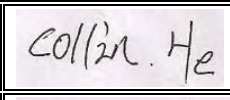
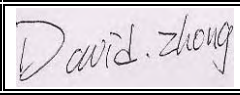
SAR EVALUATION REPORT

For

TOPLINKST TECHNOLOGY COMPANY LIMITED

UNIT 04,7F, BRIGHT WAY TOWER, NO, 33 MONG KOK ROAD KOWLOON
HONG KONG

Summary of Test Results		
Report Type:	Original Report	
Product Type:	wireless usb adapter	
FCC ID:	**ZLJRT5370S03**	
Report Number	GTSE11050032602	
Report Date:	22 May, 2011	
Rule Part(s):	CFR 47 §2.1093	
Test Procedure(s):	FCC OET Bulletin 65C IEEE 1528-2003	
Device Type:	Mobile device	
Exposure Category	Population/Uncontrolled	
Modulation:	802.11B: DSSS;802.11G/N: OFDM	
TX Frequency Range:	2412-2462MHz；2422-2452MHz	
Maximum Conducted Power Tested:	24.05dBm (Peak Power)	
Antenna Type(s):	Internal Antenna	
Face-Head Accessories:	None	
Max. SAR Level(s)Measured:	**1g body Tissue: 0.264W/Kg**	
Prepared By: **(Project Engineer)**	**Collin.He**	
Reviewed By **(Reviewer)**	**David.zhong**	
Prepared By	Global United Technology Services Co., Ltd. 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China 518102 Tel: +86 (0) 755 2779 8480 Fax: +86 (0) 755 2779 8960	

Note: This report details the results of the testing carried out on one sample.The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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REVISON HISTORY

Change History		
Issue	Date	Reason for change
1.0	**22 May, 2011**	**Original Report**

REFERENCE, STANDARDS, AND GUILDELINES

FCC:

The Report and Order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g as recommended by the ANSI/IEEE standard C95.1-1992 [6] for an uncontrolled environment (Paragraph 65). According to the Supplement C of OET Bulletin 65 “Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields", released on Jun 29, 2001 by the FCC, the device should be evaluated at maximum output power (radiated from the antenna) under “worst-case” conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

This report describes the methodology and results of experiments performed on wireless data terminal. The objective was to determine if there is RF radiation and if radiation is found, what is the extent of radiation with respect to safety limits. SAR (Specific Absorption Rate) is the measure of RF exposure determined by the amount of RF energy absorbed by human body (or its parts) – to determine how the RF energy couples to the body or head which is a primary health concern for body worn devices. The limit below which the exposure to RF is considered safe by regulatory bodies in North America is 1.6 mW/g average over 1 gram of tissue mass.

CE:

The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 2 mW/g as recommended by the EN50360 for an uncontrolled environment. According to the Standard, the device should be evaluated at maximum output power (radiated from the antenna) under “worst-case” conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

This report describes the methodology and results of experiments performed on wireless data terminal. The objective was to determine if there is RF radiation and if radiation is found, what is the extent of radiation with respect to safety limits. SAR (Specific Absorption Rate) is the measure of RF exposure determined by the amount of RF energy absorbed by human body (or its parts) – to determine how the RF energy couples to the body or head which is a primary health concern for body worn devices. The limit below which the exposure to RF is considered safe by regulatory bodies in Europe is 2 mW/g average over 10 gram of tissue mass.

The test configurations were laid out on a specially designed test fixture to ensure the reproducibility of measurements. Each configuration was scanned for SAR. Analysis of each scan was carried out to characterize the above effects in the device.

SAR Limits

FCC Limit (1g Tissue)

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

CE Limit (10g Tissue)

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	2.0	10
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

Population/Uncontrolled Environments are defined as locations where there is the exposure of individual who have no knowledge or control of their exposure.

Occupational/Controlled Environments are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).

EUT DESCRIPTION

Identification of Applicant

Company Name:	TOPLINKST TECHNOLOGY COMPANY LIMITED
Address:	UNIT 04,7F,BRIGHT WAY TOWER, NO,33 MONG KOK ROAD KOWLOON HONG KONG

Identification of Manufacturer

Company Name:	TOPLINKST TECHNOLOGY COMPANY LIMITED
Address:	UNIT 04,7F,BRIGHT WAY TOWER, NO,33 MONG KOK ROAD KOWLOON HONG KONG

Equipment Under Test (EUT)

Product Name:	Wireless USB Adapter
Model No.:	ST-S03, S03, GS03
Operation Frequency:	2412MHz~2462MHz (802.11b/802.11g/802.11n(H20)) 2422MHz~2452MHz (802.11n(H40))
Channel numbers:	11 for 802.11b/802.11g/802.11(H20) 7 for 802.11(H40)
Channel separation:	5MHz
Modulation technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum (DSSS)
Modulation technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Data speed (IEEE 802.11b):	1Mbps, 2Mbps, 5.5Mbps, 11Mbps
Data speed (IEEE 802.11g):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps
Data speed (IEEE 802.11n):	Up to 150Mbps
Antenna Type:	Integral
Antenna gain:	0dBi (declare by Applicant)
Power supply:	DC 5V (USB port supply)
Remark:	Only the model No. ST-S03 was tested. S03 and GS03 are identical interior structure, electrical circuits, components and appearance with different model names for the marketing requirement.

FACILITIES AND ACCREDITATION

Identification of the Responsible Testing Laboratory

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

DESCRIPTION OF TEST SYSTEM

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.

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:

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

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

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

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,

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

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.

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.

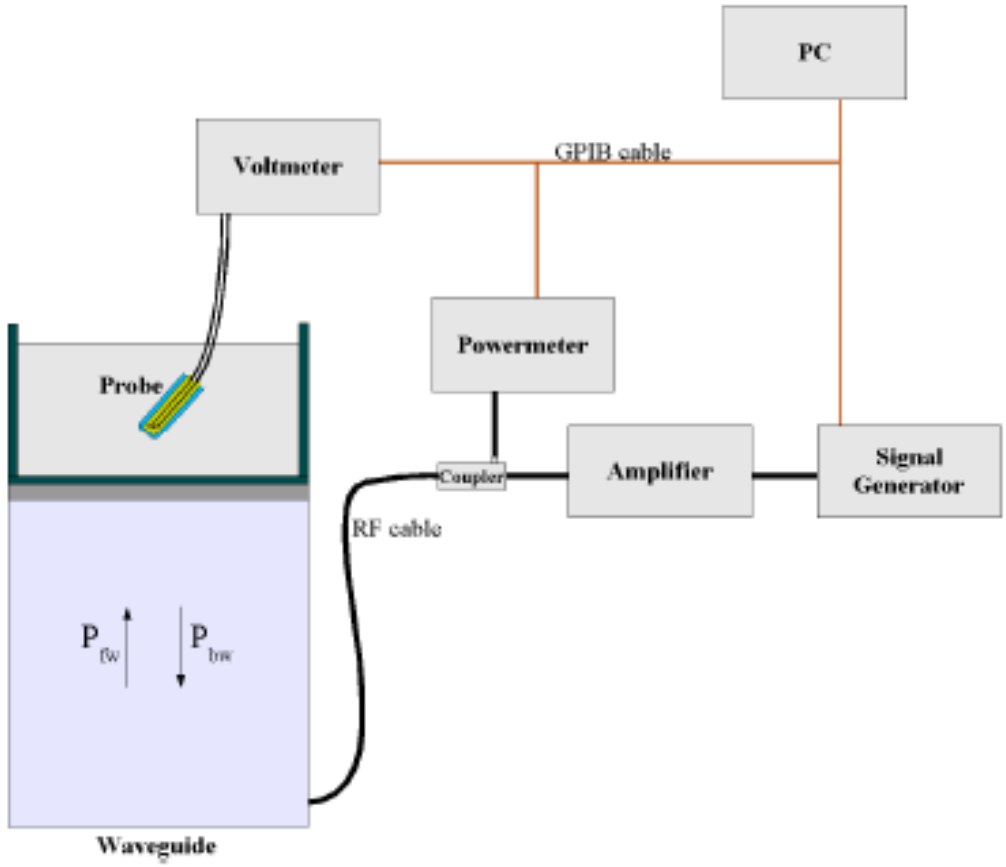
Probe

For the measurements the Specific Dosimetric E-Field Probe SSE5 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 5 mm
- Distance between probe tip and sensor center: 2.5mm
- Distance between sensor center and the inner phantom surface: 4 mm
  (repeatability better than +/- 1mm)
- Probe linearity: ＜0.25 dB
- Axial Isotropy: ＜0.25 dB
- Spherical Isotropy: ＜0.25 dB
- Calibration range: 835to 2500MHz for head & body simulating liquid.

Angle between probe axis (evaluation axis) and suface normal line:1ess than 30°

Probe calibration is realized, in compliance with CENELEC EN 50361 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the EN 50361 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:

$$CF(N)=SAR(N)/Vlin(N) \qquad (N=1,2,3)$$

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

$$Vlin(N)=V(N)*(1+V(N)/DCP(N)) \qquad (N=1,2,3)$$

where DCP is the diode compression point in mV.

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.

1.1. Device Holder

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

Device holder

System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

Tissue Dielectric Parameters for Head and Body Phantoms

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

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (Nacl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton x-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (s/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

IEEE SCC-34/SC-2 P1528 Recommended Tissue Dielectric Parameters

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

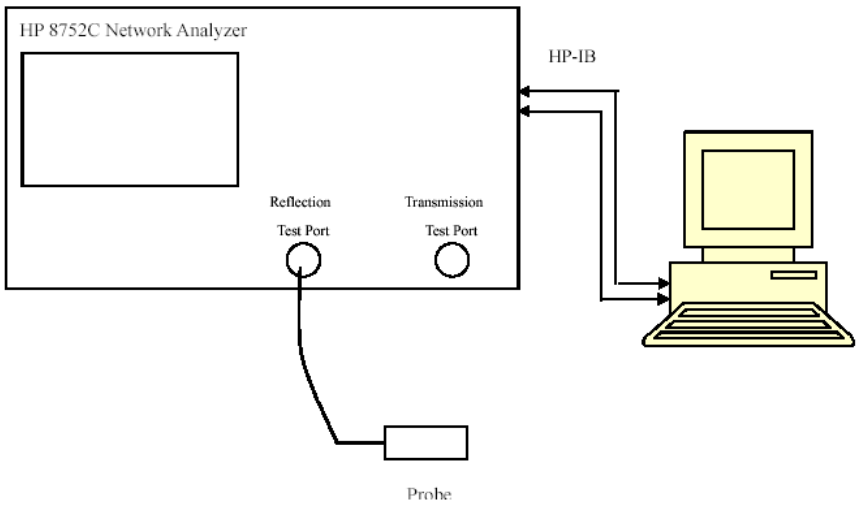
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Info

Equipment:	Model:	Calibration Date:	Due Date:
PC	Dell (Pentium IV 2.4GHz, SN:X10-23533)		
Network Emulator	Rohde&Schwarz (CMU200, SN:105894)	2010-9-26	1year
Voltmeter	Keithley (2000, SN:1000572)	2010-9-24	1year
Synthetizer	Rohde&Schwarz (SML_03, SN:101868)	2010-9-24	1year
Amplifier	Nucl udes (ALB216, SN:10800)	2010-9-24	1year
Power Meter	Rohde&Schwarz (NRVD, SN:101066)	2010-9-24	1year
Probe	Antennessa (SN:SN_3708_EP80)	2010-9-24	1year
Phantom	Antennessa (SN:SN_36_08_SAM62)	2010-9-24	1year
Liquid	Antennessa (Last Calibration:21 08 08)	2010-8-21	1year
Signal Generator	HP8341B	2010-11-06	1year
Power Amplifier	5S1G4	2010-11-06	1year
Spectrum Analyzer	FSEM30	2010-05-08	1year
Dipole 2450MHz	SN 36/08 DIPJ103	2010-9-24	1year

SAR MEASUREMENT SYSTEM VERIFICATION

Liquid Verification



Liquid Verification Setup Block Diagram

Liquid Verification Results

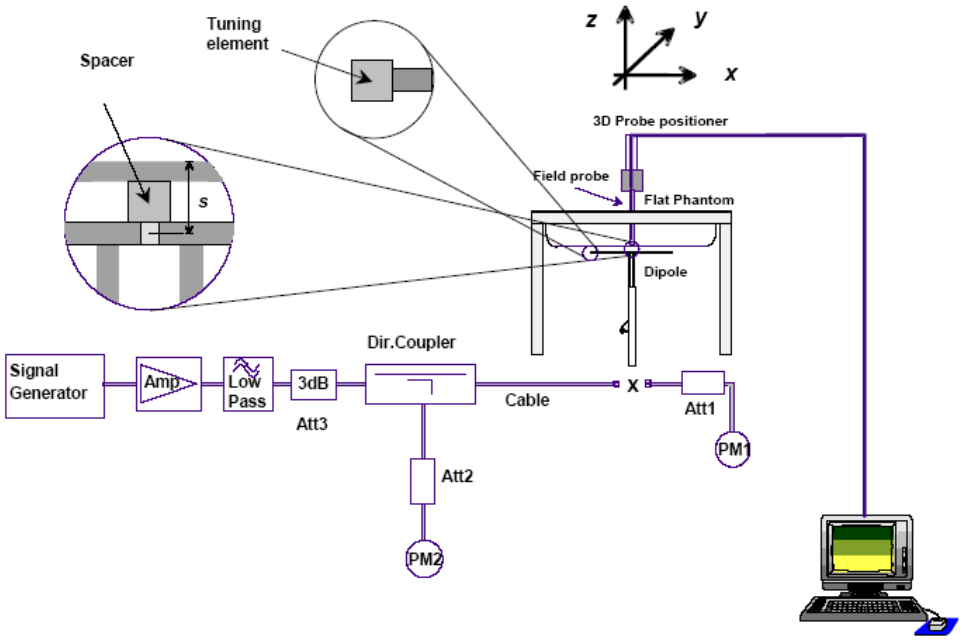
Frequency (MHz)	Liquid Type	Liquid Parameter		Result
		εr	Ơ (S/m)	
2450	Body	51.55	1.92	In Tolerance

** Verification was performed on 2011-05-19.*

System Accuracy Verification

Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of ±10%. The validation results are tabulated below. And also the corresponding SAR plot is attached as well in the SAR plots files.

System Verification Setup Block Diagram



System Accuracy Check Results

Frequency (MHz)	1 g SAR (W/Kg) (250mW)	1 g SAR (W/Kg) (1W)	Result
2450	12.989	51.956	In Tolerance

* Note: All SAR values are normalized to 0.25 Watt forward power.

IEEE P1528 recommended reference value for Head Tissue

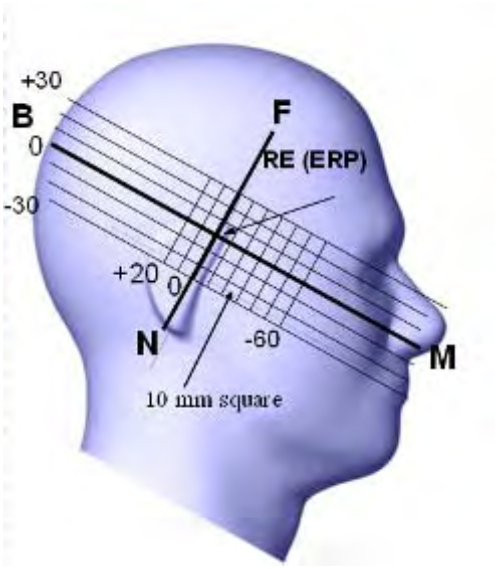
Frequency (MHz)	1 g SAR (W/Kg)	10 g SAR (W/Kg)	Local SAR at surface (above feed point)	Local SAR at surface (v=2cm offset from feed point)
300	3.0	2.0	4.4	2.1
450	4.9	3.3	7.2	3.2
835	9.5	6.2	14.1	4.9
900	10.8	6.9	16.4	5.4
1450	29.0	16.0	50.2	6.5
1800	38.1	19.8	69.5	6.8
1900	39.7	20.5	72.1	6.6
2000	41.1	21.1	74.6	6.5
2450	52.4	24.0	104.2	7.7
3000	63.8	25.7	140.2	9.5

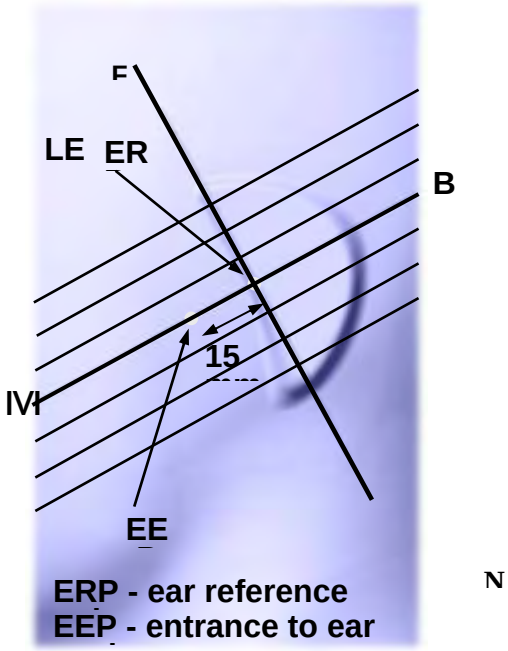
EUT TEST STRATEGY AND METHODOLOGY

Test Positions for Device Operating Next to a Person's Ear

This category includes most wireless handsets with fixed, retractable or internal antennas located toward the top half of the device, with or without a foldout, sliding or similar keypad cover. The handset should have its earpiece located within the upper ¼ of the device, either along the centerline or off-centered, as perceived by its users. This type of handset should be positioned in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point". The "test device reference point" should be located at the same level as the center of the earpiece region. The "vertical centerline" should bisect the front surface of the handset at its top and bottom edges. A "ear reference point" is located on the outer surface of the head phantom on each ear spacer. It is located 1.5 cm above the center of the ear canal entrance in the "phantom reference plane" defined by the three lines joining the center of each "ear reference point" (left and right) and the tip of the mouth.

A handset should be initially positioned with the earpiece region pressed against the ear spacer of a head phantom. For the SCC-34/SC-2 head phantom, the device should be positioned parallel to the "N-F" line defined along the base of the ear spacer that contains the "ear reference point". For interim head phantoms, the device should be positioned parallel to the cheek for maximum RF energy coupling. The "test device reference point" is aligned to the "ear reference point" on the head phantom and the "vertical centerline" is aligned to the "phantom reference plane". This is called the "initial ear position". While maintaining these three alignments, the body of the handset is gradually adjusted to each of the following positions for evaluating SAR:





Cheek/Touch Position

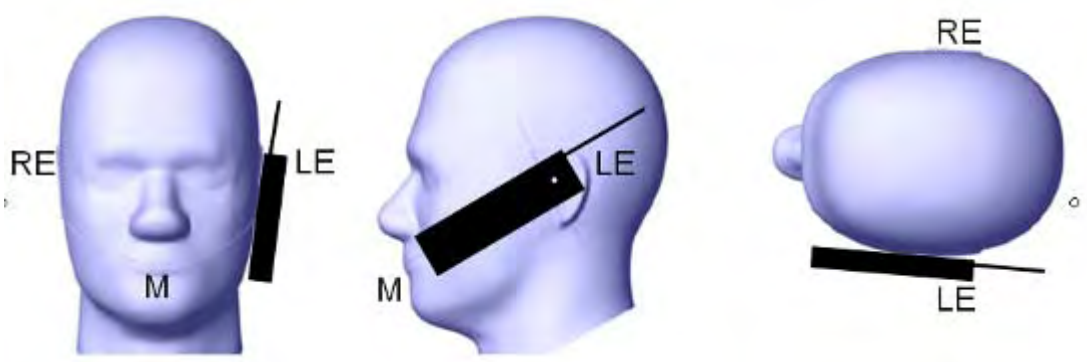
The device is brought toward the mouth of the head phantom by pivoting against the “ear reference point” or along the “N-F” line for the SCC-34/SC-2 head phantom.

This test position is established:

- When any point on the display, keypad or mouthpiece portions of the handset is in contact with the phantom.
- (or) When any portion of a foldout, sliding or similar keypad cover opened to its intended self-adjusting normal use position is in contact with the cheek or mouth of the phantom.

For existing head phantoms – when the handset loses contact with the phantom at the pivoting point, rotation should continue until the device touches the cheek of the phantom or breaks its last contact from the ear spacer.

Check /Touch Position



Ear/Tilt Position

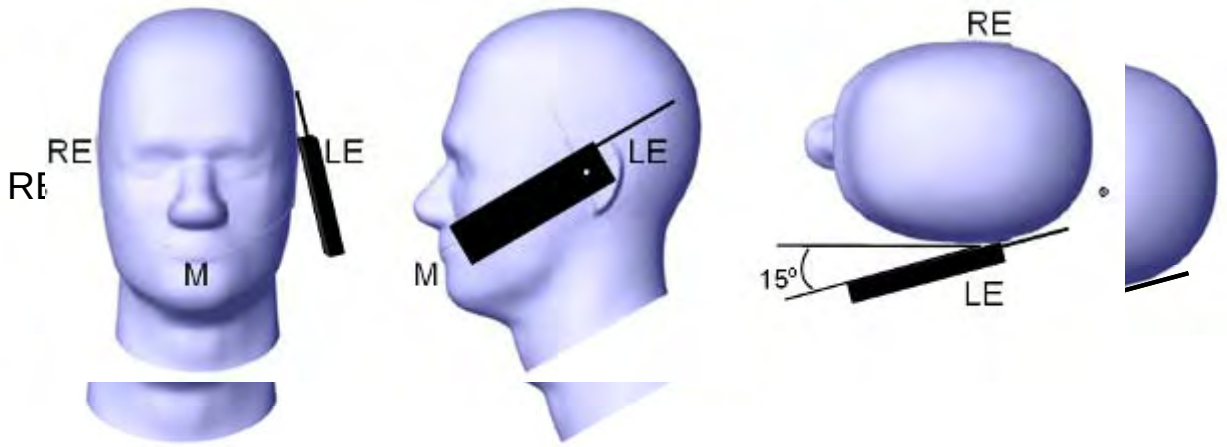
With the handset aligned in the “Cheek/Touch Position”:

1) If the earpiece of the handset is not in full contact with the phantom’s ear spacer (in the “Cheek/Touch position”) and the peak SAR location for the “Cheek/Touch” position is located at the ear spacer region or corresponds to the earpiece region of the handset, the device should be returned to the “initial ear position” by rotating it away from the mouth until the earpiece is in full contact with the ear spacer.

2) (otherwise) The handset should be moved (translated) away from the cheek perpendicular to the line passes through both “ear reference points” (note: one of these ear reference points may not physically exist on a split head model) for approximate 2-3 cm. While it is in this position, the device handset is tilted away from the mouth with respect to the “test device reference point” until the inside angle between the vertical centerline on the front surface of the phone and the horizontal line passing through the ear reference point is by 15 80°. After the tilt, it is then moved (translated) back toward the head perpendicular to the line passes through both “ear reference points” until the device touches the phantom or the ear spacer. If the antenna touches the head first, the positioning process should be repeated with a tilt angle less than 15° so that the device and its antenna would touch the phantom simultaneously. This test position may require a device holder or positioner to achieve the translation and tilting with acceptable positioning repeatability.

If a device is also designed to transmit with its keypad cover closed for operating in the head position, such positions should also be considered in the SAR evaluation. The device should be tested on the left and right side of the head phantom in the "Cheek/Touch" and "Ear/Tilt" positions. When applicable, each configuration should be tested with the antenna in its fully extended and fully retracted positions. These test configurations should be tested at the high, High and low frequency channels of each operating mode; for example, AMPS, CDMA, and TDMA. If the SAR measured at the High channel for each test configuration (left, right, Cheek/Touch, Tile/Ear, extended and retracted) is at least 2.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s). If the transmission band of the test device is less than 10 MHz, testing at the high and low frequency channels is optional.

Ear /Tilt 15° Position



Test positions for body-worn and other configurations

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device. When multiple accessories that do not contain metallic components are supplied with the device, the device may be tested with only the accessory that dictates the closest spacing to the body. When multiple accessories that contain metallic components are supplied with the device, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (e.g., the same metallic belt-clip used with different holsters with no other metallic components), only the accessory that dictates the closest spacing to the body must be tested.

Body-worn accessories may not always be supplied or available as options for some devices that are intended to be authorized for body-worn use. A separation distance of 1.5 cm between the back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances. Other separation distances may be used, but they should not exceed 2.5 cm. In these cases, the device may use body-worn accessories that provide a separation distance greater than that tested for the device provided however that the accessory contains no metallic components.

SAR Evaluation Procedure

The evaluation was performed with the following procedure:

Step 1: Measurement of the SAR value at a fixed location above the ear point or central position was used as a reference value for assessing the power drop. The SAR at this point is measured at the start of the test and then again at the end of the testing.

Step 2: The SAR distribution at the exposed side of the head was measured at a distance of 4 mm from the inner surface of the shell. The area covered the entire dimension of the head or EUT and the horizontal grid spacing was 15 mm x 15 mm. Based on these data, the area of the maximum absorption was determined by spline interpolation. The first Area Scan covers the entire dimension of the EUT to ensure that the hotspot was correctly identified.

Step 3: Around this point, a volume of 30 mm x 30 mm x 21 mm was assessed by measuring 5 x 5 x 7 points. On the basis of this data set, the spatial peak SAR value was evaluated under the following procedure:

1) The data at the surface were extrapolated, since the center of the dipoles is 1.2 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

2) The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed by the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one dimensional splines with the “Not a knot"-condition (in x, y and z-directions). The volume was integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the averages.

All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement of the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation was repeated.

SAR MEASUREMENT RESULTS

According with KDB D02 SAR Procedures for Dongle, USB dongle should be tested four figures: A: Horizontal-Up, B: Horizontal-Down, C: Vertical-Front, D: Vertical-Back. According with KDB 447498 D01,When the SAR procedures require multiple channels to be tested and the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required. The EUT is commanded to operate at maximum transmitting power. The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the manufacturer. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the handset.
The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the handset by at least 35 dB.

This page summarizes the results of the performed dosimetric evaluation. The plots with the corresponding SAR distributions, which reveal information about the location of the maximum SAR with respect to the device, could be found in Appendix C.

SAR Test Data

Environmental Conditions

Temperature:	21° C
Relative Humidity:	54%
ATM Pressure:	1005 mbar

** Testing was performed on 2011-05-19.*

RESULTS

Band	Phantom Configurations	Antenna Type	Liquid	Accessories	SAR (W/kg) Limit:1.6W/Kg Device Test channel & Plot			
					Low Channel	Middle Channel	High Channel	Ref. Meas.#
802.11B	Body-Figure A	Integral	Body	-	/	/	0.254	2
	Body-Figure B	Integral	Body	-	/	/	0.181	3
	Body-Figure C	Integral	Body	-	/	/	0.126	4
	Body-Figure D	Integral	Body	-	/	/	0.101	5
802.11G	Body-Figure A	Integral	Body	-	/	/	0.215	6
	Body-Figure B	Integral	Body	-	/	/	0.217	7
	Body-Figure C	Integral	Body	-	/	/	0.174	8
	Body-Figure D	Integral	Body	-	/	/	0.185	9
802.11N	Body-Figure A	Integral	Body	-	/	/	0.255	10
	Body-Figure B	Integral	Body	-	/	/	0.224	11
	Body-Figure C	Integral	Body	-	/	/	0.208	12
	Body-Figure D	Integral	Body	-	/	/	0.264	13

APPENDIX A – MEASUREMENT UNCERTAINTY

The uncertainty budget has been determined for the measurement system and is given in the following Table.

Exposure Assessment Measurement Uncertainty

Source of Uncertainty	Tolerance Value	Probability Distribution	Divisor	c_i^1 (1-g)	c_i^1 (10-g)	Standard Uncertainty (1-g) %	Standard Uncertainty (10-g) %
Measurement System							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1\text{-cp})^{1/2}$	$(1\text{-cp})^{1/2}$	1.5	1.5
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	$\sqrt{cp}$	$\sqrt{cp}$	4.4	4.4
Boundary Effect	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	rectangular	$\sqrt{3}$	1	1	2.7	2.7
Detection Limit	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Readout Electronics	1.0	normal	1	1	1	1.0	1.0
Response Time	0.8	rectangular	$\sqrt{3}$	1	1	0.5	0.5
Integration Time	1.7	rectangular	$\sqrt{3}$	1	1	1.0	1.0
RF Ambient Condition	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech.	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2
Restriction							
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1
Test Sample Positioning	4.0	normal	1	1	1	4.0	4.0
Device Holder Uncertainty	2.0	normal	1	1	1	2.0	2.0
Drift of Output Power	3.2	rectangular	$\sqrt{3}$	1	1	1.8	1.8
Phantom and Setup							
Phantom Uncertainty(shape & thickness tolerance)	3.4	rectangular	$\sqrt{3}$	1	1	2.0	2.0
Liquid Conductivity(target)	5.0	rectangular	$\sqrt{3}$	0.7	0.5	2.0	1.4
Liquid Conductivity(meas.)	0.0	normal	1	0.7	0.5	0.0	0.0
Liquid Permittivity(target)	5.0	rectangular	$\sqrt{3}$	0.6	0.5	1.7	1.4
Liquid Permittivity(meas.)	0.0	normal	1	0.6	0.5	0.0	0.0
Combined Uncertainty		RSS				9.4	9.2
Combined Uncertainty (coverage factor=2)		Normal(k=2)				18.8	18.5

APPENDIX B –SAR SYSTEM VALIDATION DATA

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: 19/05/2011
Measurement duration: 7 minutes 34 seconds

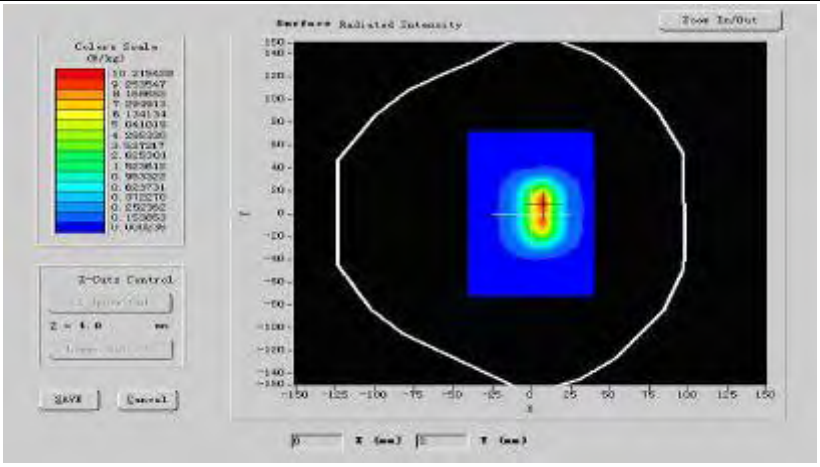
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	
Band	2450MHz
Channels	
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2450.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	0.570000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

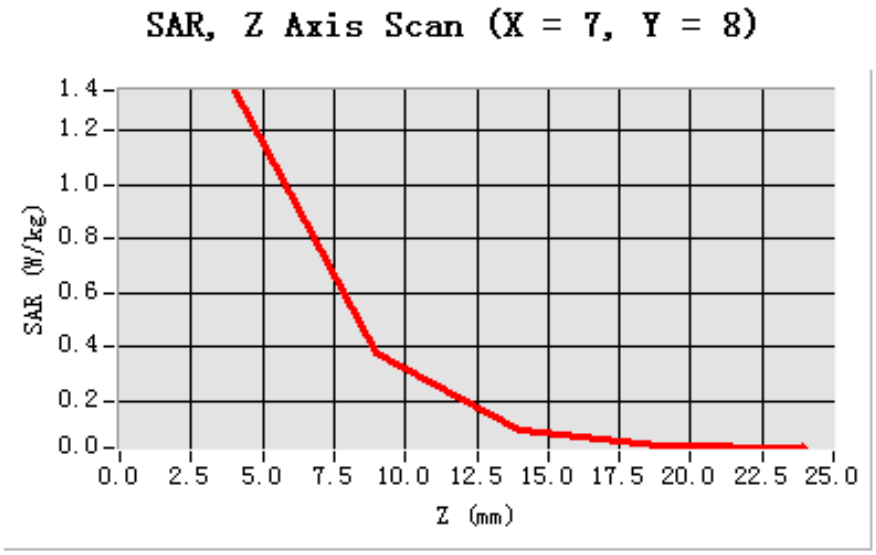
SURFACE SAR


Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	7.077634
SAR 1g (W/Kg)	12.988772

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	1.3503	0.3791	0.0904	0.0338	0.0000	1.3503



APPENDIX C – EUT SCAN RESULTS

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: 19/05/2011
Measurement duration: 7 minutes10 seconds

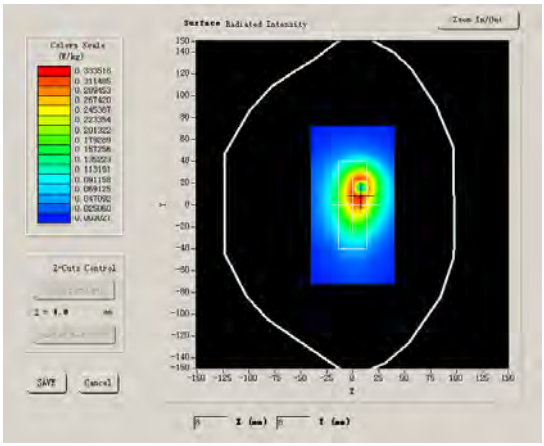
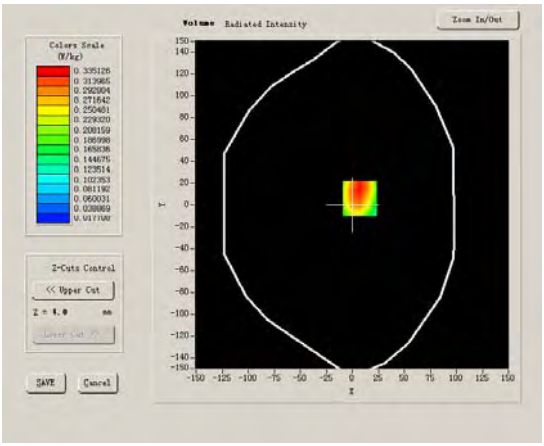
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	802.11 b
Channels	High
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2462.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	-1.240000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

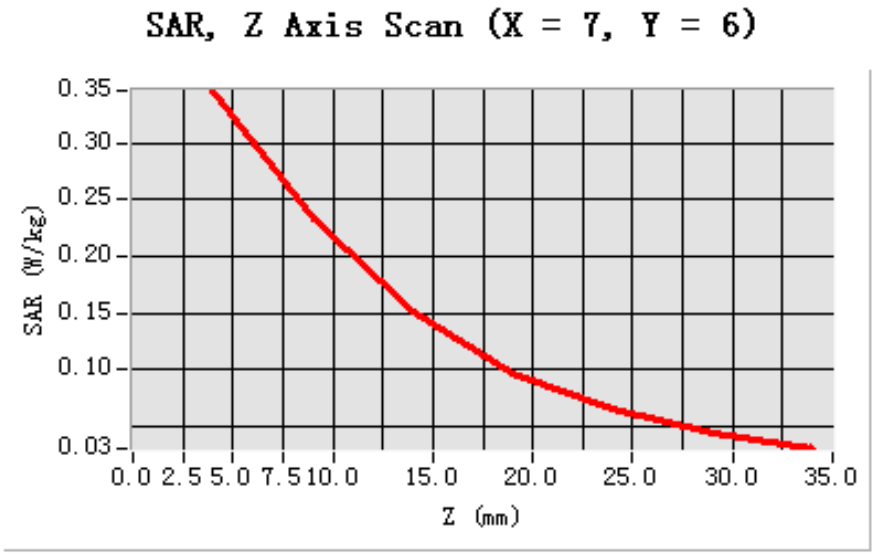
SURFACE SAR	VOLUME SAR
	

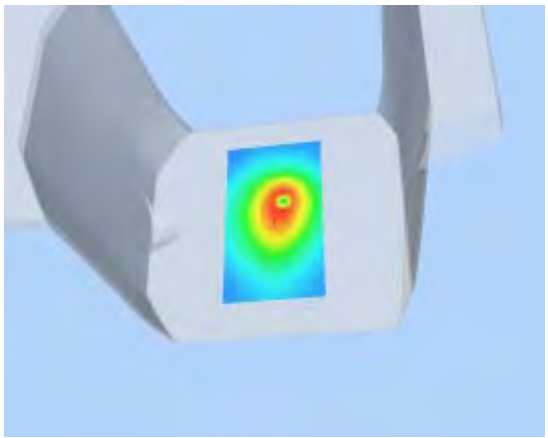
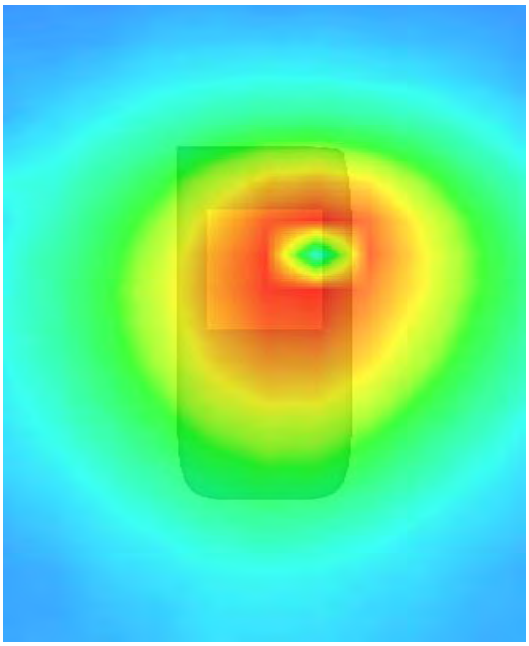
Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	0.136313
SAR 1g (W/Kg)	0.254388

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	03289	0.2200	0.1212	0.0906	0.0528	0.0429



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: 19/05/2011
Measurement duration: 7 minutes 22 seconds

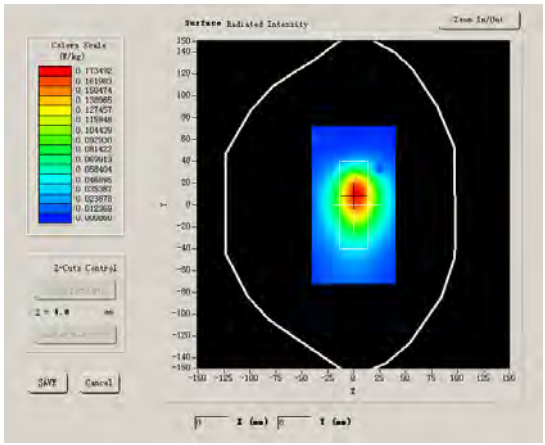
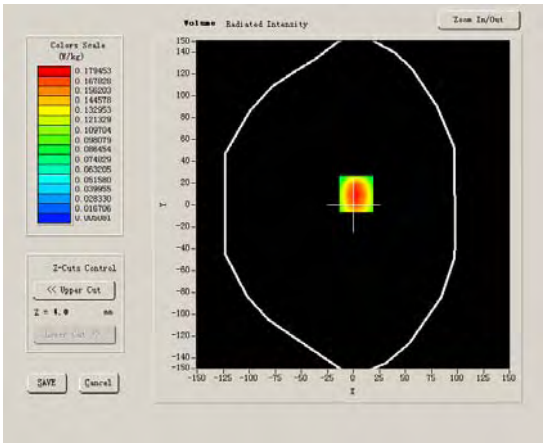
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	802.11 b
Channels	High
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2462.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	1.540000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

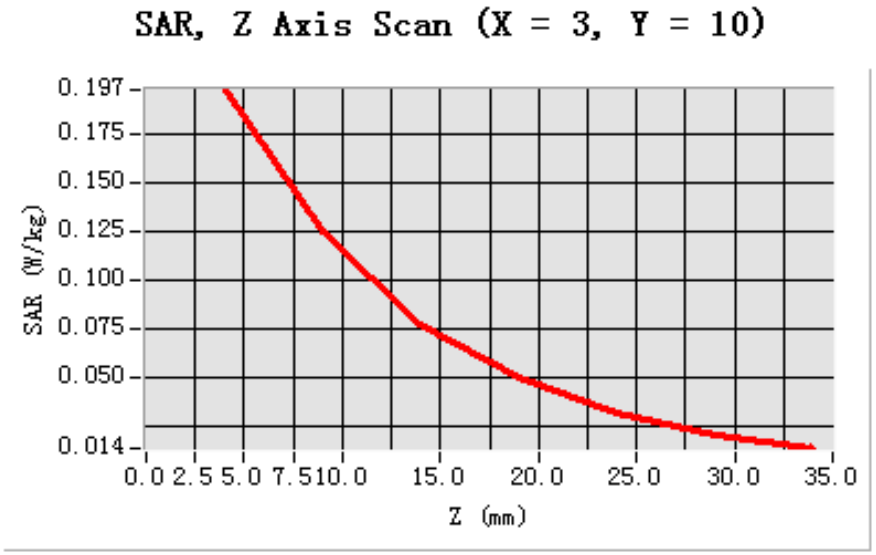
SURFACE SAR	VOLUME SAR
	

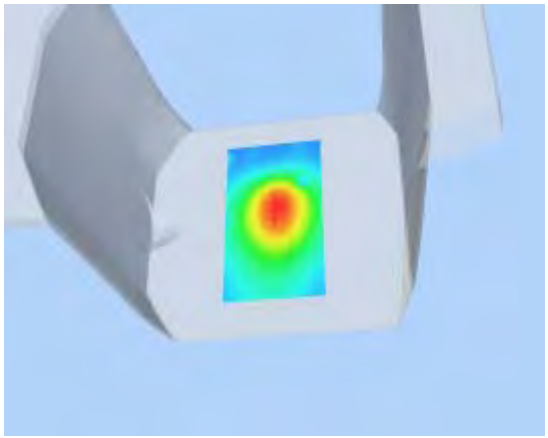
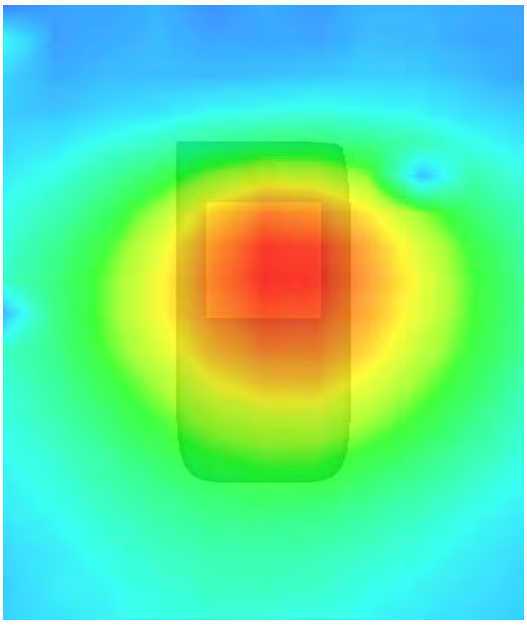
Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	0.094367
SAR 1g (W/Kg)	0.181292

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.1970	0.1248	0.0779	0.0503	0.0327	0.0208



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: 19/05/2011
Measurement duration: 7 minutes 31 seconds

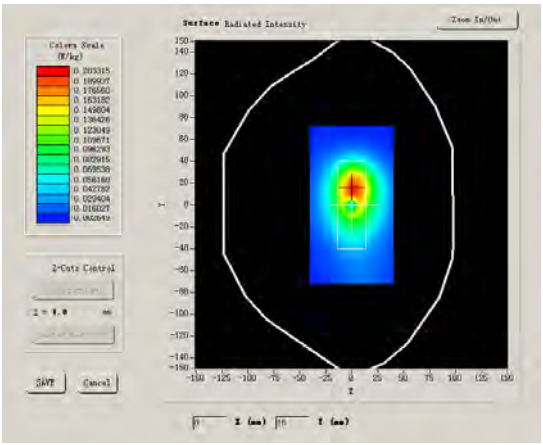
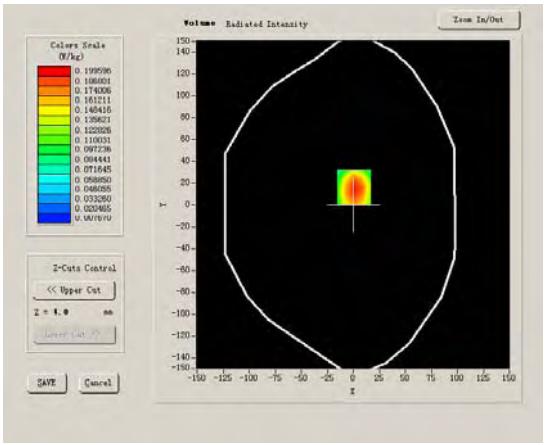
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	802.11 b
Channels	High
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2462.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	2.110000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

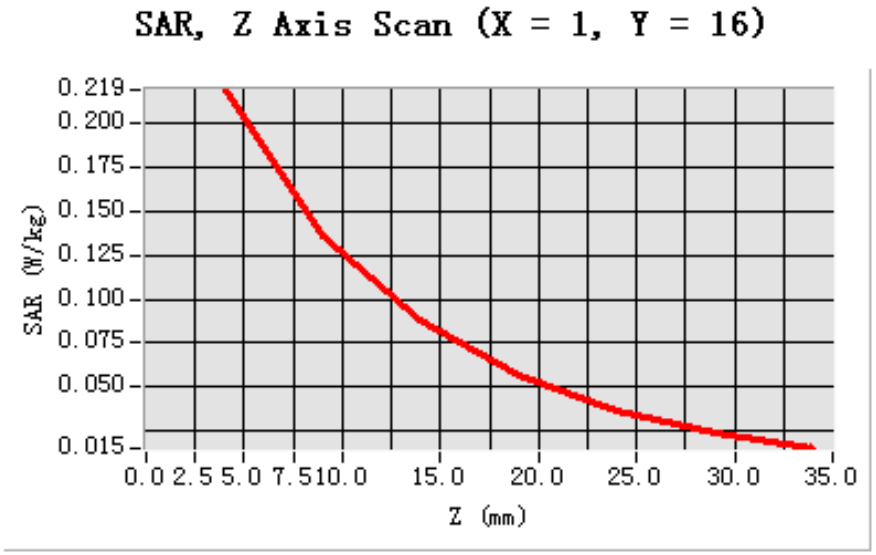
SURFACE SAR	VOLUME SAR
	

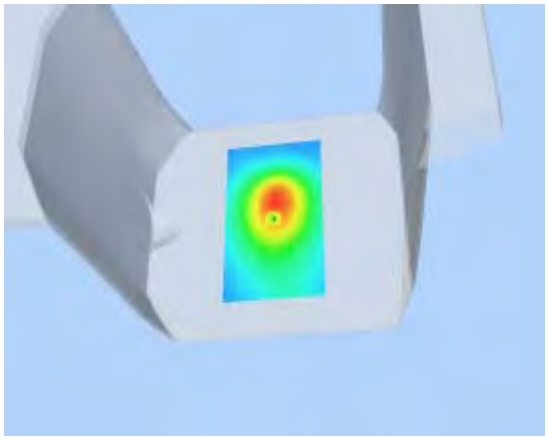
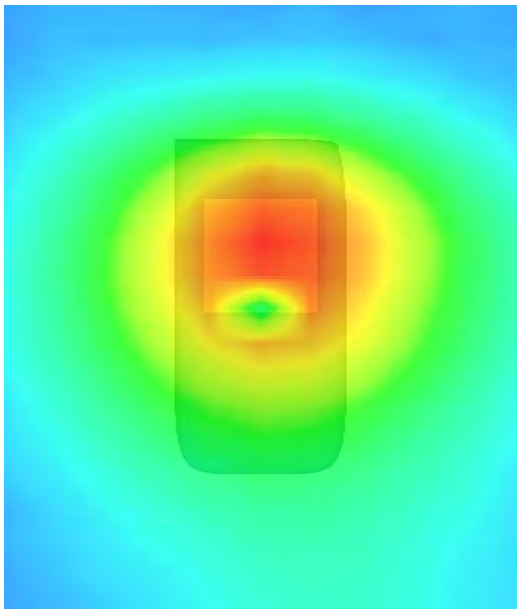
Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	0.080355
SAR 1g (W/Kg)	0.125743

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.2191	0.1357	0.0880	0.0563	0.0363	0.0238



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: 19/05/2011
Measurement duration: 7 minutes 33 seconds

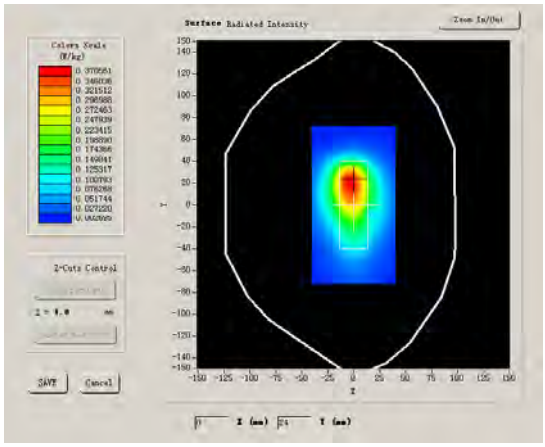
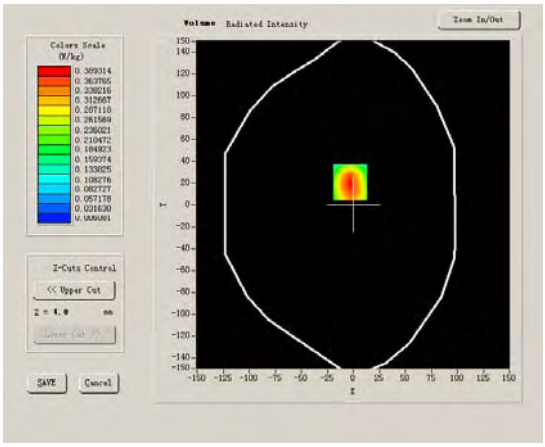
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	802.11 b
Channels	High
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2462.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	-1.470000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

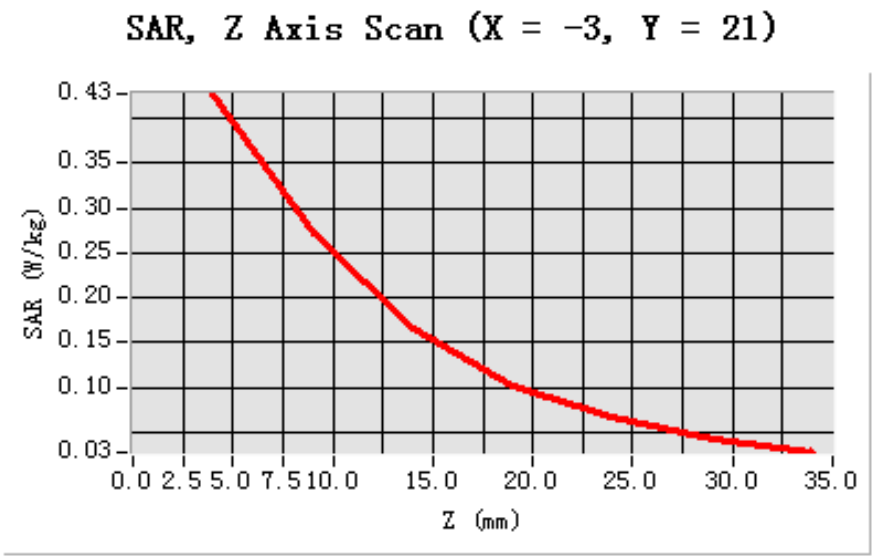
SURFACE SAR	VOLUME SAR
	

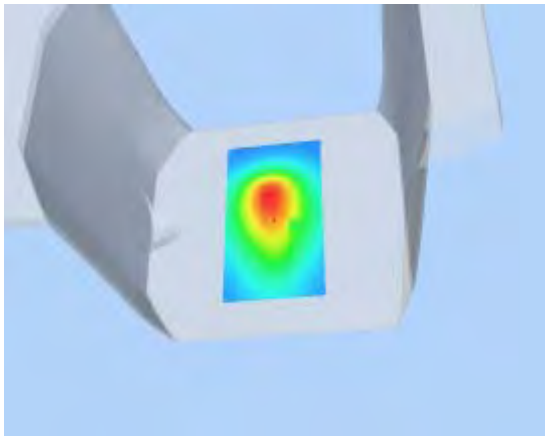
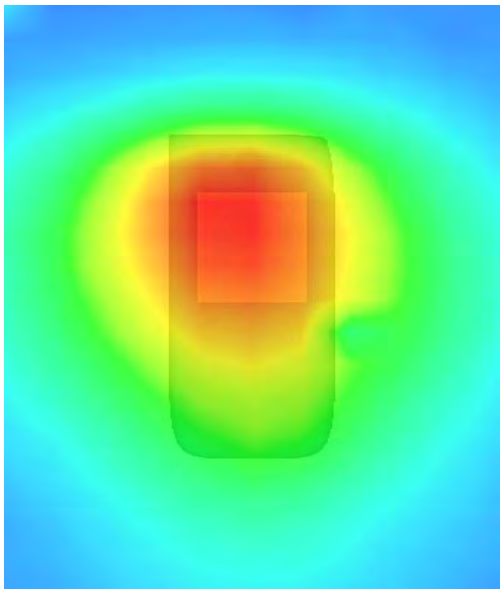
Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	0.068459
SAR 1g (W/Kg)	0.100881

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.4274	0.2715	0.1650	0.1015	0.0665	0.0425



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: 19/05/2011
Measurement duration: 7 minutes 27seconds

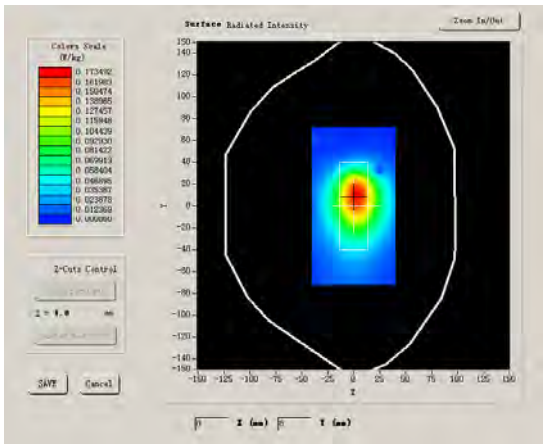
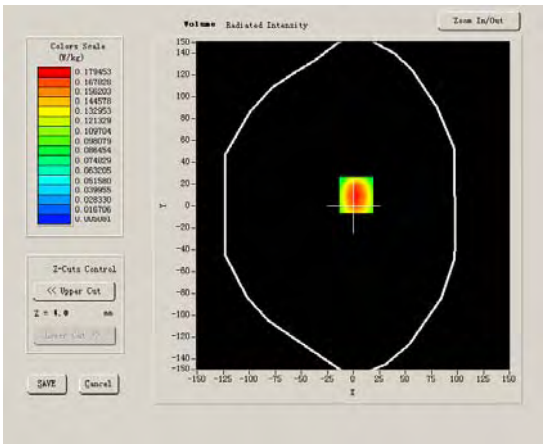
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	802.11 g
Channels	High
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2462.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	2.170000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

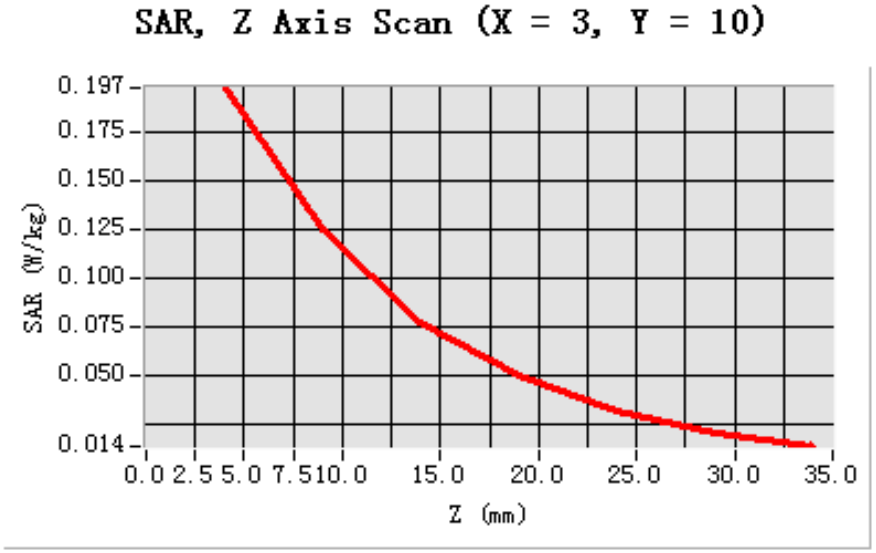
SURFACE SAR	VOLUME SAR
	

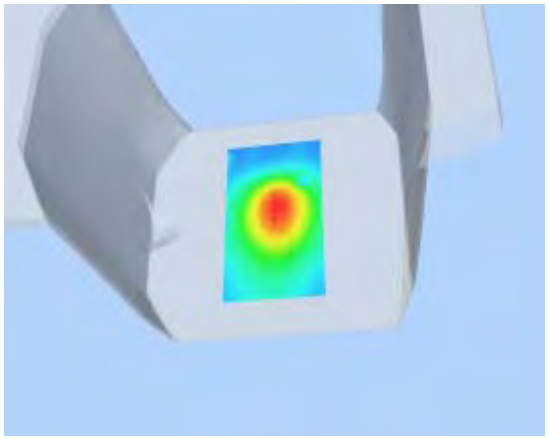
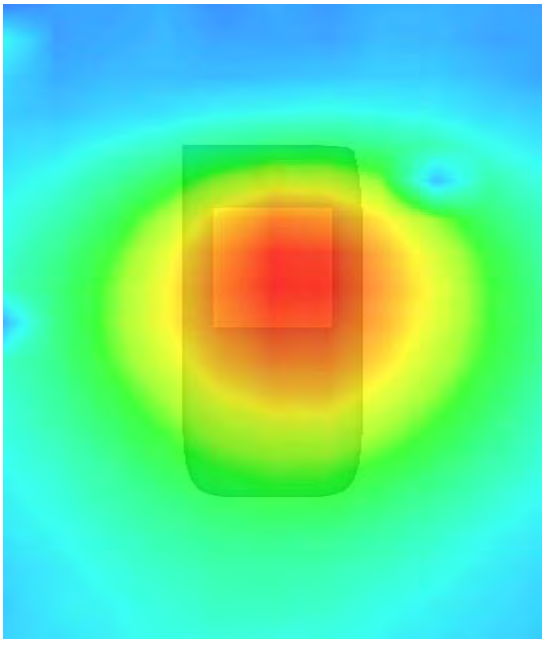
Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	0.127466
SAR 1g (W/Kg)	0.215664

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.1970	0.1248	0.0779	0.0503	0.0327	0.0208



3D sceen shot	Hot spot position
	

MEASUREMENT 7

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 19/05/2011
Measurement duration: 7 minutes 06 seconds

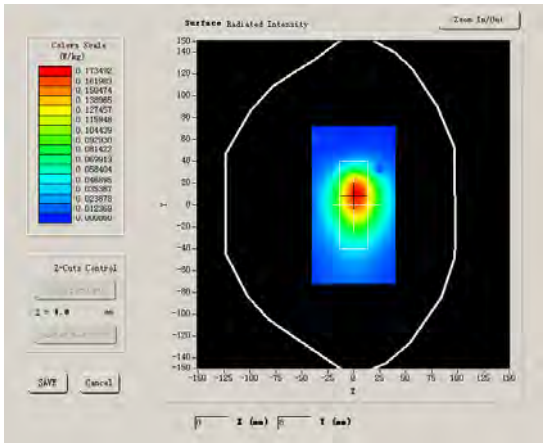
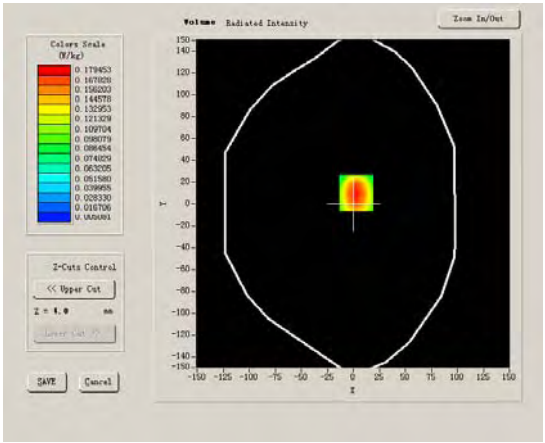
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	802.11 g
Channels	High
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2462.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	0.270000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

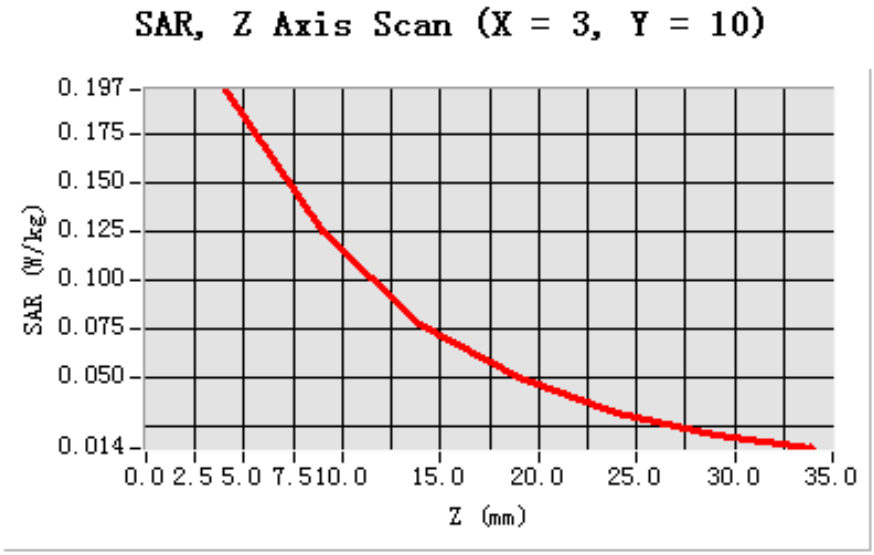
SURFACE SAR	VOLUME SAR
	

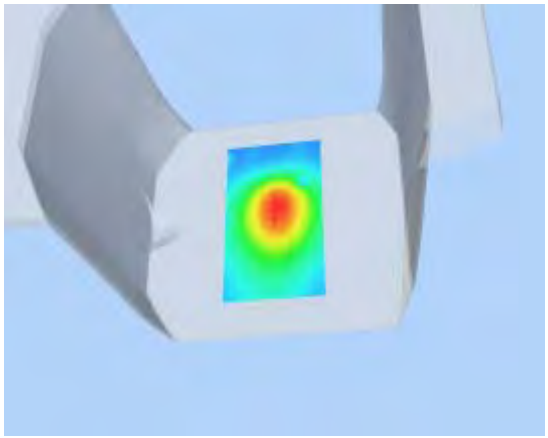
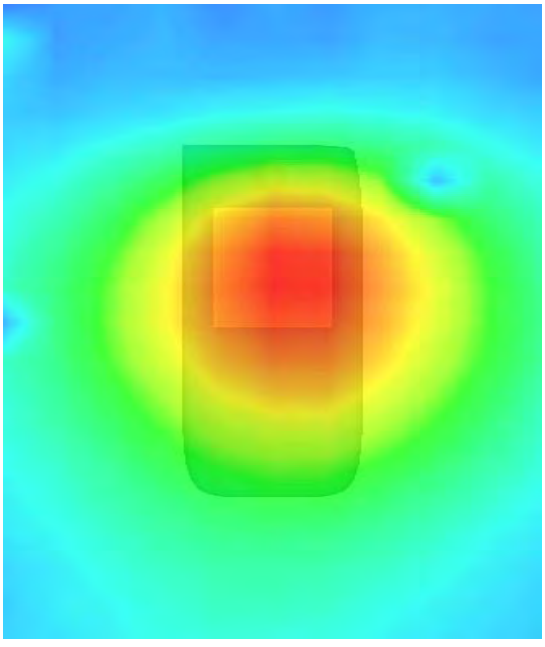
Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	0.128499
SAR 1g (W/Kg)	0.217307

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.2191	0.1357	0.0880	0.0563	0.0363	0.0238



3D sceen shot	Hot spot position
	

MEASUREMENT 8

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 19/05/2011
Measurement duration: 7 minutes 45 seconds

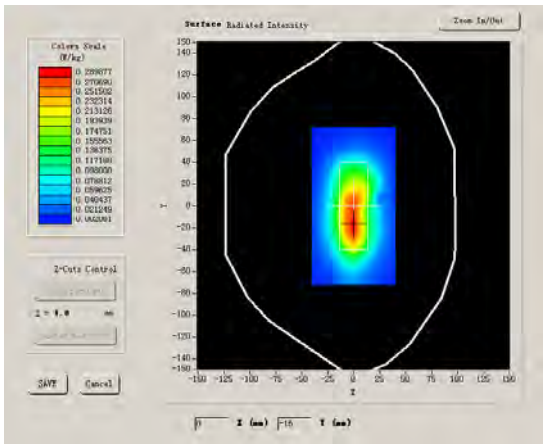
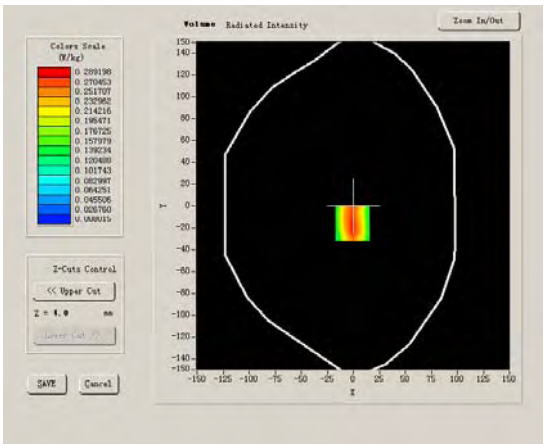
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	802.11 g
Channels	High
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2462.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	-2.010000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

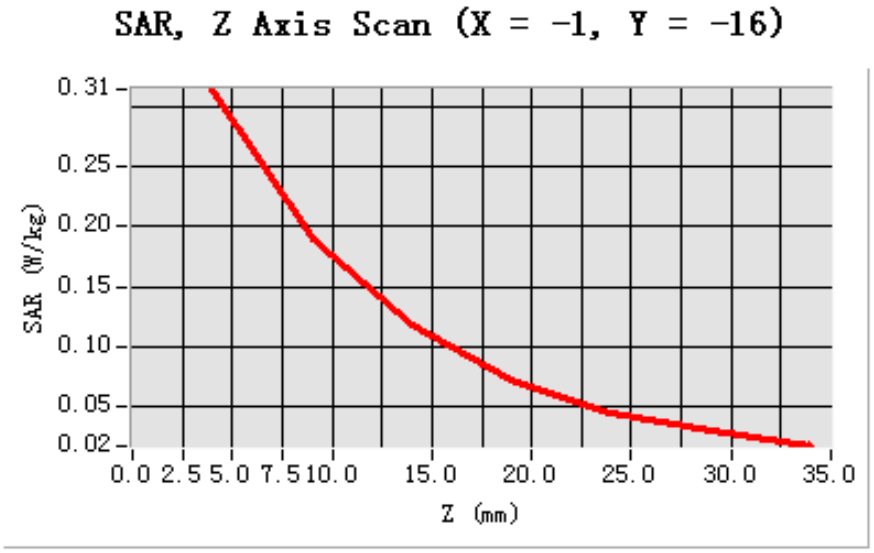
SURFACE SAR	VOLUME SAR
	

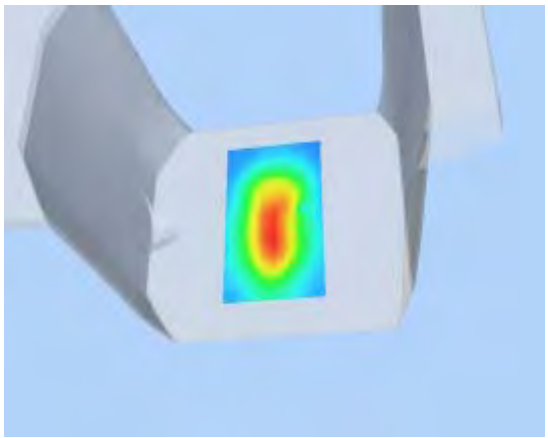
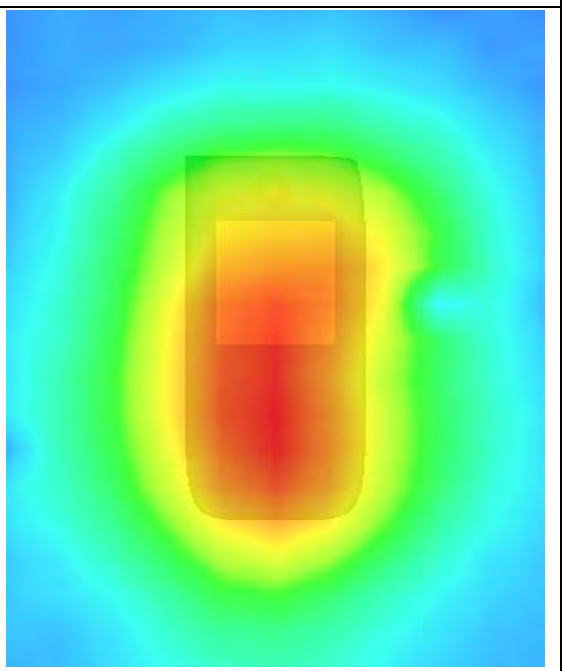
Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	0.092882
SAR 1g (W/Kg)	0.173862

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.3149	0.1901	0.1178	0.0726	0.0447	0.0291



3D sceen shot	Hot spot position
	

MEASUREMENT 9

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 19/05/2011
Measurement duration: 7 minutes 35 seconds

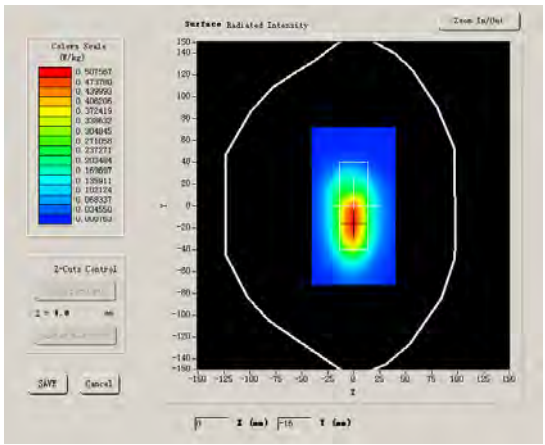
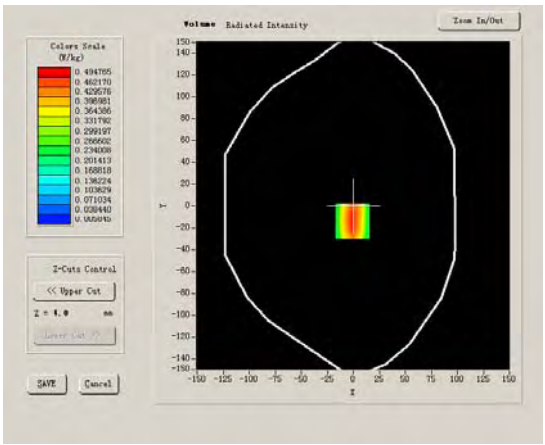
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	802.11 g
Channels	High
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2462.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	1.220000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

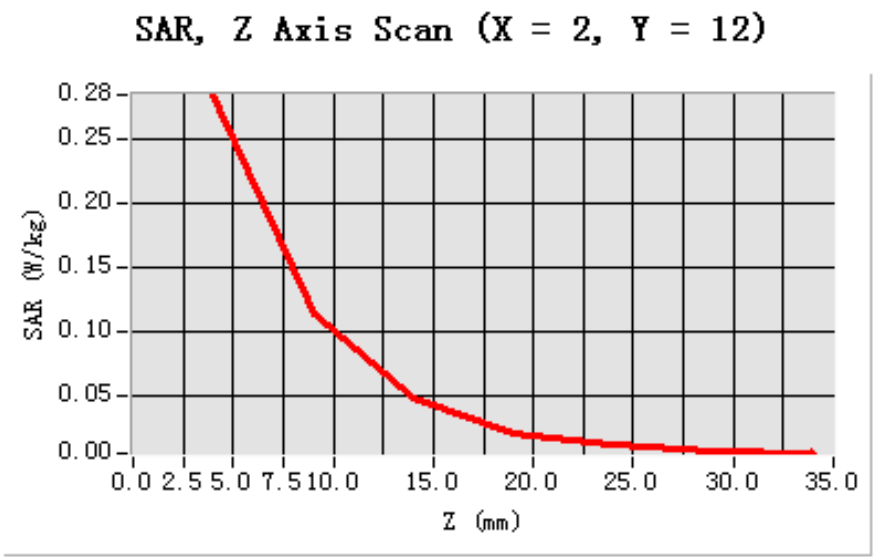
SURFACE SAR	VOLUME SAR
	

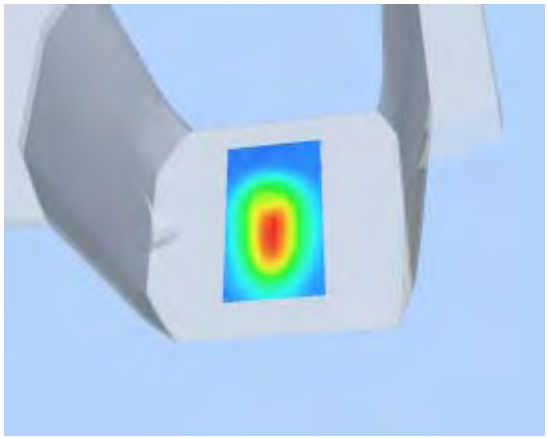
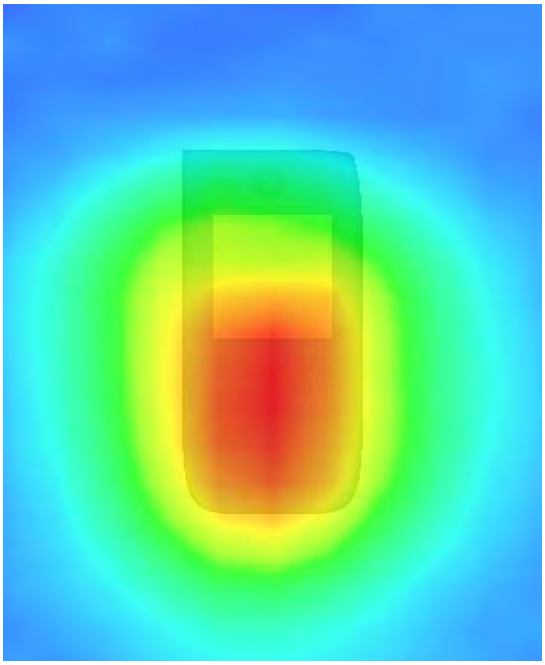
Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	0.136626
SAR 1g (W/Kg)	0.184686

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.136626	0.136626	0.136626	0.136626	0.136626	0.136626	0.136626



3D sceen shot	Hot spot position
	

MEASUREMENT 10

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 19/05/2011
Measurement duration: 7 minutes 28 seconds

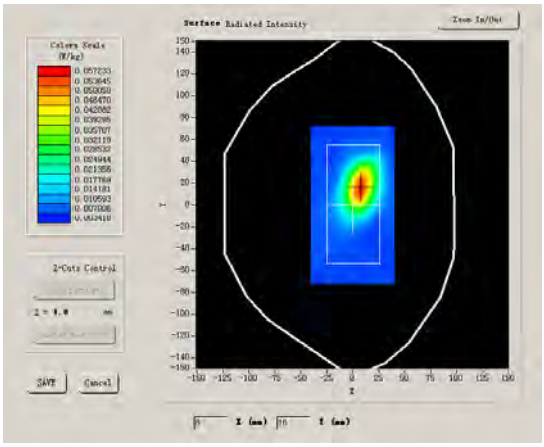
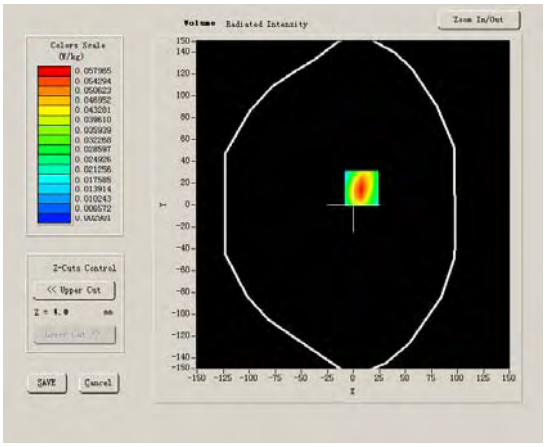
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	802.11 n
Channels	High
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2462.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	2.210000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

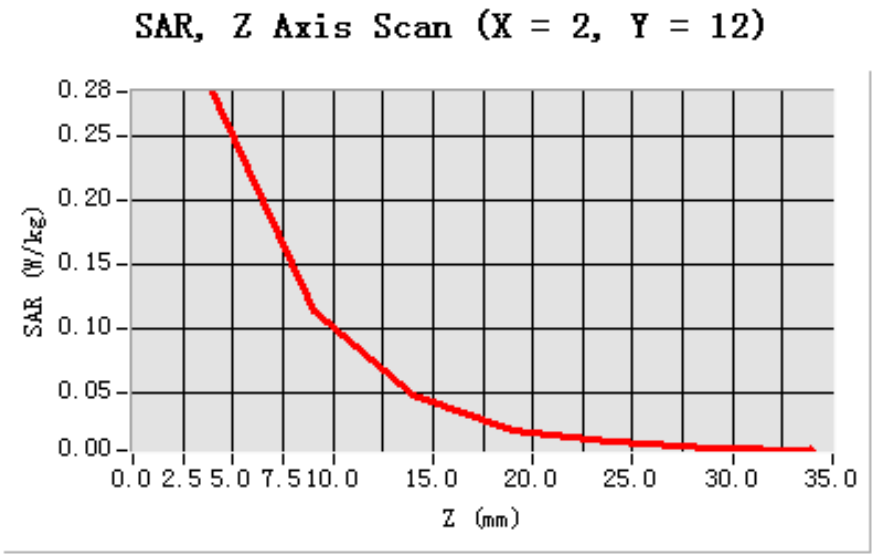
SURFACE SAR	VOLUME SAR
	

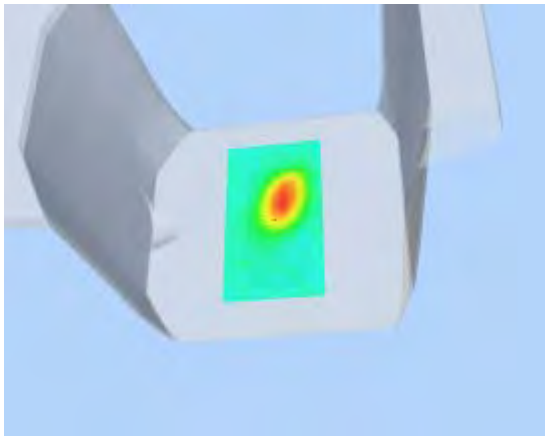
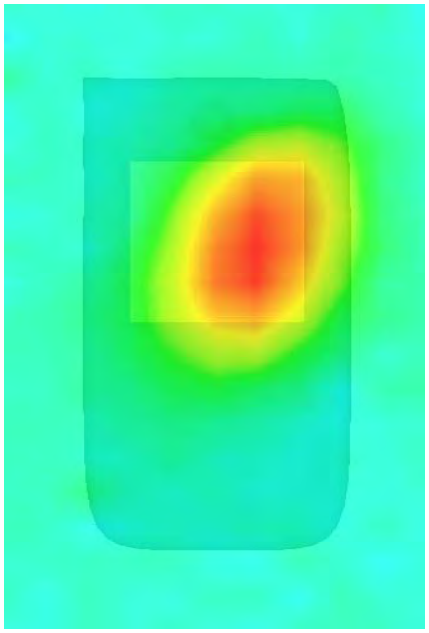
Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	0.126488
SAR 1g (W/Kg)	0.254861

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.2839	0.1128	0.0479	0.0207	0.0110	0.0071



3D sceen shot	Hot spot position
	

MEASUREMENT 11

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 19/05/2011
Measurement duration: 7 minutes 41 seconds

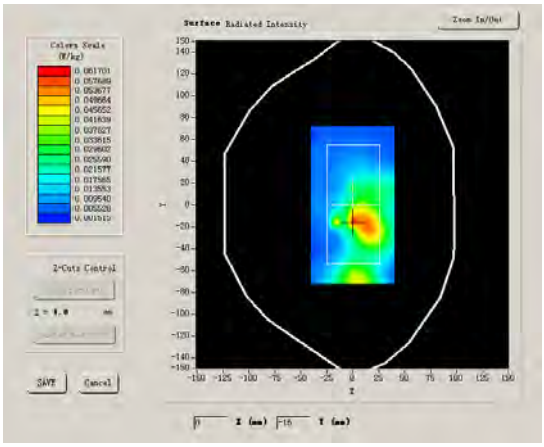
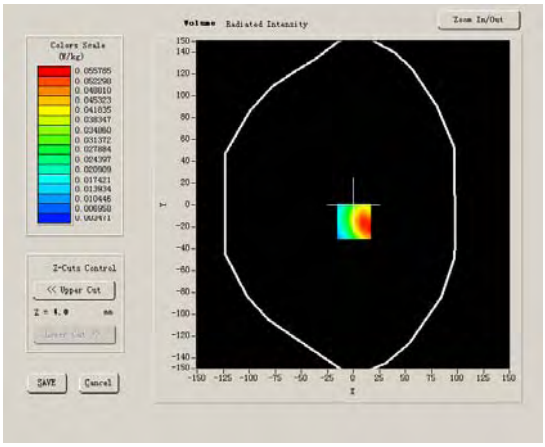
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	802.11 n
Channels	High
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2462.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	0.950000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

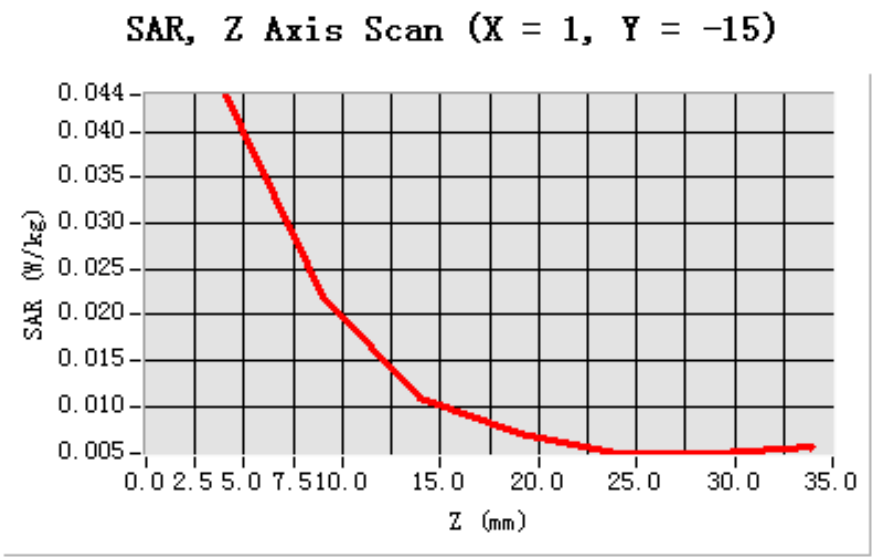
SURFACE SAR	VOLUME SAR
	

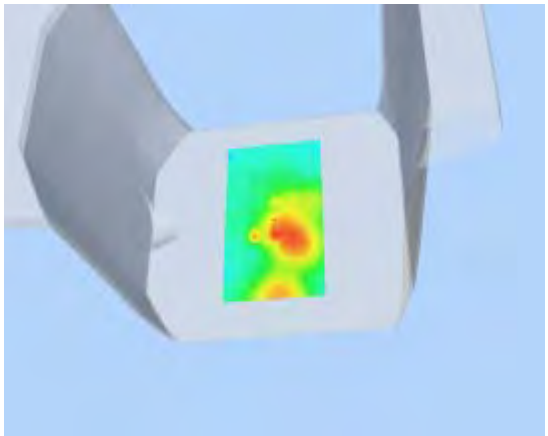
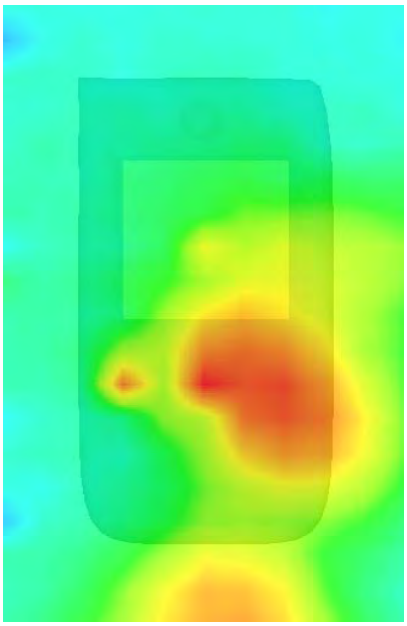
Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	0.107411
SAR 1g (W/Kg)	0.224145

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.1137	0.0517	0.0245	0.0137	0.0069	0.0070



3D sceen shot	Hot spot position
	

MEASUREMENT 12

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 19/05/2011
Measurement duration: 7 minutes 28 seconds

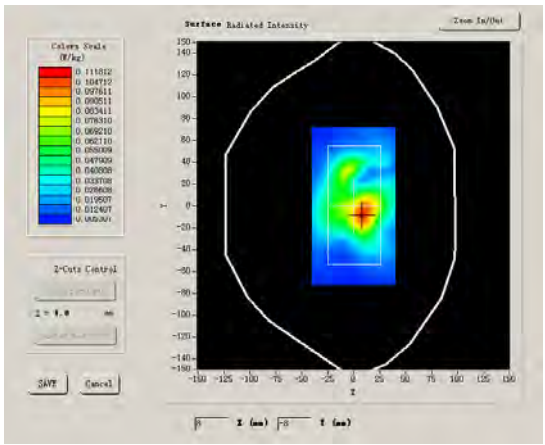
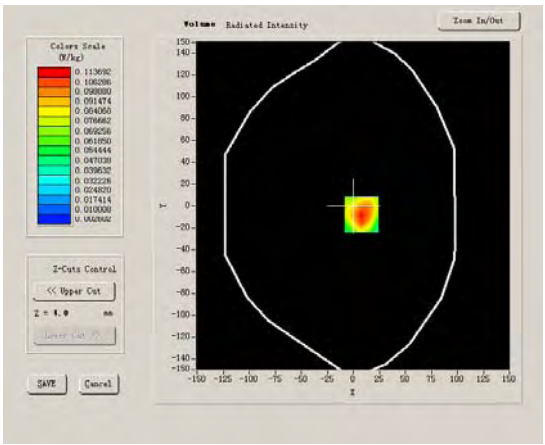
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	802.11 n
Channels	High
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2462.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	1.440000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

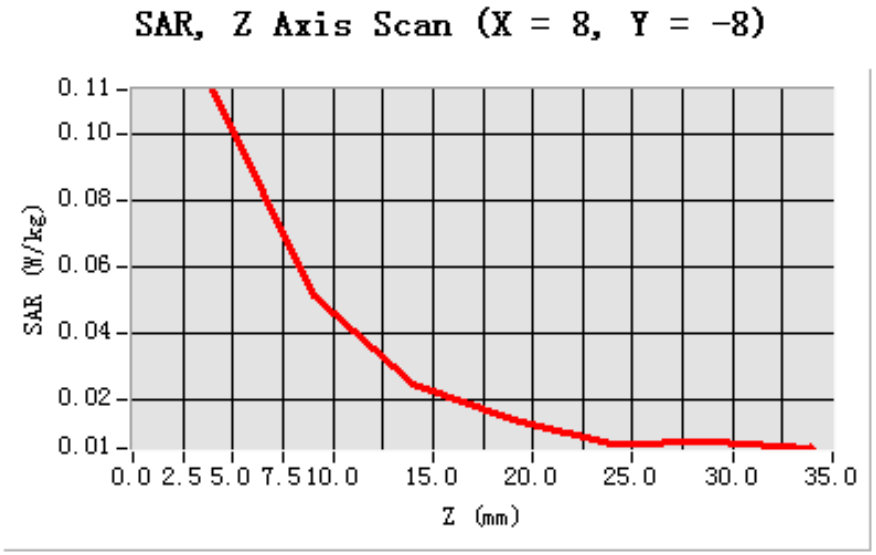
SURFACE SAR	VOLUME SAR
	

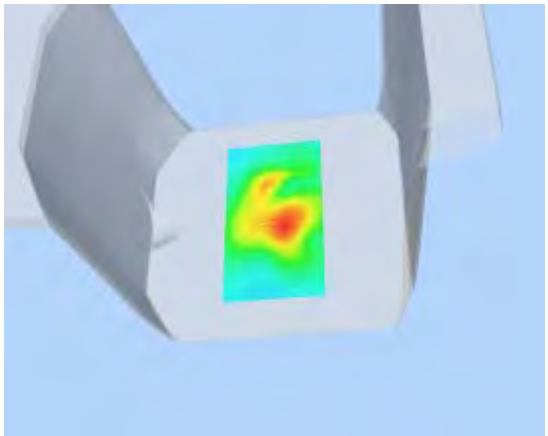
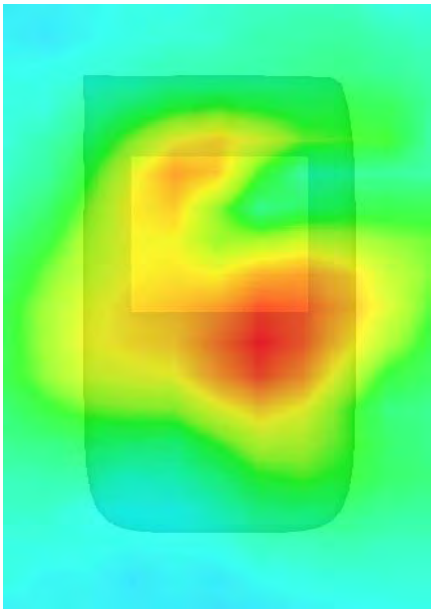
Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	0.105444
SAR 1g (W/Kg)	0.208833

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.1137	0.0517	0.0245	0.0137	0.0069	0.0070



3D sceen shot	Hot spot position
	

MEASUREMENT 13

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 19/05/2011
Measurement duration: 7 minutes 34 seconds

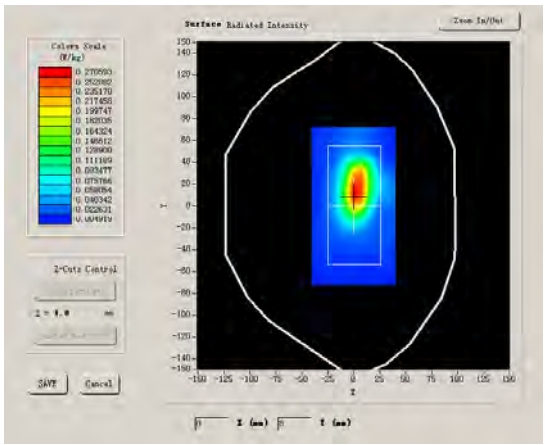
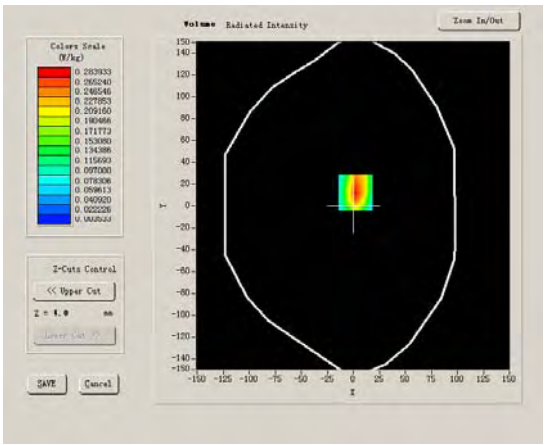
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	802.11 n
Channels	High
Signal	CW

B. B. SAR Measurement Results

Band SAR (Channel High):

Frequency (MHz)	2462.000000
Relative permittivity (real part)	51.548876
Relative permittivity	22.000000
Conductivity (S/m)	1.920014
Power drift (%)	1.420000
Ambient Temperature:	22.4°C
Liquid Temperature:	22.3°C
ConvF:	39.563,33.614,37.677
Crest factor：	1:1

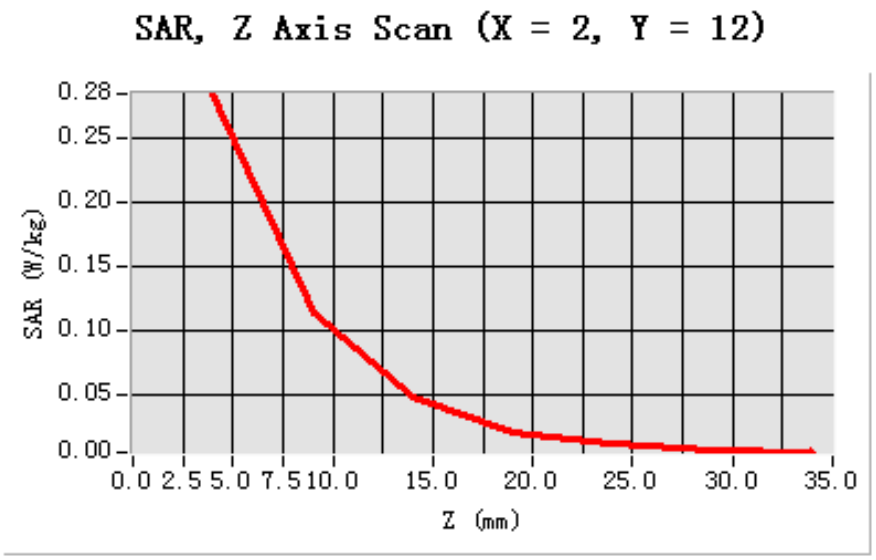
SURFACE SAR	VOLUME SAR
	

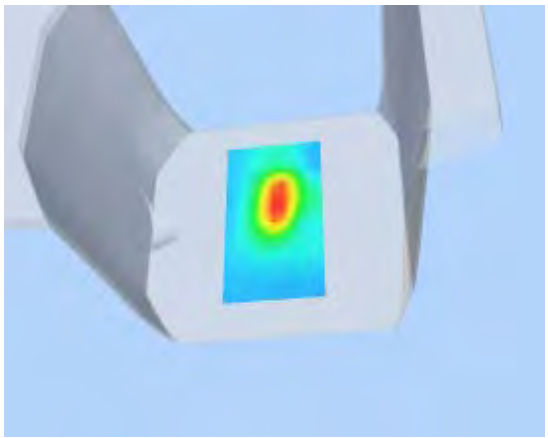
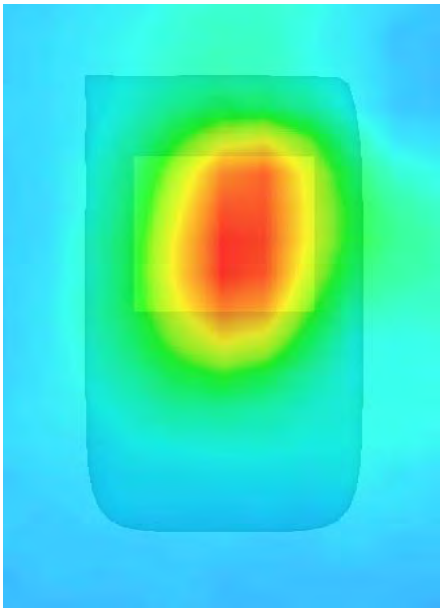
Maximum location: X=-29.00, Y=-15.00

SAR 10g (W/Kg)	0.122704
SAR 1g (W/Kg)	0.264145

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	0.2839	0.1128	0.0479	0.0207	0.0110	0.0071



3D sceen shot	Hot spot position
	

APPENDIX D – CONDUCTED OUTPUT POWER MEASUREMENT

Provision Applicable

The measured peak output power should be greater and within 5% than EMI measurement.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Test Equipment

Manufacturer	Equipment Description	Model No.	Serial No.	Calibration Date
Rohde & Schwarz	Communication Tester	CMD60	1050.9008.60	2009-10-28
Rohde & Schwarz	Spectrum Analyzer	ESCI	1166.5950.03	2009-11-28

Test Results

Band		Channel No.	Frequency (MHz)	Conducted Peak Output Power (dBm)
802.11B		1	2412	22.09
		6	2437	22.09
		11	2462	24.05
802.11G		1	2412	22.40
		6	2437	22.82
		11	2462	23.51
802.11 N	N20	1	2412	21.45
		6	2437	21.23
		11	2462	21.81
	N40	1	2422	21.05
		4	2437	20.95
		7	2452	20.90

APPENDIX E – EUT APPEARANCES PHOTOS

Figure A

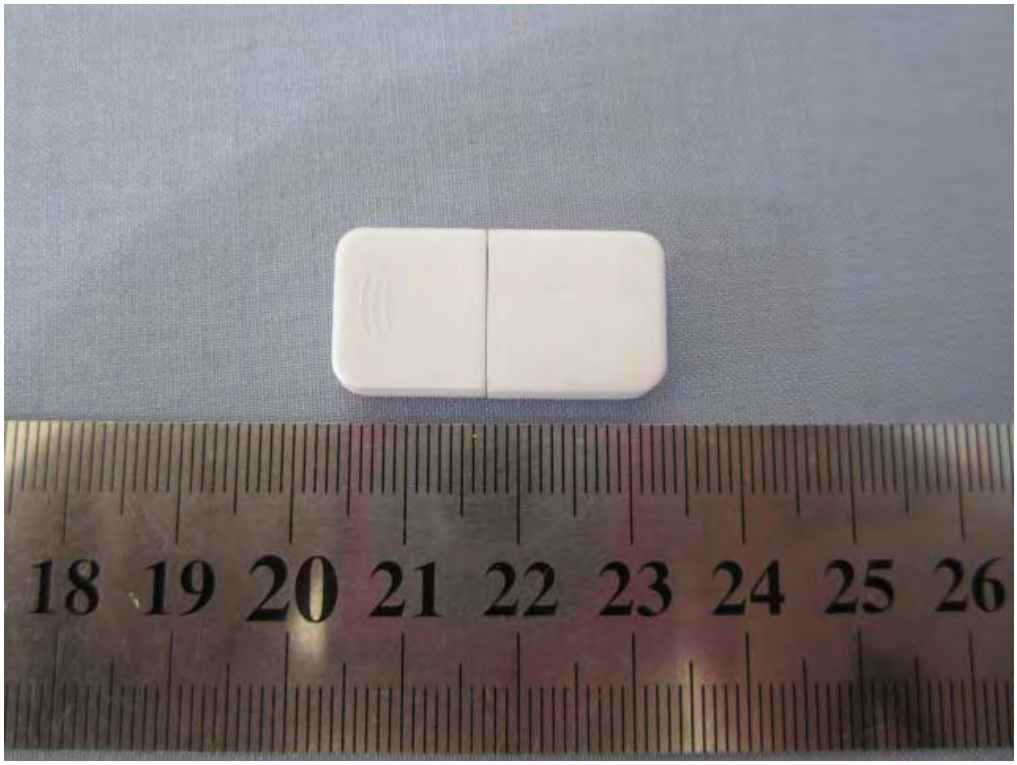
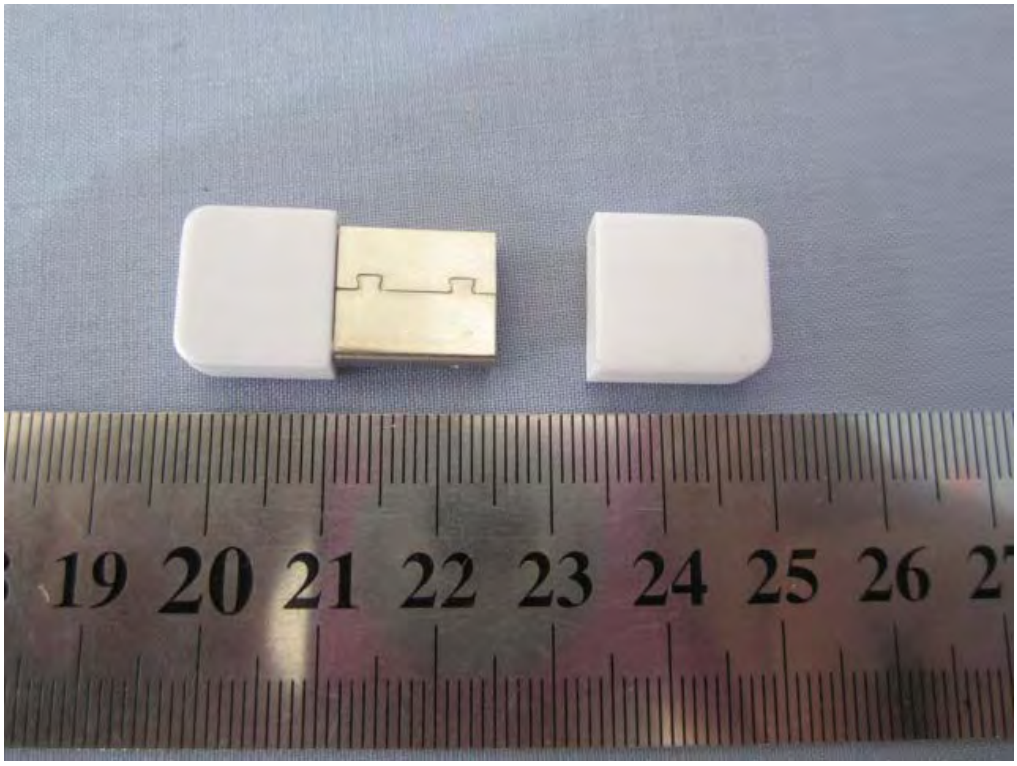


Figure B



APPENDIX F – EUT TEST POSITION PHOTOS

Figure A

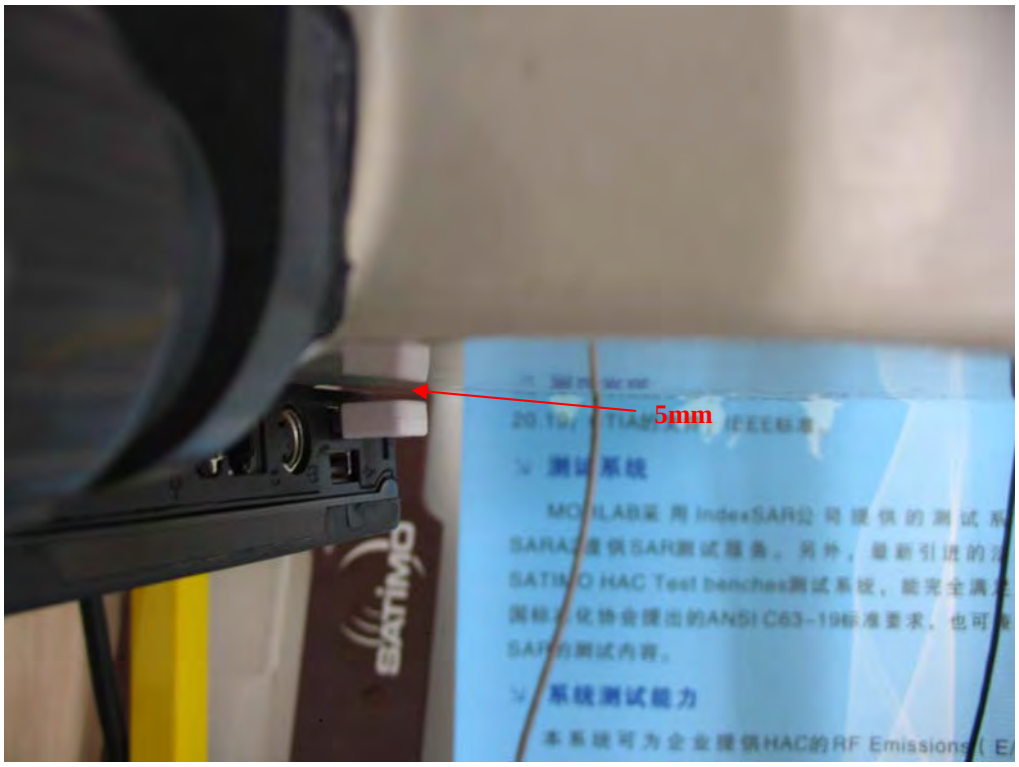


Figure B

Figure C

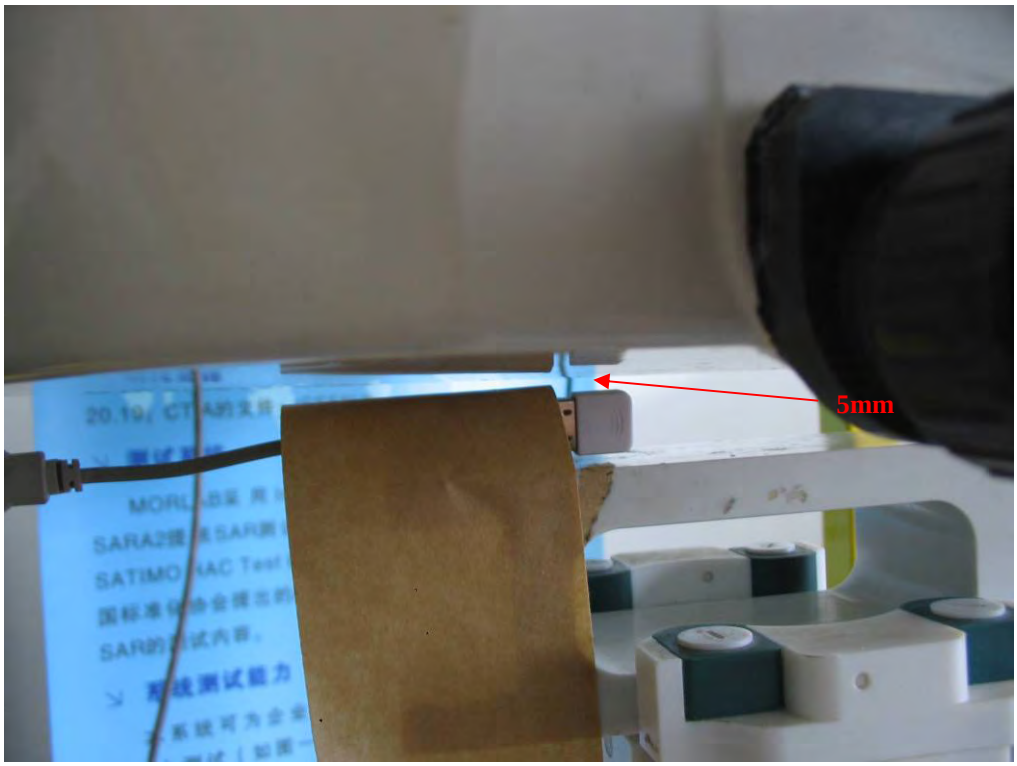
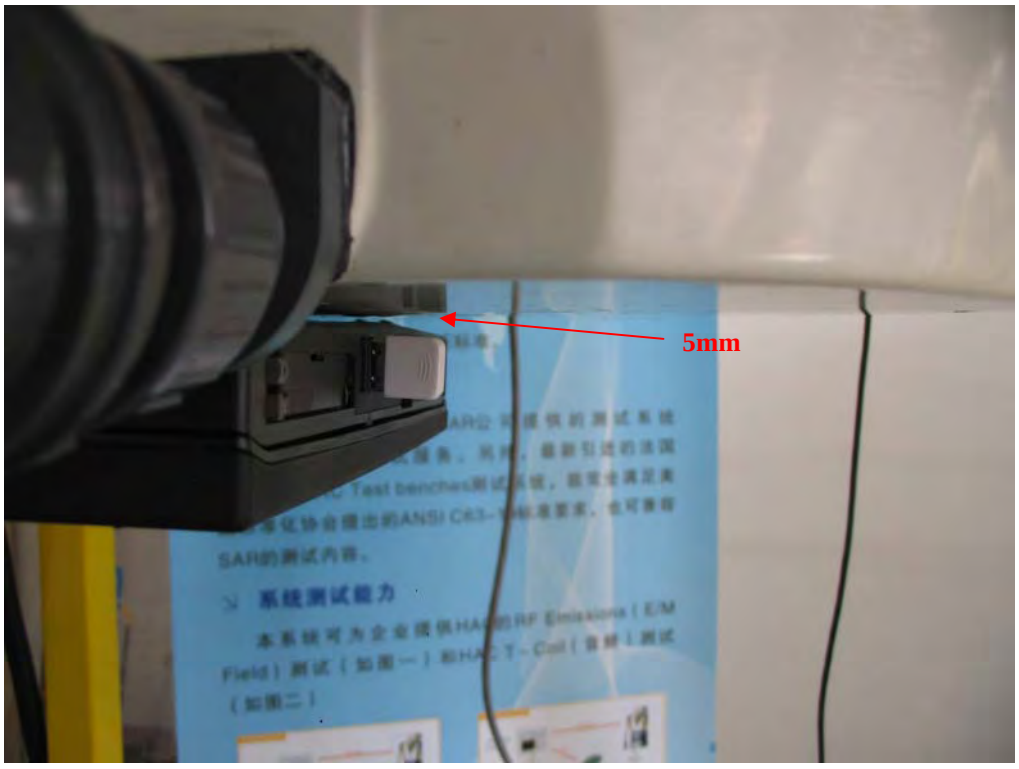
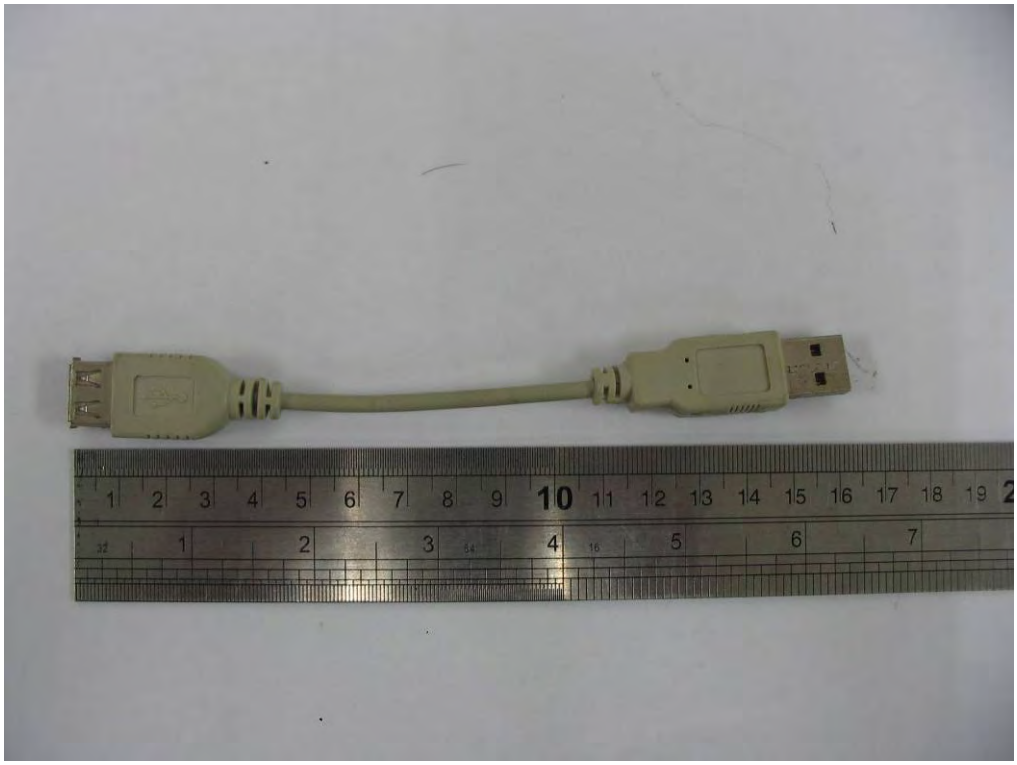


Figure D



Liquid depth>=15cm

USB Cable less than 12 inches



APPENDIX G –Dipole Calibration Report

Please refer annex A

APPENDIX H –Probe Calibration Report

Please refer annex B

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