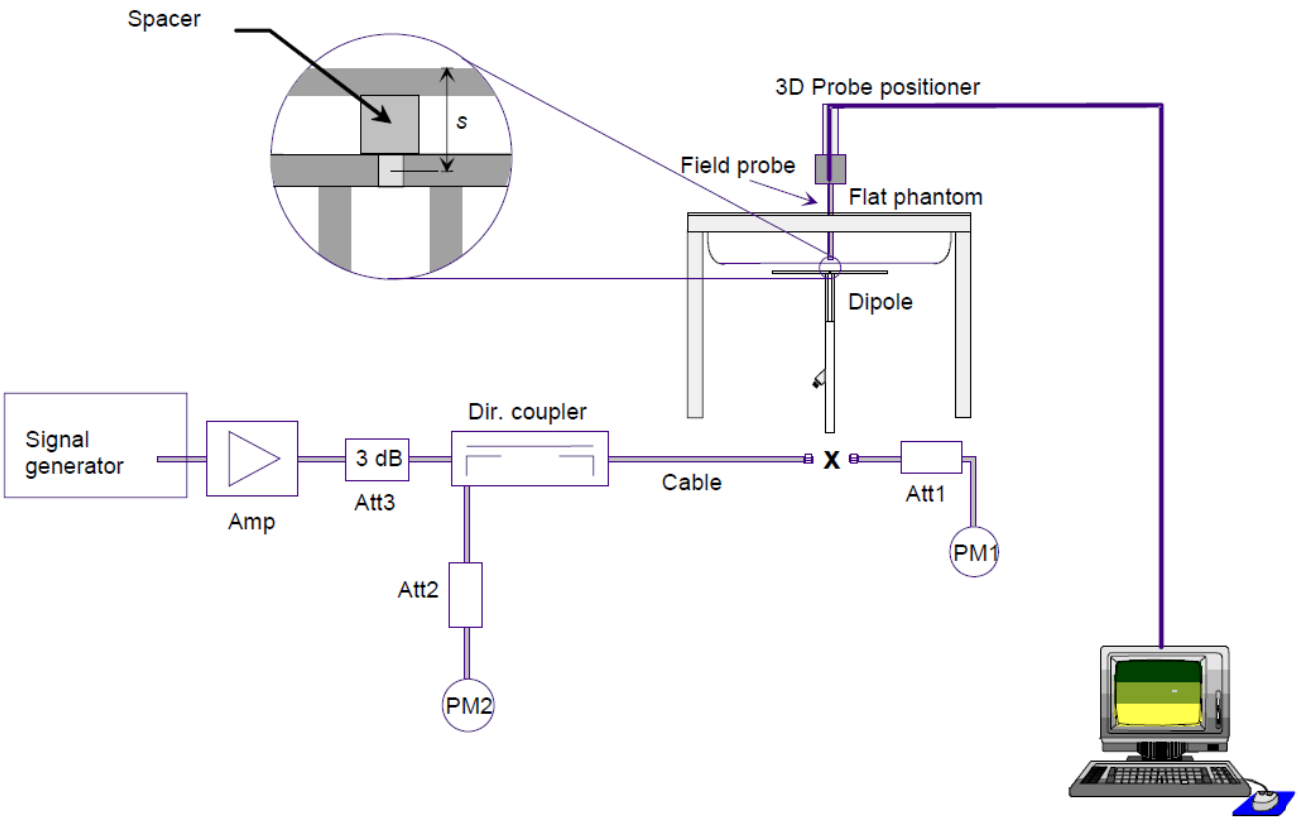
7.1. System Setup

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. 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 surFront 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

System Verification Setup Block Diagram



7.2. Validation Results

After system check testing, the SAR result will be normalized to 1W forward input power and compared with the reference SAR value derived from validation dipole certificate report. The deviation of system check should be within 10 %.

Frequency	835MHz(H)	835MHz(B)
Target value (1g)	9.740 W/Kg	9.880 W/Kg
Test value (1g 250 mW input)	2.386 W/Kg	2.380 W/Kg
Normalized value (1g)	9.544 W/Kg	9.520W/Kg

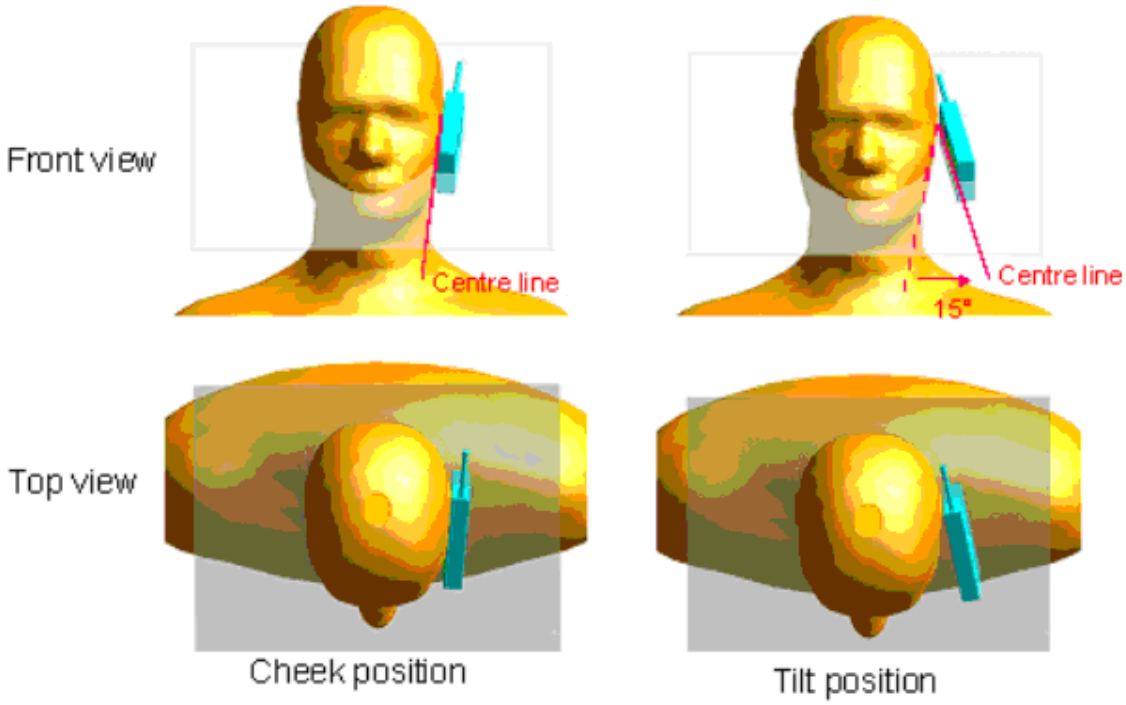
Note: System checks the specific test data please see page 44~47

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.

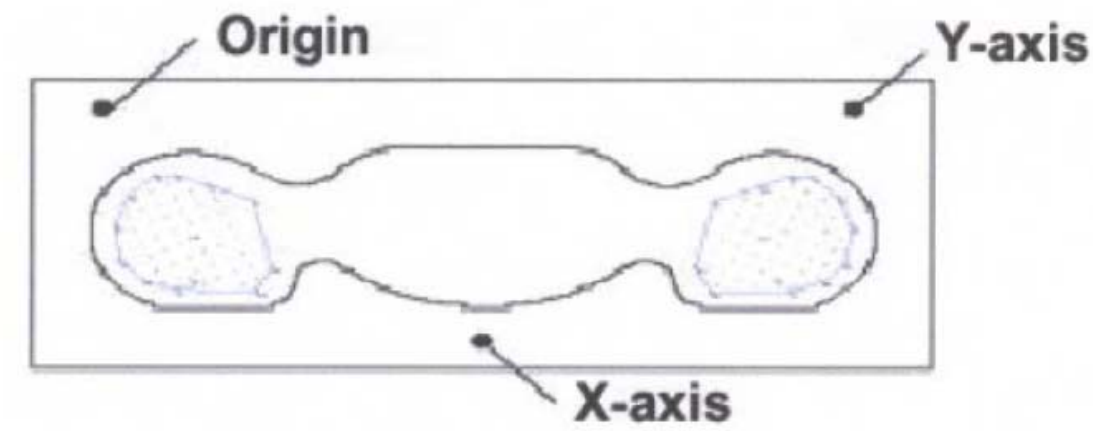
Remark: Please refer to Appendix B for the test setup photos.

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 folHighing 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 interFront
- 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 to16 mm and a constant distance to the inner surFront of the phantom. Since the sensors can not directly measure at the inner phantom surFront, the values between the sensors and the inner phantom surFront 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 surFront in order to minimize measurements errors, but the highest local SAR will occur at the surFront 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 surFront 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. CDMA 1xRTT& EVDO power

Band	Channel	Frequency	SO55 (dBm)		SO32+RC3 (dBm)	
	F-RC	(MHz)	RC1	RC3	FCH+SCH	FCH
CDMA800	1013	824.7	26.41	26.42	26.36	26.40
	384	836.52	26.30	27.37	27.34	27.37
	777	848.31	26.34	26.53	26.41	26.50

2. Bluetooth peak output power

Band	Channel	Frequency (MHz)	Output Power(dBm)		
			GFSK	Π/4-DQPSK	8-DPSK
BT	0	2402	7.644	7.585	7.659
	39	2441	7.199	7.179	7.212
	78	2480	8.289	8.353	8.494

10. Test Results List

Summary of Measurement Results (CDMA 800MHz Band)

Temperature: 21.0~23.8°C, humidity: 54~60%.					
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/K), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g
Right Side Of Head	Cheek/Touch	384	0.686	1.156	0.793
	Ear/Tilt		0.412		0.476
Left Side Of Head	Cheek/Touch		0.668		0.772
	Ear/Tilt		0.464		0.536
Body (15mm)	Back upward		0.778		0.899
	Front upward		0.618		0.714

Note:

1.When the 1-g SAR for the mid-band channel or the channel with the highest output power satisfy the folHighing conditions, testing of the other channels in the band is not required. (Per KDB 447498 D01 General RF Exposure Guidance v05)

≤ 0.8 W/kg and transmission band ≤ 100 MHz

≤ 0.6 W/kg and, 100 MHz < transmission bandwidth ≤ 200 MHz

≤ 0.4 W/kg and transmission band > 200 MHz

Per KDB publication 941225 D01v02(note 2&3):

2. SAR for head exposure configurations is measured in RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the maximum average output of each channel is less than 1/4 dB higher than that measured in RC3.

3.SAR for body exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiple code channels (FCH + SCHn) is not required when the maximum average output of each RF channel is less than 1/4 dB higher than that measured with FCH only.

4. Scaling Factor calculation

Band	**Tune-up power tolerance (dBm)**	**SAR test channel Power (dBm)**	**Scaling Factor**
CDMA 800	Max output power =27.5+-0.5	27.37	1.156

11. Multiple Transmitters Evaluation

The are two transmitters build in EUT, as following highlighted:

Standalone SAR

TEST distance: 5mm		
Band	**SAR Test Exclusion Threshold(mW) Per KDB 447498 D01v05**	**Highest test power(mW)**
BT	**10**	7.079

The SAR test for BT(head &body SAR) is not required for highest power is not exceed the power threshold for 2450MHz at the test distance of 5mm.

Simultaneous SAR

Applicable Multiple Scenario Evaluation

Test Position	CDMA SARMax (W/Kg)	Bluetooth SAR(W/Kg)	∑1-gSARMax (W/Kg)
			BT&Main Ant
Head SAR	0.793	0.292	1.085
Body SAR	0.899	0.097	0.996

The BT stand-alone SAR is not required, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance,mm*)]·[√f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 mm;

where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.

(Max power=7.079 mW(per tune up) ; *min. test separation distance*=5mm for head, 15mm for body; *f*=2.4GHz)

BT estimated Head SAR = 0.292 W/Kg (1g); BT estimated Body SAR = 0.097 W/Kg (1g)

Simultaneous Transmission SAR evaluation is not required for BT and CDMA, because the sum of 1g SARMax is 1**.085**W/Kg < 1.6W/Kg for BT and CDMA.

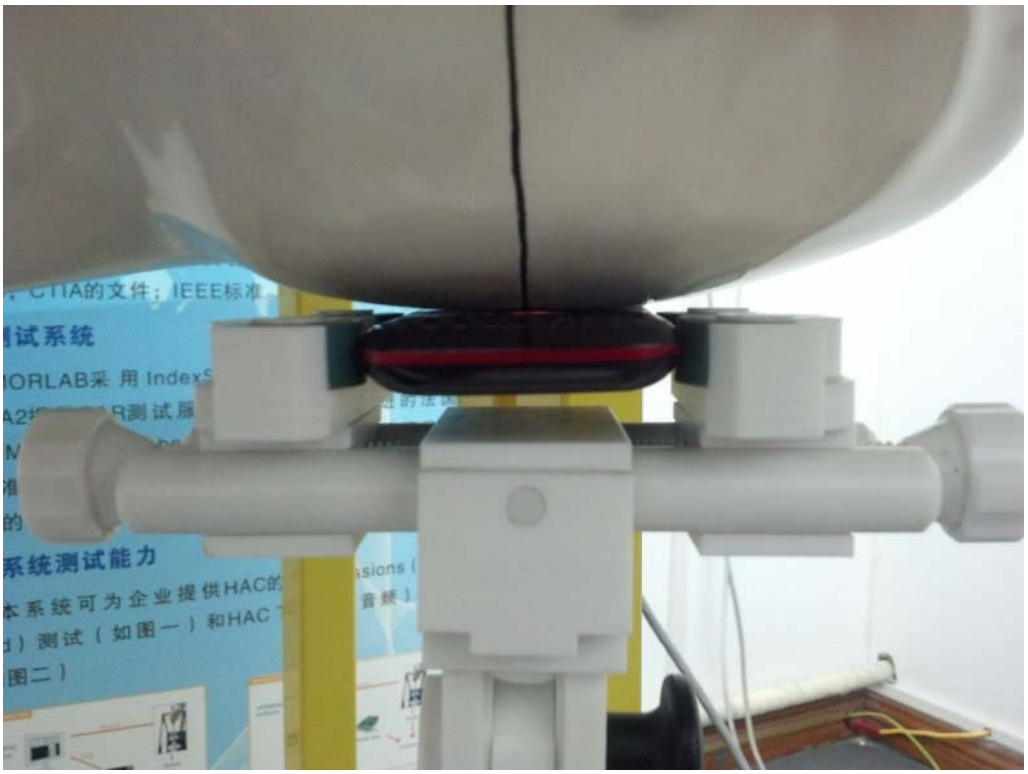
(According to KDB 447498D01v05, the sum of the highest *reported* SAR of each antenna does not exceed the limit, simultaneous transmission SAR evaluation is not required.)

Annex A EUT Setup Photos

1 EUT Right Head Touch Cheek Position

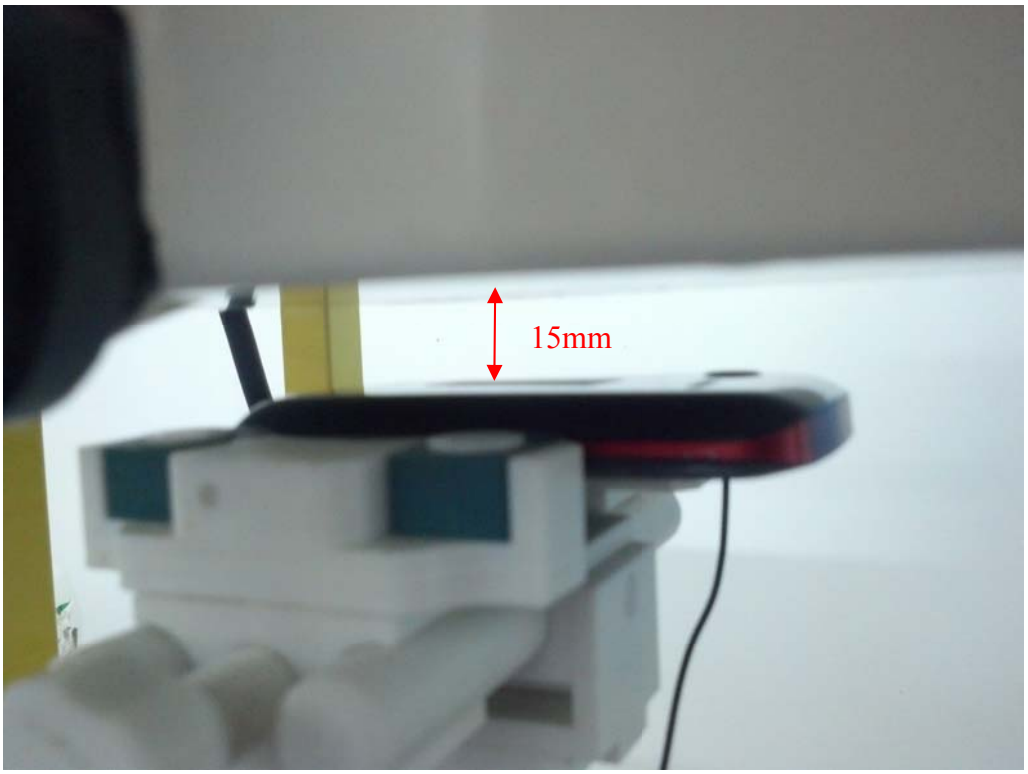
2 EUT Right Head Tilt15 Position

3 EUT Left Head Touch Cheek Position

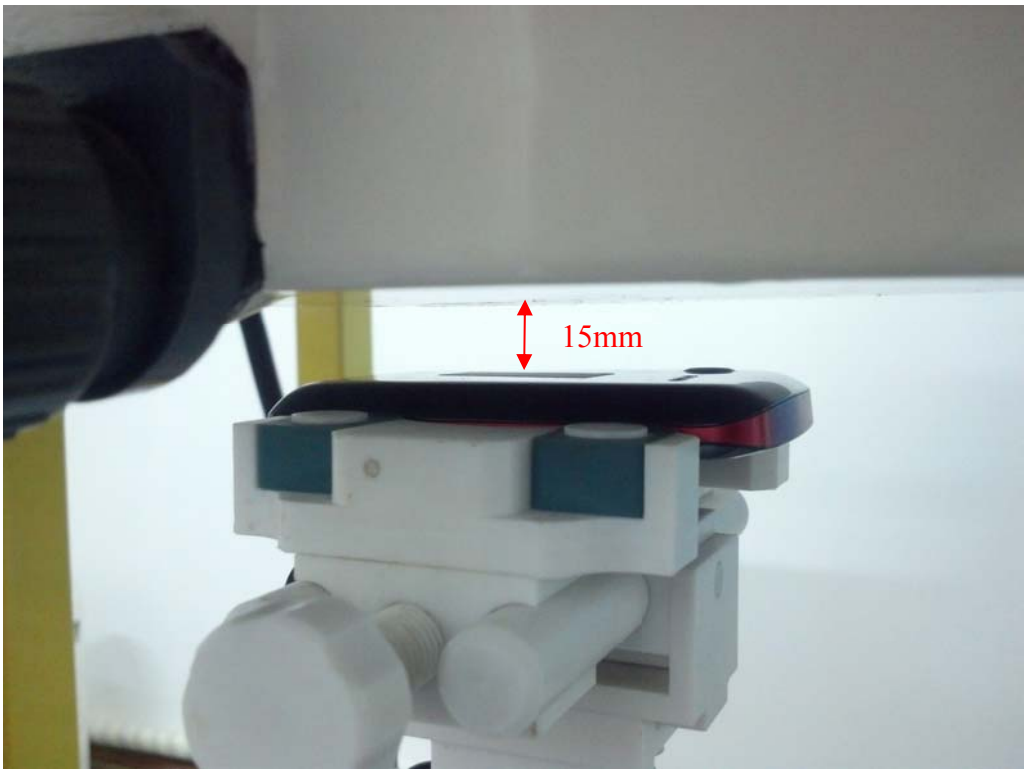


4 EUT Left Head Tilt15 Position

5 Side Position with earphone



6 Side Position



Liquid Level Photo

Liquid depth :15.5cm

Annex B Graph Test Results

BAND	PARAMETERS
CDMA 800	Measurement 1: Right Head with Cheek device position on Middle Channel in CDMA mode Measurement 2: Right Head with Tilt device position on Middle Channel in CDMA mode Measurement 3: Left Head with Cheek device position on Middle Channel in CDMA mode Measurement 4: Left Head with Tilt device position on Middle Channel in CDMA mode Measurement 5: Flat Plane with Body device position on Middle Channel in CDMA mode Measurement 6: Flat Plane with Body device position on Middle Channel in CDMA mode

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: 2013.1.27
Measurement duration: 7 minutes 59 seconds

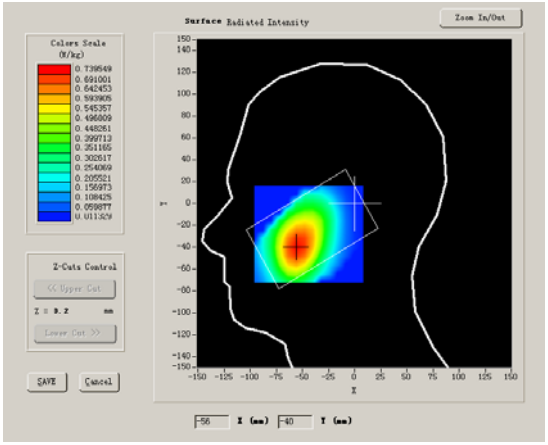
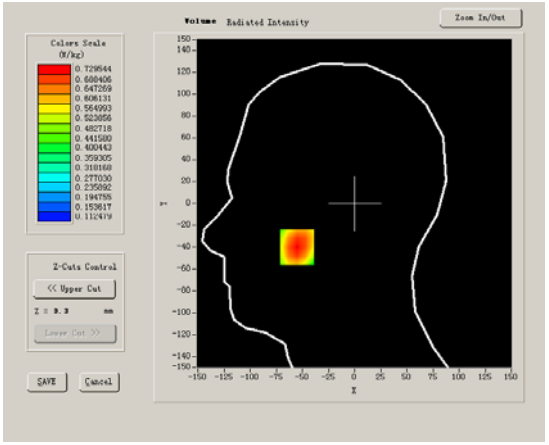
A. Experimental conditions.

Phantom File	sam_direct_droit2_surf8mm.txt
Phantom	Right head
Device Position	Cheek
Band	CDMA800
Channels	Middle
Signal	CDMA

B. SAR Measurement Results

Middle Band SAR (Channel 384):

Frequency (MHz)	836.520000
Relative permittivity (real part)	41.631854
Conductivity (S/m)	0.912487
Power drift (%)	0.450000
Ambient Temperature:	22.7°C
Liquid Temperature:	22.3°C
ConvF:	28.479, 25.214, 27.196
Crest factor:	1:1

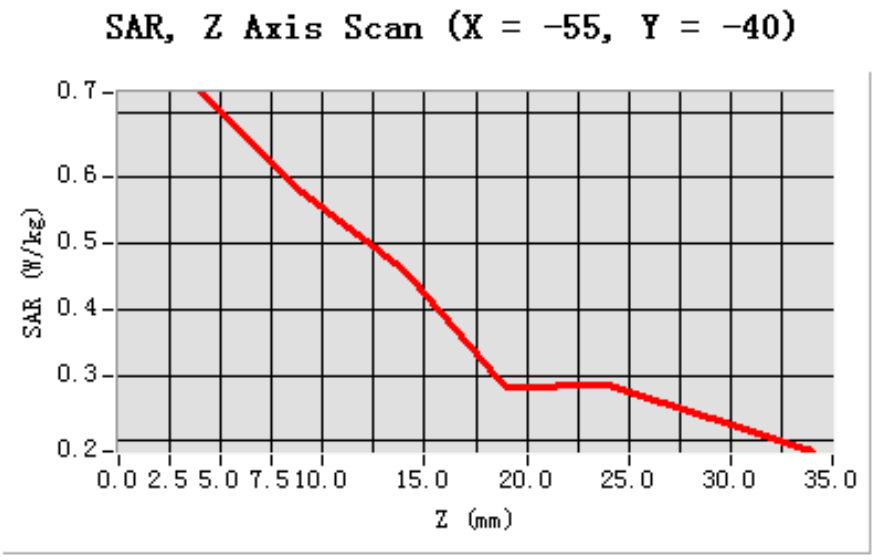
SURFACE SAR	VOLUME SAR
	

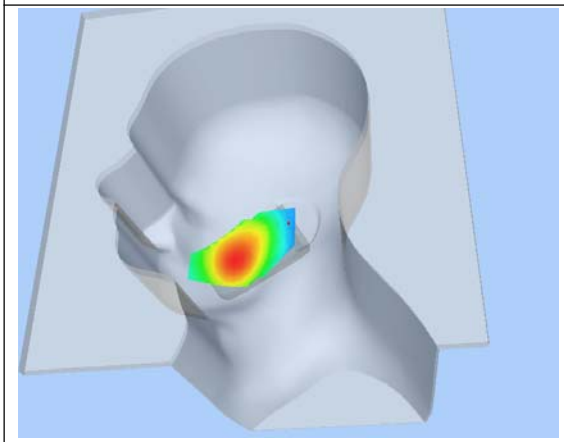
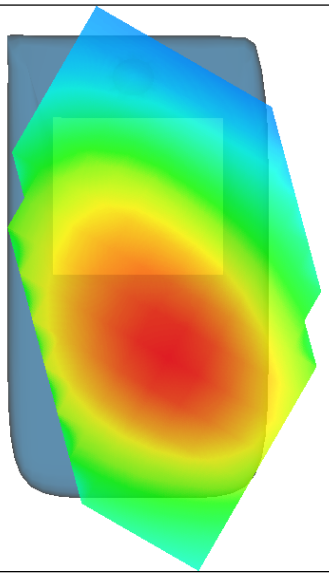
Maximum location: X=-55.00, Y=-40.00

SAR 10g (W/Kg)	0.51000
SAR 1g (W/Kg)	0.685798

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.7295	0.5782	0.4597	0.2802	0.2846	0.2347



3D sceen 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: 2013.1.27
Measurement duration: 7 minutes 41 seconds

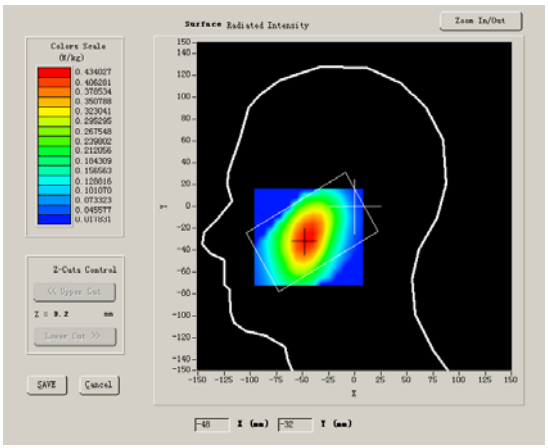
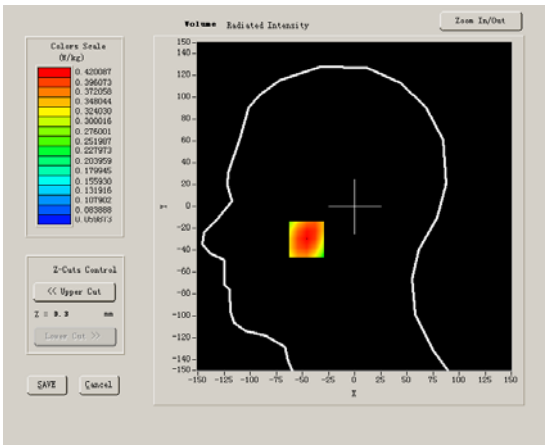
A. Experimental conditions.

Phantom File	sam_direct_droit2_surf8mm.txt
Phantom	Right head
Device Position	Tilt
Band	CDMA800
Channels	Middle
Signal	CDMA

B. SAR Measurement Results

Middle Band SAR (Channel 384):

Frequency (MHz)	836.520000
Relative permittivity (real part)	41.631854
Conductivity (S/m)	0.912487
Power drift (%)	0.020000
Ambient Temperature:	22.7°C
Liquid Temperature:	22.3°C
ConvF:	28.479, 25.214, 27.196
Crest factor:	1:1

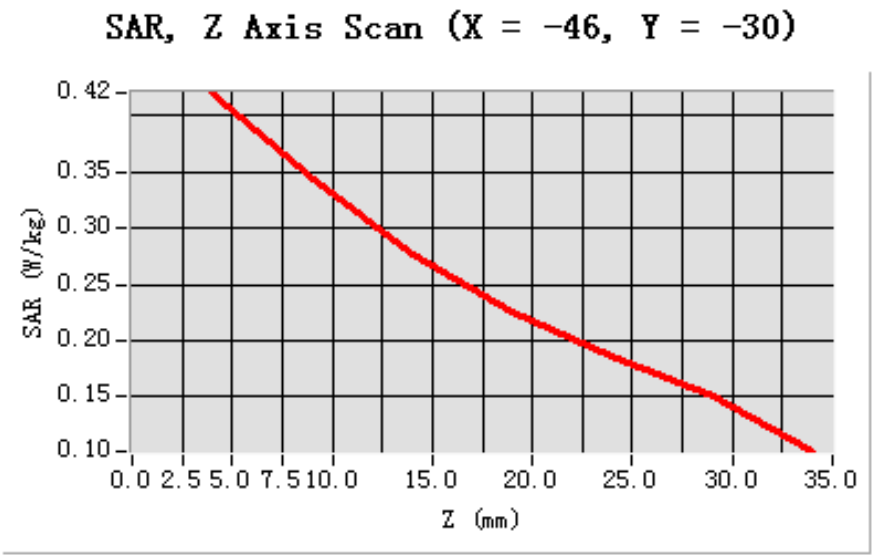
SURFACE SAR	VOLUME SAR
	

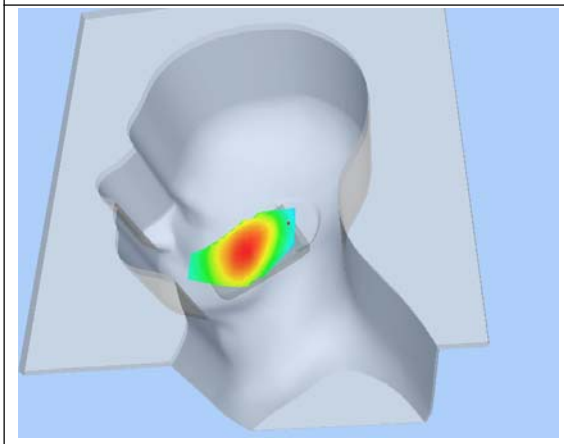
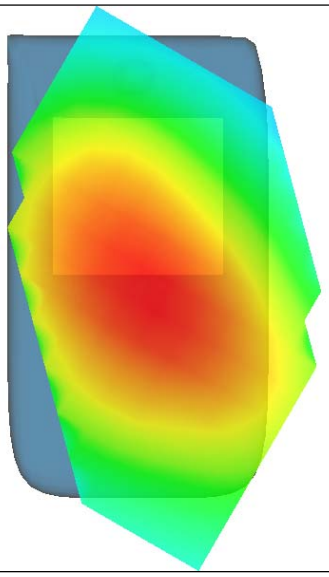
Maximum location: X=-46.00, Y=-30.00

SAR 10g (W/Kg)	0.311590
SAR 1g (W/Kg)	0.412039

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.4201	0.3425	0.2763	0.2258	0.1859	0.1500



3D sceen 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: 2013.1.27
Measurement duration: 7 minutes 53 seconds

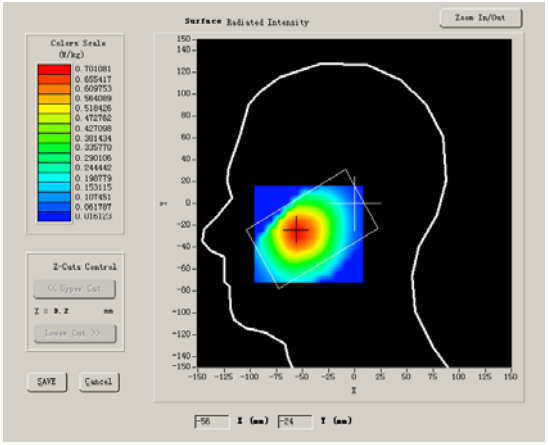
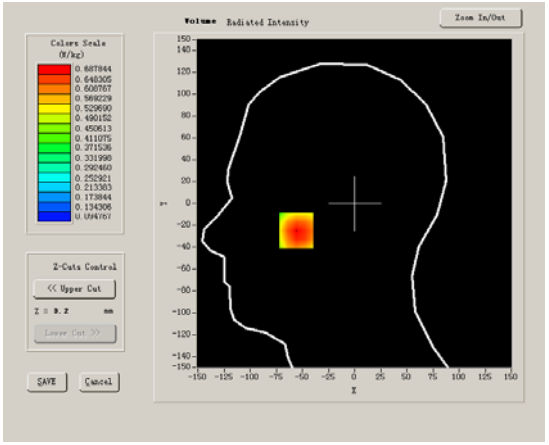
A. Experimental conditions.

Phantom File	sam_direct_droit2_surf8mm.txt
Phantom	Left head
Device Position	Cheek
Band	CDMA800
Channels	Middle
Signal	CDMA

B. SAR Measurement Results

Middle Band SAR (Channel 384):

Frequency (MHz)	836.520000
Relative permittivity (real part)	41.631854
Conductivity (S/m)	0.912487
Power drift (%)	-0.500000
Ambient Temperature:	22.7°C
Liquid Temperature:	22.3°C
ConvF:	28.479, 25.214, 27.196
Crest factor:	1:1

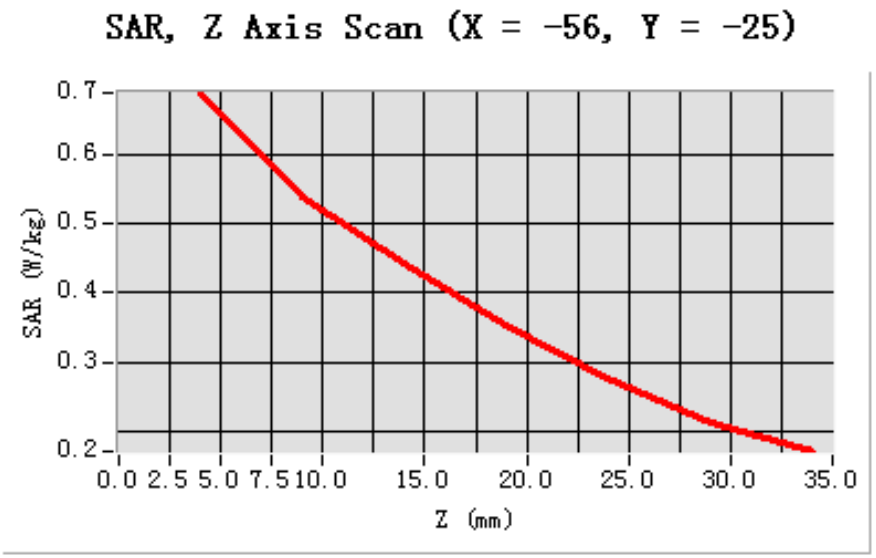
SURFACE SAR	VOLUME SAR
	

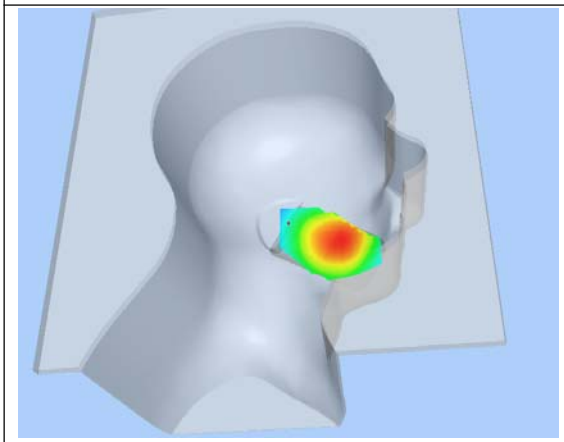
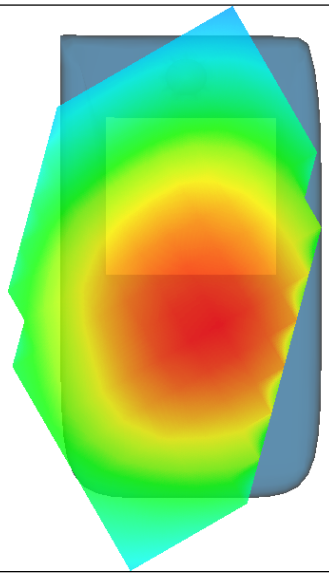
Maximum location: X=-56.00, Y=-25.00

SAR 10g (W/Kg)	0.501152
SAR 1g (W/Kg)	0.668028

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.6878	0.5369	0.4414	0.3522	0.2766	0.2124



3D sceen 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: 2013.1.27
Measurement duration: 7 minutes 40 seconds

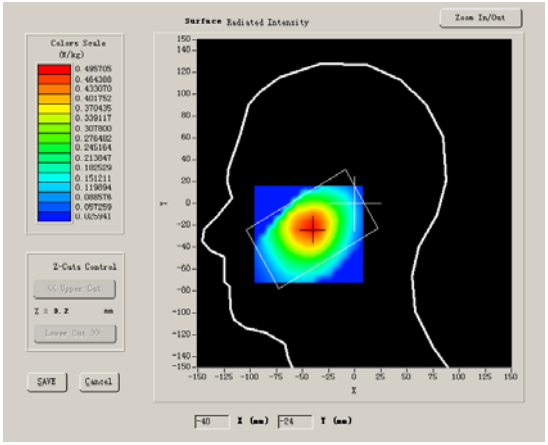
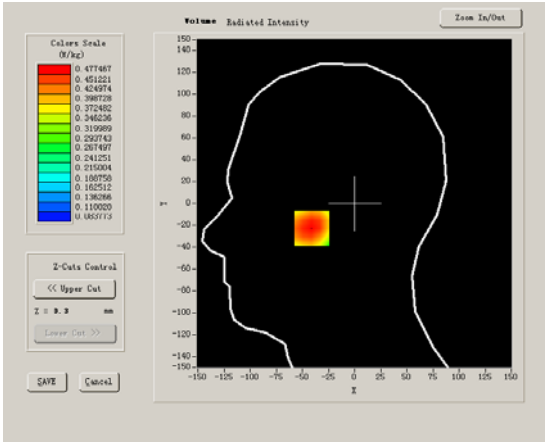
A. Experimental conditions.

Phantom File	sam_direct_droit2_surf8mm.txt
Phantom	Left head
Device Position	Tilt
Band	CDMA800
Channels	Middle
Signal	CDMA

B. SAR Measurement Results

Middle Band SAR (Channel 384):

Frequency (MHz)	836.520000
Relative permittivity (real part)	41.631854
Conductivity (S/m)	0.912487
Power drift (%)	-0.380000
Ambient Temperature:	22.7°C
Liquid Temperature:	22.3°C
ConvF:	28.479, 25.214, 27.196
Crest factor:	1:1

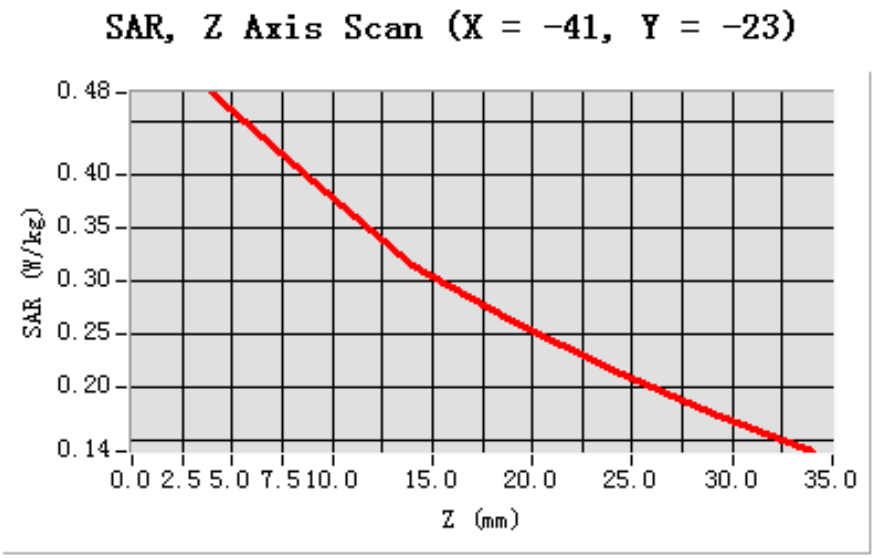
SURFACE SAR	VOLUME SAR
	

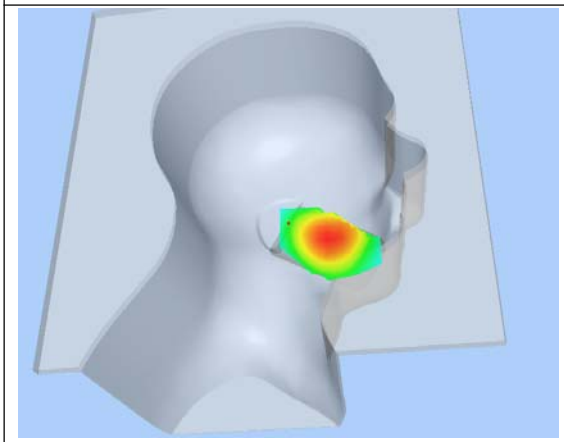
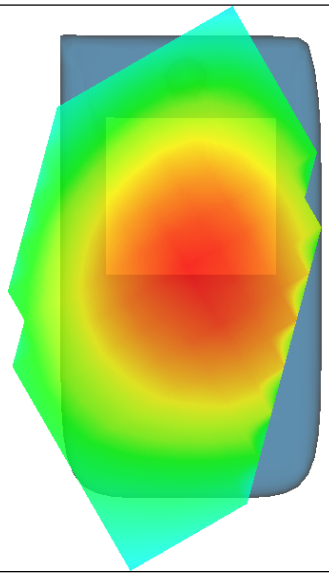
Maximum location: X=-41.00, Y=-23.00

SAR 10g (W/Kg)	0.356057
SAR 1g (W/Kg)	0.464114

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.4775	0.3933	0.3134	0.2627	0.2157	0.1748



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: 2013.1.27
Measurement duration: 9 minutes 15 seconds

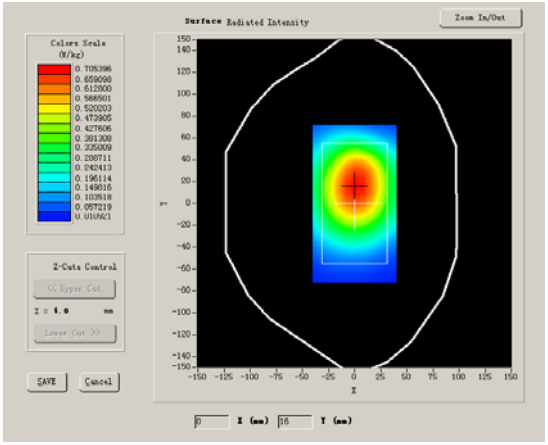
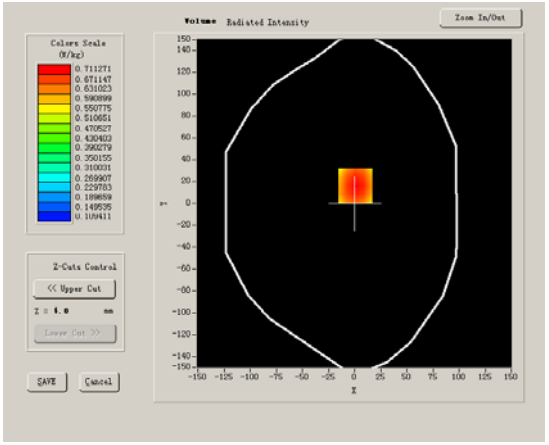
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	CDMA800
Channels	Middle
Signal	CDMA

B. SAR Measurement Results

Middle Band SAR (Channel 384):

Frequency (MHz)	836.520000
Relative permittivity (real part)	55.016124
Conductivity (S/m)	0.951510
Power drift (%)	-0.030000
Ambient Temperature:	22.7°C
Liquid Temperature:	22.3°C
ConvF:	28.559, 25.681, 27.588
Crest factor:	1:1

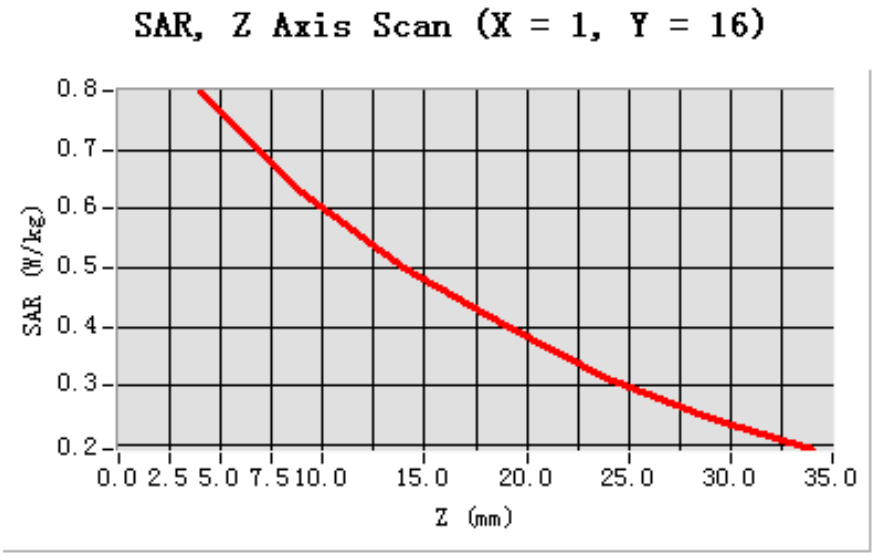
SURFACE SAR	VOLUME SAR
	

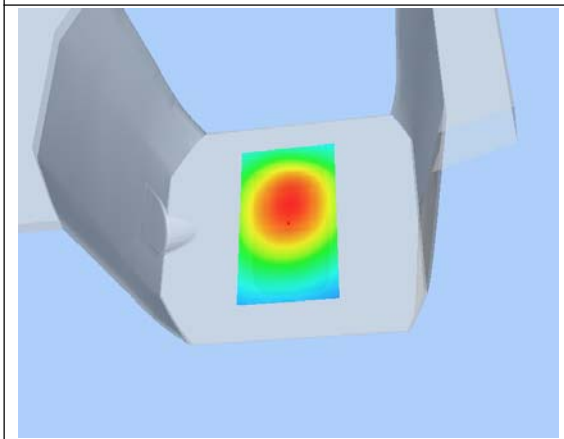
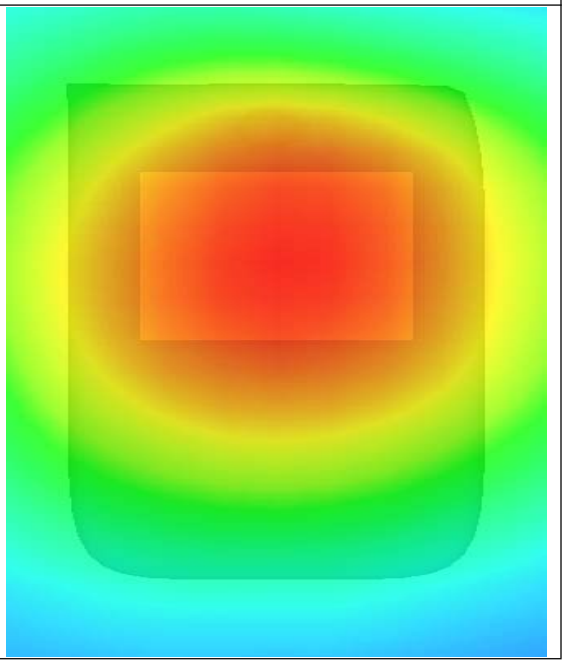
Maximum location: X=1.00, Y=16.00

SAR 10g (W/Kg)	0.588114
SAR 1g (W/Kg)	0.777559

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.7999	0.6280	0.4994	0.4039	0.3126	0.2471



3D sceen 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: 2013.1.27
Measurement duration: 9 minutes 16 seconds

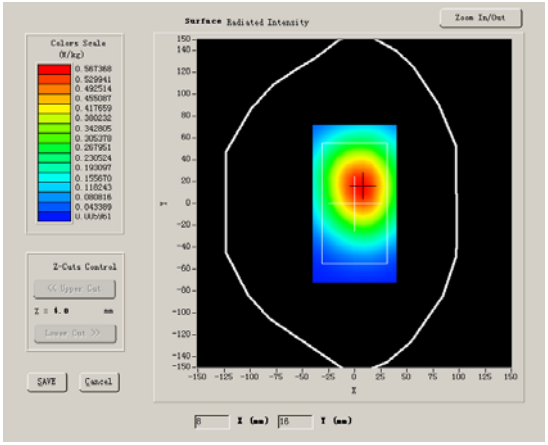
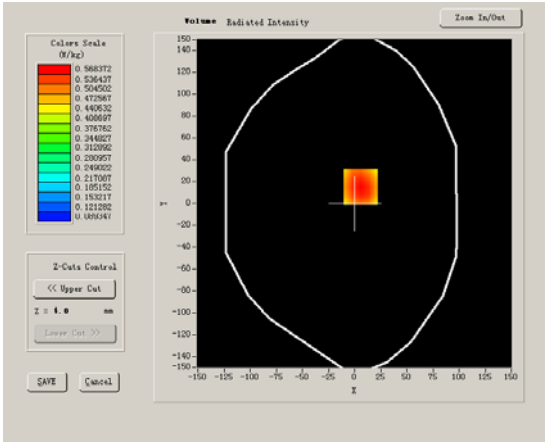
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	CDMA800
Channels	Middle
Signal	CDMA

B. SAR Measurement Results

Middle Band SAR (Channel 384):

Frequency (MHz)	836.520000
Relative permittivity (real part)	55.016124
Conductivity (S/m)	0.951510
Power drift (%)	-1.390000
Ambient Temperature:	22.7°C
Liquid Temperature:	22.3°C
ConvF:	28.559, 25.681, 27.588
Crest factor:	1:1

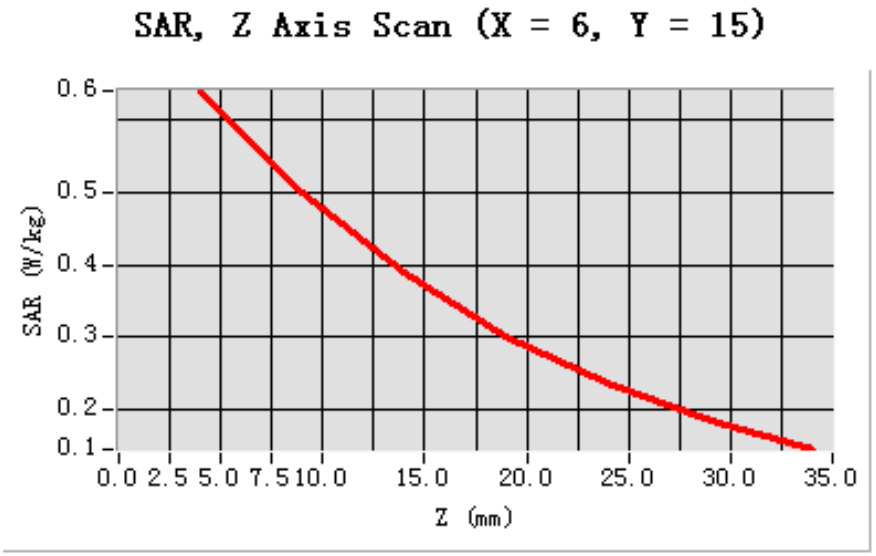
SURFACE SAR	VOLUME SAR
	

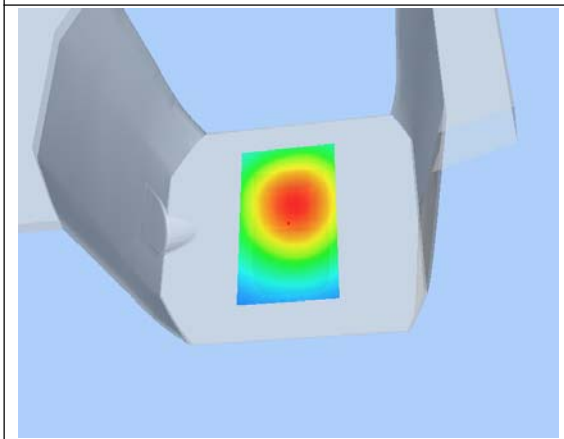
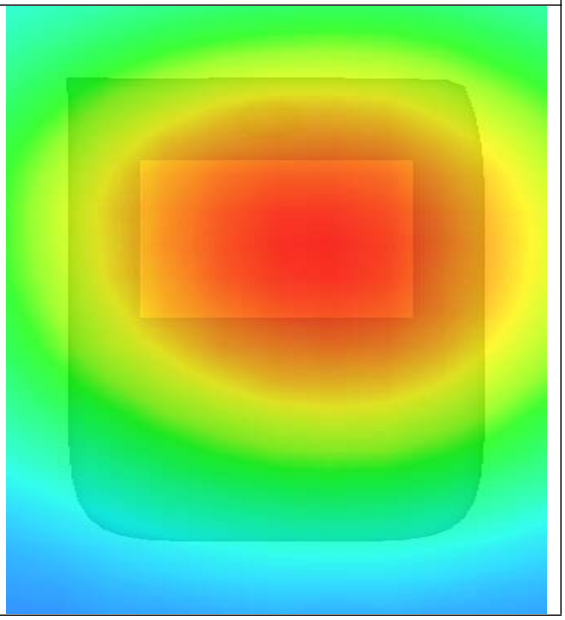
Maximum location: X=6.00, Y=15.00

SAR 10g (W/Kg)	0.462707
SAR 1g (W/Kg)	0.618240

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.6392	0.4978	0.3891	0.3023	0.2382	0.1851



3D sceen 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: 2013.1.27
Measurement duration: 13 minutes 27 seconds

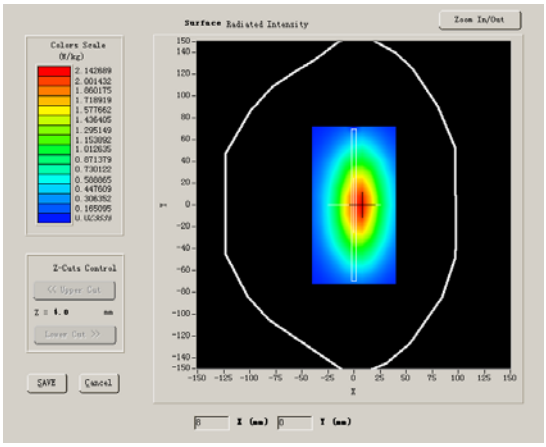
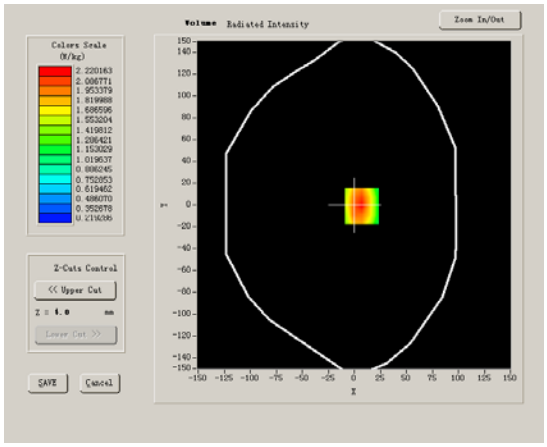
A. Experimental conditions.

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)	41.631854
Conductivity (S/m)	0.912487
Power drift (%)	-0.310000
Ambient Temperature:	22.4°C
Liquid Temperature:	21.5°C
ConvF:	28.479,25.214,27.196
Crest factor:	1:1

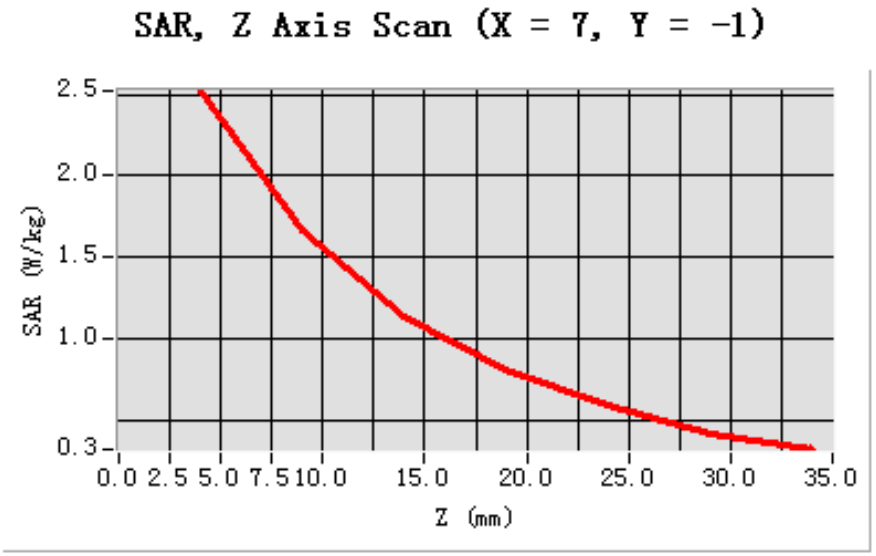
SURFACE SAR	VOLUME SAR
	

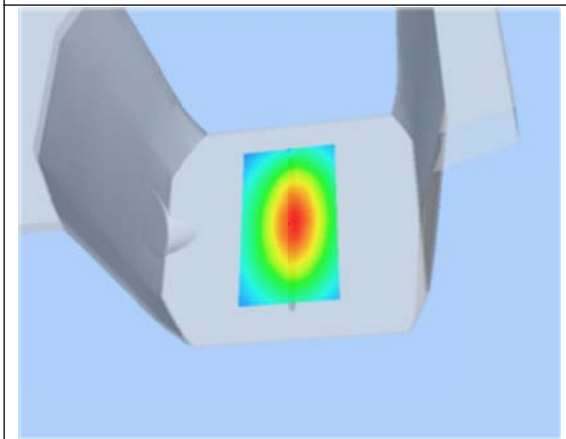
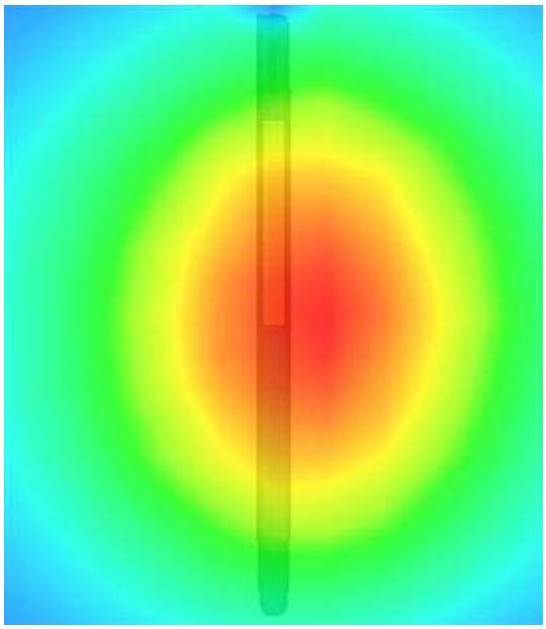
Maximum location: X=7.00, Y=-1.00

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



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: 2013.1.27
Measurement duration: 13 minutes 27 seconds

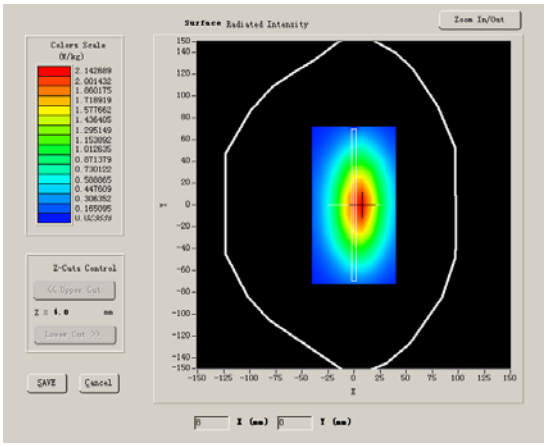
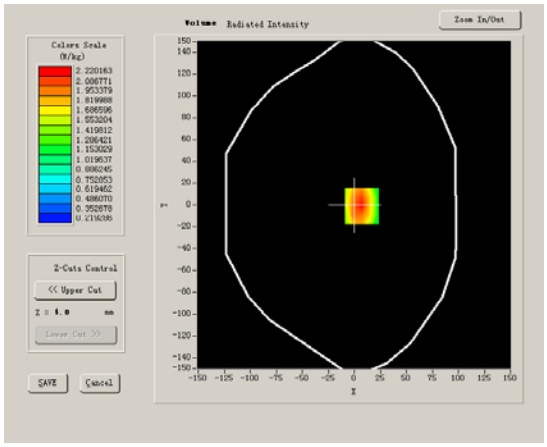
A. Experimental conditions.

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)	55.016124
Conductivity (S/m)	0.951510
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

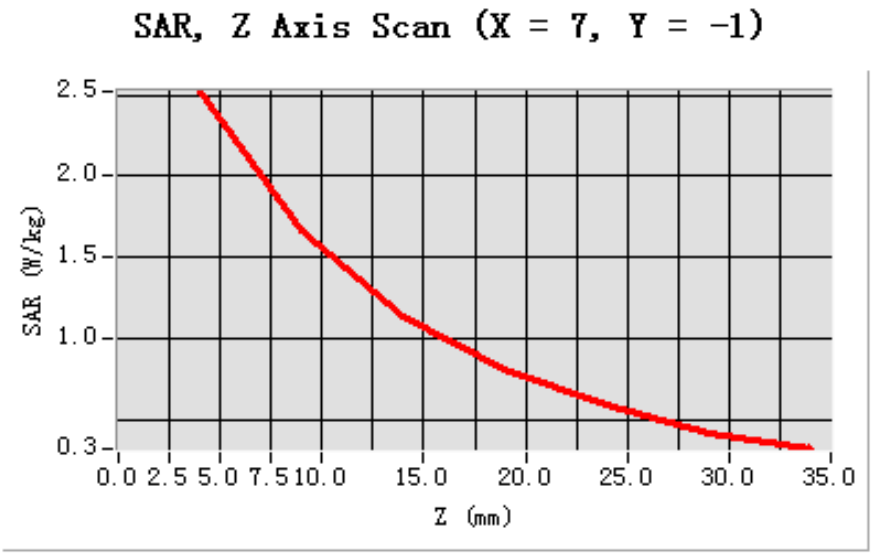
SURFACE SAR	VOLUME SAR
	

Maximum location: X=7.00, Y=-1.00

SAR 10g (W/Kg)	1.497122
SAR 1g (W/Kg)	2.379818

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



3D sceen shot	Hot spot position