

FCC SAR TEST REPORT



Issued to

TCT Mobile Limited

For

UMTS USB Modem

Model Name : X602A/X602
Trade Name : ALCATEL
onetouch
Brand Name : ALCATEL
onetouch
FCC ID : RAD502
Standard : 47CFR 2.1093
IEEE 1528-2013
MAX SAR : Body: 1.088 W/kg
Test date : 2014-5-4 to 2014-5-5
Issue date : 2014-5-16

by

Shenzhen Morlab Communications Technology Co., Ltd.

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Change History		
Issue	Date	Reason for change
1.0	May 16, 2014	First edition

1. TESTING LABORATORY

1.1 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

1.2 Accreditation Certificate

Accredited Testing Laboratory: No. CNAS L3572

1.3 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)	2014-2-21	1year
3	Network Analyzer	Agilent(E5071B ,SN:MY42404762)	2013-9-26	1year
4	Voltmeter	Keithley (2000, SN:1000572)	2013-9-24	1year
5	Signal Generator	Rohde&Schwarz (SMP_02)	2013-9-24	1year
6	Power Amplifier	PRANA (Ap32 SV125AZ)	2013-9-24	1year
7	Power Meter	Agilent (E4416A, SN:MY45102093)	2013-5-07	1year
8	Power Sensor	Agilent (N8482A, SN:MY41091706)	2013-5-07	1year
9	Directional coupler	Giga-tronics(SN:1829112)	2013-9-24	1year
10	Probe	Satimo (SN:SN 37/08 EP80)	2013-9-25	1year
11	Dielectric Probe Kit	Agilent (85033E)	2013-9-24	1year
12	Phantom	Satimo (SN:SN_36_08_SAM62)	2013-9-24	1year
13	Liquid	Satimo(Last Calibration: 2014-5-4 to 2014-5-5)	N/A	N/A
14	Dipole 835MHz	Satimo (SN 20/08 DIPC 99)	2013-9-25	1year
15	Dipole 1900MHz	Satimo (SN 30/13 DIP1G900-261)	2013-9-25	1year

2. TECHNICAL INFORMATION

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

2.1 Identification of Applicant

Company Name:	TCT Mobile Limited
Address:	5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203

2.2 Identification of Manufacturer

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

2.3 Equipment Under Test (EUT)

Model Name:	X602A/X602
Trade Name:	ALCATEL onetouch
Brand Name:	ALCATEL onetouch
Hardware Version:	V2.0
Software Version:	X602-A-C.140423.R007.00.0.X.T
Frequency Bands:	GSM 850MHz/PCS1900MHz; WCDMA 850MHZ/1900MHZ; (Band II, V)
Modulation Mode:	GSM/GPRS: GMSK; EDGE:8PSK; WCDMA/HSDPA/HSUPA/HSPA+: QPSK;
Multi-slot Class:	GPRS: Class 12; EDGE: Class 12
GPRS Class:	Class B
DTM:	Not support
Antenna type:	Fixed Internal Antenna
Development Stage:	Identical prototype
3GPP Version:	Release 8
Hotspot function:	No

Note:

X602A and X602 are the same both in hardware and software, just different model name for marketing requirement, no other changes.

2.3.1 Photographs of the EUT

Please refer to the External Photos for the Photos 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#	V2.0	X602-A-C.140423.R007.00.0.X.T

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	IEEE 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.
3	KDB 447498 D01v05r02	General RF Exposure Guidance
4	KDB 447498 D02v02	SAR Procedures for Dongle Xmtr
5	KDB 941225 D01v02	SAR test for 3G devices
6	KDB 941225 D02v02r02	HSPA and 1x Advanced
7	KDB 941225 D03v01	SAR Test Reduction GSM GPRS EDGE
8	KDB 865664 D01v01r03	SAR Measurement 100 MHz to 6 GHz
9	KDB 865664 D02v01r01	RF Exposure Reporting

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 /PCS1900MHz; WCDMA 850MHz/WCDMA1900MHz;
Operation mode:	Call established
Power Level:	GSM 850 MHz Maximum output power(level 5) PCS1900 MHz Maximum output power(level 0) WCDMA 850MHz Maximum output power(All up bits) WCDMA 1900MHz 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 128, 190 and 251 respectively in the case of GSM 850MHz, or to 512, 661 and 810 respectively in the case of PCS 1900MHz, or to 9262, 9400 and 9538 respectively in the case of WCDMA 1900MHz, or to 4132, 4182 and 4233 respectively in the case of WCDMA 850MHz. 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 Middle 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 Middle 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:

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

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

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

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

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

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

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

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

4. SAR MEASUREMENT SETUP

4.1 The Measurement System

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

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

The Following figure shows the system.



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

4.2 Probe

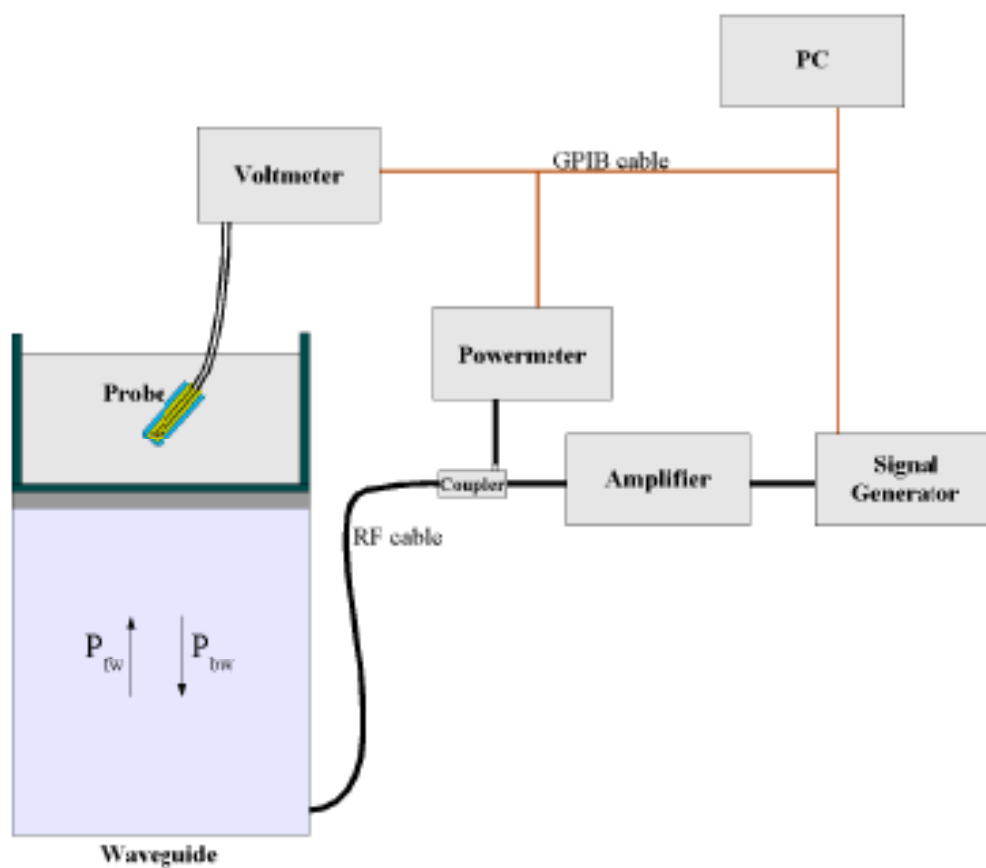
For the measurements the Specific Dosimetric E-Field Probe SN 37/08 EP80 with Following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 6.5 mm
- Distance between probe tip and sensor center: 2.5mm

- Distance between sensor center and the inner phantom surface: 4 mm
(repeatability better than +/- 1mm)
- Probe linearity: <0.25 dB
- Axial Isotropy: <0.25 dB
- Spherical Isotropy: <0.25 dB
- Calibration range: 835 to 2500MHz for head & body simulating liquid.

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

Probe calibration is realized, in compliance with CENELEC EN 62209 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the EN 622091 annex 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

l = 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/cm^2) 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/cm^2 .

4.3.3 Temperature Assessment Procedure

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulating 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:

δt = exposure time (30 seconds),

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

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.

Where:

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

σ = simulated tissue conductivity,

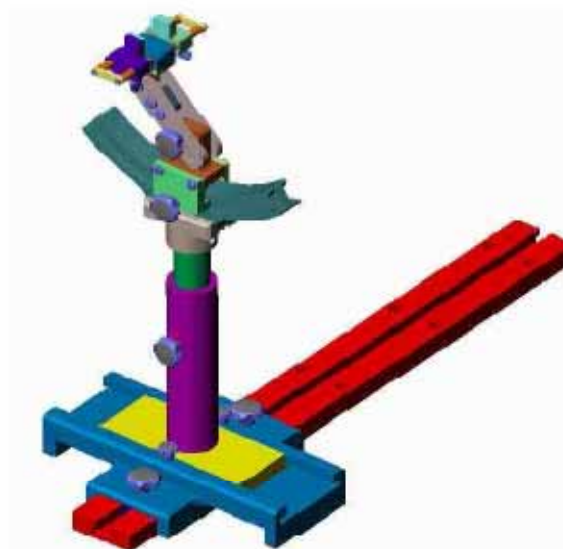
ρ = Tissue density (1.25 g/cm³ for brain tissue)

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 Middle than 1°.



Device holder

System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

5. TISSUE SIMULATING LIQUIDS

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in below table.

The following table gives the recipes for tissue simulating liquids

Frequency Band (MHz)	835.00	1900.00
Tissue Type	Body	Body
Ingredients (% by weight)		
Deionised Water	50.20	40.40
Salt(NaCl)	0.90	0.50
Sugar	48.50	58.00
Tween 20	0.00	0.00
HEC	0.20	1.00
Bactericide	0.20	0.10
Triton X-100	0.00	0.00
DGBE	0.00	0.00
Diethylenglycol monohexylether	0.00	0.00
Measured dielectric parameters		
Dielectric Constant	56.10	53.30
Conductivity (S/m)	0.95	1.52

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

Table 1: Dielectric Performance of Tissue Simulating Liquid

Temperature: 22.0~23.8°C, humidity: 54~60%.						
Date	Freq.(MHz)	Liquid Parameters	Meas.	Target	Delta(%)	Limit±(%)
2014/5/4	Body 835	Relative Permittivity(ϵ_r):	56.43	56.10	0.59	5
		Conductivity(σ):	0.97	0.95	2.11	5
2014/5/5	Body 1900	Relative Permittivity(ϵ_r):	53.18	53.30	-0.23	5
		Conductivity(σ):	1.50	1.52	-1.32	5

6. UNCERTAINTY ASSESSMENT

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

6.1 UNCERTAINTY EVALUATION FOR EUT SAR TEST

a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/ e	k
Uncertainty Component	Sec.	Tol (+-%)	Prob Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	4.76	N	1	1	1	4.76	4.7	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.0	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	0.7	0.7	1.62	1.6	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.5	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.8	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.5	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.0	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.7	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.1	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.7	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.1 5	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.0 3	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.8 9	∞
Test sample Related									
Test sample positioning	E.4.2. 1	0.03	N	1	1	1	0.03	0.0 3	N- 1
Device Holder Uncertainty	E.4.1. 1	5.00	N	1	1	1	5.00	5.0 0	N- 1
Output power Power drift -	6.6.2	4.04	R	$\sqrt{3}$	1	1	2.33	2.3	∞

SAR drift measurement								3	
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

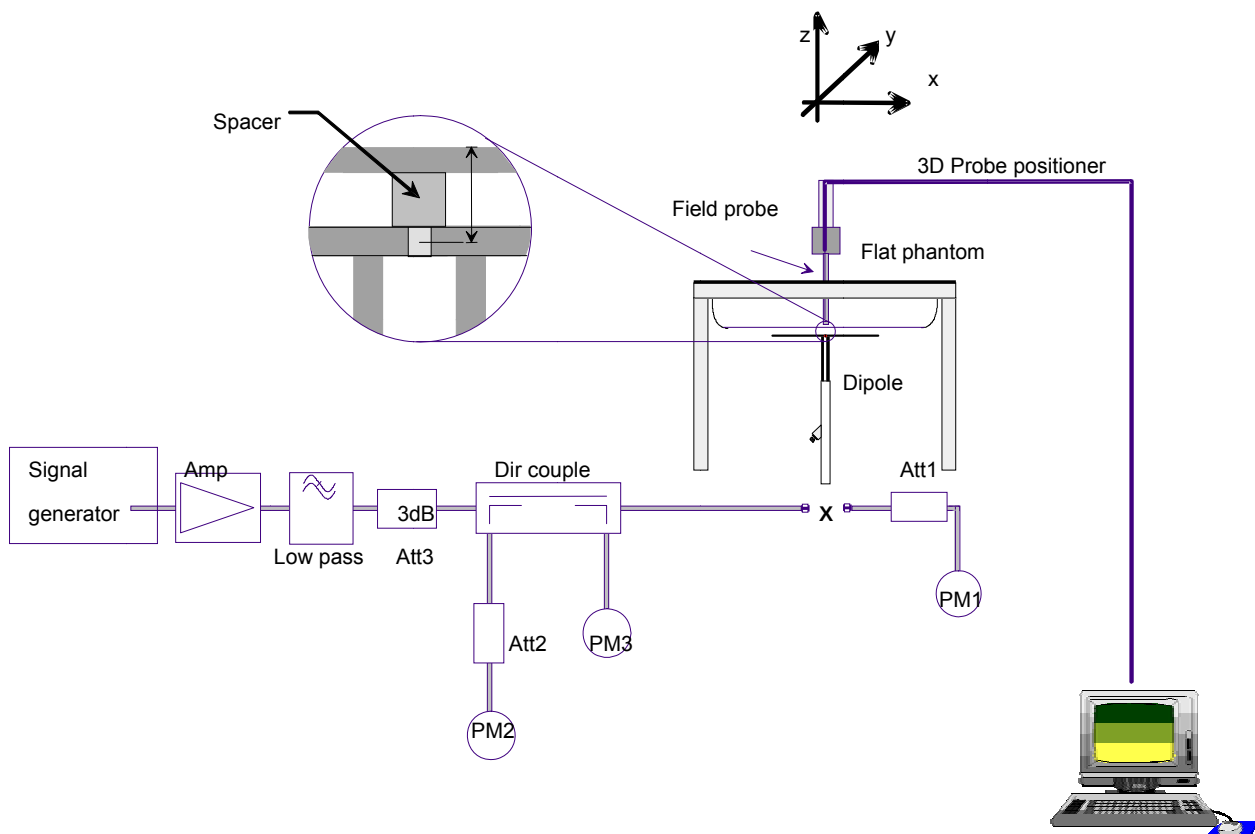
a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/ e	k
Uncertainty Component	Sec.	Tol (+-%)	Prob Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	4.76	N	1	1	1	4.76	4.7	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.0	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	0.7	0.7	1.62	1.6	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.5	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.8	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.5	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.0	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.7	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.1	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.7	∞

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. 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. The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below.



The validation dipole is placed beneath the flat phantom with the specific spacer in place. The distance spacer is touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The power meter PM1 measures the forward power at the location of the system check dipole connector. The signal generator is adjusted for the desired forward power (250 mW is used for 700 MHz to 3 GHz, 100 mW is used for 3.5 GHz to 6 GHz) at the dipole connector and the power meter PM2 is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2.

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(B)	1900MHz(B)
Target value (1g)	10.020 W/Kg	42.330 W/Kg
Test value (1g 250 mW input)	2.482 W/Kg (5.4)	9.908 W/Kg (5.5)
Normalized value (1g)	9.928 W/Kg	39.632 W/Kg

Note: System checks the specific test data please see page 69~72.

8. OPERATIONAL CONDITIONS DURING TEST

8.1 Body-worn Configurations

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

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.

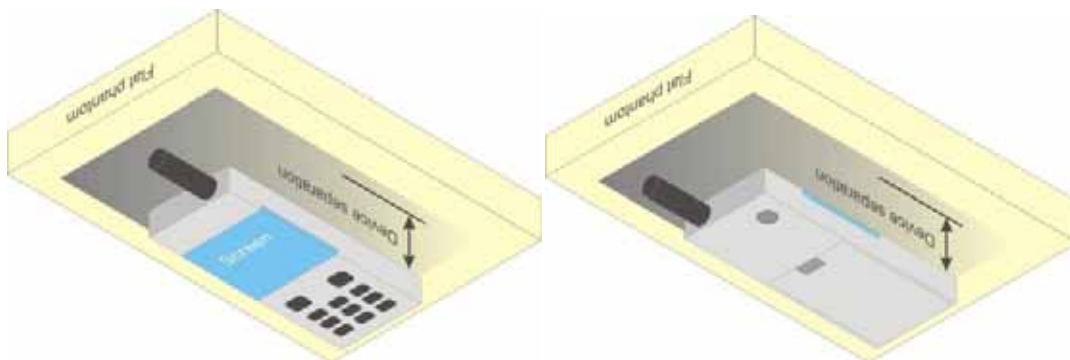


Illustration for Body Worn Position

8.2 Measurement procedure

The Following steps are used for each test position

1. 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.
2. Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
3. 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.
4. Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

8.3 Description of interpolation/extrapolation scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body.



The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.

9. MEASUREMENT OF CONDUCTED PEAK OUTPUT POWER

1. WCDMA Conducted peak output power

Item	band	WCDMA 850			WCDMA 1900		
	ARFCN	4132	4182	4233	9262	9400	9538
	subtest	dBm			dBm		
5.2(WCDMA)	non	23.30	22.84	22.80	24.11	24.45	23.85
HSDPA	1	23.30	22.75	22.74	24.11	24.45	23.76
	2	23.26	22.72	22.76	24.08	24.41	23.77
	3	22.81	22.23	22.19	23.55	23.86	23.24
	4	22.78	22.27	22.21	23.48	23.90	23.28
HSUPA	1	23.26	22.80	22.80	24.04	24.40	23.84
	2	21.24	20.82	20.72	22.10	22.37	21.86
	3	22.30	21.79	21.82	23.03	23.42	22.79
	4	21.22	20.80	20.84	22.08	23.39	21.82
	5	23.25	22.75	22.76	23.96	24.28	23.71
HSPA+	1	23.27	22.65	22.75	23.85	24.37	23.67
Note: The Conducted RF Output Power test of WCDMA /HSDPA /HSUPA/HSPA+ was tested by power meter.							

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	31.76	30.40	29.49	28.96
	190	836.6	31.80	30.44	29.53	29.00
	251	848.8	31.85	30.49	29.58	29.05
PCS 1900	512	1850.2	27.33	25.97	25.06	24.53
	661	1880.0	27.27	25.91	25.00	24.47
	810	1909.8	26.41	25.05	24.14	23.61

GPRS Time-based Average Power

Band	Channel	Frequency (MHz)	Output Power(dBm)			
			Slot 1	Slot 2	Slot 3	Slot 4
GSM 850	128	824.2	22.73	24.38	25.23	25.95
	190	836.6	22.77	24.42	25.27	25.99
	251	848.8	22.82	24.47	25.32	26.04
PCS 1900	512	1850.2	18.30	19.95	20.80	21.52
	661	1880.0	18.24	19.89	20.74	21.46
	810	1909.8	17.38	19.03	19.88	20.60

4. EGPRS Mode Conducted peak output power

Band	Channel	Frequency (MHz)	Output Power(dBm)			
			Slot 1	Slot 2	Slot 3	Slot 4
GSM 850	128	824.2	31.74	30.37	29.56	29.10
	190	836.6	31.83	30.46	29.65	29.19
	251	848.8	31.80	30.43	29.62	29.16
PCS 1900	512	1850.2	26.84	25.47	24.66	24.20
	661	1880.0	27.30	25.93	25.12	24.66
	810	1909.8	27.41	26.04	25.23	24.77

EGPRS Time-based Average Power

Band	Channel	Frequency (MHz)	Output Power(dBm)			
			Slot 1	Slot 2	Slot 3	Slot 4
GSM 850	128	824.2	22.71	24.35	25.3	26.09
	190	836.6	22.80	24.44	25.39	26.18
	251	848.8	22.77	24.41	25.36	26.15
PCS 1900	512	1850.2	17.81	19.45	20.4	21.19
	661	1880.0	18.27	19.91	20.86	21.65
	810	1909.8	18.38	20.02	20.97	21.76

Timeslot consignations:

No. Of Slots	Slot 1	Slot 2	Slot 3	Slot 4
Slot Consignation	1Up4Down	2Up2Down	3Up2Down	4Up1Down
Duty Cycle	1:8	1:2	1:2.67	1:2
Correct Factor	-9.03dB	-6.02dB	-4.26dB	-3.01dB

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	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g
Body (5mm Separation)	EDGE	Horizontal-Up	190	0.200	1.074	0.215
		Horizontal-Down		0.233		0.250
		Vertical-Front		0.101		0.108
		Vertical-Back		0.080		0.086
	GPRS	Horizontal-Down	251	0.258	1.109	0.286

Summary of Measurement Results (GSM 1900MHz Band)

Temperature: 21.0~23.8°C, humidity: 54~60%.						
Phantom Configurations		Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g
Body (5mm Separation)	EDGE	Horizontal-Up	512	0.905	1.202	1.088
		Horizontal-Up	661	0.936	1.081	1.012
		Horizontal-Up	810	0.808	1.054	0.852
		Horizontal-Down	810	0.742	1.054	0.782
		Vertical-Front		0.355		0.374
		Vertical-Back		0.497		0.524
	GPRS	Horizontal-Up	512	0.561	1.114	0.625

Note:

1. GPRS/EDGE test Scenario (Based on the Max. Time-based Average Power)

Band	Channel	Slots	Power level	Duty Cycle
GPRS850	251	4	5	1:2
EDGE850	190	4	5	1:2
GPRS1900	512	4	0	1:2
EDGE1900	810	4	0	1:2

Summary of Measurement Results (WCDMA 850MHz Band)

Temperature: 21.0~23.8°C, humidity: 54~60%.					
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g
Body (5mm Separation)	Horizontal-Up	4132	0.143	1.047	0.150
	Horizontal-Down		0.161		0.169
	Vertical-Front		0.058		0.061
	Vertical-Back		0.054		0.057

Summary of Measurement Results (WCDMA 1900MHz Band)

Temperature: 21.0~23.8°C, humidity: 54~60%.					
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g
Body (5mm Separation)	Horizontal-Up	9400	0.745	1.012	0.754
	Horizontal-Down		0.677		0.685
	Vertical-Front		0.264		0.267
	Vertical-Back		0.357		0.361

Note:

- When the 1-g SAR for the mid-band channel or the channel with the Highest output power satisfy the following 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
- The WCDMA mode is test with 12.2kbps RMC and TPC set to all "1", if maximum SAR for 12.2kbps RMC is $\leq 75\%$ of the SAR limit (i.e. 1.2W/Kg 1g) and maximum average output of each RF channel with HSDPA/HSUPA/HSPA+ active is less than 1/4 dB Middle than that measured without HSDPA/HSUPA/HSPA+ using 12.2kbps RMC, according to KDB 941225D01v02, SAR is not required for this handset with HSPA capabilities.

3. Scaling Factor calculation

Band	Tune-up power tolerance (dBm)	SAR test channel Power (dBm)	Scaling Factor
GPRS 850	PCL = 5, PWR =29+-0.5(4 slots)	29.05	1.109
EDGE 850	PCL = 5, PWR =29+-0.5(4 slots)	29.19	1.074
GPRS 1900	PCL=0, PWR= 24.5+-0.5(4 slots)	24.53	1.114
EDGE 1900	PCL=0, PWR= 24.5+-0.5(4 slots)	24.20	1.202
		24.66	1.081
		24.77	1.054
WCDMA 850	Max output power =22.5(+1/-2)	23.30	1.047
WCDMA 1900	Max output power =23.5 (+1/-2)	24.45	1.012

ANNEX A GRAPH TEST RESULTS

BAND	PARAMETERS
<u>GSM850</u>	<u>Measurement 1:</u> Flat Plane with Body device position on Middle Channel in EDGE mode <u>Measurement 2:</u> Flat Plane with Body device position on Middle Channel in EDGE mode <u>Measurement 3:</u> Flat Plane with Body device position on Middle Channel in EDGE mode <u>Measurement 4:</u> Flat Plane with Body device position on Middle Channel in EDGE mode <u>Measurement 5:</u> Flat Plane with Body device position on High Channel in GPRS mode
<u>GSM1900</u>	<u>Measurement 6:</u> Flat Plane with Body device position on Low Channel in EDGE mode <u>Measurement 7:</u> Flat Plane with Body device position on Middle Channel in EDGE mode <u>Measurement 8:</u> Flat Plane with Body device position on High Channel in EDGE mode <u>Measurement 9:</u> Flat Plane with Body device position on High Channel in EDGE mode <u>Measurement 10:</u> Flat Plane with Body device position on High Channel in EDGE mode <u>Measurement 11:</u> Flat Plane with Body device position on High Channel in EDGE mode <u>Measurement 12:</u> Flat Plane with Body device position on Low Channel in GPRS mode
<u>WCDMA 850</u>	<u>Measurement 13:</u> Flat Plane with Body device position on Low Channel in WCDMA mode <u>Measurement 14:</u> Flat Plane with Body device position on Low Channel in WCDMA mode <u>Measurement 15:</u> Flat Plane with Body device position on Low Channel in WCDMA mode <u>Measurement 16:</u> Flat Plane with Body device position on Low Channel in WCDMA mode
<u>WCDMA 1900</u>	<u>Measurement 17:</u> Flat Plane with Body device position on Middle Channel in WMA mode <u>Measurement 18:</u> Flat Plane with Body device position on Middle Channel in WCMA mode

	<u>Measurement 19:</u> Flat Plane with Body device position on Middle Channel in WCDMA mode <u>Measurement 20:</u> Flat Plane with Body device position on Middle Channel in WCMA mode
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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: 2014.5.4

Measurement duration: 9 minutes 33 seconds

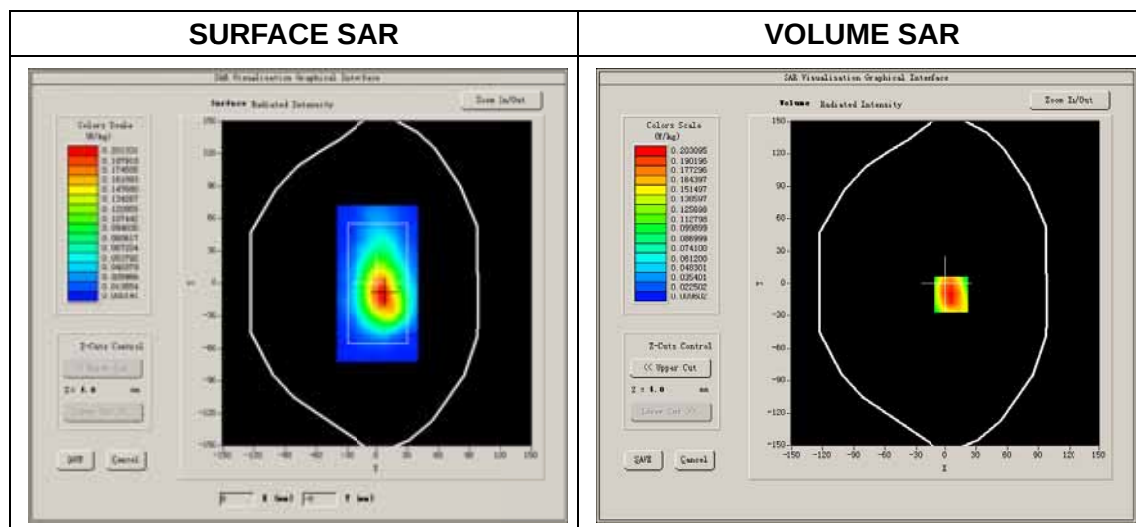
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM850
Channels	Middle
Signal	EDGE

B. SAR Measurement Results

Middle Band SAR (Channel 190):

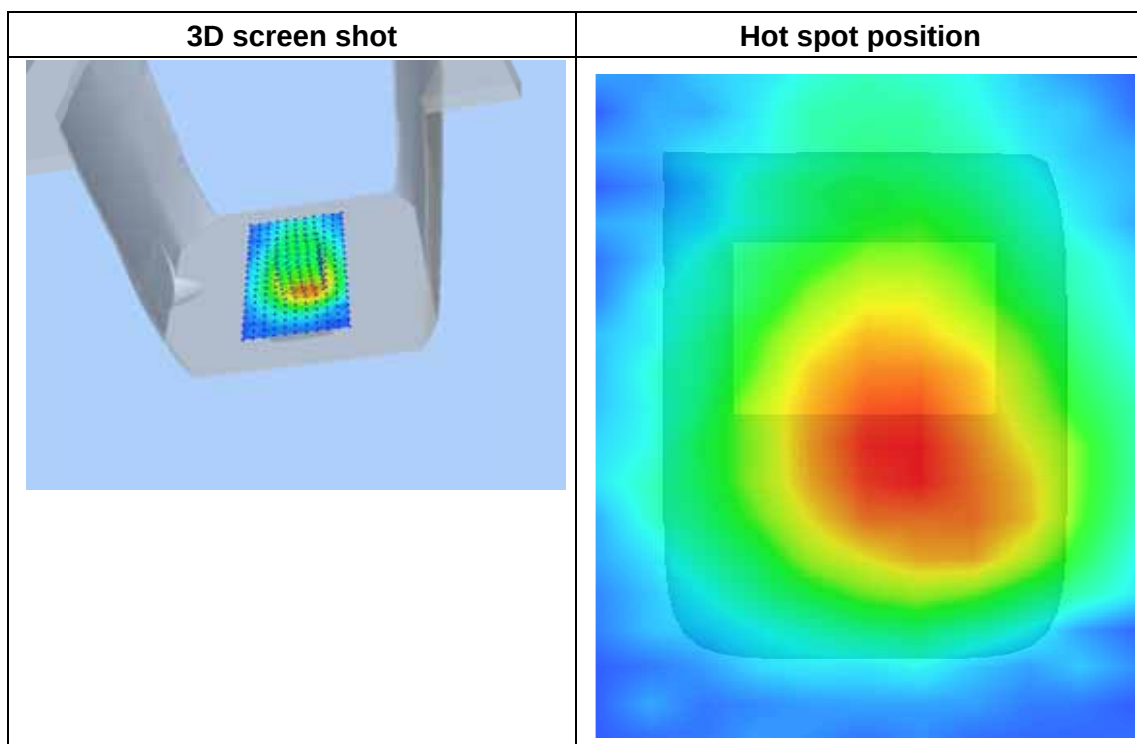
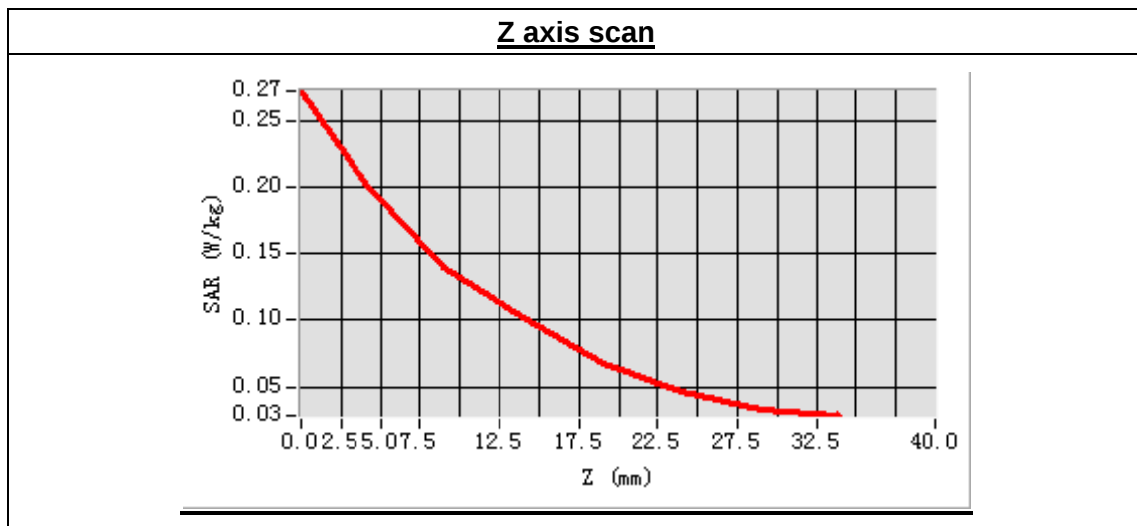
Frequency (MHz)	836.600000
Relative permittivity (real part)	56.430942
Conductivity (S/m)	0.973481
Power drift(%)	-2.470000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.99
Crest factor:	1:2



Maximum location: X=6.00, Y=-10.00

SAR Peak: 0.30 W/kg

SAR 10g (W/Kg)	0.125454
SAR 1g (W/Kg)	0.200448



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: 2014.5.4

Measurement duration: 9 minutes 33 seconds

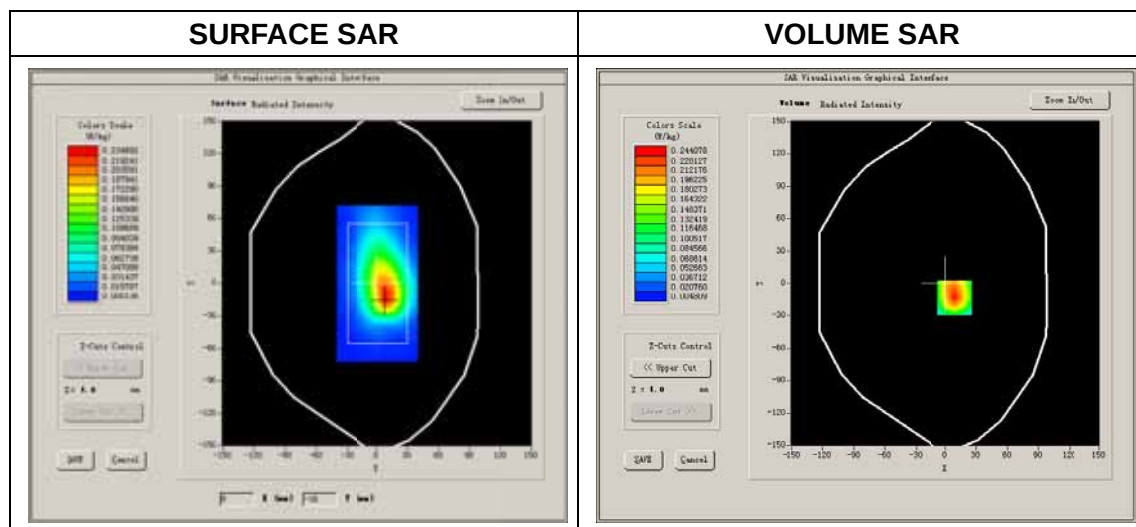
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM850
Channels	Middle
Signal	EDGE

B. SAR Measurement Results

Middle Band SAR (Channel 190):

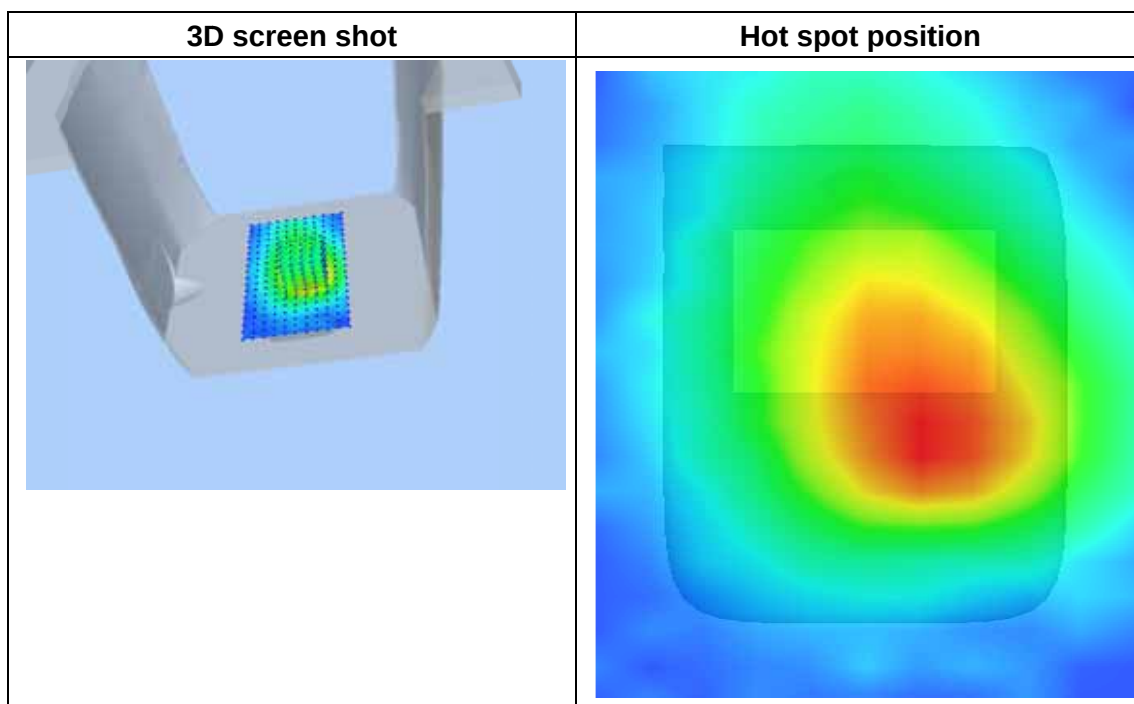
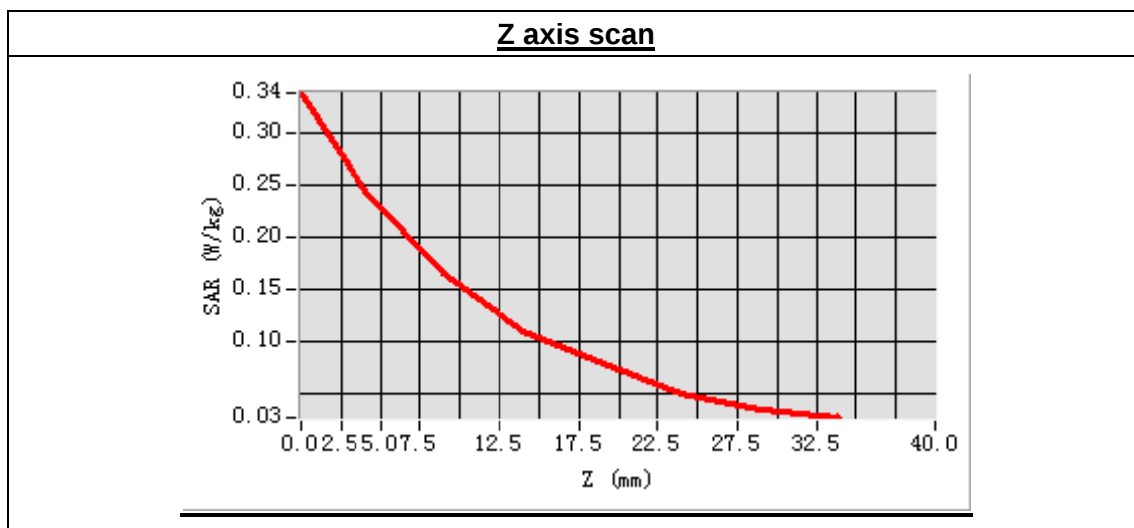
Frequency (MHz)	836.600000
Relative permittivity (real part)	56.430942
Conductivity (S/m)	0.973481
Power drift(%)	-0.560000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.99
Crest factor:	1:2



Maximum location: X=9.00, Y=-13.00

SAR Peak: 0.35 W/kg

SAR 10g (W/Kg)	0.142101
SAR 1g (W/Kg)	0.232804



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: 2014.5.4

Measurement duration: 9 minutes 35 seconds

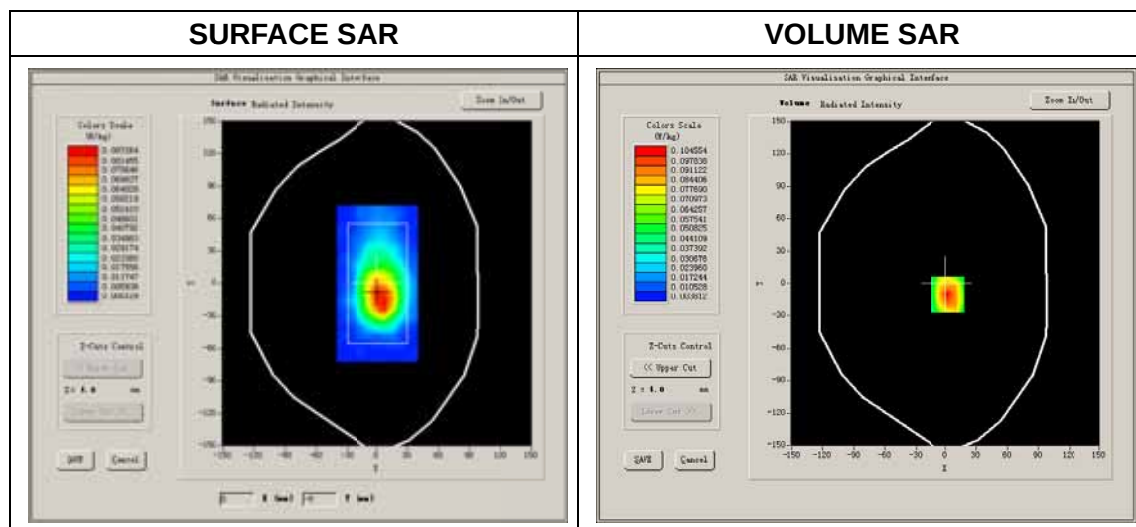
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM850
Channels	Middle
Signal	EDGE

B. SAR Measurement Results

Middle Band SAR (Channel 190):

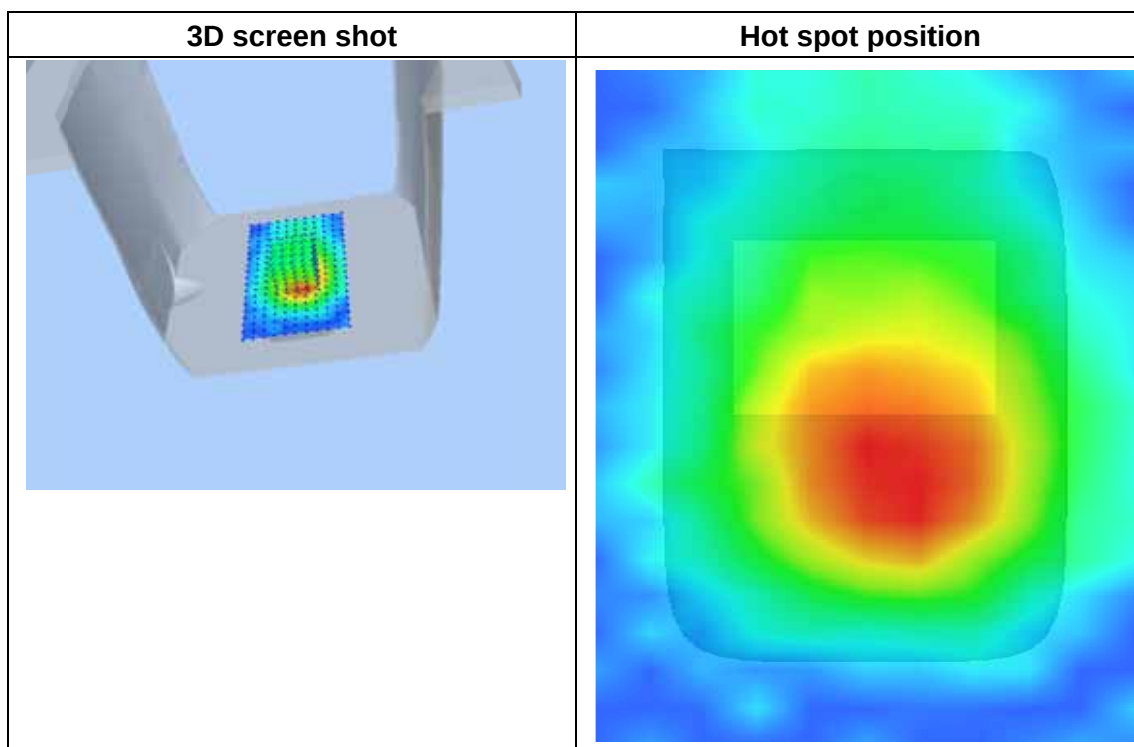
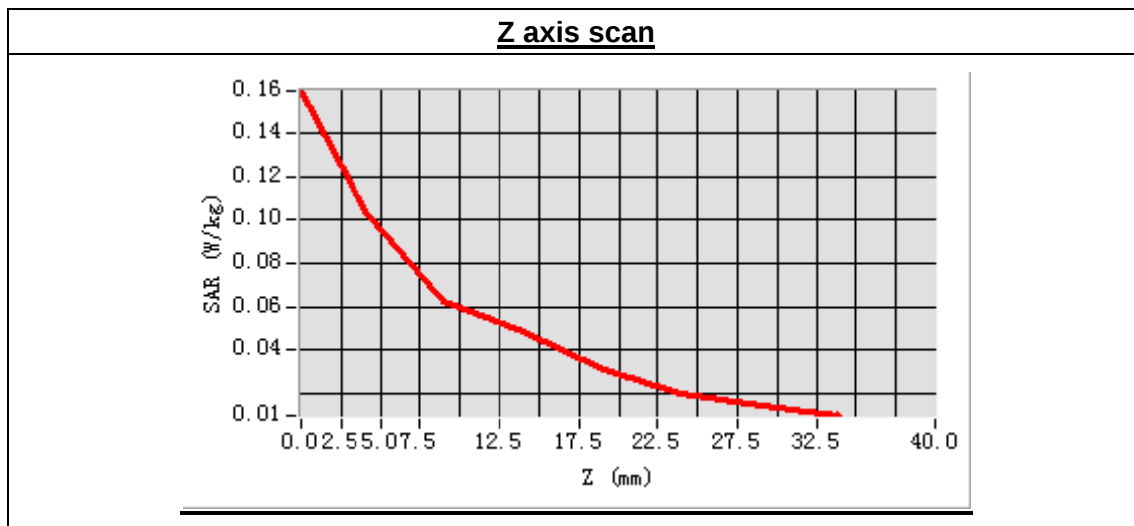
Frequency (MHz)	836.600000
Relative permittivity (real part)	56.430942
Conductivity (S/m)	0.973481
Power drift(%)	3.830000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.99
Crest factor:	1:2



Maximum location: X=2.00, Y=-10.00

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.059247
SAR 1g (W/Kg)	0.100876



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: 2014.5.4

Measurement duration: 9 minutes 34 seconds

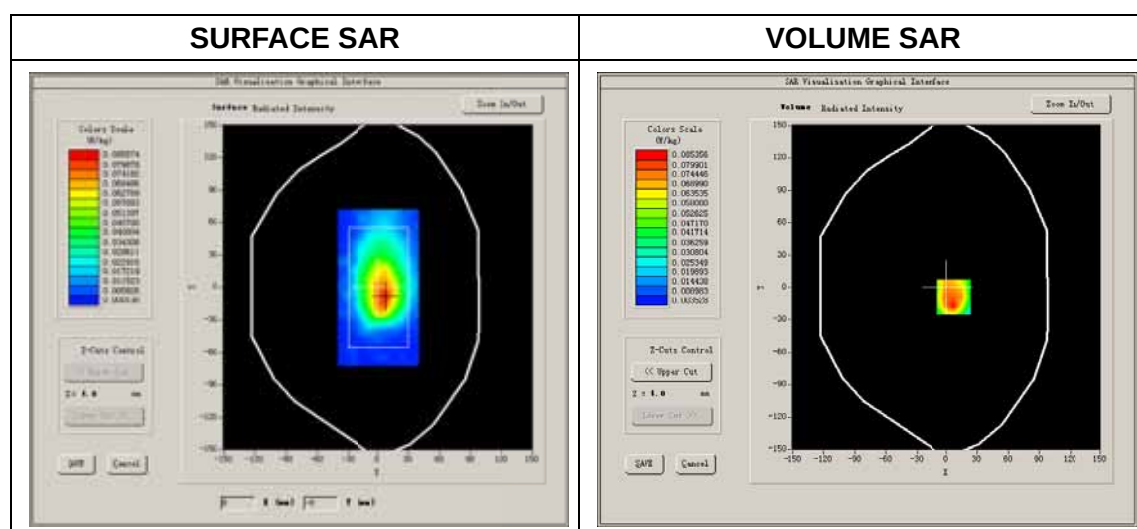
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM850
Channels	Middle
Signal	EDGE

B. SAR Measurement Results

Middle Band SAR (Channel 190):

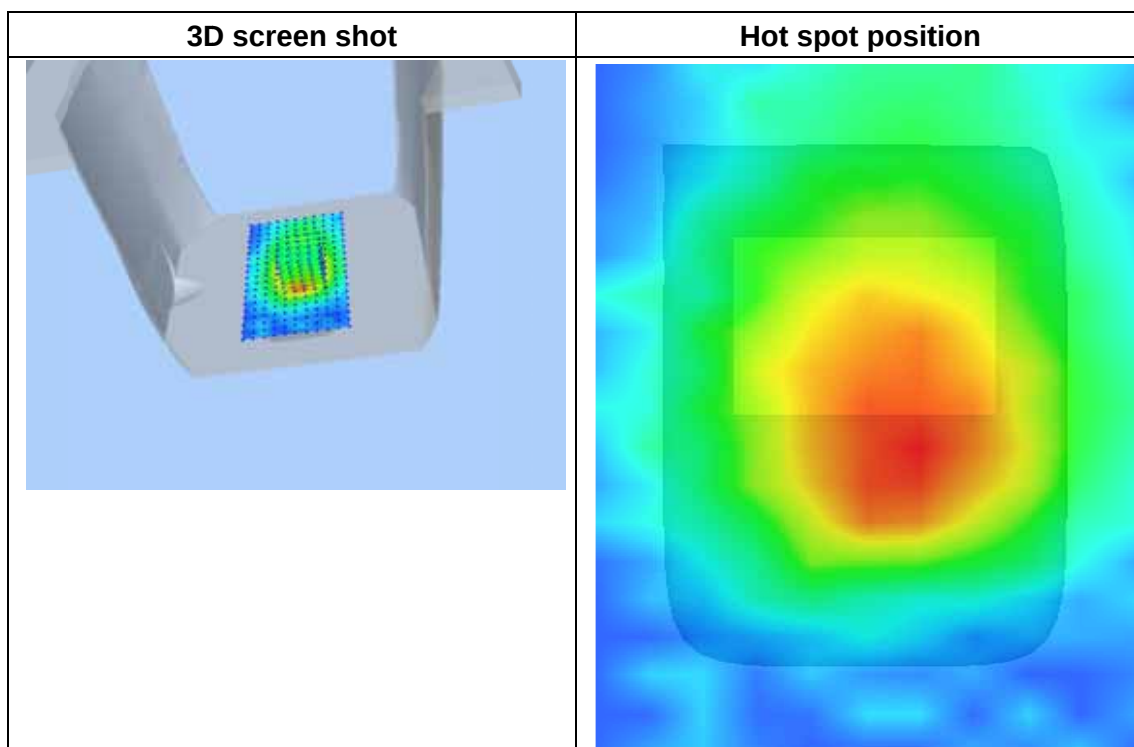
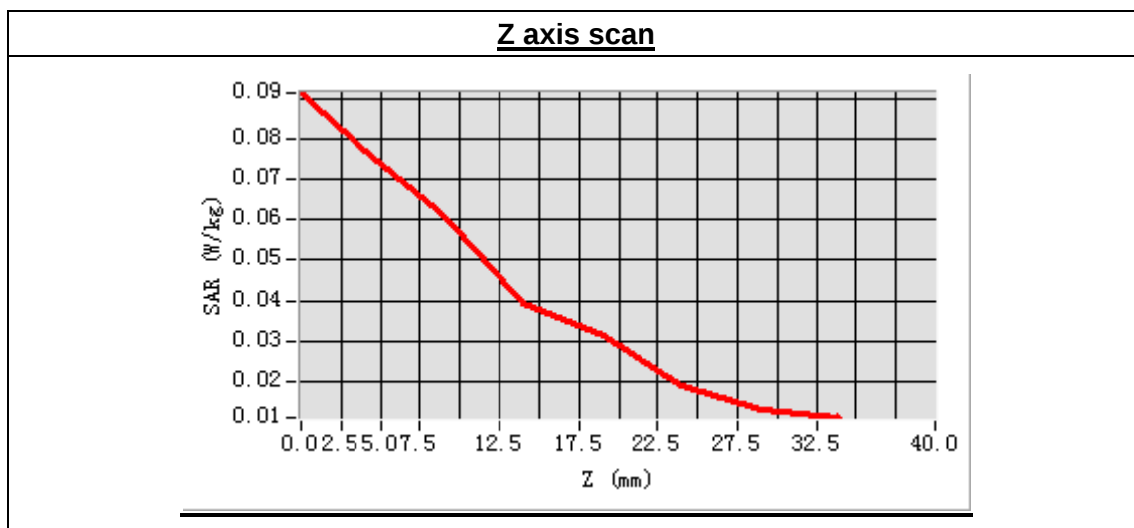
Frequency (MHz)	836.600000
Relative permittivity (real part)	56.430942
Conductivity (S/m)	0.973481
Power drift(%)	-3.410000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.99
Crest factor:	1:2



Maximum location: X=7.00, Y=-9.00

SAR Peak: 0.12 W/kg

SAR 10g (W/Kg)	0.050457
SAR 1g (W/Kg)	0.080089



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: 2014.5.4

Measurement duration: 9 minutes 35 seconds

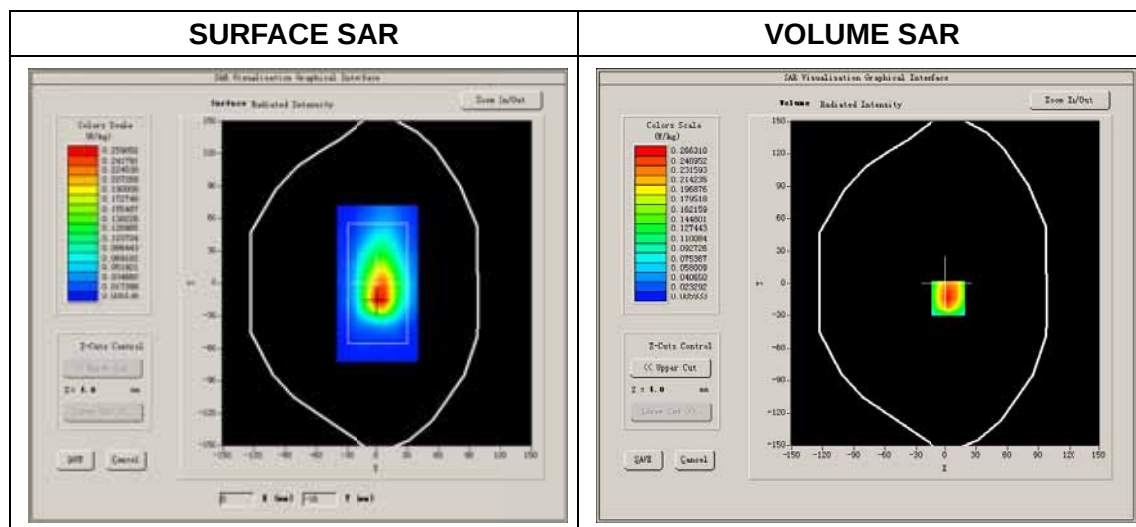
A. Experimental conditions.

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

B. SAR Measurement Results

High Band SAR (Channel 251):

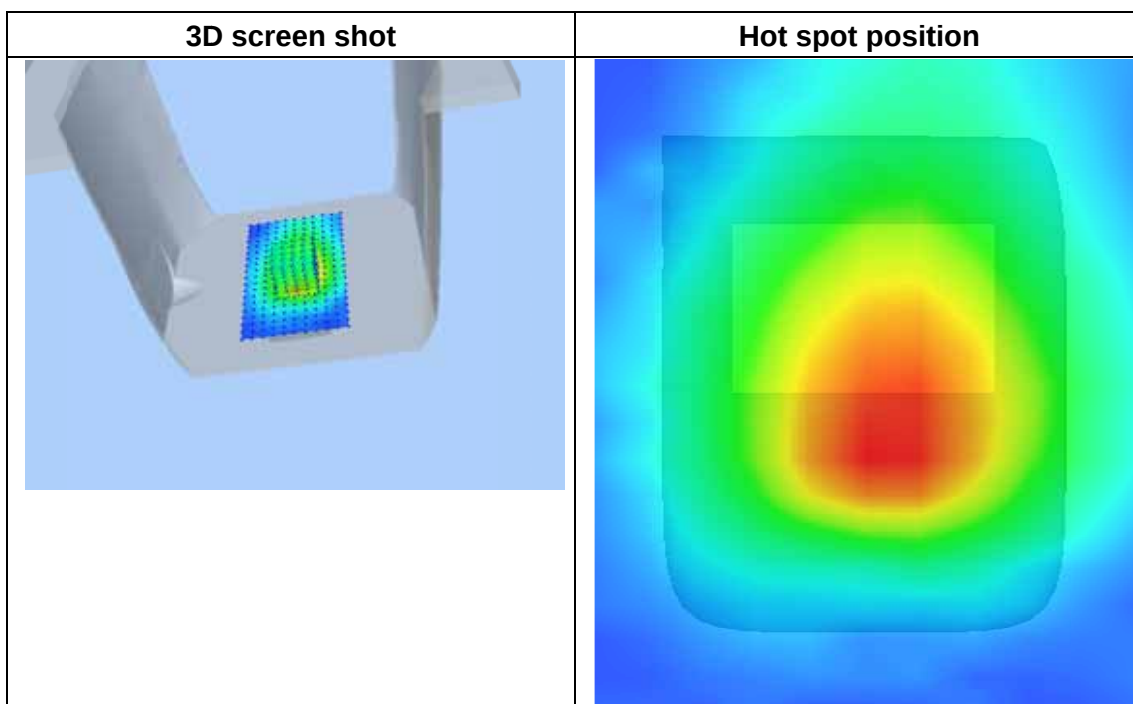
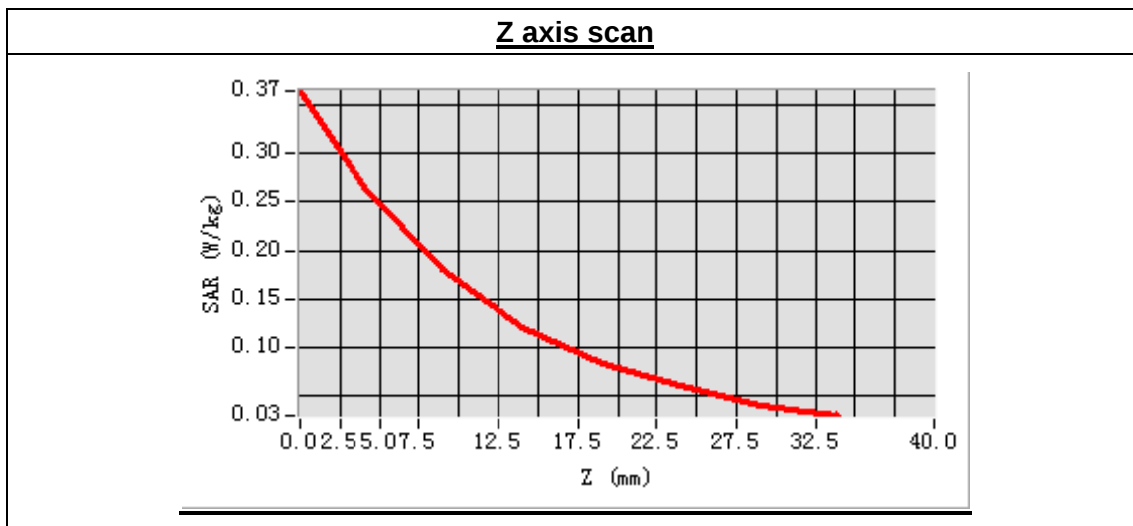
Frequency (MHz)	848.800000
Relative permittivity (real part)	56.430942
Conductivity (S/m)	0.973481
Power drift(%)	1.600000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.99
Crest factor:	1:2



Maximum location: X=3.00, Y=-14.00

SAR Peak: 0.39 W/kg

SAR 10g (W/Kg)	0.156946
SAR 1g (W/Kg)	0.257883



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: 2014.5.5

Measurement duration: 9 minutes 37 seconds

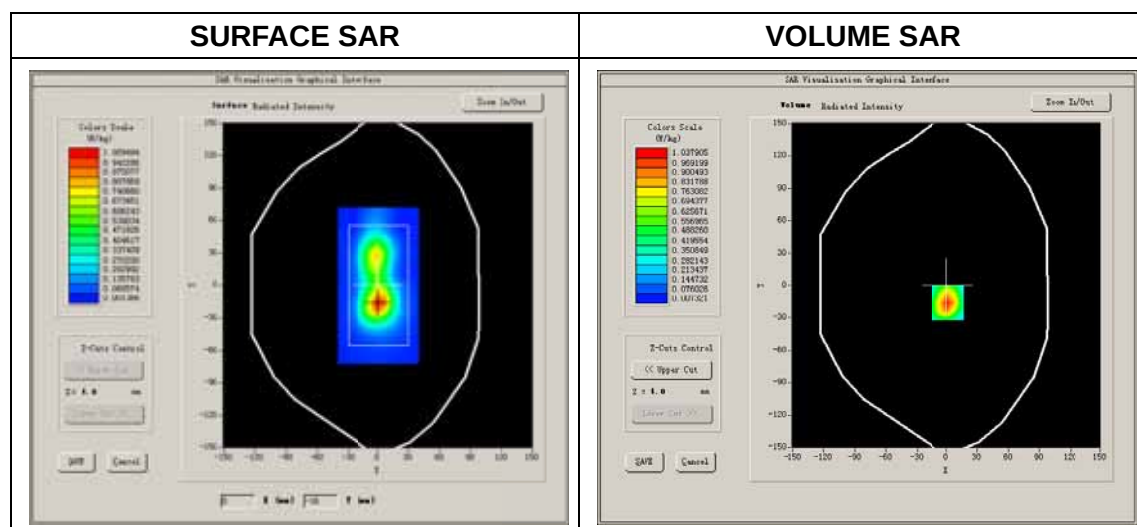
A. Experimental conditions.

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

B. SAR Measurement Results

Low Band SAR (Channel 512):

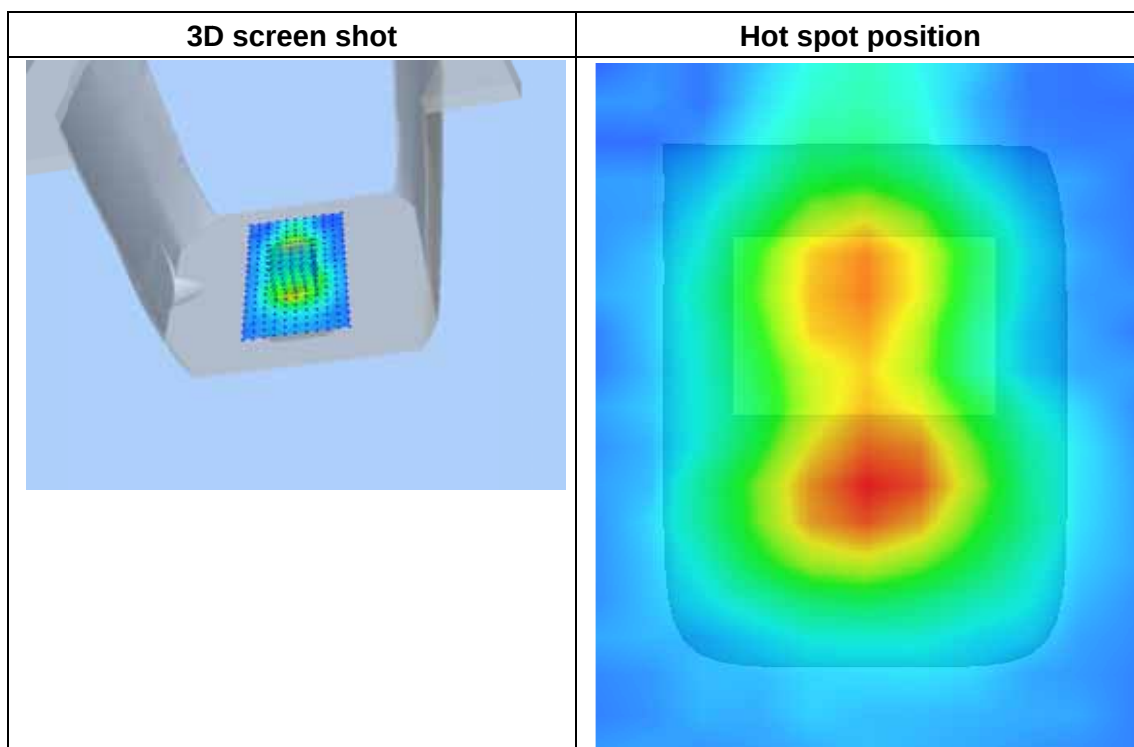
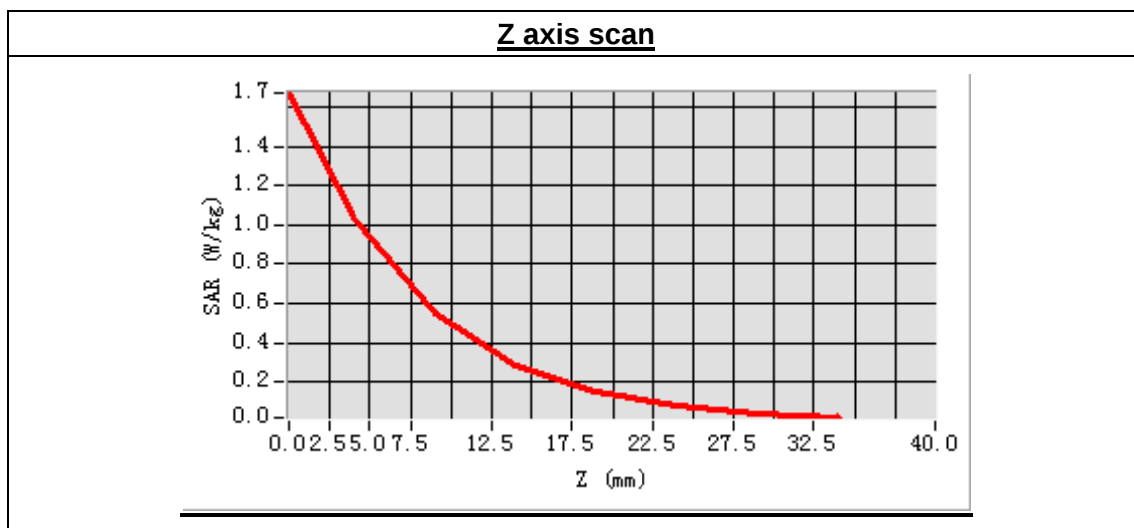
Frequency (MHz)	1850.200000
Relative permittivity (real part)	53.183720
Conductivity (S/m)	1.496482
Power drift(%)	0.200000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.17
Crest factor:	1:2



Maximum location: X=1.00, Y=-16.00

SAR Peak: 1.71 W/kg

SAR 10g (W/Kg)	0.476991
SAR 1g (W/Kg)	0.904594



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: 2014.5.5

Measurement duration: 9 minutes 34 seconds

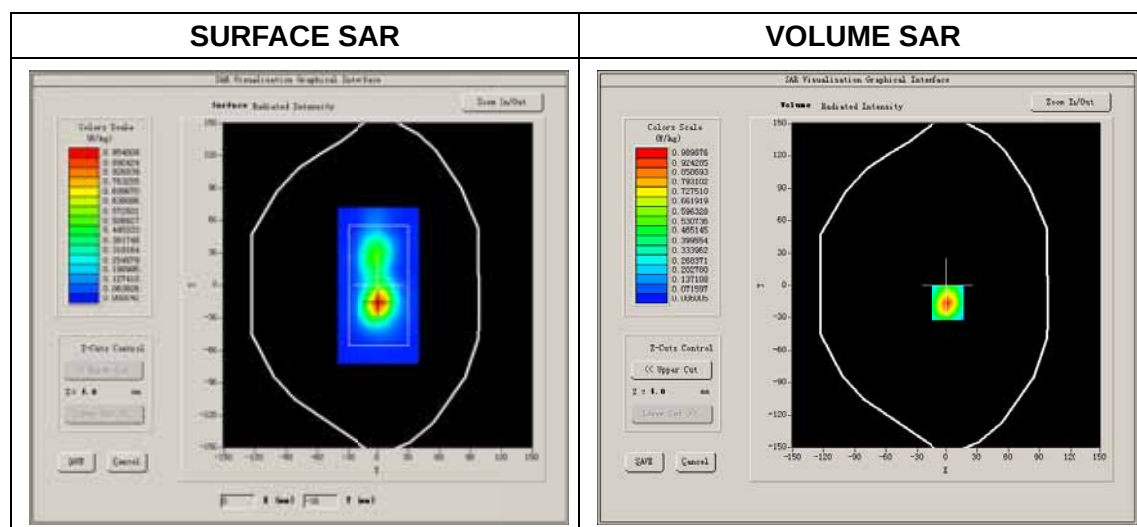
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM1900
Channels	Middle
Signal	EDGE

B. SAR Measurement Results

Middle Band SAR (Channel 661):

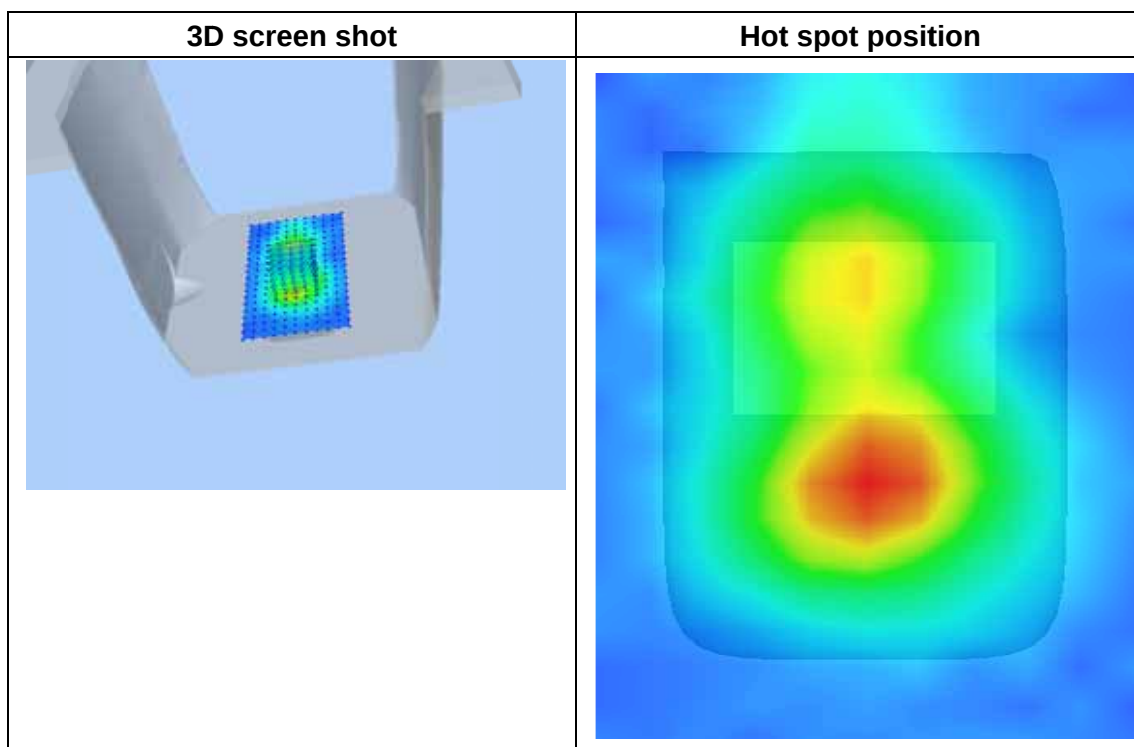
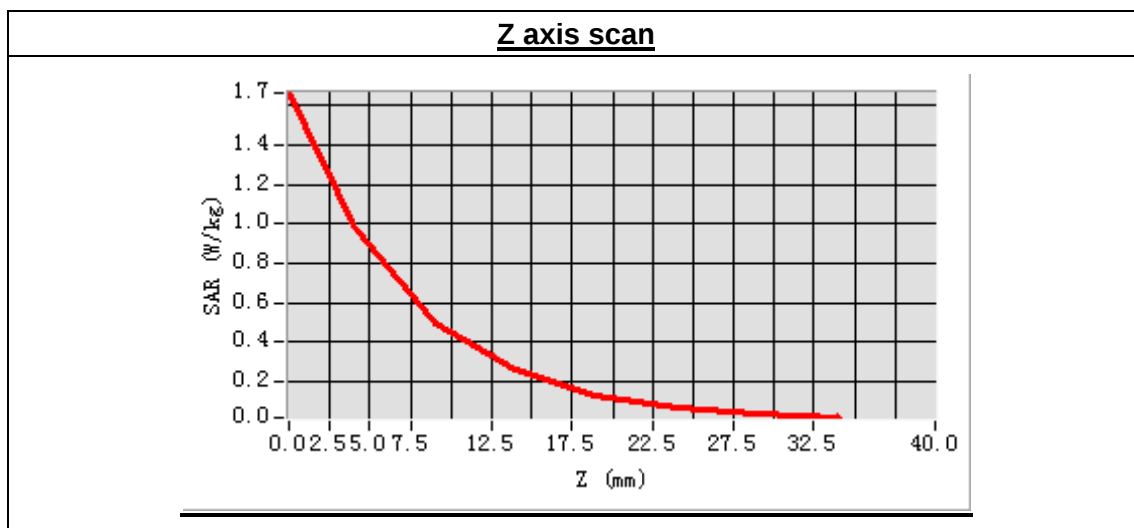
Frequency (MHz)	1880.000000
Relative permittivity (real part)	53.183720
Conductivity (S/m)	1.496482
Power drift(%)	0.400000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.17
Crest factor:	1:2



Maximum location: X=1.00, Y=-16.00

SAR Peak: 1.67 W/kg

SAR 10g (W/Kg)	0.432441
SAR 1g (W/Kg)	0.935700



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: 2014.5.5

Measurement duration: 9 minutes 36 seconds

A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM1900
Channels	High
Signal	EDGE

B. SAR Measurement Result

High Band SAR (Channel 810):

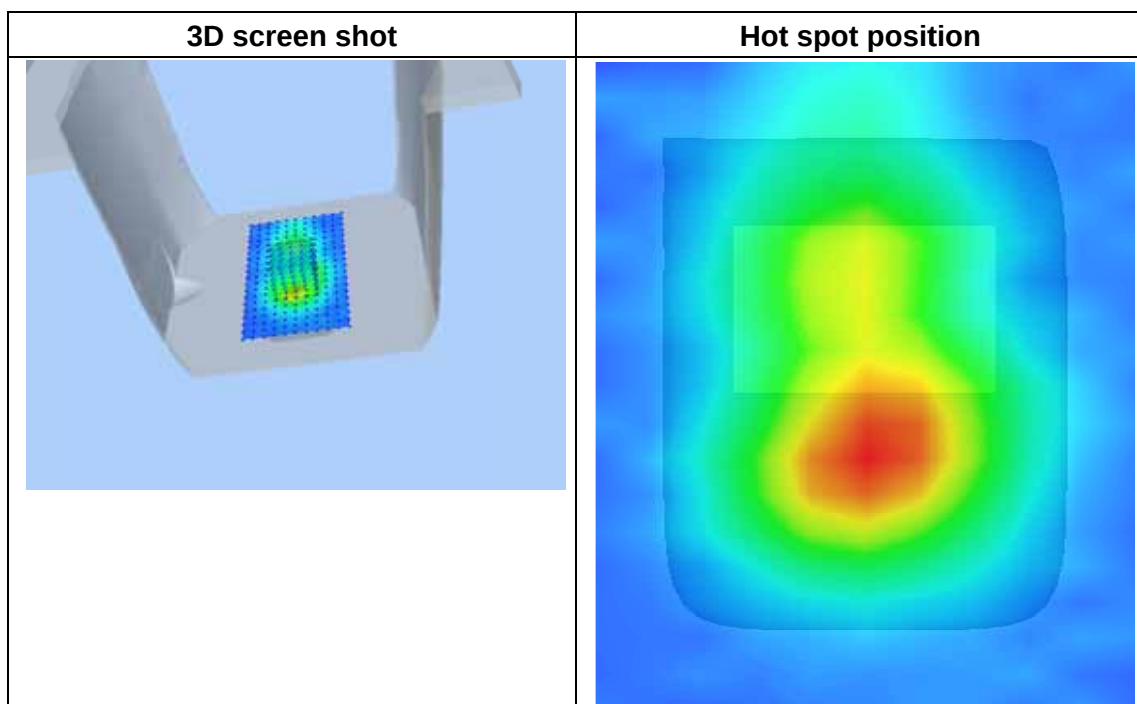
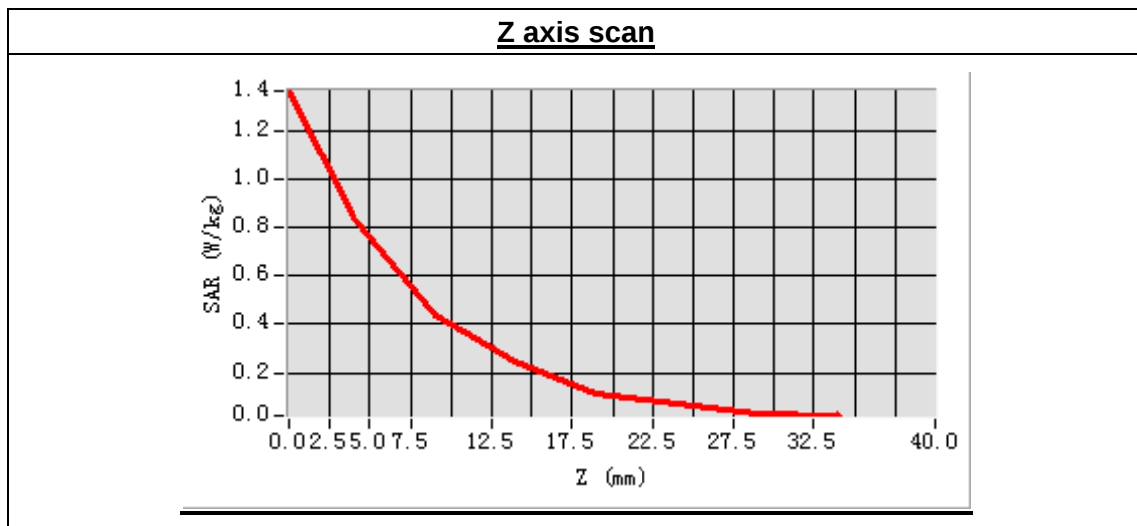
Frequency (MHz)	1909.800000
Relative permittivity (real part)	53.183720
Conductivity (S/m)	1.496482
Power drift(%)	2.000000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.17
Crest factor:	1:2



Maximum location: X=1.00, Y=-15.00

SAR Peak: 1.37 W/kg

SAR 10g (W/Kg)	0.394284
SAR 1g (W/Kg)	0.807537



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: 2014.5.5

Measurement duration: 9 minutes 38 seconds

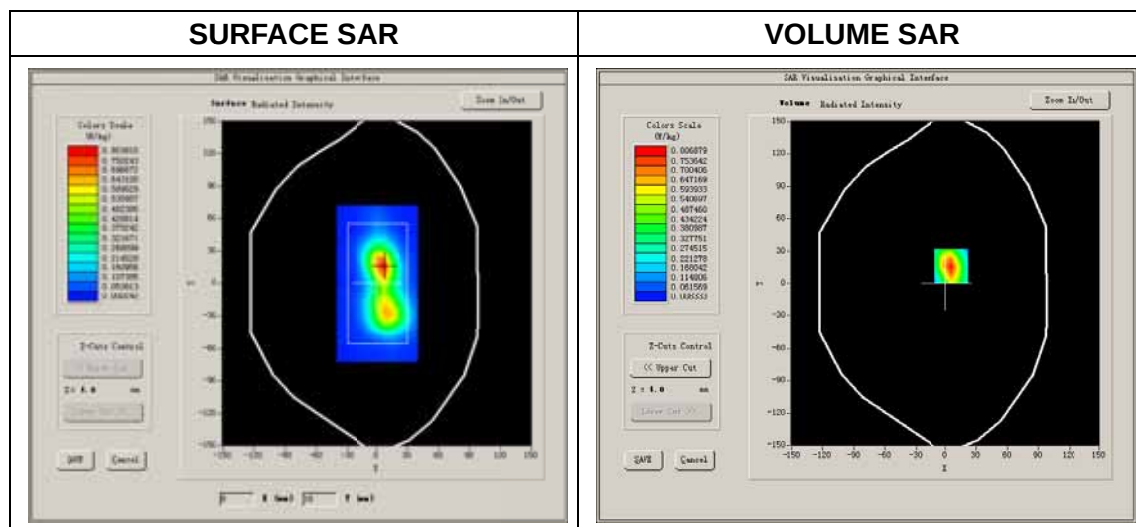
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM1900
Channels	High
Signal	EDGE

B. SAR Measurement Results

High Band SAR (Channel 810):

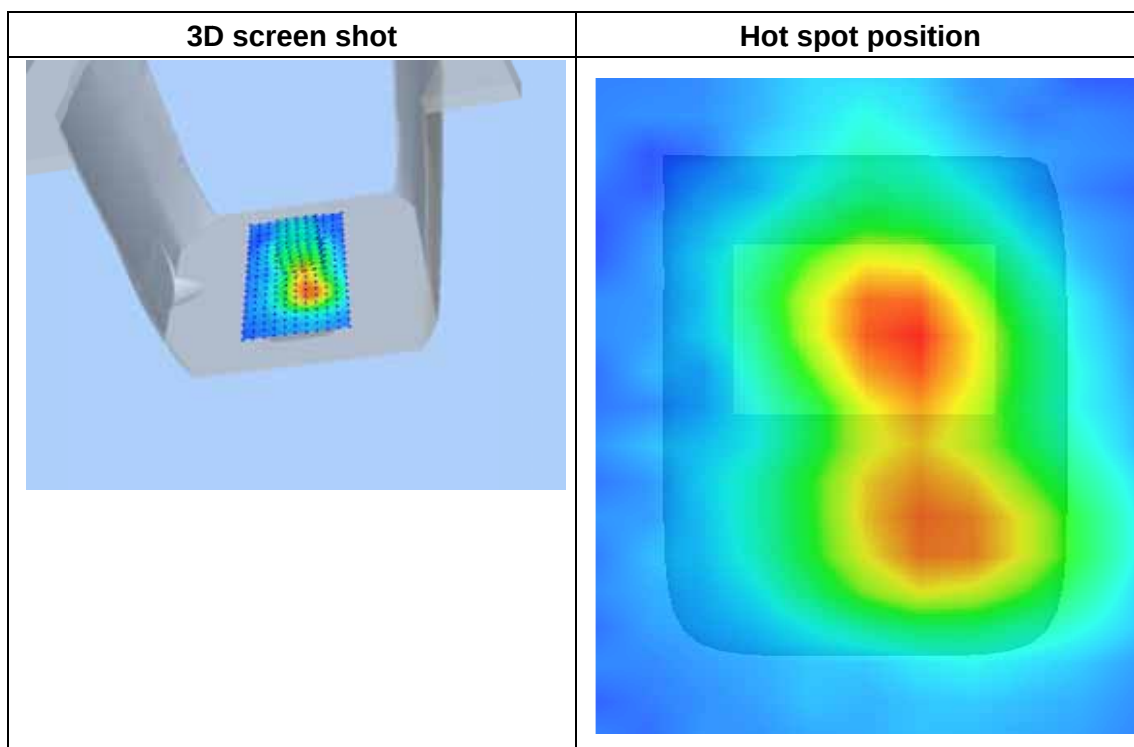
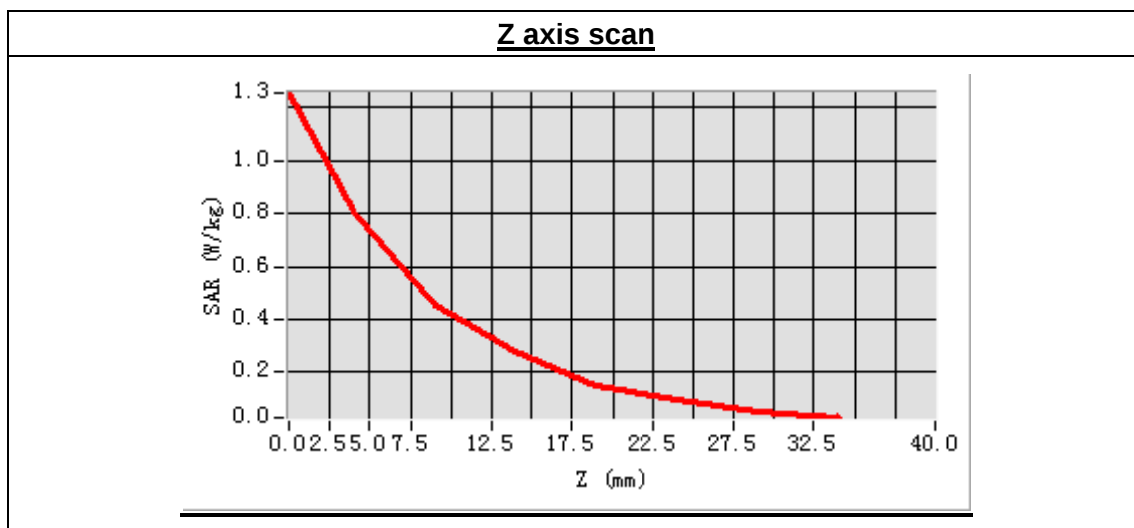
Frequency (MHz)	1909.800000
Relative permittivity (real part)	53.183720
Conductivity (S/m)	1.496482
Power drift(%)	1.580000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.17
Crest factor:	1:2



Maximum location: X=6.00, Y=16.00

SAR Peak: 1.26 W/kg

SAR 10g (W/Kg)	0.388626
SAR 1g (W/Kg)	0.741565



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: 2014.5.5

Measurement duration: 9 minutes 37 seconds

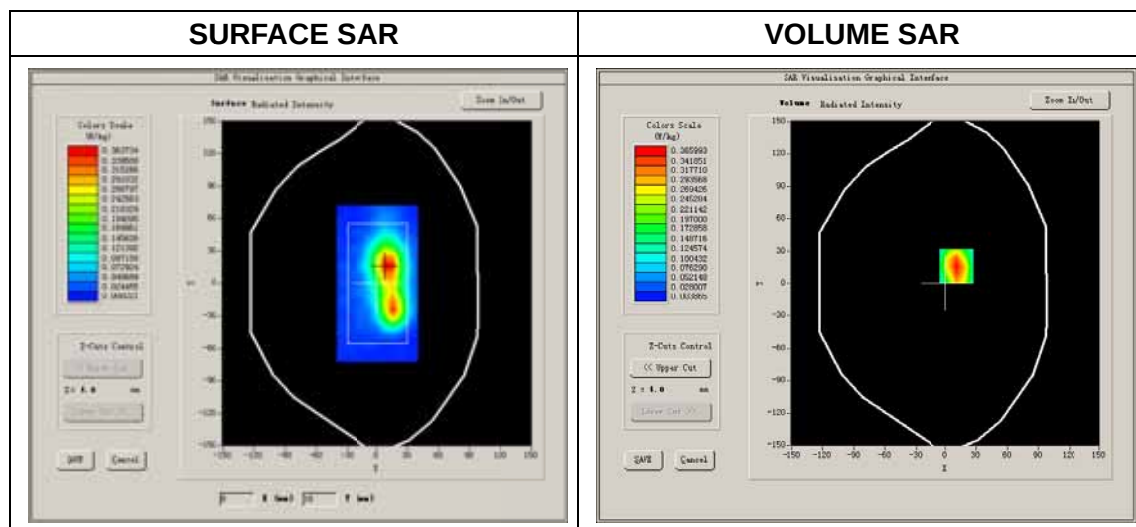
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM1900
Channels	High
Signal	EDGE

B. SAR Measurement Results

High Band SAR (Channel 810):

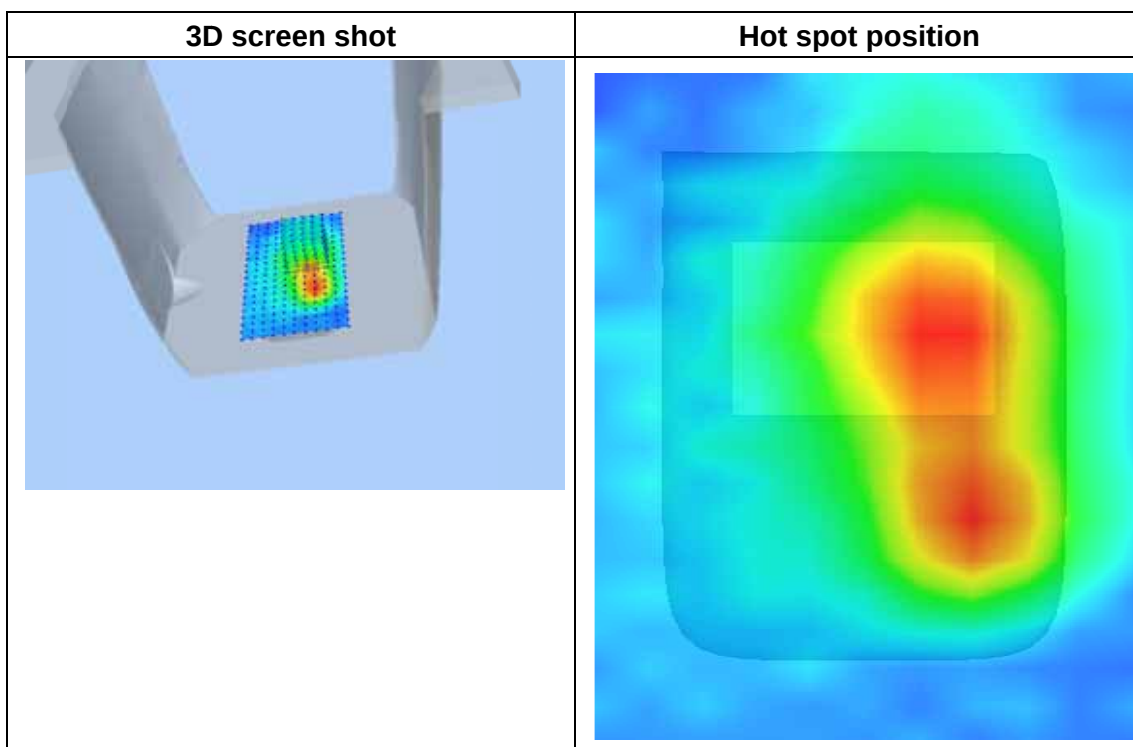
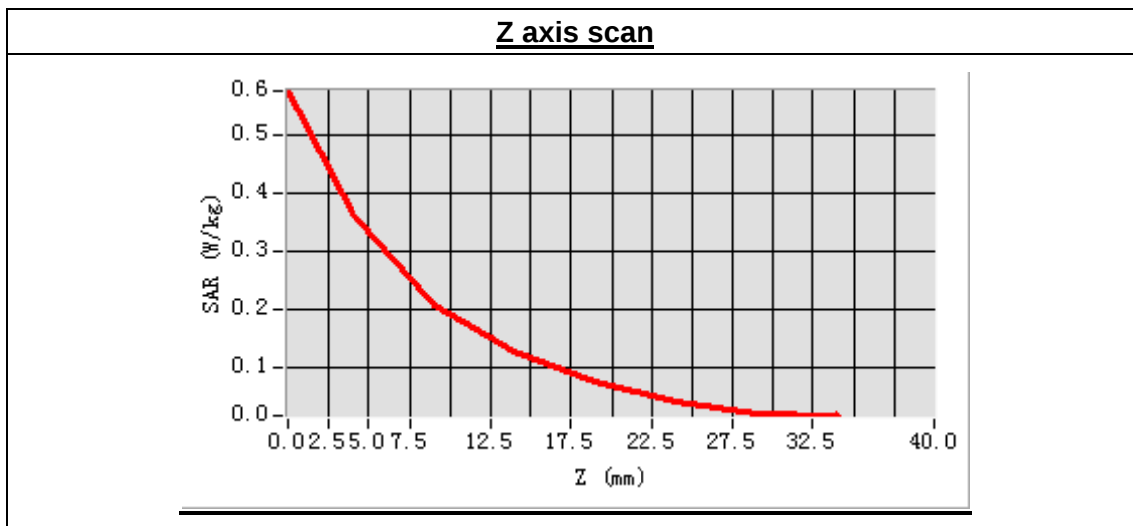
Frequency (MHz)	1909.800000
Relative permittivity (real part)	53.183720
Conductivity (S/m)	1.496482
Power drift(%)	-3.270000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.17
Crest factor:	1:2



Maximum location: X=11.00, Y=16.00

SAR Peak: 0.58 W/kg

SAR 10g (W/Kg)	0.186358
SAR 1g (W/Kg)	0.355411



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: 2014.5.5

Measurement duration: 9 minutes 36 seconds

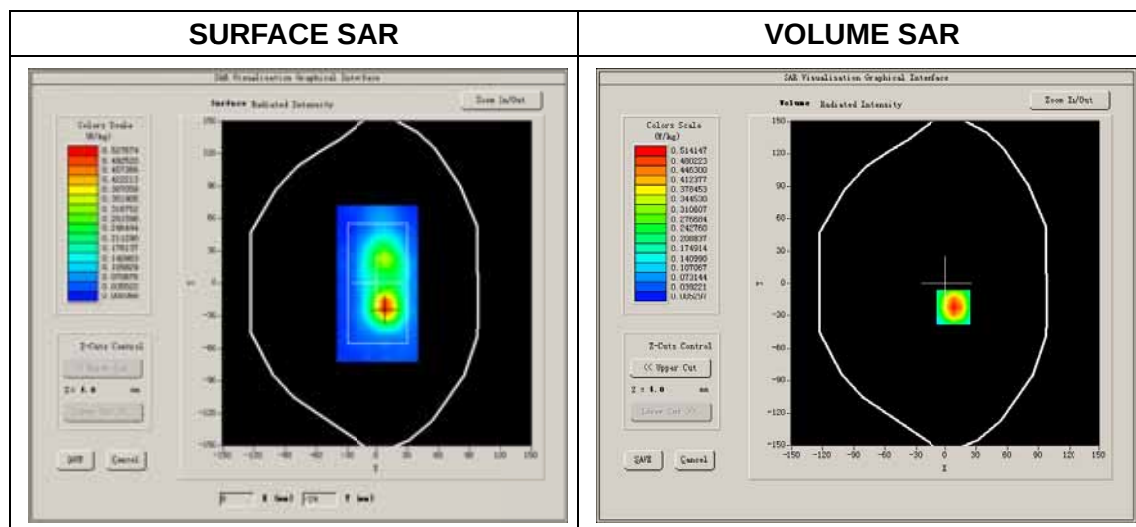
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat Plane
Device Position	Body
Band	GSM1900
Channels	High
Signal	EDGE

B. SAR Measurement Results

High Band SAR (Channel 810):

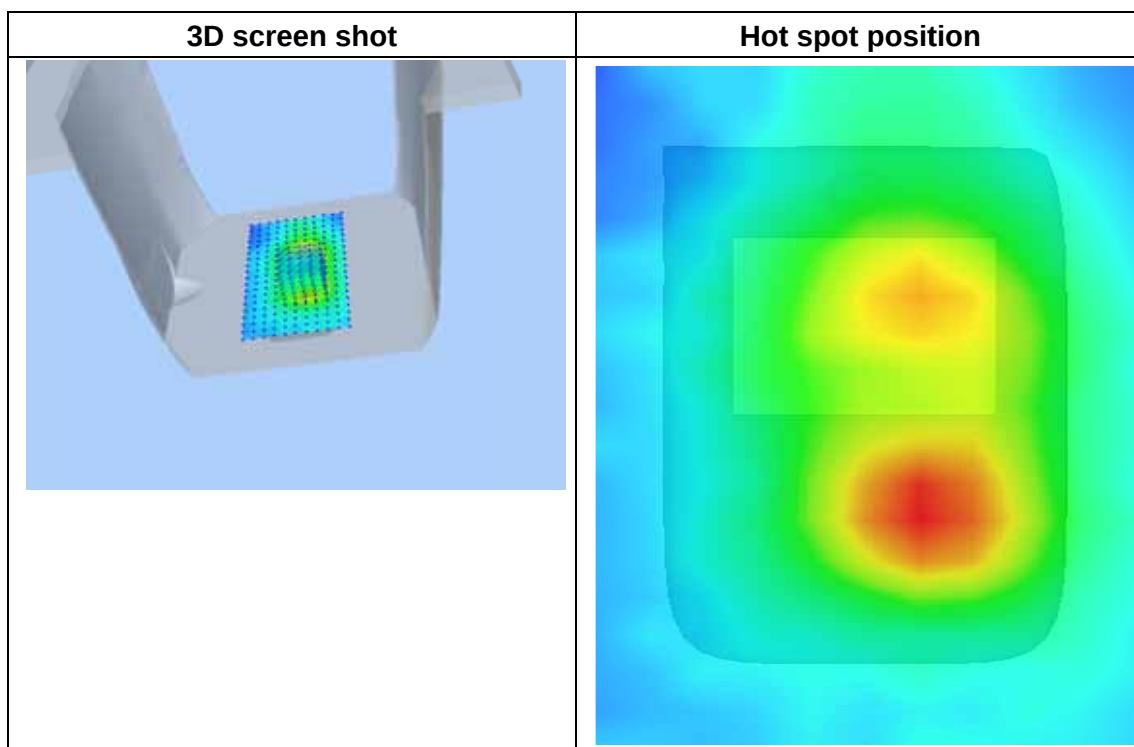
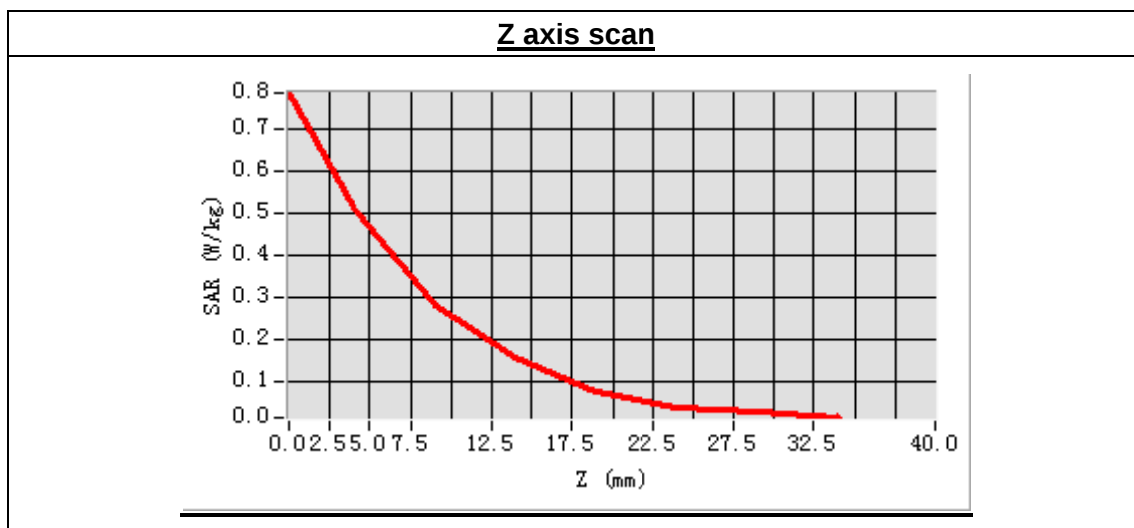
Frequency (MHz)	1909.800000
Relative permittivity (real part)	53.183720
Conductivity (S/m)	1.496482
Power drift(%)	0.870000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.17
Crest factor:	1:2



Maximum location: X=8.00, Y=-22.00

SAR Peak: 0.83 W/kg

SAR 10g (W/Kg)	0.243325
SAR 1g (W/Kg)	0.496780



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: 2014.5.5

Measurement duration: 9 minutes 28 seconds

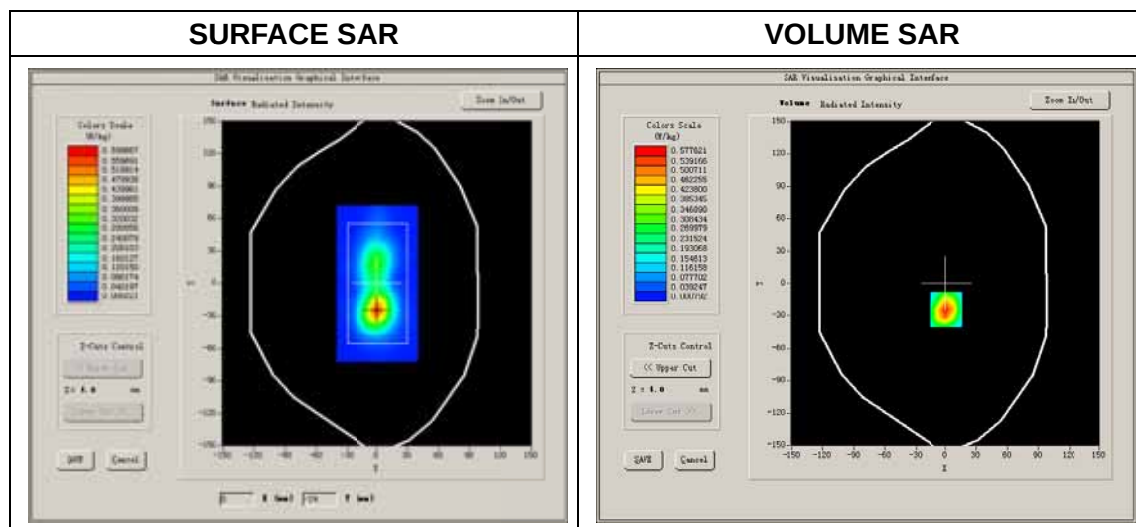
A. Experimental conditions.

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

B. SAR Measurement Results

Low Band SAR (Channel 512):

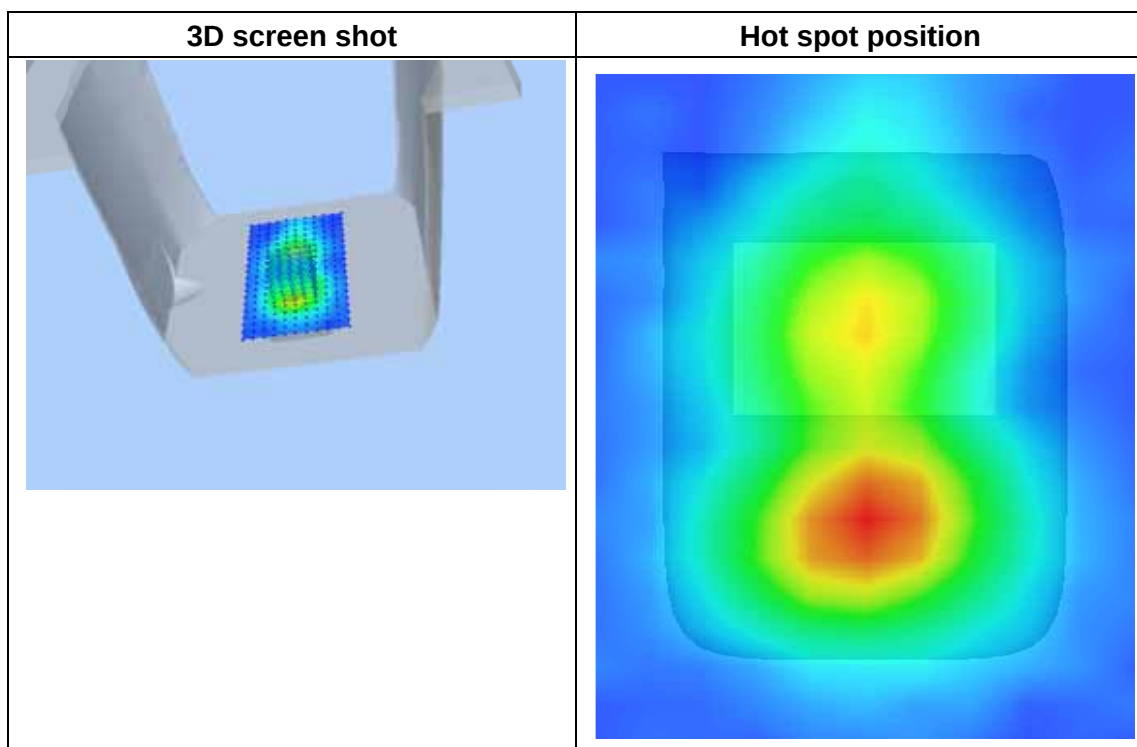
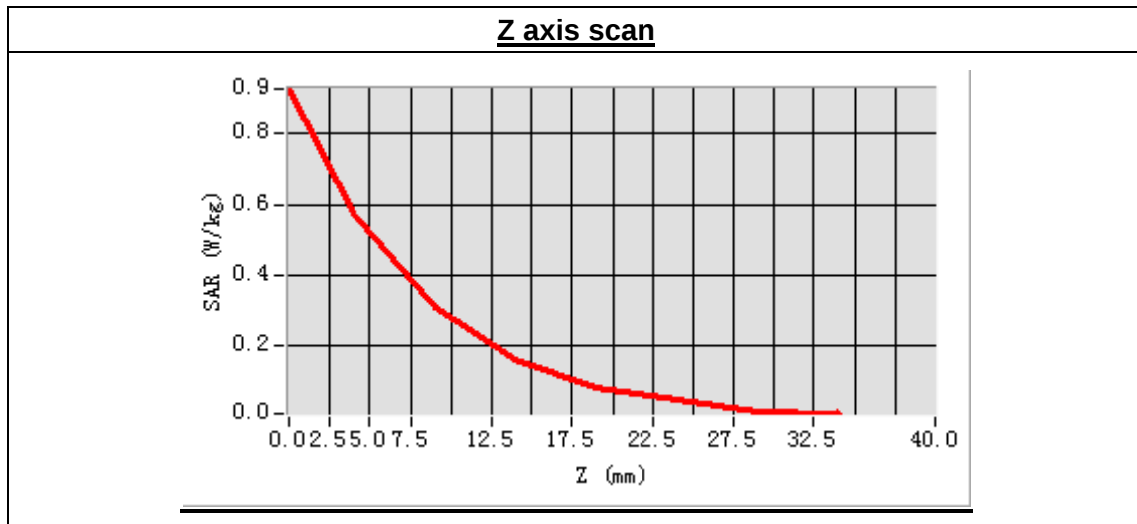
Frequency (MHz)	1850.200000
Relative permittivity (real part)	53.183720
Conductivity (S/m)	1.496482
Power drift(%)	-3.870000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.17
Crest factor:	1:2



Maximum location: X=0.00, Y=-24.00

SAR Peak: 0.95 W/kg

SAR 10g (W/Kg)	0.262843
SAR 1g (W/Kg)	0.561168



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: 2014.5.4

Measurement duration: 9 minutes 33 seconds

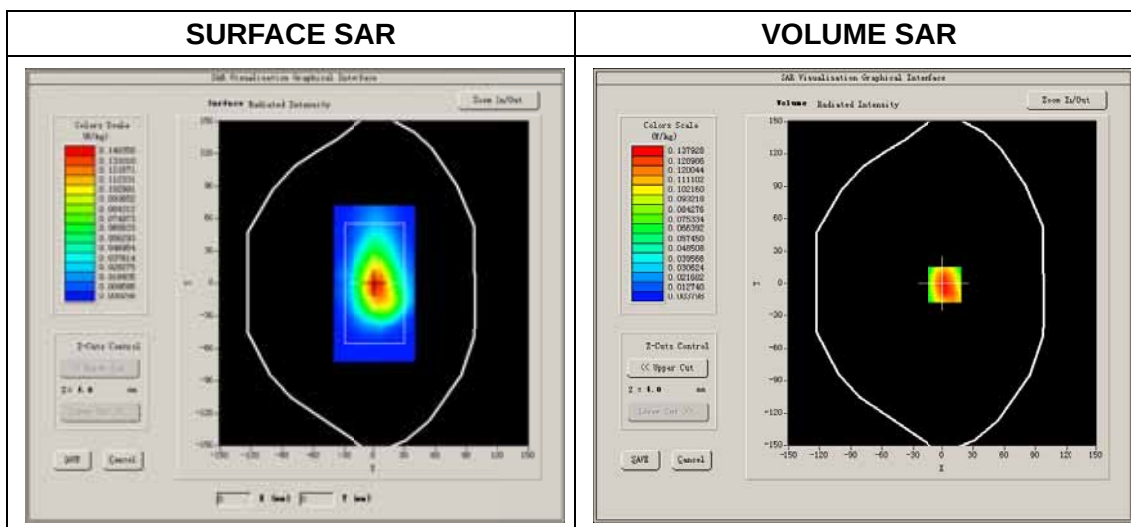
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	WCDMA850
Channels	Low
Signal	CDMA

B. SAR Measurement Results

Low Band SAR (Channel 4132):

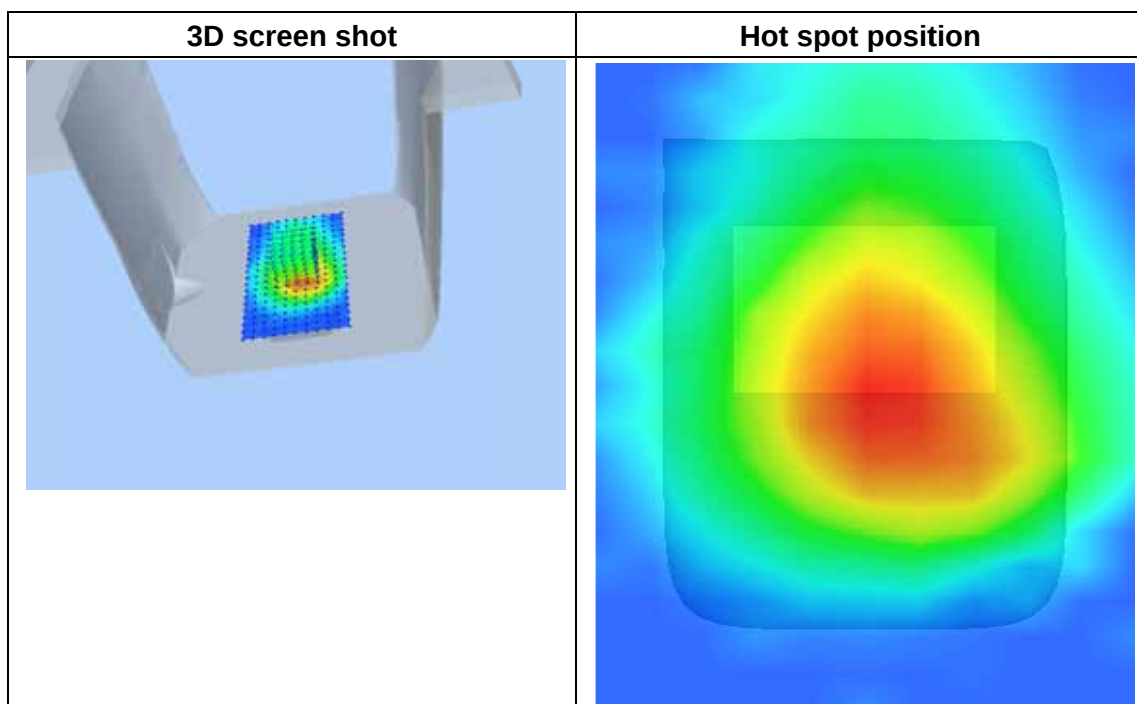
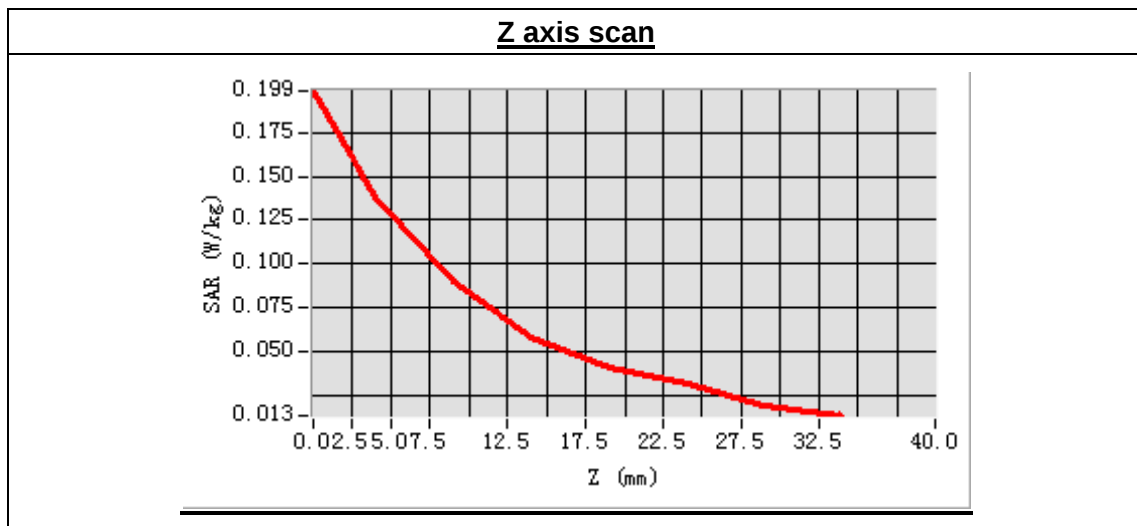
Frequency (MHz)	826.400000
Relative permittivity (real part)	56.430942
Conductivity (S/m)	0.973481
Power drift (%)	0.550000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.99
Crest factor:	1:1



Maximum location: X=2.00, Y=-1.00

SAR Peak: 0.22 W/kg

SAR 10g (W/Kg)	0.089761
SAR 1g (W/Kg)	0.142760



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: 2014.5.4

Measurement duration: 9 minutes 35 seconds

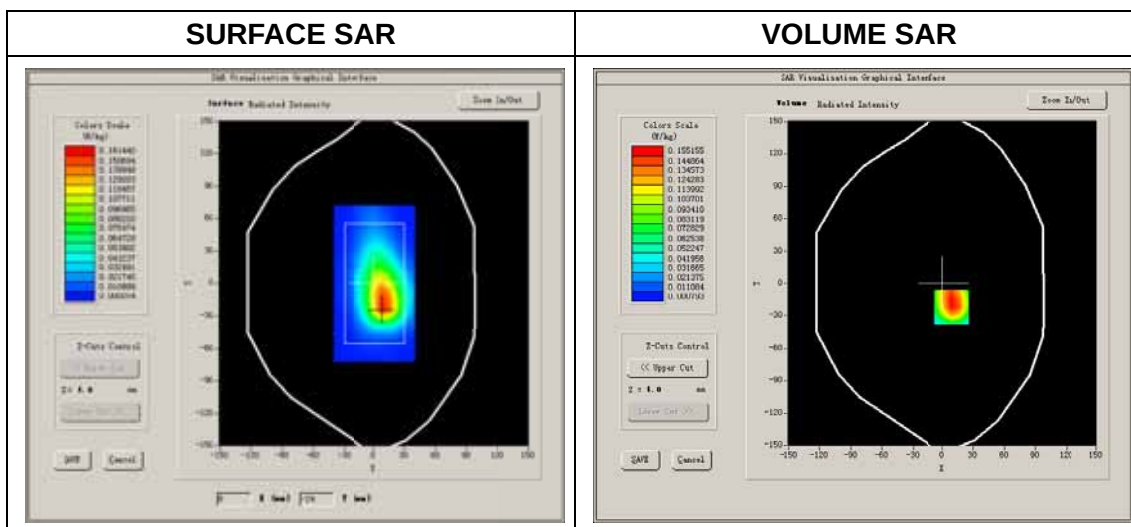
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	WCDMA850
Channels	Low
Signal	CDMA

B. SAR Measurement Results

Low Band SAR (Channel 4132):

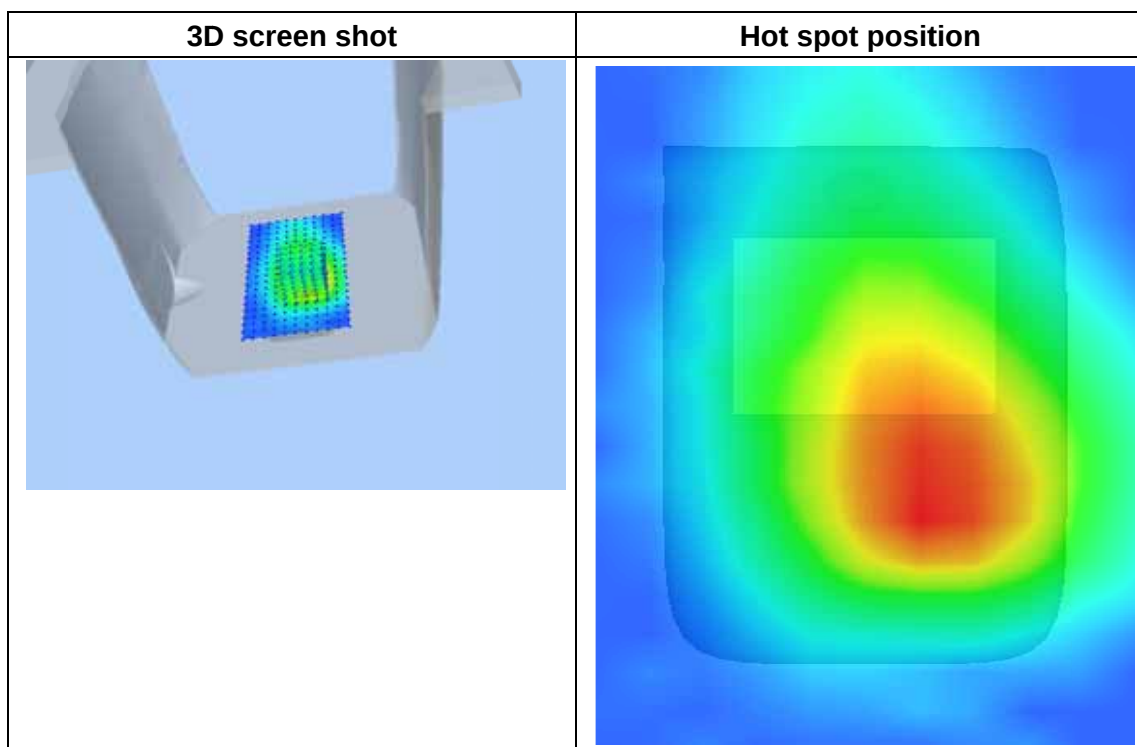
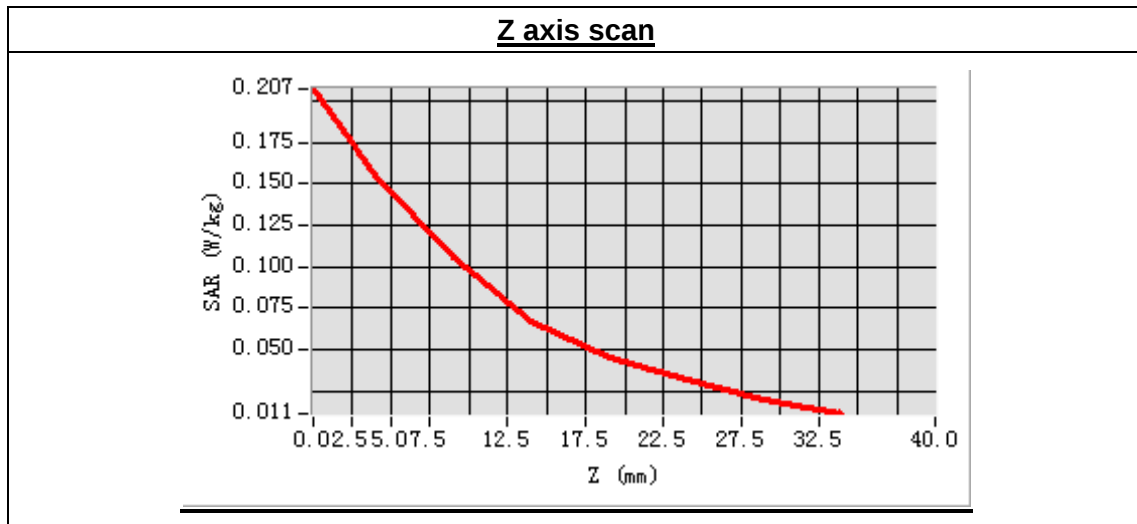
Frequency (MHz)	826.400000
Relative permittivity (real part)	56.430942
Conductivity (S/m)	0.973481
Power drift (%)	-3.250000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.99
Crest factor:	1:1



Maximum location: X=9.00, Y=-22.00

SAR Peak: 0.23 W/kg

SAR 10g (W/Kg)	0.101314
SAR 1g (W/Kg)	0.160630



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: 2014.5.4

Measurement duration: 9 minutes 32 seconds

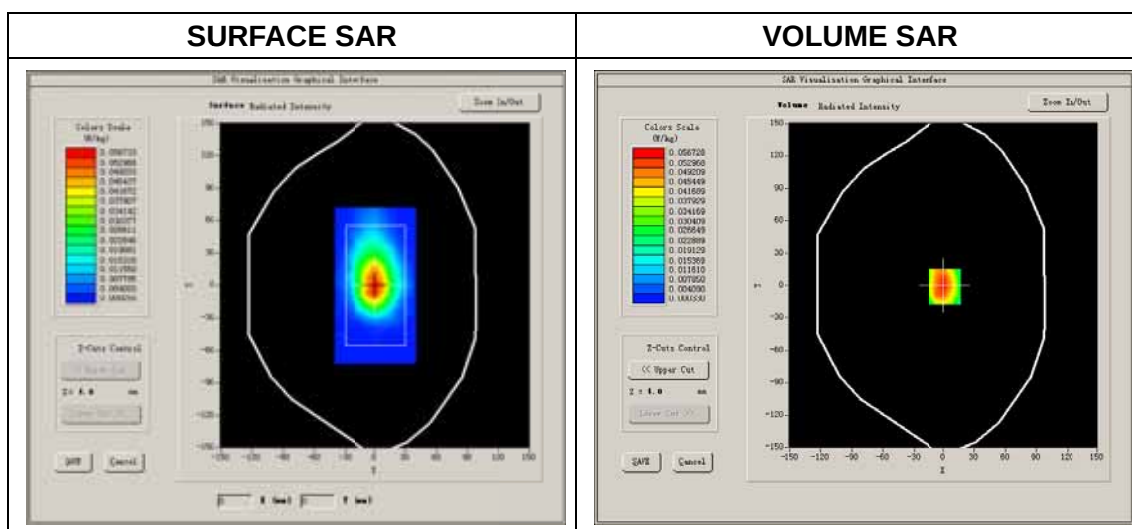
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	WCDMA850
Channels	Low
Signal	CDMA

B. SAR Measurement Results

Low Band SAR (Channel 4132):

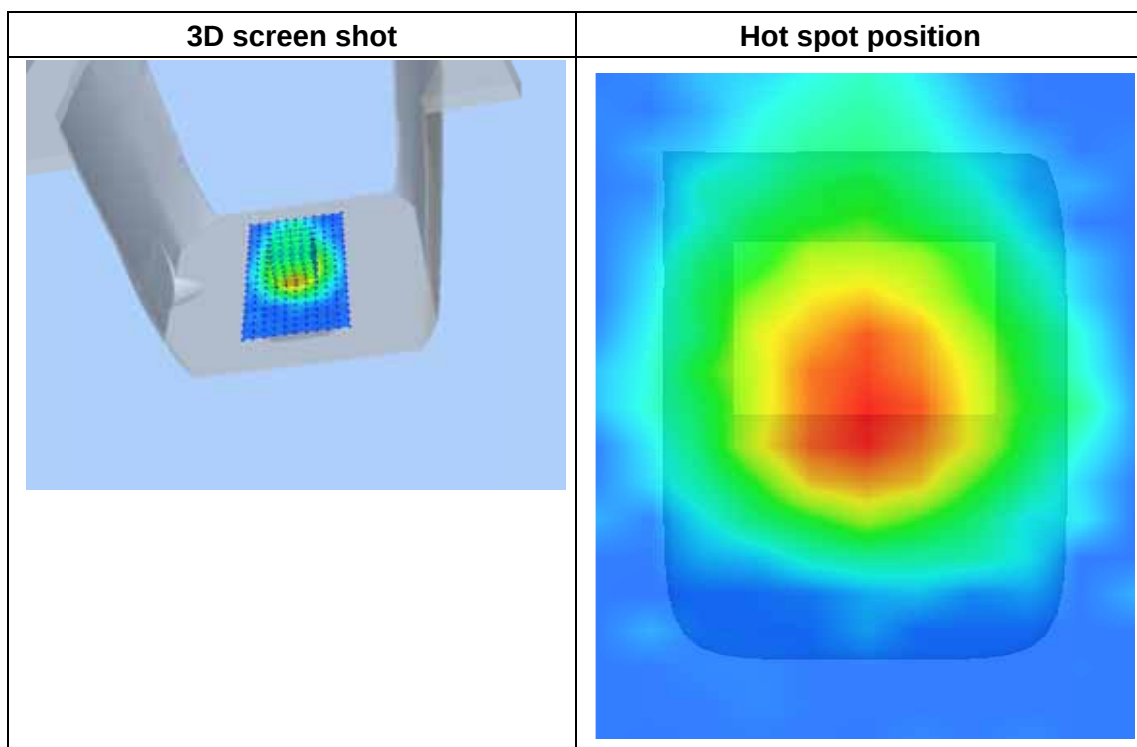
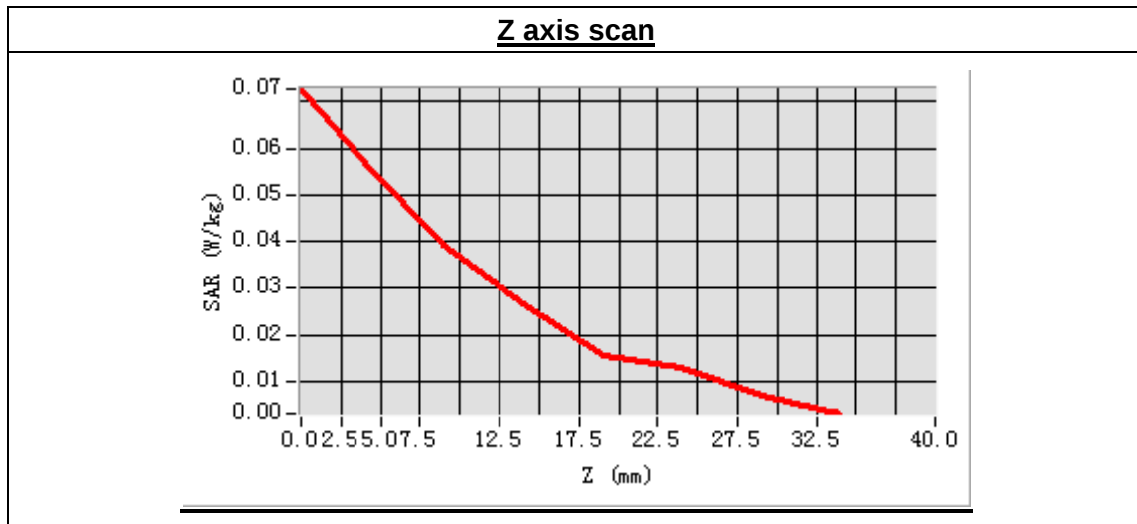
Frequency (MHz)	826.400000
Relative permittivity (real part)	56.430942
Conductivity (S/m)	0.973481
Power drift (%)	-0.430000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.99
Crest factor:	1:1



Maximum location: X=1.00, Y=-1.00

SAR Peak: 0.09 W/kg

SAR 10g (W/Kg)	0.034755
SAR 1g (W/Kg)	0.057781



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: 2014.5.4

Measurement duration: 9 minutes 31 seconds

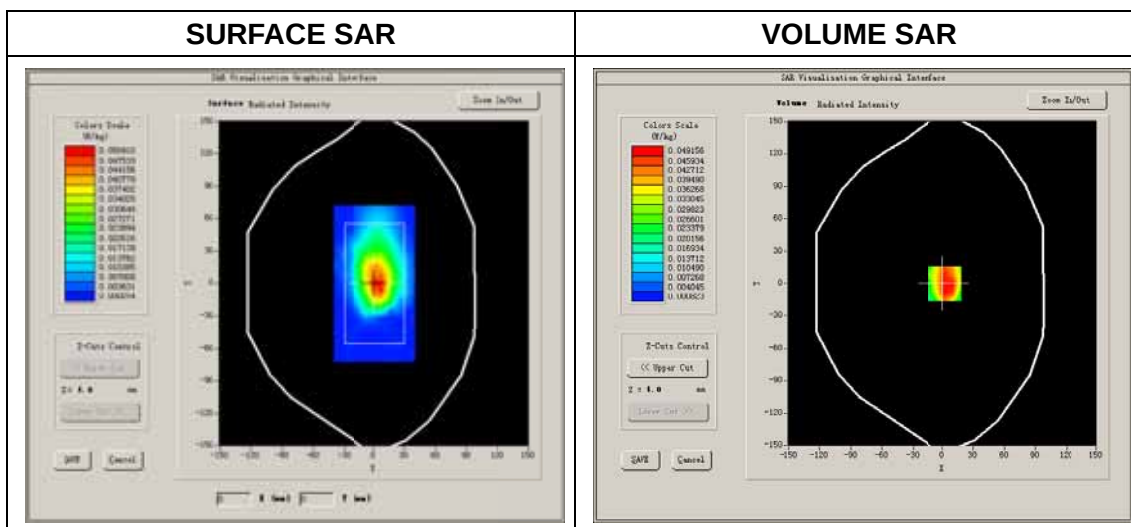
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	WCDMA850
Channels	Low
Signal	CDMA

B. SAR Measurement Results

Low Band SAR (Channel 4132):

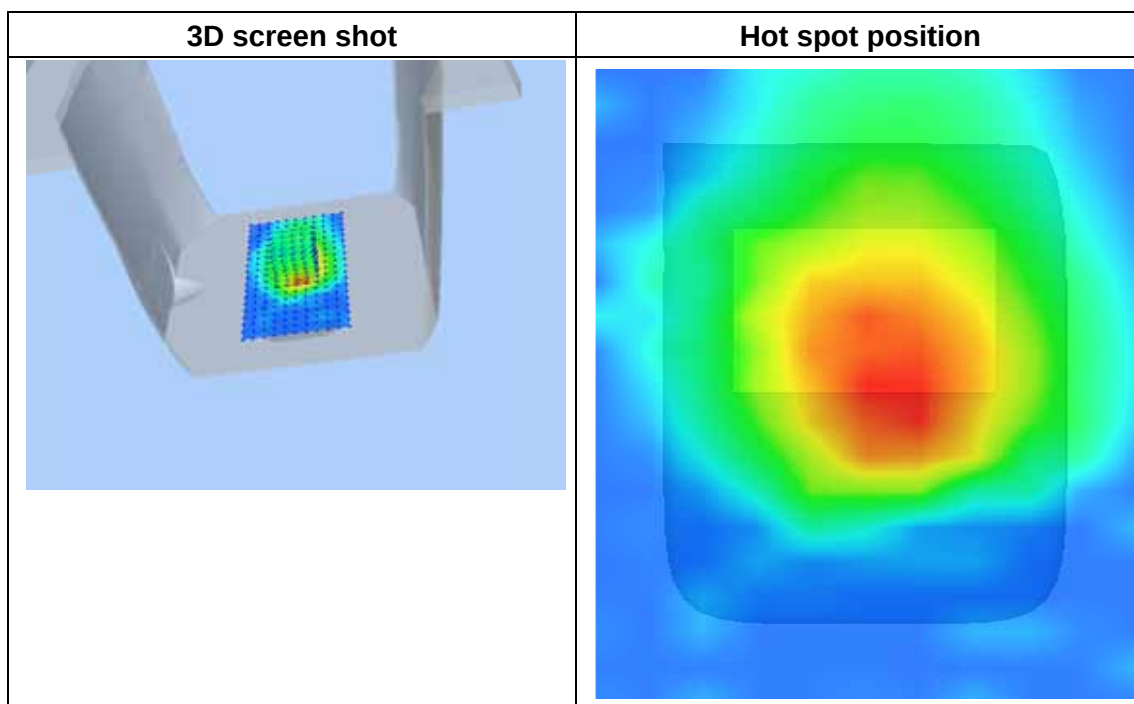
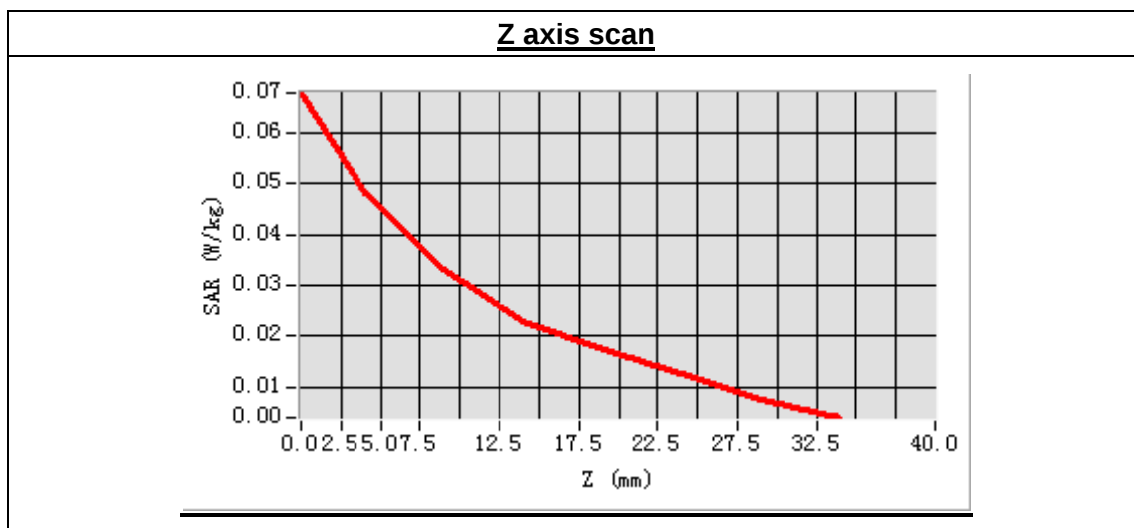
Frequency (MHz)	826.400000
Relative permittivity (real part)	56.430942
Conductivity (S/m)	0.973481
Power drift (%)	0.670000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.99
Crest factor:	1:1



Maximum location: X=2.00, Y=0.00

SAR Peak: 0.09 W/kg

SAR 10g (W/Kg)	0.032538
SAR 1g (W/Kg)	0.053699



MEASUREMENT 17

Type: Phone measurement (Complete)

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

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

Date of measurement: 2014.5.5

Measurement duration: 9 minutes 31 seconds

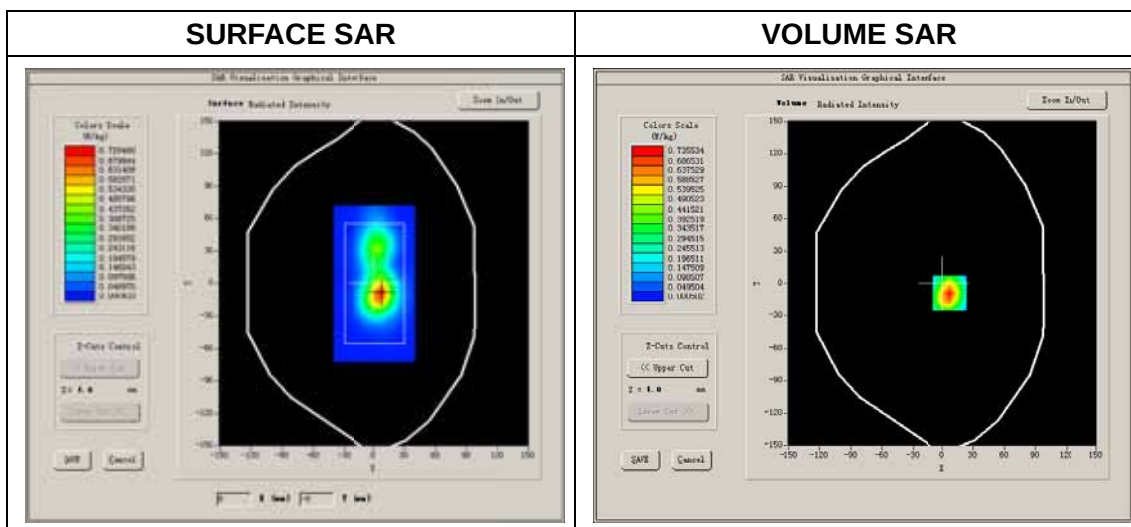
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	WCDMA1900
Channels	Middle
Signal	CDMA

B. SAR Measurement Results

Middle Band SAR (Channel 9400):

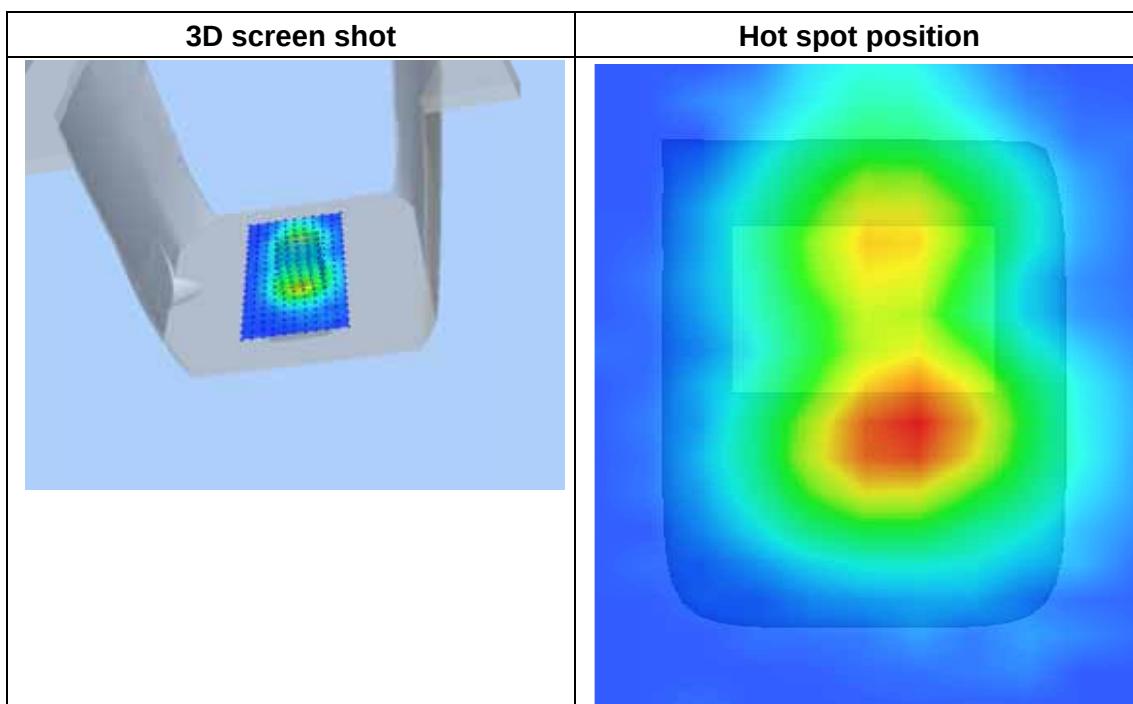
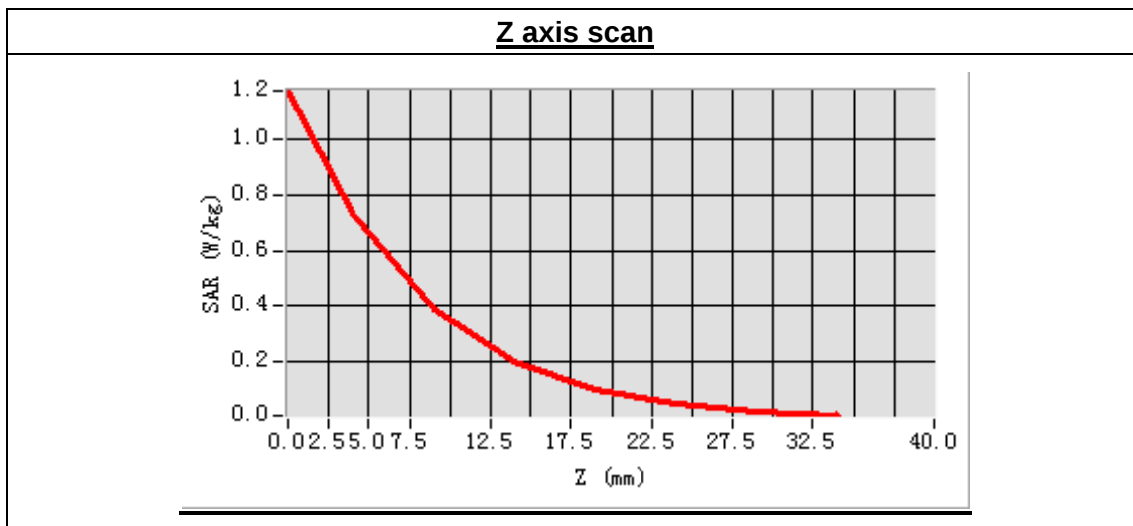
Frequency (MHz)	1880.000000
Relative permittivity (real part)	53.183720
Conductivity (S/m)	1.496482
Power drift (%)	1.230000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.17
Crest factor:	1:1



Maximum location: X=7.00, Y=-9.00

SAR Peak: 1.31 W/kg

SAR 10g (W/Kg)	0.351774
SAR 1g (W/Kg)	0.744658



MEASUREMENT 18

Type: Phone measurement (Complete)

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

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

Date of measurement: 2014.5.5

Measurement duration: 9 minutes 38 seconds

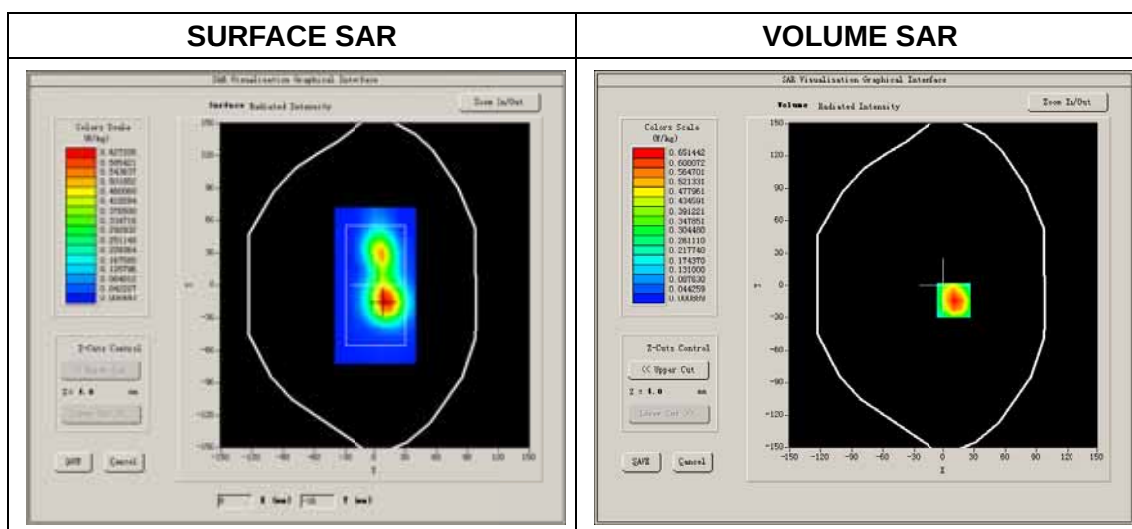
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	WCDMA1900
Channels	Middle
Signal	CDMA

B. SAR Measurement Results

Middle Band SAR (Channel 9400):

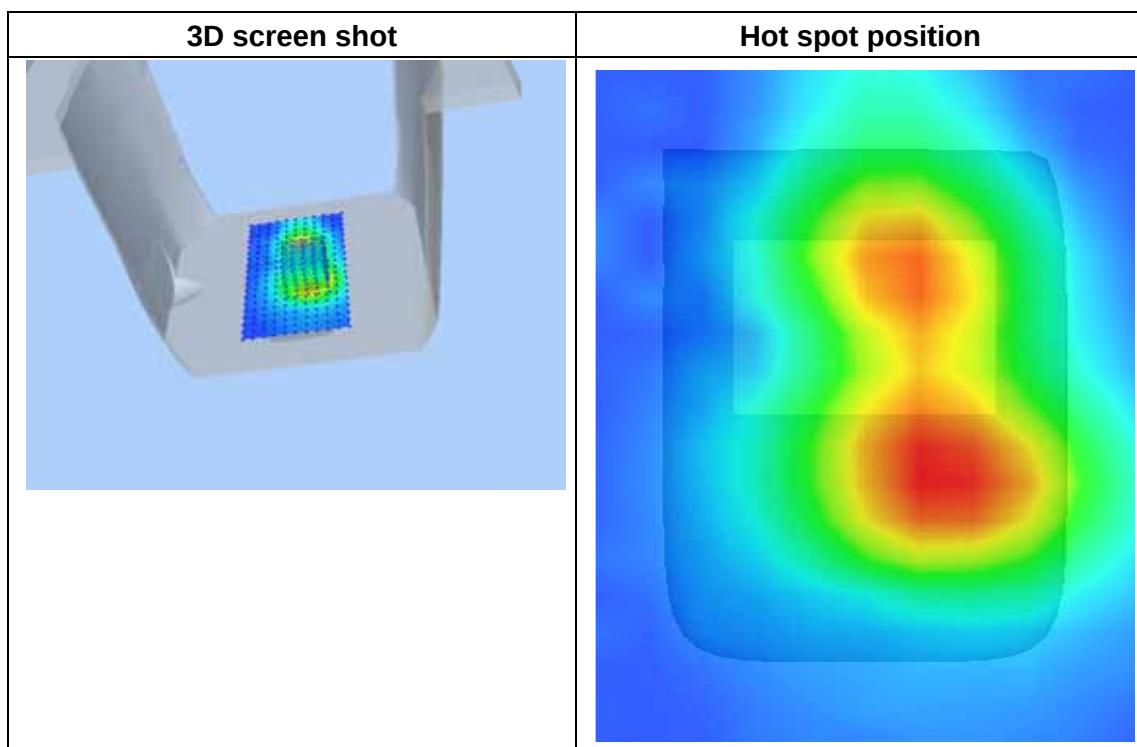
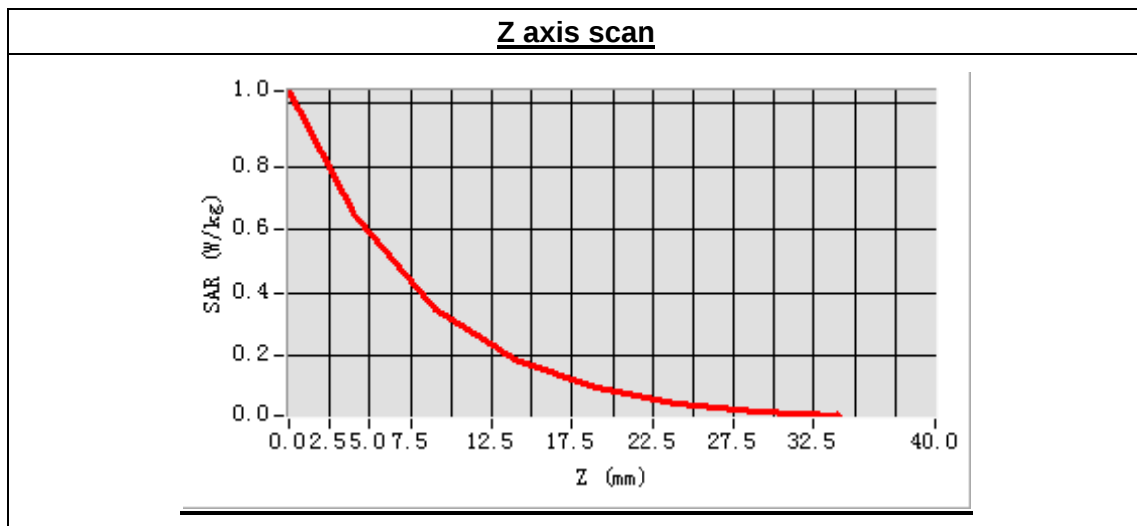
Frequency (MHz)	1880.000000
Relative permittivity (real part)	53.183720
Conductivity (S/m)	1.496482
Power drift (%)	2.320000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.17
Crest factor:	1:1



Maximum location: X=10.00, Y=-14.00

SAR Peak: 1.17 W/kg

SAR 10g (W/Kg)	0.339617
SAR 1g (W/Kg)	0.676959



MEASUREMENT 19

Type: Phone measurement (Complete)

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

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

Date of measurement: 2014.5.5

Measurement duration: 9 minutes 38 seconds

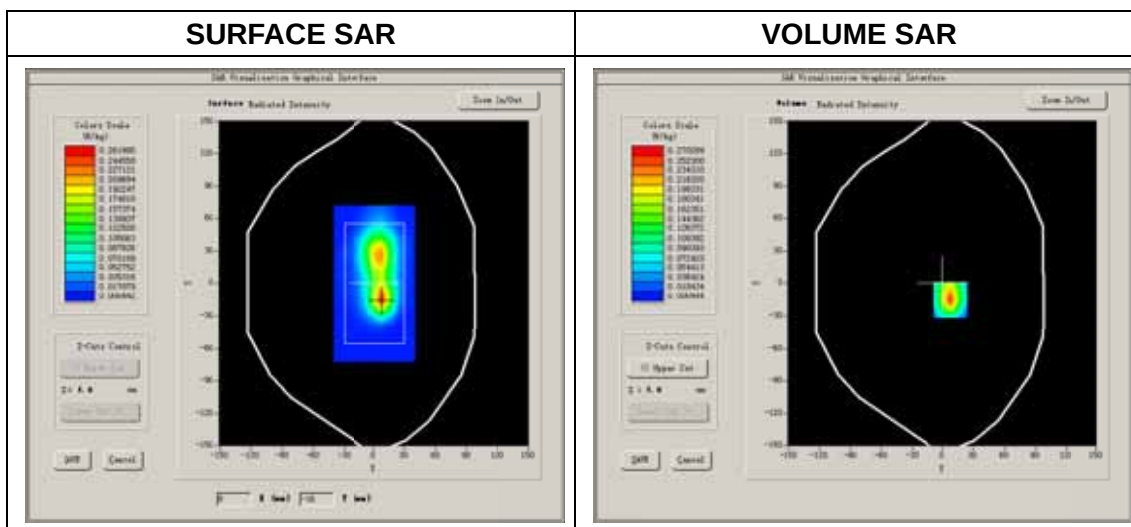
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	WCDMA1900
Channels	Middle
Signal	CDMA

B. SAR Measurement Results

Middle Band SAR (Channel 9400):

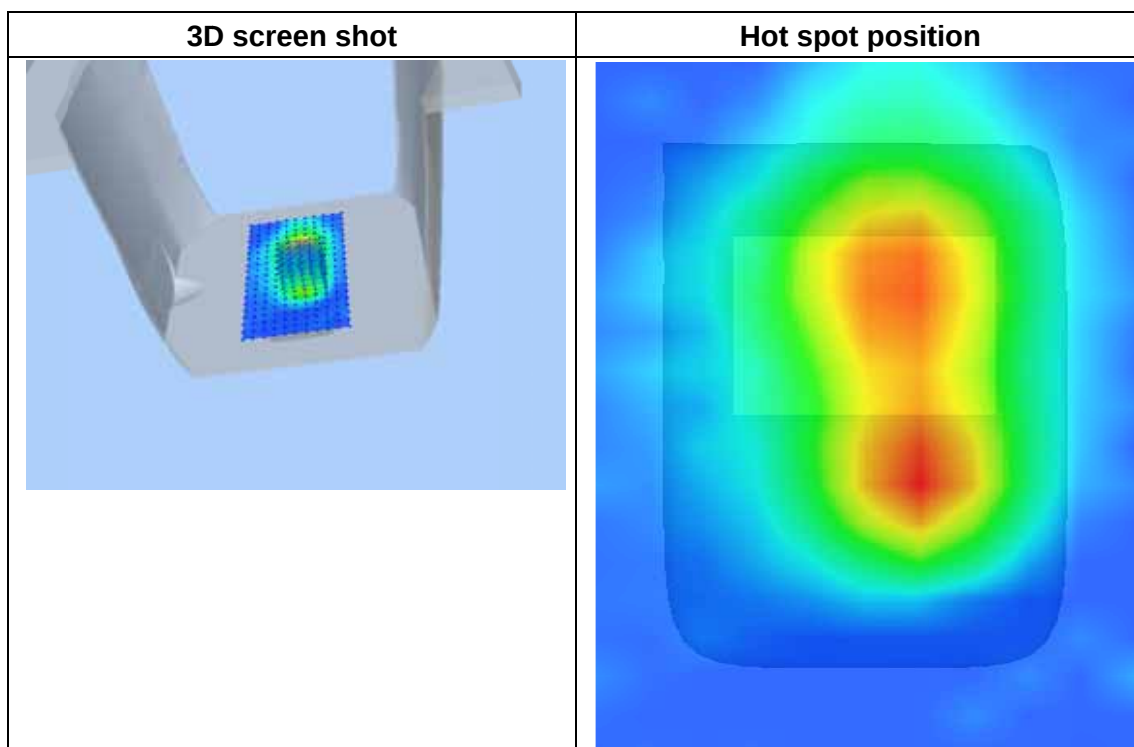
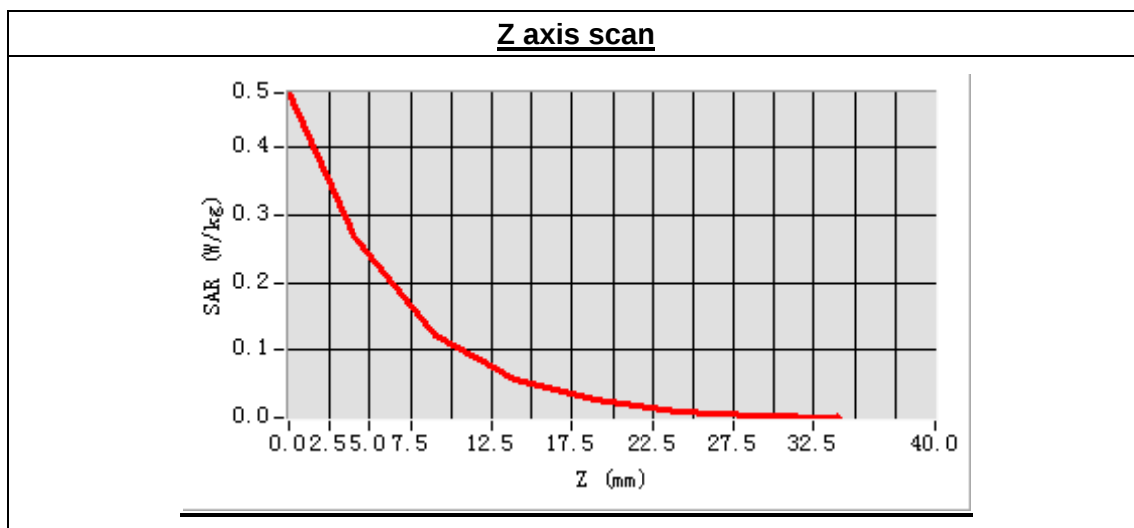
Frequency (MHz)	1980.000000
Relative permittivity (real part)	53.183720
Conductivity (S/m)	1.496482
Power drift (%)	0.700000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.17
Crest factor:	1:1



Maximum location: X=8.00, Y=-15.00

SAR Peak: 0.52 W/kg

SAR 10g (W/Kg)	0.112282
SAR 1g (W/Kg)	0.263711



MEASUREMENT 20

Type: Phone measurement (Complete)

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

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

Date of measurement: 2014.5.5

Measurement duration: 9 minutes 32 seconds

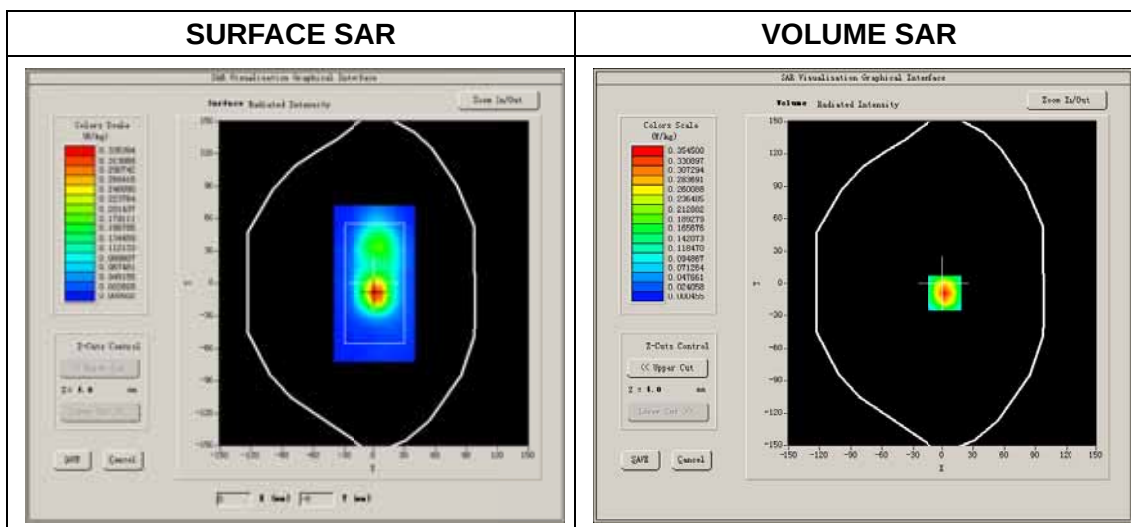
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	WCDMA1900
Channels	Middle
Signal	CDMA

B. SAR Measurement Results

Middle Band SAR (Channel 9400):

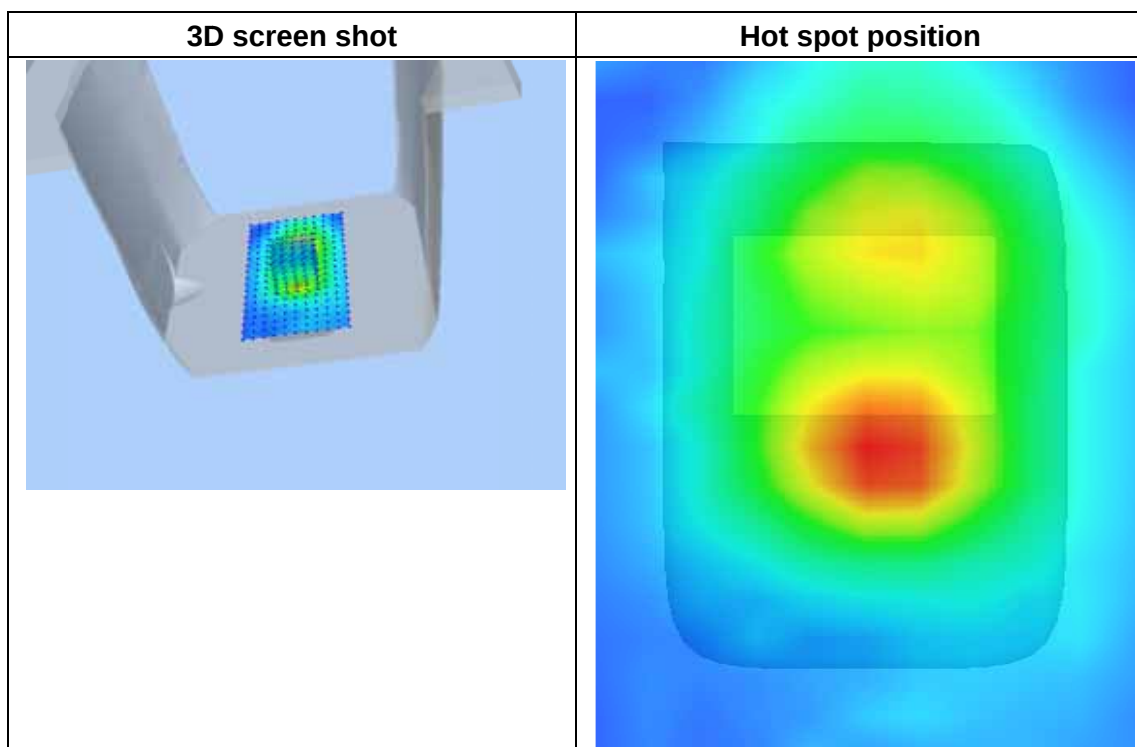
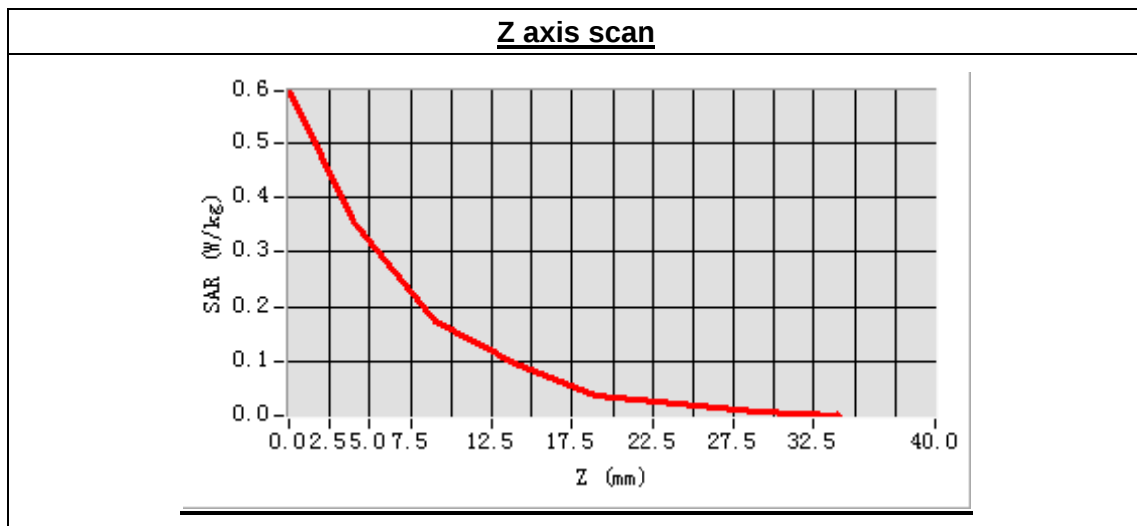
Frequency (MHz)	1880.000000
Relative permittivity (real part)	53.183720
Conductivity (S/m)	1.496482
Power drift (%)	0.150000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.17
Crest factor:	1:1



Maximum location: X=2.00, Y=-9.00

SAR Peak: 0.64 W/kg

SAR 10g (W/Kg)	0.167325
SAR 1g (W/Kg)	0.356657



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: 2014.5.4

Measurement duration: 13 minutes 27 seconds

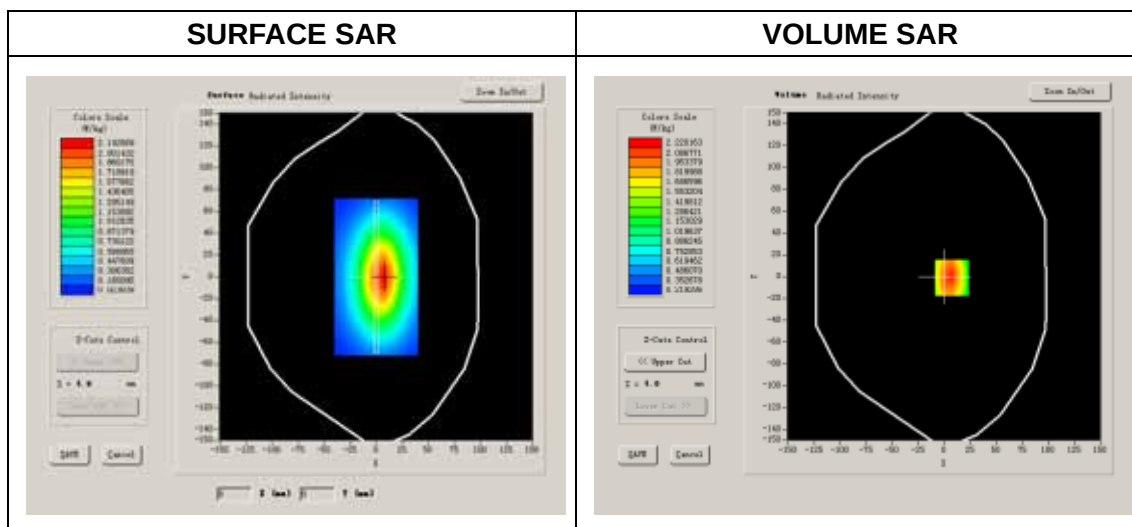
A. Experimental conditions.

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)	56.430942
Conductivity (S/m)	0.973481
Power drift (%)	1.030000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.99
Crest factor:	1:1



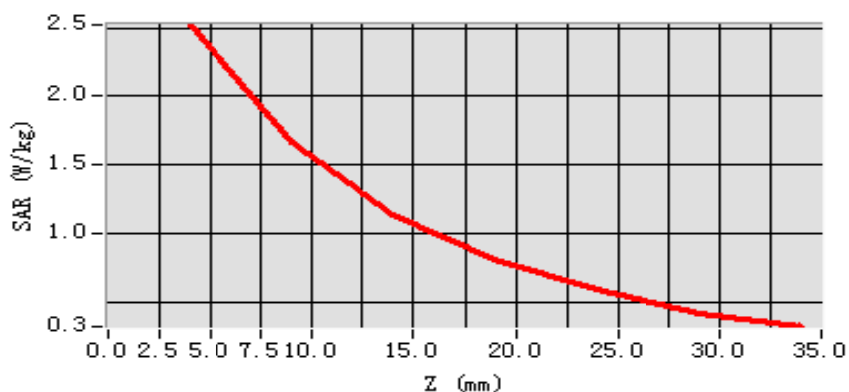
Maximum location: X=7.00, Y=-1.00

SAR 10g (W/Kg)	1.518375
SAR 1g (W/Kg)	2.482163

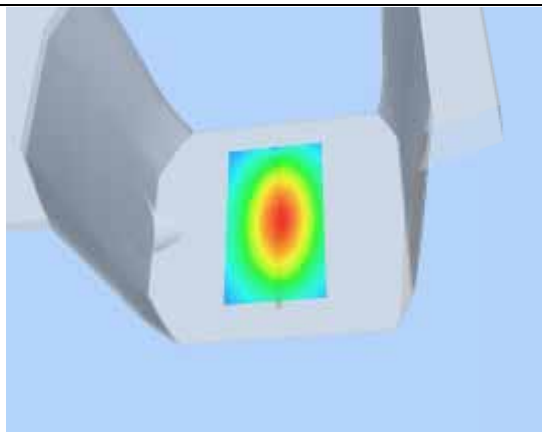
Z Axis Scan

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

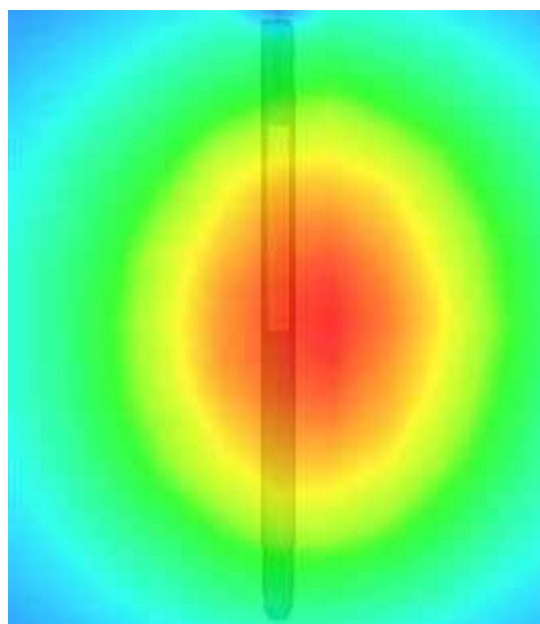
SAR, Z Axis Scan (X = 7, Y = -1)



3D scene shot



Hot spot position



System Performance Check Data(Body)

Type: Phone measurement (Complete)

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

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

Date of measurement: 2014.5.5

Measurement duration: 13 minutes 32 seconds

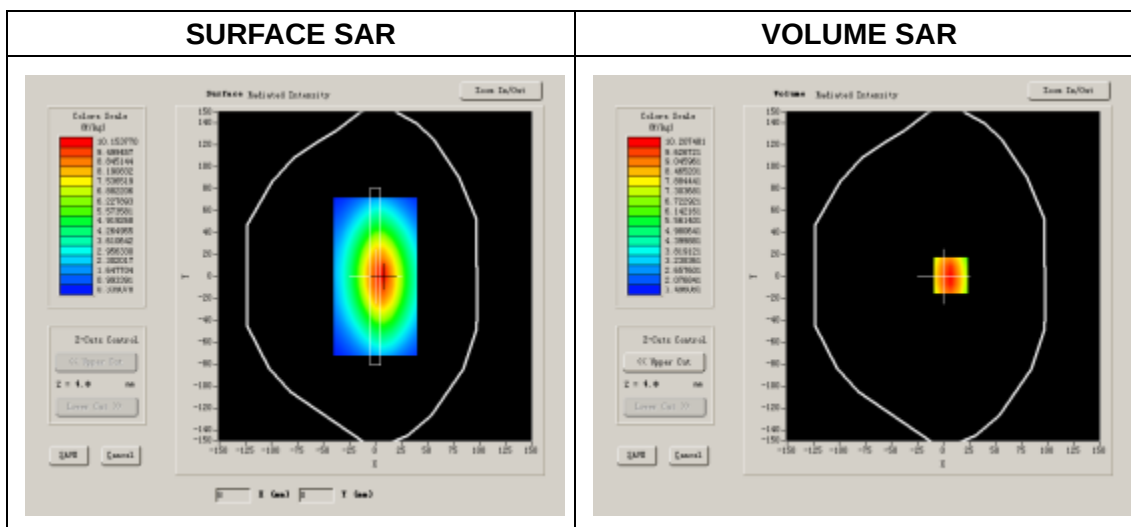
A. Experimental conditions.

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)	53.183720
Conductivity (S/m)	1.496482
Power drift (%)	-0.820000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	6.17
Crest factor:	1:1



Maximum location: X=7.00, Y=1.00

SAR 10g (W/Kg)	6.41376
SAR 1g (W/Kg)	9.907739

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	10.2075	7.3996	5.4654	4.1101	3.1286	2.4128

