REPORT No.：SZ18010063S01

SAR TEST REPORT

APPLICANT	:	Shenzhen Chainway Information Technology Co.,Ltd.
PRODUCT NAME	:	Mobile Data Terminal
MODEL NAME	:	C72
BRAND NAME	:	CHAINWAY
FCC ID	:	2AC6AC72
STANDARD(S)	:	47CFR 2.1093 IEEE 1528-2013
TEST DATE	:	2018-02-08 to 2018-04-14
ISSUE DATE	:	2018-04-28

Tested by: Gan Yueming(Test engineer)

Approved by: Peng Huarui (Supervisor)

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Change History		
Issue	**Date**	**Reason for change**
1.0	2018-04-28	First edition

1. Technical Information

Note: Provide by manufacturer.

1.1. Applicant and Manufacturer Information

Applicant:	Shenzhen Chainway Information Technology Co.,Ltd.
Applicant Address:	9/F, Building 2, Daqian Industrial Park, Longchang Rd., District 67, Bao'an, Shenzhen
Manufacturer:	Shenzhen Chainway Information Technology Co.,Ltd.
Manufacturer Address:	9/F, Building 2, Daqian Industrial Park, Longchang Rd., District 67, Bao'an, Shenzhen

1.2. Equipment Under Test (EUT) Description

Model Name:	C72
Brand Name:	CHAINWAY
Hardware Version:	C70SE_MB_V11
Software Version:	C72A_MT6735_V1.1_AM_GIT938ee72_20171205
Frequency Bands:	GSM850: 824.2 MHz ~ 848.8MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band II: 1852.4 MHz ~ 1907.6MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6MHz WCDMA Band V: 826.4 MHz ~ 846.6MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 17: 704 MHz ~ 716 MHz WLAN 2.4GHz: 2412 MHz ~ 2462 MHz WLAN 5GHz Band 1: 5150 MHz ~ 5250 MHz; WLAN 5GHz Band 2: 5250 MHz ~ 5350 MHz; WLAN 5GHz Band 3: 5470 MHz ~ 5725 MHz; WLAN 5GHz Band 4: 5725 MHz ~ 5850 MHz; Bluetooth: 2402 MHz ~ 2480 MHz RFID:902 MHz ~928 MHz NFC: 13.56 MHz GPS:1575.42MHz
Modulation Mode:	GSM / GPRS: GMSK EDGE: 8PSK

	WCDMA: AMR/RMC12.2Kbps HSDPA/HSUPA HSPA+ LTE: QPSK / 16QAM 802.11b/g/n HT20/n HT40 802.11a/n HT20/HT40 Bluetooth 2.1 BDR (1Mbps) : GFSK Bluetooth 2.1 EDR (2Mbps) :π/4-DQPSK Bluetooth 2.1 EDR (3Mbps) : 8-DPSK Bluetooth 4.0 - LE (1Mbps): GFSK RFID GPS NFC: ASK		
Multi-slot Class:	GPRS: Multi-slot Class 12; EDGE: Multi-slot Class 12;		
Operation mode:	Class B		
Hotspot function:	Not Support Hotspot		
Antenna type:	WWAN : Fixed Internal Antenna WLAN : Fixed Internal Antenna Bluetooth : Fixed Internal Antenna		
Battery Model:	646069		
Battery specification:	8000mAh 3.8V		
SIM cards description:	Single SIM card		
Max Scaled SAR-1g(W/Kg)	Head	0.247 W/kg	Limit(W/kg): 1.6W/kg
	Body-worn	1.168 W/kg	

Note: For a more detailed description, please refer to specification or user's manual supplied by the applicant and/or manufacturer.

1.3. Summary of Maximum SAR Value

Frequency Band		Highest SAR Summary	
		Head (Separation 0mm)	Body-worn (Separation 10mm)
		1g SAR (W/kg)	
WWAN	GSM850	0.071	0.388
	GSM1900	0.124	0.622
	WCDMA II	0.102	0.569
	WCDMA IV	0.052	0.962
	WCDMA V	0.057	0.185
	LTE Band 2	0.085	0.938
	LTE Band 4	0.055	**1.168**
	LTE Band 7	**0.247**	0.488
	LTE Band 12	0.059	0.200
	LTE Band 17	0.078	0.244
WLAN	2.4GHz WLAN	0.181	0.400
	5GHz WLAN	0.172	0.219
2.4GHz Band	Bluetooth	N/A	N/A

Maximum Simultaneous Transmission SAR	Head	Body-worn
WWAN+WLAN 2.4GHz	0.428	1.568
WWAN+WLAN 5GHz	0.419	1.387
WWAN+Bluetooth	N/A	N/A

Note:

1、The summary maximum simultaneous transmission SAR is combined at the same exposure position.

2、Bluetooth is not required for SAR testing.

1.4. Photographs of the EUT

Please refer to the External Photos for the Photos of the EUT

1.5. 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**	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
3	**KDB 447498 D01v06**	General RF Exposure Guidance
4	**KDB 248227 D01v02r02**	SAR Measurement Procedures for 802.11 Transmitters
5	**KDB 865664 D01v01r04**	SAR Measurement 100 MHz to 6 GHz
6	**KDB 865664 D02v01r02**	RF Exposure Reporting
7	**KDB 648474 D04v01r03**	Handset SAR
8	**KDB 941225 D01v03r01**	3G SAR Measurement Procedures
9	**KDB 941225 D05v02r05**	SAR Evaluation Consideration for LTE Devices
10	**KDB 941225 D06v02r01**	SAR Evaluation Procedures For Portable Devices With Wireless Router Capabilities

2. Device Category and SAR Limits

Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Note: 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.

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:

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

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

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

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

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

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

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

4. SAR Measurement Setup

4.1. The Measurement System

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

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

The Following figure shows the system.

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

4.2. Probe

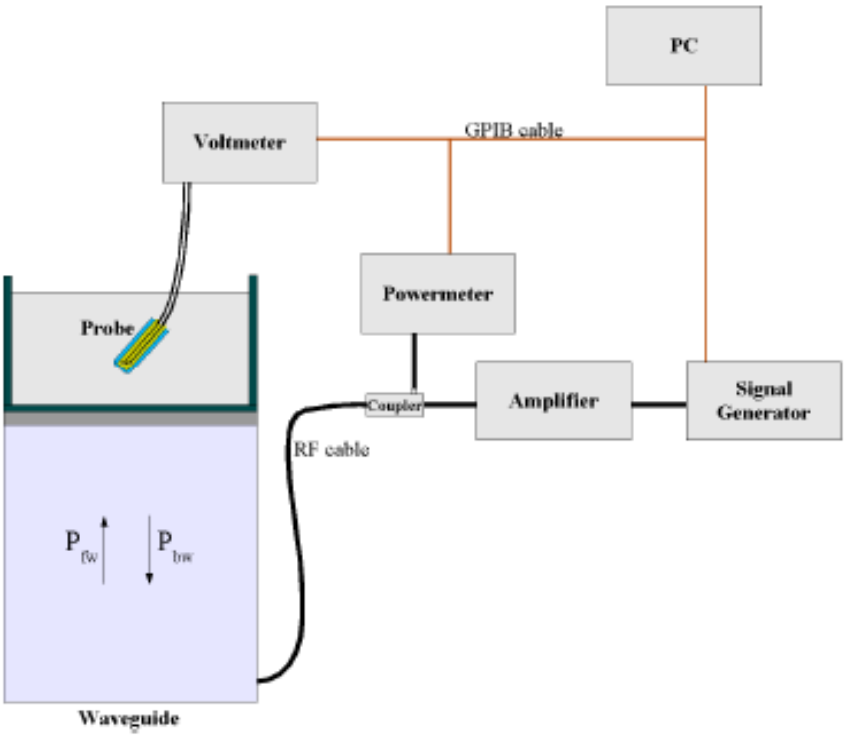
For the measurements the Specific Dosimetric E-Field Probe SN 37/08 EP80 with Following specifications is used

- Dynamic range: 0.01-100 W/kg

- Tip Diameter: 6.5 mm
- Distance between probe tip and sensor center: 2.5mm
- Distance between sensor center and the inner phantom surface: 4 mm (repeatability better than +/- 1mm)
- Probe linearity: <0.25 dB
- Axial Isotropy: <0.25 dB
- Spherical Isotropy: <0.25 dB
- Calibration range: 835to 2500MHz for head & body simulating liquid.

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

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



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

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 aNPL 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.

4.3. Probe Calibration Process

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.

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.

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),

C = heat capacity of tissue (brainor muscle),

δT = temperature increase due to RF exposure.

SAR is proportional to ΔT/Δt, 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:

σ = simulated tissue conductivity,

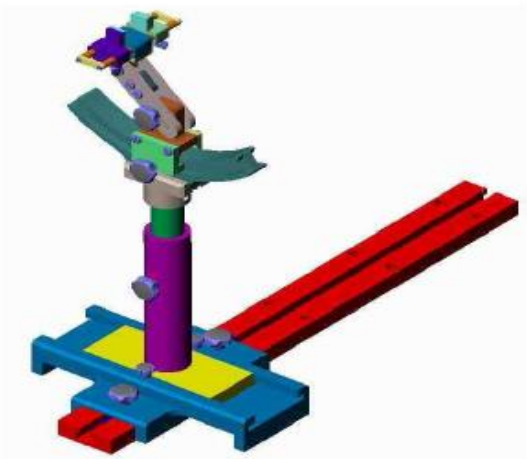
ρ = Tissue density (1.25 g/cm³ for brain tissue)

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 15cm. For head SAR testing, the liquid height from the ear reference point(ERP) of the phantom to the liquid top surface is larger than15cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than15cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in below table.

Fig 5.1 Photo of Liquid Height for Head SAR

Fig 5.2 Photo of Liquid Height for Body SAR

The following table gives the recipes for tissue simulating liquids

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

Note: Please refer to the validation results for dielectric parameters of each frequency band.

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 : Dielectric Performance of Tissue Simulating Liquid

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Conductivity Target (σ)	Delta (σ) (%)	Limit (%)	Date
750	HSL	21.2	0.890	0.89	0.00	±5	2018.02.23
835	HSL	21.2	0.892	0.90	-0.89	±5	2018.02.23
1800	HSL	22.6	1.365	1.40	-2.50	±5	2018.02.24
2000	HSL	22.4	1.414	1.40	1.00	±5	2018.02.24
2450	HSL	21.8	1.836	1.80	2.00	±5	2018.02.24
2600	HSL	21.8	1.975	1.96	0.77	±5	2018.02.26
5200	HSL	22.1	4.665	4.66	0.11	±5	2018.04.14
5600	HSL	22.1	5.100	5.07	0.59	±5	2018.04.14
5800	HSL	22.1	5.310	5.27	0.76	±5	2018.04.14
750	MSL	21.2	1.031	0.96	4.17	±5	2018.02.12
835	MSL	21.2	0.972	0.97	0.21	±5	2018.02.22
1800	MSL	22.6	1.515	1.52	-0.33	±5	2018.02.09
2000	MSL	22.4	1.514	1.52	-0.33	±5	2018.02.09
2450	MSL	21.8	1.966	1.95	0.82	±5	2018.02.08
2600	MSL	21.8	2.105	2.16	-2.55	±5	2018.02.09
5200	MSL	22.1	5.543	5.30	4.58	±5	2018.04.14
5600	MSL	22.1	5.743	5.77	-0.47	±5	2018.04.14
5800	MSL	22.1	5.931	6.00	-1.15	±5	2018.04.14

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Permittivity (ε_r)	Permittivity Target (ε_r)	Delta (ε_r) (%)	Limit (%)	Date
750	HSL	21.2	41.350	41.90	-1.31	±5	2018.02.23
835	HSL	21.2	41.182	41.50	-0.77	±5	2018.02.23
1800	HSL	22.6	40.095	40.00	0.24	±5	2018.02.24
2000	HSL	22.4	39.984	40.00	-0.04	±5	2018.02.24
2450	HSL	21.8	39.284	39.20	0.21	±5	2018.02.24
2600	HSL	21.8	39.025	39.00	0.06	±5	2018.02.26
5200	HSL	22.1	36.123	36.00	0.34	±5	2018.04.14
5600	HSL	22.1	35.562	35.50	0.17	±5	2018.04.14
5800	HSL	22.1	35.335	35.30	0.10	±5	2018.04.14
750	MSL	21.2	53.520	55.50	-3.57	±5	2018.02.12
835	MSL	21.2	55.382	55.20	0.15	±5	2018.02.22
1800	MSL	22.6	53.295	53.30	-0.01	±5	2018.02.09
2000	MSL	22.4	53.285	53.30	-0.03	±5	2018.02.09
2450	MSL	21.8	52.884	52.70	0.35	±5	2018.02.08
2600	MSL	21.8	52.363	52.50	-0.26	±5	2018.02.09
5200	MSL	22.1	48.273	49.00	-1.48	±5	2018.04.14
5600	MSL	22.1	48.394	48.50	-0.22	±5	2018.04.14
5800	MSL	22.1	48.093	48.20	-0.22	±5	2018.04.14

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	5.83	N	1	1	1	5.83	5.83	∞
Axial Isotropy	E.2.2	3.5	R	$\sqrt{3}$	1	1	2.02	2.02	∞
Hemispherical Isotropy	E.2.2	5.9	R	$\sqrt{3}$	1	1	3.41	3.41	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	E.2.6	0.5	N	1	1	1	0.5	0.5	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	3.0	3.0	∞
Integration Time	E.2.8	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	E.6.2	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	E.6.3	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Test sample Related									
Test sample positioning	E.4.2.1	2.6	N	1	1	1	2.6	2.6	N-1
Device Holder Uncertainty	E.4.1.1	3.0	N	1	1	1	3.0	3.0	N-1
Output power Power drift -	6.6.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞

SAR drift measurement									
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	4.0	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Liquid conductivity - deviation from target value	E.3.2	2.0	R	$\sqrt{3}$	0.64	0.43	1.69	1.13	∞
Liquid conductivity - measurement uncertainty	E.3.3	2.5	N	1	0.64	0.43	3.20	2.15	M
Liquid permittivity - deviation from target value	E.3.2	2.5	R	$\sqrt{3}$	0.6	0.49	1.28	1.04	∞
Liquid permittivity - measurement uncertainty	E.3.3	5.0	N	1	0.6	0.49	6.00	4.90	M
Liquid conductivity–temperature uncertainty	E.3.4		R	$\sqrt{3}$	0.78	0.41			∞
Liquidpermittivity–temperature uncertainty	E.3.4		R	$\sqrt{3}$	0.23	0.26			∞
Combined Standard Uncertainty			RSS				11.55	12.07	
Expanded Uncertainty (95% Confidence interval)			K=2				± 23.20	± 24.17	

6.2. Uncertainty For System Performance Check

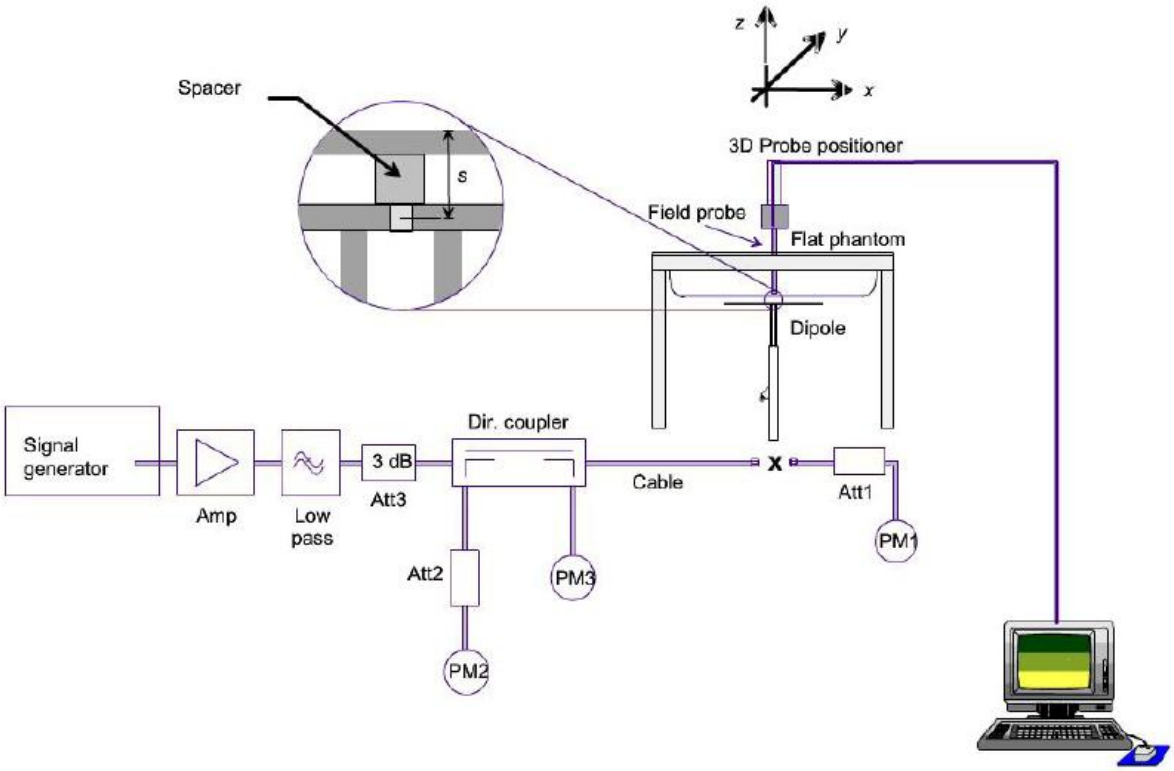
a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+-%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	4.76	N	1	1	1	4.76	4.7	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.0	∞
Hemispherical Isotropy	E.2.2	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 Algoritms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Dipole									
Dipole axis to liquid Distance	8,E.4.2	1.00	N	$\sqrt{3}$	1	1	0.58	0.58	∞
Input power and SAR drift measurement	8,6.6.2	4.04	R	$\sqrt{3}$	1	1	2.33	2.33	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Liquid conductivity - deviation from target value	E.3.2	4.57	R	$\sqrt{3}$	0.64	0.43	1.69	1.13	∞
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	$\sqrt{3}$	0.64	0.43	1.85	1.24	M
Liquid permittivity - deviation from target value	E.3.2	3.69	R	$\sqrt{3}$	0.6	0.49	1.28	1.04	∞
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	$\sqrt{3}$	0.6	0.49	3.46	2.83	M
Combined Standard Uncertainty			RSS				8.83	8.37	
Expanded Uncertainty (95% Confidence interval)			K=2				17.66	16.73	

7. SAR Measurement Evaluation

7.1. System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator. 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 specifics pacer in place. The distances pacer is touch the phantom surface with alight 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 (250mWisusedfor700MHzto3GHz, 100mWisusedfor3.5GHzto6 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.

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 %.

<1g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2018.02.23	750	HSL	100	0.78	8.41	7.84	-6.78
2018.02.23	835	HSL	100	0.97	9.61	9.68	0.73
2018.02.24	1800	HSL	100	3.70	37.05	36.98	-0.19
2018.02.24	2000	HSL	100	4.26	42.70	42.56	-0.33
2018.02.24	2450	HSL	100	5.33	53.34	53.26	-0.15
2018.02.26	2600	HSL	100	5.68	56.94	56.81	-0.23
2018.04.14	5200	HSL	100	16.40	164.05	163.99	-0.04
2018.04.14	5600	HSL	100	17.14	177.81	171.44	-3.58
2018.04.14	5800	HSL	100	17.71	185.02	177.11	-4.28
2018.02.12	750	MSL	100	0.91	8.69	9.054	4.19
2018.02.22	835	MSL	100	0.99	9.88	9.87	-0.10
2018.02.09	1800	MSL	100	3.75	37.78	37.53	-0.66
2018.02.09	2000	MSL	100	4.12	41.43	41.2	-0.24
2018.02.08	2600	MSL	100	5.39	54.07	53.86	-0.39
2018.02.09	2450	MSL	100	5.08	50.93	50.81	-0.24
2018.04.14	5200	MSL	100	16.28	163.36	162.84	-0.32
2018.04.14	5600	MSL	100	17.20	172.11	171.96	-0.09
2018.04.14	5800	MSL	100	17.70	177.10	176.95	-0.08

<10g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2018.02.23	750	HSL	100	0.54	5.52	5.37	-2.72
2018.02.23	835	HSL	100	0.62	6.17	6.22	0.81
2018.02.24	1800	HSL	100	2.05	19.85	20.48	3.17
2018.02.24	2000	HSL	100	1.99	21.39	19.93	-6.97
2018.02.24	2450	HSL	100	2.38	24.22	23.77	-1.86
2018.02.26	2600	HSL	100	2.50	25.06	24.98	-0.32
2018.04.14	5200	HSL	100	5.65	57.03	56.51	-0.91
2018.04.14	5600	HSL	100	6.06	60.90	60.54	-0.59
2018.04.14	5800	HSL	100	5.99	62.43	59.94	-3.99
2018.02.12	750	MSL	100	0.61	5.78	6.097	5.48
2018.02.22	835	MSL	100	0.63	6.48	6.29	-2.93
2018.02.09	1800	MSL	100	2.04	20.15	20.38	1.14
2018.02.09	2000	MSL	100	2.09	20.86	20.93	0.19
2018.02.08	2450	MSL	100	2.38	23.26	23.77	2.19
2018.02.09	2600	MSL	100	2.37	24.27	23.7	-2.35
2018.04.14	5200	MSL	100	5.62	57.09	56.24	-1.49
2018.04.14	5600	MSL	100	5.91	58.61	59.07	0.78
2018.04.14	5800	MSL	100	5.98	59.95	59.83	-0.20

Note: System checks the specific test data please see Annex C

8. Operational Conditions During Test

8.1. Information on the testing

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

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

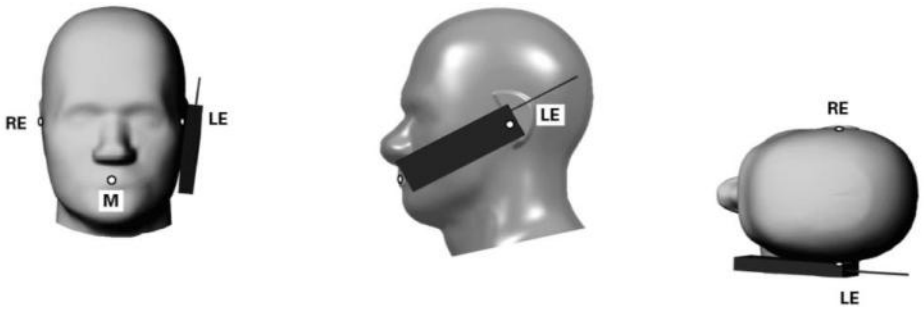


Illustration for Cheek Position

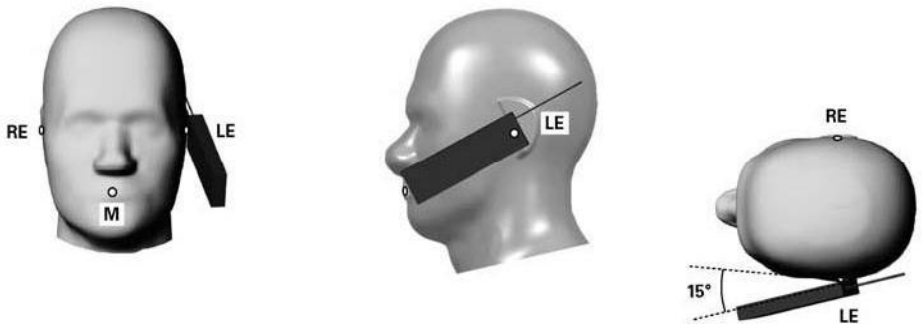


Illustration for Tilted Position

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

Description of the “tilted” position:
The mobile phone is well placed in the “cheek” position as described above. Then the mobile

phone is moved outward away from the month by an angle of 15 degrees or until contact with the ear lost.

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

8.2. Body-worn Configurations

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

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.

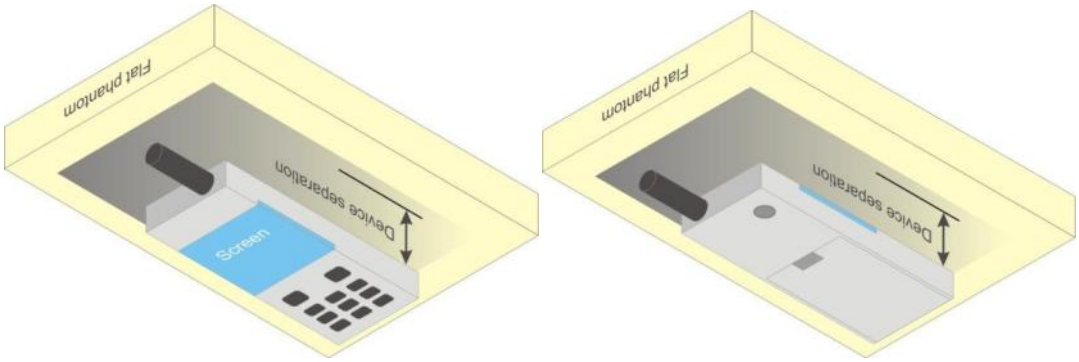


Illustration for Body-Worn Position

8.3. 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 to16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot 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.

8.4. Description of interpolation/extrapolation scheme

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

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

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

9. Body SAR Evaluation Procedure

Assessment side for SAR Test distance: 10mm		
Antennas	Back Side	Front Side
LTE/WCDMA/GSM	Yes	Yes
WLAN&BT	Yes	Yes

Note:

The SAR evaluation procedures for Portable Devices with Wireless Router function is according to KDB 941225 D06 Hotspot SAR v02r01.

1. Head/Body-worn mode SAR assessments are required.

2. Referring to KDB 941225 D06, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

3. For Main antenna, SAR measurements at Top side and Right Side are not required since the distance between DUT and flat phantom > 25mm.

4. For WLAN&BT antenna, SAR measurements Top side and Right side are not required since the distance between DUT and flat phantom > 25mm.

5.For the secondary antenna, it supports RX only, SAR is not required.

10. Information Related to LTE Test parameter (Per 941225 D05v02r05)

1	Identify the operating frequency range of each LTE transmission FCC band used by the device	Band 2 Tx:1850-1910MHz Band 4 Tx:1710-1755MHz Band 7 Tx:2500-2570MHz Band 12 Tx:699-716MHz Band 17 Tx:704-716MHz						
2	Identify the high, middle and low (L, M, H) channel numbers and frequencies tested in each LTE frequency band	**Band2**	**Channel Bandwidth**					
			20Mhz	**15MHz**	**10MHz**	**5MHz**	**3MHz**	**1.4MHz**
		Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7
		Middle	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5
		High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20384/ 1753.5	20392/ 1754.2
		Band4	**Channel Bandwidth**					
			20Mhz	**15MHz**	**10MHz**	**5MHz**	**3MHz**	**1.4MHz**
		Low	20050/ 1720	20025/ 1717.5	20000/ 1715	19975/ 1712.5	19965/ 1711.5	19957/ 1710.7
		Middle	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5	20175/ 1732.5
		High	20300/ 1745	20325/ 1747.5	20350/ 1750	20375/ 1752.5	20384/ 1753.5	20392/ 1754.2
		Band7	**Channel Bandwidth**					
			20Mhz	**15MHz**	**10MHz**	**5MHz**	**3MHz**	**1.4MHz**
		Low	20850/ 2510	20825/ 2507.2	20800/ 2505	20775/ 2502.5	/	/
		Middle	21100/ 2535	21100/ 2535	21100/ 2535	21100/ 2535	/	/
		High	21350/ 2560	21375/ 2562.5	21400/ 2565	21425/ 2567.5	/	/
		Band	**Channel Bandwidth**					

		12	**10MHz**	**5MHz**	**3MHz**	**1.4MHz**	/	/
		Low	23060/ 704	23035/ 701.5	23025/ 700.5	23017/ 699.7	/	/
		Middle	23095/ 707.5	23095/ 707.5	23095/ 707.5	23095/ 707.5	/	/
		High	23130/ 711	23155/ 713.5	23165/ 714.5	23173/ 715.3	/	/
		Band 17	**Channel Bandwidth**					
			10MHz	**5MHz**	/	/	/	/
		Low	23780/ 709	23755/ 706.5	/	/	/	/
		Middle	23790/ 710	23790/ 710	/	/	/	/
		High	23800/ 711	23825/ 713.5	/	/	/	/
3	Specify the UE category and uplink modulations used	The UE Category is 4 and the uplink modulations used are QPSK and 16QAM.						
4	Descriptions of the LTE transmitter and antenna implementation & identify whether it is a standalone transmitter operating independently of other wireless transmitters in the device or sharing hardware components and/or antenna(s) with other transmitters etc.	The module has a primary antenna for all LTE&UMTS bands, a Wi-Fi Tx/Rx antenna.						
5	Identify the LTE Band Voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna diversity conditions, etc.	Mobile Hotspot Mode will be tested according to Section 9 of this report.						
6	Identify if Maximum Power	As per 3GPP TS 36.101 v11.0.0 (2012-03)						

<table>
<tr><td></td><td>Reduction (MPR) is optional or mandatory, i.e. built-in by design:
only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards
b) A-MPR (additional MPR) must be disabled.</td><td>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (N_{RB})</th><th rowspan="2">MPR (dB)</th></tr>
<tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr>
<tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr>
</table>
A-MPR is supported by design, but disable for SAR testing.</td></tr>
<tr><td>7</td><td>Include the maximum average conducted output power measured on the required test channels for each channel bandwidth and UL modulation used in each frequency band:
a) with 1 RB allocated at the low, centred, high end of a channel
b) using 50% RB allocation low, centered, high end within a channel
c) using 100% RB allocation</td><td>This is included in the section 11 of this report.</td></tr>
<tr><td>8</td><td>Include the maximum average conducted output power measured for the other wireless mode and frequency bands</td><td>This is included in the section 13 of this report.</td></tr>
</table>

10	Identify the simultaneous transmission conditions for the voice and data configurations supported by all wireless modes, device configurations and frequency bands, for the head and body exposure conditions and device operating configurations (handset flip or cover positions, antenna diversity conditions etc.)	This is included in Section 15
11	When power reduction is applied to certain wireless modes to satisfy SAR compliance for simultaneous transmission conditions, other equipment certification or operating requirements, include the maximum average conducted output power measured in each power reduction mode applicable to the simultaneous voice/data transmission configurations for such wireless configurations and frequency bands; and also include details of the power reduction implementation and measurement setup	Not applicable.

11. SAR Evaluation Procedures for LTE

1. QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and *required test channel* combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each *required test channel*. When the *reported* SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and *required test channels* is not required for 1 RB allocation; otherwise, SAR is required for the remaining r*equired test channels* and only for the RB offset configuration with the highest output power for that channel.6 When the *reported* SAR of a *required test channel* is > 1.45 W/kg, SAR is required for all three RB offset configurations for that *required test channel*.

2. QPSK with 50% RB allocation

The procedures required for 1 RB allocation in 1. are applied to measure the SAR for QPSK with50% RB allocation.

3. QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest *reported* SAR for 1 RB and 50% RB allocation in 1. and 2. are ≤ 0.8W/kg. Otherwise, SAR is measured for the highest output power channel and if the *reported* SAR is > 1.45 W/kg, the remaining *required test channels* must also be tested.

<u>Higher order modulations</u>

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 1. and 2.and 3. to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power or the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the *reported* SAR for the QPSK configuration is > 1.45 W/kg.

4. Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section 5.2 to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the *reported* SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

The equivalent channel configuration for the RB allocation, RB offset and modulation etc. Is determined for the smaller channel bandwidth according to the same number of RB allocated in

The largest channel bandwidth. For example, 50 RB in 10 MHz channel bandwidth does not apply to5MHz channel bandwidth; therefore, this cannot be tested in the smaller channel bandwidth. However, 50% RB allocation in 10 MHz channel bandwidths equivalent to 100% RB allocation in 5 MHz channel bandwidth; therefore, these are the equivalent configurations to be compared to determine the specific channel and configuration in the smaller channel bandwidth that need SAR testing."

12. Measurement of Conducted output power

1. GSM Conducted Average output power

GSM850	Burst Average Power (dBm)			Tune-up	Frame-Average Power (dBm)			Tune-up
TX Channel	128	190	251	Limit	128	190	251	Limit
Frequency (MHz)	824.2	836.6	848.8	(dBm)	824.2	836.6	848.8	(dBm)
GSM 1 Tx slot	32.09	32.12	32.15	32.50	23.09	23.12	23.15	23.50
GPRS 1 Tx slot	32.15	32.19	32.22	32.50	23.15	23.19	23.22	23.50
GPRS 2 Tx slots	31.57	31.64	31.62	32.00	25.57	25.64	25.62	26.00
GPRS 3 Tx slots	29.94	29.95	29.93	30.00	25.68	25.69	25.67	25.74
GPRS 4 Tx slots	28.74	28.78	28.78	29.00	25.74	25.78	25.78	**26.00**
EDGE 1 Tx slot	27.06	27.14	26.99	27.50	18.06	18.14	17.99	18.50
EDGE 2 Tx slots	26.93	26.45	26.37	27.00	20.93	20.45	20.37	21.00
EDGE 3 Tx slots	26.94	25.27	25.92	27.00	22.68	21.01	21.66	22.74
EDGE 4 Tx slots	24.96	24.27	24.41	25.00	21.96	21.27	21.41	22.00

GSM1900	Burst Average Power (dBm)			Tune-up	Frame-Average Power (dBm)			Tune-up
TX Channel	512	661	810	Limit	512	661	810	Limit
Frequency (MHz)	1850.2	1880	1909.8	(dBm)	1850.2	1880	1909.8	(dBm)
GSM 1 Tx slot	27.52	27.91	28.41	28.50	18.52	18.91	19.41	19.50
GPRS 1 Tx slot	27.34	27.71	28.49	28.50	18.34	18.71	19.49	19.50
GPRS 2 Tx slots	26.89	27.31	28.03	28.50	20.89	21.31	22.03	22.50
GPRS 3 Tx slots	25.53	25.87	27.01	27.50	20.97	21.61	22.75	**23.24**
GPRS 4 Tx slots	24.36	24.97	25.99	26.00	21.36	21.97	22.99	23.00
EDGE 1 Tx slot	26.06	26.02	26.16	26.50	17.06	17.02	17.16	17.50
EDGE 2 Tx slots	25.02	25.27	25.07	25.50	19.02	19.27	19.07	19.50
EDGE 3 Tx slots	22.80	23.18	23.09	23.50	18.54	18.92	18.83	19.24
EDGE 4 Tx slots	22.07	22.26	22.10	22.50	19.07	19.26	19.10	19.50

Time slot consignations:

No. of Slots	Slot 1	Slot 2	Slot 3	Slot 4
Slot Consignation	1Up4Down	2Up3Down	3Up2Down	4Up1Down
Duty Cycle	1:83	1:4.15	1:2.77	1:208
Correct Factor	-9.03dB	-6.02dB	-4.26dB	-3.01dB

2. WCDMA Conducted Average output power

Band	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)
TX Channel	9262	9400	9538		1312	1413	1513	
Rx Channel	9662	9800	9938		1537	1638	1738	
Frequency (MHz)	1852.4	1880	1907.6		1712.4	1732.6	1752.6	
AMR 12.2Kbps	20.90	20.93	21.25	21.50	21.52	21.51	21.55	22.00
RMC 12.2Kbps	20.93	20.99	21.27	21.50	21.54	21.54	21.56	22.00
HSDPA Subtest-1	20.09	20.13	20.50	21.00	20.63	20.66	20.63	21.00
HSDPA Subtest-2	20.03	20.12	20.51	21.00	20.64	20.70	20.67	21.00
HSDPA Subtest-3	19.59	19.70	20.08	20.50	20.21	20.23	20.21	20.50
HSDPA Subtest-4	19.56	19.64	20.07	20.50	20.18	20.22	20.21	20.50
HSUPA Subtest-1	18.07	18.19	18.45	19.00	18.73	18.70	18.71	19.00
HSUPA Subtest-2	17.98	18.08	18.47	18.50	18.67	18.70	18.73	19.00
HSUPA Subtest-3	19.02	19.07	19.43	19.50	19.68	19.69	19.72	20.00
HSUPA Subtest-4	17.60	17.68	17.89	18.50	18.12	18.14	18.15	19.00
HSUPA Subtest-5	19.98	20.02	20.39	20.50	20.65	20.65	20.63	21.00
HSPA+ (16QAM) Subtest-1	22.10	22.36	22.40	22.50	21.48	21.64	21.65	22.00

Band	WCDMA V			Tune-up Limit (dBm)
TX Channel	4132	4182	4233	
Rx Channel	4357	4407	4458	
Frequency (MHz)	826.4	836.4	846.6	
AMR 12.2Kbps	22.20	21.95	22.08	22.50
RMC 12.2Kbps	22.21	21.98	22.10	22.50
HSDPA Subtest-1	21.10	20.98	21.19	21.50
HSDPA Subtest-2	21.16	21.02	21.18	21.50
HSDPA Subtest-3	20.69	20.56	20.70	21.00
HSDPA Subtest-4	20.66	20.56	20.67	21.00
HSUPA Subtest-1	19.21	19.03	19.18	20.00
HSUPA Subtest-2	19.15	19.05	19.14	19.50
HSUPA Subtest-3	20.14	20.05	20.18	20.50
HSUPA Subtest-4	18.68	18.49	18.66	19.50
HSUPA Subtest-5	21.19	21.01	21.12	21.50
HSPA+ (16QAM) Subtest-1	21.77	21.66	21.70	22.00

3. LTE Conducted Average output power

LTE Band 2

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	23.26	**23.38**	23.36	23.5
20	QPSK	1	49	23.16	23.05	23.01	
20	QPSK	1	99	22.95	23.29	23.27	
20	QPSK	50	0	22.16	22.09	22.13	22.5
20	QPSK	50	24	22.09	22.12	22.02	
20	QPSK	50	50	22.13	22.09	22.01	
20	QPSK	100	0	21.19	21.20	21.13	
20	16QAM	1	0	21.73	22.21	22.43	22.5
20	16QAM	1	49	21.88	22.28	22.29	
20	16QAM	1	99	21.93	22.02	22.20	
20	16QAM	50	0	20.83	20.98	21.07	21.5
20	16QAM	50	24	20.74	20.91	21.04	
20	16QAM	50	50	20.77	20.99	21.13	
20	16QAM	100	0	20.77	21.00	21.15	
Channel				18675	18900	19125	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	23.12	23.10	23.21	23.5
15	QPSK	1	37	23.08	23.06	23.00	
15	QPSK	1	74	23.12	23.10	23.01	
15	QPSK	36	0	22.08	22.07	22.10	22.5
15	QPSK	36	20	22.12	22.10	22.08	
15	QPSK	36	39	22.11	22.08	22.10	
15	QPSK	75	0	22.31	22.41	22.38	
15	16QAM	1	0	21.71	22.26	22.47	22.5
15	16QAM	1	37	21.86	22.28	22.25	
15	16QAM	1	74	21.82	21.89	22.35	
15	16QAM	36	0	20.65	20.92	20.98	21.5
15	16QAM	36	20	20.62	20.92	21.01	
15	16QAM	36	39	20.64	20.89	21.04	

15	16QAM	75	0	20.64	20.92	21.05	
Channel				18650	18900	19150	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	22.49	22.76	22.91	23.5
10	QPSK	1	25	23.05	23.01	23.31	
10	QPSK	1	49	22.88	23.04	23.08	
10	QPSK	25	0	22.31	22.29	22.18	22.5
10	QPSK	25	12	22.34	22.30	22.28	
10	QPSK	25	25	22.25	22.15	22.10	
10	QPSK	50	0	22.16	22.21	22.08	
10	16QAM	1	0	21.46	21.64	21.83	22.5
10	16QAM	1	25	21.94	22.30	22.17	
10	16QAM	1	49	21.85	21.87	22.03	
10	16QAM	25	0	20.57	20.88	20.98	21.5
10	16QAM	25	12	20.49	20.84	20.96	
10	16QAM	25	25	20.51	20.88	21.07	
10	16QAM	50	0	20.59	20.93	21.05	
Channel				18625	18900	19175	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	22.88	22.86	22.92	23.5
5	QPSK	1	12	22.96	22.91	22.90	
5	QPSK	1	24	23.01	22.98	22.80	
5	QPSK	12	0	21.81	21.93	21.89	22.5
5	QPSK	12	7	21.78	21.82	21.79	
5	QPSK	12	13	22.05	22.12	22.03	
5	QPSK	25	0	22.03	22.10	22.05	
5	16QAM	1	0	21.36	21.57	21.96	22.5
5	16QAM	1	12	21.80	22.08	22.35	
5	16QAM	1	24	21.45	21.81	21.75	
5	16QAM	12	0	20.62	20.83	21.08	21.5
5	16QAM	12	7	20.50	20.82	21.00	
5	16QAM	12	13	20.55	20.86	21.10	
5	16QAM	25	0	20.48	20.86	20.96	
Channel				18615	18900	19185	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1908.5	

3	QPSK	1	0	22.48	22.81	22.78	23.5
3	QPSK	1	8	22.38	22.40	22.43	
3	QPSK	1	14	22.35	22.72	22.61	
3	QPSK	8	0	21.96	22.02	21.96	22.5
3	QPSK	8	4	21.95	21.86	21.79	
3	QPSK	8	7	21.86	21.79	21.63	
3	QPSK	15	0	21.99	21.88	21.66	
3	16QAM	1	0	21.88	22.27	22.21	22.5
3	16QAM	1	8	21.52	21.78	22.15	
3	16QAM	1	14	21.54	21.93	22.31	
3	16QAM	8	0	20.47	20.97	20.92	21.5
3	16QAM	8	4	20.40	20.87	21.10	
3	16QAM	8	7	20.51	20.83	21.05	
3	16QAM	15	0	20.53	20.95	20.98	
Channel				18607	18900	19193	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	22.84	22.84	22.85	23.5
1.4	QPSK	1	3	22.96	23.06	22.93	
1.4	QPSK	1	5	22.99	23.01	23.10	
1.4	QPSK	3	0	23.01	23.10	23.02	
1.4	QPSK	3	1	22.98	22.97	23.09	
1.4	QPSK	3	3	22.86	22.96	22.96	
1.4	QPSK	6	0	22.12	22.13	22.02	22.5
1.4	16QAM	1	0	21.32	21.68	22.01	22.5
1.4	16QAM	1	3	21.74	22.28	22.19	
1.4	16QAM	1	5	21.40	21.64	21.96	
1.4	16QAM	3	0	21.47	22.21	21.91	
1.4	16QAM	3	1	21.46	21.99	22.14	
1.4	16QAM	3	3	21.38	21.79	22.12	
1.4	16QAM	6	0	20.46	20.87	21.07	21.5

LTE Band 4

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	23.96	23.98	**23.99**	24.0
20	QPSK	1	49	23.78	23.69	23.88	
20	QPSK	1	99	23.89	23.88	23.90	
20	QPSK	50	0	23.32	23.31	23.35	23.5
20	QPSK	50	24	23.25	23.16	23.39	
20	QPSK	50	50	23.26	23.13	23.21	
20	QPSK	100	0	23.10	23.08	23.12	
20	16QAM	1	0	22.60	22.33	22.66	23.5
20	16QAM	1	49	22.54	22.50	22.59	
20	16QAM	1	99	22.14	22.44	22.77	
20	16QAM	50	0	21.23	21.24	21.44	22.5
20	16QAM	50	24	21.11	21.10	21.46	
20	16QAM	50	50	21.02	21.20	21.74	
20	16QAM	100	0	21.14	21.18	21.55	
Channel				20025	20175	20325	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	23.80	23.82	23.91	24.5
15	QPSK	1	37	23.79	23.86	23.96	
15	QPSK	1	74	23.88	23.96	23.99	
15	QPSK	36	0	22.96	23.03	23.21	23.5
15	QPSK	36	20	23.01	23.10	23.02	
15	QPSK	36	39	23.12	23.01	23.00	
15	QPSK	75	0	22.98	22.98	23.02	
15	16QAM	1	0	22.49	22.37	22.51	23.5
15	16QAM	1	37	22.42	22.12	22.95	
15	16QAM	1	74	22.10	22.18	22.91	
15	16QAM	36	0	21.18	21.13	21.46	22.5
15	16QAM	36	20	21.12	21.05	21.63	
15	16QAM	36	39	21.03	21.09	21.78	
15	16QAM	75	0	21.10	21.13	21.61	
Channel				20000	20175	20350	Tune-up

Frequency (MHz)				1715	1732.5	1750	limit (dBm)
10	QPSK	1	0	23.08	23.09	23.01	23.5
10	QPSK	1	25	23.01	23.03	23.10	
10	QPSK	1	49	23.12	23.10	23.08	
10	QPSK	25	0	23.22	23.21	23.12	23.5
10	QPSK	25	12	23.23	23.12	22.98	
10	QPSK	25	25	23.01	22.97	22.90	
10	QPSK	50	0	22.98	22.96	22.96	
10	16QAM	1	0	21.85	22.12	22.46	22.5
10	16QAM	1	25	22.29	22.36	22.80	
10	16QAM	1	49	22.28	22.37	23.17	
10	16QAM	25	0	21.07	21.06	21.54	21.5
10	16QAM	25	12	21.02	20.98	21.61	
10	16QAM	25	25	21.01	21.07	21.76	
10	16QAM	50	0	21.04	21.13	21.70	
Channel				19975	20175	20375	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1732.5	1752.5	
5	QPSK	1	0	23.05	22.91	23.01	23.5
5	QPSK	1	12	23.12	23.01	23.11	
5	QPSK	1	24	23.41	23.10	23.57	
5	QPSK	12	0	23.20	23.18	23.08	23.5
5	QPSK	12	7	23.20	23.02	23.12	
5	QPSK	12	13	23.12	23.23	23.36	
5	QPSK	25	0	23.21	23.22	23.26	
5	16QAM	1	0	22.14	21.89	22.63	22.5
5	16QAM	1	12	22.41	22.13	23.09	
5	16QAM	1	24	21.93	21.68	22.41	
5	16QAM	12	0	21.06	21.16	21.71	21.5
5	16QAM	12	7	21.06	20.95	21.69	
5	16QAM	12	13	21.10	21.00	21.68	
5	16QAM	25	0	21.01	20.95	21.65	
Channel				19965	20175	20385	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	22.98	23.38	23.43	23.5
3	QPSK	1	8	22.96	23.25	23.41	

3	QPSK	1	14	23.01	23.34	23.44	
3	QPSK	8	0	22.12	22.10	22.16	22.5
3	QPSK	8	4	22.32	22.31	22.26	
3	QPSK	8	7	22.41	22.40	22.43	
3	QPSK	15	0	22.46	22.35	22.25	
3	16QAM	1	0	22.15	22.19	22.01	22.5
3	16QAM	1	8	22.04	22.31	22.86	
3	16QAM	1	14	22.47	22.40	23.09	
3	16QAM	8	0	20.95	21.19	21.56	21.5
3	16QAM	8	4	21.07	21.09	21.60	
3	16QAM	8	7	21.05	20.99	21.87	
3	16QAM	15	0	21.08	21.17	21.70	
Channel				19957	20175	20393	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1732.5	1754.3	
1.4	QPSK	1	0	23.69	23.74	23.69	24
1.4	QPSK	1	3	23.58	23.70	23.66	
1.4	QPSK	1	5	23.46	23.50	23.56	
1.4	QPSK	3	0	23.16	23.20	23.46	
1.4	QPSK	3	1	23.60	23.69	23.87	
1.4	QPSK	3	3	23.77	23.78	23.80	
1.4	QPSK	6	0	22.89	22.80	22.79	23
1.4	16QAM	1	0	21.92	21.72	22.56	23
1.4	16QAM	1	3	22.27	22.42	22.74	
1.4	16QAM	1	5	21.92	21.89	22.52	
1.4	16QAM	3	0	22.34	22.07	22.82	
1.4	16QAM	3	1	22.13	22.18	22.75	
1.4	16QAM	3	3	21.93	22.10	22.70	
1.4	16QAM	6	0	21.01	21.00	21.71	22

LTE Band 7

BW [MHz]	Modulation	RB Size	RB Offset	Measured Power			Tune-up limit (dBm)
Channel				20850	21100	21350	
Frequency (MHz)				2510	2535	2560	
20	QPSK	1	0	23.79	23.87	**24.18**	24.5
20	QPSK	1	49	24.01	23.88	24.12	
20	QPSK	1	99	23.00	23.87	23.98	
20	QPSK	50	0	23.02	23.48	23.01	23.5
20	QPSK	50	24	23.13	23.03	23.25	
20	QPSK	50	50	23.26	23.16	23.06	
20	QPSK	100	0	23.41	23.34	23.30	
20	16QAM	1	0	22.78	22.93	23.44	23.5
20	16QAM	1	49	22.95	22.93	23.07	
20	16QAM	1	99	22.87	23.09	22.85	
20	16QAM	50	0	21.58	21.83	21.92	22
20	16QAM	50	24	20.59	21.72	21.82	
20	16QAM	50	50	20.76	21.68	21.77	
20	16QAM	100	0	20.68	21.80	21.93	
Channel				20825	21100	21375	Tune-up limit (dBm)
Frequency (MHz)				2507.5	2535	2562.5	
15	QPSK	1	0	23.88	23.96	24.01	24.5
15	QPSK	1	37	23.86	23.89	23.99	
15	QPSK	1	74	23.94	24.03	24.06	
15	QPSK	36	0	22.96	23.12	23.05	23.5
15	QPSK	36	20	23.01	23.22	23.22	
15	QPSK	36	39	23.06	23.05	23.01	
15	QPSK	75	0	23.41	23.12	23.10	
15	16QAM	1	0	21.86	23.06	22.84	23.5
15	16QAM	1	37	22.12	22.92	22.84	
15	16QAM	1	74	21.85	22.93	22.85	
15	16QAM	36	0	20.43	21.62	21.77	22.5
15	16QAM	36	20	20.60	21.49	21.81	
15	16QAM	36	39	20.67	21.60	21.81	
15	16QAM	75	0	20.56	21.56	21.83	
Channel				20800	21100	21400	Tune-up limit
Frequency (MHz)				2505	2535	2565	

							(dBm)
10	QPSK	1	0	23.98	23.94	24.01	24.5
10	QPSK	1	25	23.76	23.86	23.99	
10	QPSK	1	49	23.89	24.04	24.06	
10	QPSK	25	0	22.90	23.10	23.05	23.5
10	QPSK	25	12	23.01	23.27	23.22	
10	QPSK	25	25	23.08	23.06	23.02	
10	QPSK	50	0	23.48	23.11	23.12	
10	16QAM	1	0	21.58	22.63	22.68	23
10	16QAM	1	25	21.74	22.71	23.02	
10	16QAM	1	49	21.82	22.68	23.12	
10	16QAM	25	0	20.42	21.56	21.75	22.5
10	16QAM	25	12	20.39	21.42	21.69	
10	16QAM	25	25	20.57	21.51	21.80	
10	16QAM	50	0	20.50	21.51	21.79	
Channel				20775	21100	21425	Tune-up limit (dBm)
Frequency (MHz)				2502.5	2535	2567.5	
5	QPSK	1	0	23.29	23.55	23.68	24.5
5	QPSK	1	12	23.12	23.10	23.22	
5	QPSK	1	24	23.27	23.59	23.63	
5	QPSK	12	0	23.40	23.48	23.40	23.5
5	QPSK	12	7	23.24	23.20	23.15	
5	QPSK	12	13	23.35	23.12	23.10	
5	QPSK	25	0	23.30	23.15	23.11	
5	16QAM	1	0	22.21	22.53	22.67	23.5
5	16QAM	1	12	21.57	22.75	22.93	
5	16QAM	1	24	22.05	22.81	22.72	
5	16QAM	12	0	20.29	21.63	21.77	22.5
5	16QAM	12	7	20.34	21.37	21.81	
5	16QAM	12	13	20.32	21.54	21.83	
5	16QAM	25	0	20.31	21.54	21.74	

LTE Band 12

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				23060	23095	23130	
Frequency (MHz)				704	707.5	711	
10	QPSK	1	0	22.22	**22.29**	21.97	22.5
10	QPSK	1	25	22.18	22.19	22.01	
10	QPSK	1	49	22.22	22.12	21.84	
10	QPSK	25	0	21.18	21.19	21.13	21.5
10	QPSK	25	12	21.13	21.01	21.08	
10	QPSK	25	25	21.08	21.03	21.00	
10	QPSK	50	0	21.14	21.15	21.08	
10	16QAM	1	0	21.48	21.46	20.93	21.5
10	16QAM	1	25	21.48	21.49	21.08	
10	16QAM	1	49	21.40	21.02	20.88	
10	16QAM	25	0	20.26	20.20	19.96	20.5
10	16QAM	25	12	20.12	20.06	19.85	
10	16QAM	25	25	20.07	20.04	19.73	
10	16QAM	50	0	20.22	20.12	19.92	
Channel				23035	23095	23155	Tune-up limit (dBm)
Frequency (MHz)				701.5	707.5	713.5	
5	QPSK	1	0	22.27	22.10	21.96	22.5
5	QPSK	1	12	22.13	22.09	21.96	
5	QPSK	1	24	21.99	21.79	21.25	
5	QPSK	12	0	21.19	21.20	21.08	21.5
5	QPSK	12	7	21.10	21.13	21.11	
5	QPSK	12	13	21.12	21.09	21.12	
5	QPSK	25	0	21.13	21.15	21.14	
5	16QAM	1	0	21.37	21.10	20.74	21.5
5	16QAM	1	12	21.49	21.27	21.22	
5	16QAM	1	24	21.15	21.09	20.32	
5	16QAM	12	0	20.41	20.18	19.84	20.5
5	16QAM	12	7	20.15	20.09	19.67	
5	16QAM	12	13	20.24	20.08	19.47	
5	16QAM	25	0	20.29	20.04	19.60	
Channel				23025	23095	23165	Tune-up

Frequency (MHz)				700.5	707.5	714.5	limit (dBm)
3	QPSK	1	0	22.09	21.99	22.06	22.5
3	QPSK	1	8	21.98	21.89	21.96	
3	QPSK	1	14	21.94	21.78	21.89	
3	QPSK	8	0	21.12	21.37	21.32	21.5
3	QPSK	8	4	21.08	21.34	21.28	
3	QPSK	8	7	21.43	21.35	21.28	
3	QPSK	15	0	21.01	21.08	21.13	
3	16QAM	1	0	21.22	21.44	20.95	21.5
3	16QAM	1	8	21.32	21.36	20.45	
3	16QAM	1	14	21.46	21.46	20.55	
3	16QAM	8	0	20.45	20.10	19.45	20.5
3	16QAM	8	4	20.35	20.18	19.28	
3	16QAM	8	7	20.46	19.94	19.30	
3	16QAM	15	0	20.26	20.14	19.58	
Channel				23017	23095	23173	Tune-up limit (dBm)
Frequency (MHz)				699.7	707.5	715.3	
1.4	QPSK	1	0	22.11	21.74	21.22	22.5
1.4	QPSK	1	3	22.03	22.02	21.99	
1.4	QPSK	1	5	22.12	22.01	22.03	
1.4	QPSK	3	0	22.08	21.87	21.86	
1.4	QPSK	3	1	21.98	21.88	21.88	
1.4	QPSK	3	3	21.92	21.89	21.96	
1.4	QPSK	6	0	20.90	20.98	20.89	21.5
1.4	16QAM	1	0	21.10	21.08	20.35	21.5
1.4	16QAM	1	3	21.47	21.47	20.74	
1.4	16QAM	1	5	21.25	21.01	20.10	
1.4	16QAM	3	0	21.41	21.50	20.56	
1.4	16QAM	3	1	21.50	21.22	20.62	
1.4	16QAM	3	3	21.46	21.08	20.49	
1.4	16QAM	6	0	20.31	20.11	19.49	20.5

LTE Band 17

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				23780	23790	23800	
Frequency (MHz)				709	710	711	
10	QPSK	1	0	**22.46**	22.26	22.31	23
10	QPSK	1	25	22.34	22.08	21.99	
10	QPSK	1	49	22.31	22.01	21.91	
10	QPSK	25	0	21.40	21.38	21.08	22
10	QPSK	25	12	21.38	21.14	21.22	
10	QPSK	25	25	21.78	21.77	21.93	
10	QPSK	50	0	21.18	21.18	21.09	
10	16QAM	1	0	21.50	21.20	21.41	22
10	16QAM	1	25	21.37	21.58	21.24	
10	16QAM	1	49	21.36	21.28	20.93	
10	16QAM	25	0	20.28	20.33	20.10	21
10	16QAM	25	12	20.27	20.13	19.97	
10	16QAM	25	25	20.12	19.94	19.80	
10	16QAM	50	0	20.19	20.15	19.95	
Channel				23755	23790	23825	Tune-up limit (dBm)
Frequency (MHz)				706.5	710	713.5	
5	QPSK	1	0	22.16	22.16	21.40	23
5	QPSK	1	12	22.23	22.28	22.19	
5	QPSK	1	24	22.19	22.18	22.21	
5	QPSK	12	0	21.32	21.28	21.59	22
5	QPSK	12	7	21.52	21.36	21.28	
5	QPSK	12	13	21.29	21.23	21.21	
5	QPSK	25	0	21.12	21.16	21.24	
5	16QAM	1	0	21.01	21.34	20.95	22
5	16QAM	1	12	21.50	21.58	20.87	
5	16QAM	1	24	21.00	21.23	20.54	
5	16QAM	12	0	20.37	20.34	19.83	21
5	16QAM	12	7	20.27	20.07	19.72	
5	16QAM	12	13	20.24	20.17	19.51	
5	16QAM	25	0	20.24	20.07	19.72	

4. 2.4GHz Wi-Fi Average output power

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	CH 1	2412	16.07	16.50	100
		CH 6	2437	**16.09**	**16.50**	100
		CH 11	2462	15.96	16.50	100
	802.11g 6Mbps	CH 1	2412	12.09	12.50	100
		CH 6	2437	14.06	14.50	100
		CH 11	2462	13.84	14.50	100
	802.11n-HT20 MCS0	CH 1	2412	12.04	12.50	100
		CH 6	2437	14.01	14.50	100
		CH 11	2462	13.83	14.50	100
	802.11n-HT40 MCS0	CH 3	2422	13.20	13.50	100
		CH 6	2437	13.19	13.50	100
		CH 9	2452	13.05	13.50	100

5. 5GHz Wi-Fi Average output power

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	CH 36	5180	13.79	14.00	100
		CH 44	5220	13.14	14.00	100
		CH 48	5240	13.83	14.00	100
	802.11n-HT20 MCS0	CH 36	5180	13.90	14.50	100
		CH 44	5220	**13.91**	**14.50**	100
		CH 48	5240	13.18	13.50	100
	802.11n-HT40 MCS0	CH 38	5190	13.52	14.00	100
		CH 46	5230	13.53	14.00	100

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	CH 52	5260	13.08	13.50	100
		CH 60	5300	**13.84**	**14.50**	100
		CH 64	5320	13.61	14.00	100
	802.11n-HT20 MCS0	CH 52	5260	13.56	14.00	100
		CH 60	5300	12.94	13.50	100
		CH 64	5320	13.65	14.00	100
	802.11n-HT40 MCS0	CH 54	5270	13.39	14.00	100
		CH 62	5310	13.38	14.00	100

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	CH 100	5500	14.60	15.00	100
		CH 120	5600	14.46	15.00	100
		CH 140	5700	**14.80**	**15.50**	100
	802.11n-HT20 MCS0	CH 100	5500	14.03	14.50	100
		CH 120	5600	14.57	15.00	100
		CH 140	5700	14.26	14.50	100
	802.11n-HT40 MCS0	CH 102	5510	13.35	14.00	100
		CH 126	5630	13.55	14.00	100
		CH 142	5710	13.83	14.00	100

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a 6Mbps	CH 149	5745	13.23	13.50	100
		CH 157	5785	12.88	13.50	100
		CH 165	5825	**13.49**	**14.00**	100
	802.11n-HT20 MCS0	CH 149	5745	13.28	13.50	100
		CH 157	5785	13.36	13.50	100
		CH 165	5825	12.90	13.50	100
	802.11n-HT40 MCS0	CH 151	5755	12.56	13.00	100
		CH 159	5795	13.19	13.50	100

6. BT average output power

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	3.87	3.14	3.25
	CH 39	2441	5.94	4.94	5.01
	CH 78	2480	5.01	5.04	4.15
Tune-Up Limit (dBm)			6.5	5.5	5.5

Mode	Channel	Frequency (MHz)	Peak power (dBm)
			GFSK
LE	CH 00	2402	-3.16
	CH 19	2440	-3.21
	CH 39	2480	-3.98

Stand-alone SAR Evaluation

Test distance: 10mm			
Band	**Highest power(mW) per tune up**	**1-g SAR test threshold**	**Test required?**
Wi-Fi (2.4G)	45.00	[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)] ≤ 3.0 for 1-g SAR	Yes
Wi-Fi (5.2GHz)	28.00		Yes
Wi-Fi (5.3GHz)	28.00		Yes
Wi-Fi (5.5G)	35.00		Yes
Wi-Fi (5.8G)	25.00		Yes
Bluetooth	4.00		No

The SAR test for BT is not required.

13. Test Results List

Test Guidance:

<GSM>

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (4Tx slots) for GSM850/GSM1900 is considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes.

<WCDMA>

1. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode, SAR measurement is not required for the secondary mode.
2. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
3. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
4. For HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
5. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA / DC-HSDPA / HSPA+) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.

<LTE>

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
   e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is: ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. Considering the users may install 3rd party software to enable VOIP, LTE Head SAR is also evaluated. Because FCC has not published uniform procedures for VOIP in LTE, therefore all channels and modes and modulations required under the other KDB pub 941225 D05 FCC LTE procedures were used for the held-near-head testing.
6. Per KDB 941225 D05, for LTE, if the smaller bandwidth output power is within +/- ½ dB of the largest bandwidth, and the maximum SAR of the largest bandwidth is ≤ 1.45 W/kg, SAR for smaller bandwidth can be excluded.
7. Per KDB 941225 D05, if the measured 50%-RB QPSK 1g-SAR for the middle or highest output power channel is ≤ 0.8W/kg, remaining 2 channels SAR tests can be excluded. Otherwise, 50% RB allocation of the remaining 2 channels SAR tests are necessary.
8. Per KDB 941225 D05, for LTE, if 50%-RB QPSK SAR ≤ 1.45 W/kg, 100%-RB QPSK SAR can be excluded; if 50%-RB 16QAM SAR ≤ 1.45 W/kg, 100%-RB 16QAM SAR can be excluded.

9. If SAR of 1 RB allocation is ≤ 1.45W/kg, SAR of 1 RB allocation of remaining channels can be excluded.
10. Per KDB 648474, if the highest output channel SAR for each exposure position is ≤ 0.8 W/kg, other channels SAR tests are not necessary.

<WLAN>

1. SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

   1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

   2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.
2. 2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for
3. 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed.
4. For held-to-ear and hotspot operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured. Justification for test configurations for WLAN per KDB Publication 248227 D02DR02-41929 for 2.4 GHz WI-FI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR.

SAR Test List:

Summary of Measurement Results for Head

<GSM850 & GSM1900>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
1#	GSM850	GPRS(4 TX slots)	Right Cheek	251	848.8	1.052	0.066	**0.069**
	GSM850	GPRS(4 TX slots)	Right Tilt	251	848.8	1.052	0.030	0.032
	GSM850	GPRS(4 TX slots)	Left Cheek	251	848.8	1.052	0.054	0.057
	GSM850	GPRS(4 TX slots)	Left Tilt	251	848.8	1.052	0.043	0.045
	GSM1900	GPRS(4 TX slots)	Right Cheek	810	1909.8	1.002	0.053	0.053
	GSM1900	GPRS(4 TX slots)	Right Tilt	810	1909.8	1.002	0.030	0.030
2#	GSM1900	GPRS(4 TX slots)	Left Cheek	810	1909.8	1.002	0.121	**0.121**
	GSM1900	GPRS(4 TX slots)	Left Tilt	810	1909.8	1.002	0.038	0.038

<WCDMA Band II/IV/V>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Right Cheek	9538	1907.6	1.054	0.094	0.099
	WCDMA II	RMC 12.2Kbps	Right Tilt	9538	1907.6	1.054	0.068	0.072
3#	WCDMA II	RMC 12.2Kbps	Left Cheek	9538	1907.6	1.054	0.097	**0.102**
	WCDMA II	RMC 12.2Kbps	Left Tilt	9538	1907.6	1.054	0.034	0.036
	WCDMA IV	RMC 12.2Kbps	Right Cheek	1513	1752.6	1.107	0.029	0.032
	WCDMA IV	RMC 12.2Kbps	Right Tilt	1513	1752.6	1.107	0.022	0.024
5#	WCDMA IV	RMC 12.2Kbps	Left Cheek	1513	1752.6	1.107	0.047	**0.052**
	WCDMA IV	RMC 12.2Kbps	Left Tilt	1513	1752.6	1.107	0.018	0.020
7#	WCDMA V	RMC 12.2Kbps	Right Cheek	4132	826.4	1.069	0.053	**0.057**
	WCDMA V	RMC 12.2Kbps	Right Tilt	4132	826.4	1.069	0.029	0.031
	WCDMA V	RMC 12.2Kbps	Left Cheek	4132	826.4	1.069	0.049	0.052
	WCDMA V	RMC 12.2Kbps	Left Tilt	4132	826.4	1.069	0.049	0.052

<LTE Band 2/4/7/12/17>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Ch.	Freq. (MHz)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20Mhz	QPSK	1	0	Right Cheek	18900	1880	1.029	0.051	0.052
	LTE Band 2	20Mhz	QPSK	1	0	Right Tilt	18900	1880	1.029	0.056	0.058
16#	LTE Band 2	20Mhz	QPSK	1	0	Left Cheek	18900	1880	1.029	0.083	**0.085**
	LTE Band 2	20Mhz	QPSK	1	0	Left Tilt	18900	1880	1.029	0.037	0.038
	LTE Band 2	20Mhz	QPSK	50	0	Right Cheek	18900	1880	1.074	0.043	0.046
	LTE Band 2	20Mhz	QPSK	50	0	Right Tilt	18900	1880	1.074	0.041	0.044
	LTE Band 2	20Mhz	QPSK	50	0	Left Cheek	18900	1880	1.074	0.067	0.072
	LTE Band 2	20Mhz	QPSK	50	0	Left Tilt	18900	1880	1.074	0.031	0.033
	LTE Band 4	20Mhz	QPSK	1	0	Right Cheek	20300	1745	1.002	0.044	0.044
	LTE Band 4	20Mhz	QPSK	1	0	Right Tilt	20300	1745	1.002	0.023	0.023
	LTE Band 4	20Mhz	QPSK	1	0	Left Cheek	20300	1745	1.002	0.043	0.043
	LTE Band 4	20Mhz	QPSK	1	0	Left Tilt	20300	1745	1.002	0.016	0.016
	LTE Band 4	20Mhz	QPSK	50	0	Right Cheek	20300	1745	1.035	0.035	0.036
	LTE Band 4	20Mhz	QPSK	50	0	Right Tilt	20300	1745	1.035	0.019	0.020
18#	LTE Band 4	20Mhz	QPSK	50	0	Left Cheek	20300	1745	1.035	0.053	**0.055**
	LTE Band 4	20Mhz	QPSK	50	0	Left Tilt	20300	1745	1.035	0.013	0.013
	LTE Band 7	20Mhz	QPSK	1	0	Right Cheek	21350	2560	1.078	0.122	0.131
	LTE Band 7	20Mhz	QPSK	1	0	Right Tilt	21350	2560	1.078	0.079	0.085
20#	LTE Band 7	20Mhz	QPSK	1	0	Left Cheek	21350	2560	1.078	0.229	**0.247**
	LTE Band 7	20Mhz	QPSK	1	0	Left Tilt	21350	2560	1.078	0.086	0.093
	LTE Band 7	20Mhz	QPSK	50	0	Right Cheek	21100	2535	1.052	0.064	0.067
	LTE Band 7	20Mhz	QPSK	50	0	Right Tilt	21100	2535	1.052	0.031	0.033
	LTE Band 7	20Mhz	QPSK	50	0	Left Cheek	21100	2535	1.052	0.134	0.141
	LTE Band 7	20Mhz	QPSK	50	0	Left Tilt	21100	2535	1.052	0.037	0.039
22#	LTE Band 12	10Mhz	QPSK	1	0	Right Cheek	23095	707.5	1.051	0.056	**0.059**
	LTE Band 12	10Mhz	QPSK	1	0	Right Tilt	23095	707.5	1.051	0.026	0.027
	LTE Band 12	10Mhz	QPSK	1	0	Left Cheek	23095	707.5	1.051	0.051	0.054
	LTE Band 12	10Mhz	QPSK	1	0	Left Tilt	23095	707.5	1.051	0.030	0.032
	LTE Band 12	10Mhz	QPSK	25	0	Right Cheek	23095	707.5	1.075	0.046	0.049
	LTE Band 12	10Mhz	QPSK	25	0	Right Tilt	23095	707.5	1.075	0.031	0.033
	LTE Band 12	10Mhz	QPSK	25	0	Left Cheek	23095	707.5	1.075	0.042	0.045
	LTE Band 12	10Mhz	QPSK	25	0	Left Tilt	23095	707.5	1.075	0.023	0.025

24#	LTE Band 17	10Mhz	QPSK	1	0	Right Cheek	23780	709	1.133	0.069	**0.078**
	LTE Band 17	10Mhz	QPSK	1	0	Right Tilt	23780	709	1.133	0.023	0.026
	LTE Band 17	10Mhz	QPSK	1	0	Left Cheek	23780	709	1.133	0.065	0.074
	LTE Band 17	10Mhz	QPSK	1	0	Left Tilt	23780	709	1.133	0.042	0.048
	LTE Band 17	10Mhz	QPSK	25	25	Right Cheek	23780	709	1.052	0.056	0.059
	LTE Band 17	10Mhz	QPSK	25	25	Right Tilt	23780	709	1.052	0.022	0.023
	LTE Band 17	10Mhz	QPSK	25	25	Left Cheek	23780	709	1.052	0.050	0.053
	LTE Band 17	10Mhz	QPSK	25	25	Left Tilt	23780	709	1.052	0.032	0.034

<WLAN2.4GHz &WLAN 5GHz >

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	6	2437	1.099	0.140	0.154
	WLAN2.4GHz	802.11b 1Mbps	Right Tilt	6	2437	1.099	0.109	0.120
14#	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	6	2437	1.099	0.165	**0.181**
	WLAN2.4GHz	802.11b 1Mbps	Left Tilt	6	2437	1.099	0.142	0.156
	WLAN5.3GHz	802.11a 6Mbps	Right Cheek	60	5300	1.164	0.080	0.093
	WLAN5.3GHz	802.11a 6Mbps	Right Tilt	60	5300	1.164	0.098	0.114
09#	WLAN5.3GHz	802.11a 6Mbps	Left Cheek	60	5300	1.164	0.116	**0.135**
	WLAN5.3GHz	802.11a 6Mbps	Left Tilt	60	5300	1.164	0.041	0.048
	WLAN5.5GHz	802.11a 6Mbps	Right Cheek	140	5700	1.175	0.110	0.129
	WLAN5.5GHz	802.11a 6Mbps	Right Tilt	140	5700	1.175	0.064	0.075
	WLAN5.5GHz	802.11a 6Mbps	Left Cheek	140	5700	1.175	0.074	0.087
10#	WLAN5.5GHz	802.11a 6Mbps	Left Tilt	140	5700	1.175	0.146	**0.172**
	WLAN5.8GHz	802.11a 6Mbps	Right Cheek	165	5825	1.125	0.105	0.118
28#	WLAN5.8GHz	802.11a 6Mbps	Right Tilt	165	5825	1.125	0.128	**0.144**
	WLAN5.8GHz	802.11a 6Mbps	Left Cheek	165	5825	1.125	0.062	0.070
	WLAN5.8GHz	802.11a 6Mbps	Left Tilt	165	5825	1.125	0.046	0.052

Summary of Measurement Results for Body (test distance 10mm)

< GSM850&GSM1900>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS(4 TX slots)	Front Side	251	848.8	1.052	0.112	0.118
26#	GSM850	GPRS(4 TX slots)	Back Side	251	848.8	1.052	0.369	**0.388**
	GSM1900	GPRS(4 TX slots)	Front Side	810	1909.8	1.002	0.097	0.097
27#	GSM1900	GPRS(4 TX slots)	Back Side	810	1909.8	1.002	0.621	**0.622**

<WCDMA Band II/IV/V>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Front Side	9538	1907.6	1.054	0.093	0.098
4#	WCDMA II	RMC 12.2Kbps	Back Side	9538	1907.6	1.054	0.540	**0.569**
	WCDMA IV	RMC 12.2Kbps	Front Side	1513	1752.6	1.107	0.064	0.071
6#	WCDMA IV	RMC 12.2Kbps	Back Side	1513	1752.6	1.107	0.869	**0.962**
	WCDMA IV	RMC 12.2Kbps	Back Side	1312	1712.4	1.112	0.684	0.760
	WCDMA IV	RMC 12.2Kbps	Back Side	1412	1732.4	1.112	0.786	0.874
	WCDMA V	RMC 12.2Kbps	Front Side	4132	826.4	1.069	0.024	0.026
8#	WCDMA V	RMC 12.2Kbps	Back Side	4132	826.4	1.069	0.173	**0.185**

<LTE Band 2/4/7/12/17>

Plot No.	Band	BW (MHz)	RB Size	RB offset	Test Position	Ch.	Freq. (MHz)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20Mhz	1	0	Front Side	18900	1880	1.029	0.168	0.173
	LTE Band 2	20Mhz	1	0	Back Side	18900	1880	1.029	0.912	**0.938**
	LTE Band 2	20Mhz	100	0	Back Side	18900	1880	1.028	0.564	0.580
	LTE Band 2	20Mhz	1	0	Back Side	18700	1860	1.057	0.826	0.873
17#	LTE Band 2	20Mhz	1	0	Back Side	19100	1900	1.033	0.701	0.724
	LTE Band 2	20Mhz	50	0	Front Side	18900	1880	1.074	0.128	0.137
	LTE Band 2	20Mhz	50	0	Back Side	18900	1880	1.074	0.703	0.755

	LTE Band 4	20Mhz	1	0	Front Side	20300	1745	1.002	0.084	0.084
19#	LTE Band 4	20Mhz	1	0	Back Side	20300	1745	1.002	1.166	**1.168**
	LTE Band 4	20Mhz	1	0	Back Side	20050	1720	1.002	1.018	1.020
	LTE Band 4	20Mhz	1	0	Back Side	20175	1732.5	1.005	1.144	1.149
	LTE Band 4	20Mhz	100	0	Back Side	20300	1745	1.002	1.030	1.032
	LTE Band 4	20Mhz	100	0	Back Side	20050	1720	1.002	0.848	0.850
	LTE Band 4	20Mhz	100	0	Back Side	20175	1732.5	1.005	0.904	0.908
	LTE Band 4	20Mhz	50	0	Front Side	20300	1745	1.035	0.070	0.072
	LTE Band 4	20Mhz	50	0	Back Side	20300	1745	1.035	0.949	0.982
	LTE Band 4	20Mhz	50	0	Back Side	20050	1720	1.042	0.839	0.875
	LTE Band 4	20Mhz	50	0	Back Side	20175	1732.5	1.045	0.760	0.794
	LTE Band 4	20Mhz	100	0	Back Side	20300	1745	1.035	0.901	0.933
	LTE Band 7	20Mhz	1	0	Front Side	21350	2560	1.078	0.453	**0.488**
21#	LTE Band 7	20Mhz	1	0	Back Side	21350	2560	1.078	0.200	0.216
	LTE Band 7	20Mhz	50	0	Front Side	21100	2535	1.052	0.245	0.258
	LTE Band 7	20Mhz	50	0	Back Side	21100	2535	1.052	0.099	0.104
	LTE Band 12	10Mhz	1	0	Front Side	23095	707.5	1.051	0.042	0.044
	LTE Band 12	10Mhz	1	0	Back Side	23095	707.5	1.051	0.190	**0.200**
	LTE Band 12	10Mhz	25	0	Front Side	23095	707.5	1.075	0.022	0.024
23#	LTE Band 12	10Mhz	25	0	Back Side	23095	707.5	1.075	0.153	0.164
	LTE Band 17	10Mhz	1	0	Front Side	23780	709	1.133	0.079	0.090
	LTE Band 17	10Mhz	1	0	Back Side	23780	709	1.133	0.199	0.226
	LTE Band 17	10Mhz	25	0	Front Side	23780	709	1.052	0.062	0.065
25#	LTE Band 17	10Mhz	25	0	Back Side	23780	709	1.052	0.232	**0.244**

<WLAN2.4GHz &WLAN 5GHz >

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front Side	6	2437	1.099	0.046	0.051
15#	WLAN2.4GHz	802.11b 1Mbps	Back Side	6	2437	1.099	0.364	**0.400**
	WLAN5GHz	802.11a 6Mbps	Front Side	60	5300	1.164	0.170	0.198
11#	WLAN5GHz	802.11a 6Mbps	Back Side	60	5300	1.164	0.171	**0.199**
	WLAN5GHz	802.11a 6Mbps	Front Side	140	5700	1.175	0.165	**0.194**
12#	WLAN5GHz	802.11a 6Mbps	Back Side	140	5700	1.175	0.113	0.133
	WLAN5GHz	802.11a 6Mbps	Front Side	165	5825	1.125	0.195	**0.219**
13#	WLAN5GHz	802.11a 6Mbps	Back Side	165	5825	1.125	0.185	0.208

<RFID>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	RFID	-	Front Side	-	915.25	1.099	0.033	0.033
	RFID	-	top Side	-	915.25	1.099	0.015	0.015
	RFID		Left Side	-	915.25		0.014	0.014
	RFID		Right Side	-	915.25		0.012	0.012
29#	RFID		Front Side	-	902.75		0.048	**0.048**
	RFID		Front Side	-	927.25		0.027	0.027

<Bluetooth>

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

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

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

(Max power=4.00 mW; *min. test separation distance*= 5mm for Head; *f*=2.4GHz)

BT estimated Head SAR =0.168W/Kg (1g)

(Max power=4.00 mW; *min. test separation distance*= 10mm for Body; *f*=2.4GHz)

BT estimated Body SAR =0.084W/Kg (1g)

14. Repeated SAR Measurement

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

<Repeat SAR List>

-	Band	Mode	Test Position	Ch.	Freq. (MHz)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
original	WCDMA IV	RMC 12.2Kbps	Back Side	1513	1752.6	1.107	0.869	**0.962**
Repeat	WCDMA IV	RMC 12.2Kbps	Back Side	1513	1752.6	1.107	0.86	0.952

-	Band	BW (MHz)	RB Size	RB offset	Test Position	Ch.	Freq. (MHz)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
original	LTE Band 2	20Mhz	1	0	Back Side	18900	1880	1.029	0.912	**0.938**
Repeat	LTE Band 2	20Mhz	1	0	Back Side	18900	1880	1.029	0.91	0.936
original	LTE Band 4	20Mhz	1	0	Back Side	20300	1745	1.002	1.166	**1.168**
Repeat	LTE Band 4	20Mhz	1	0	Front Side	20300	1745	1.002	1.159	1.163
original	LTE Band 4	20Mhz	50	0	Back Side	20300	1745	1.035	0.949	0.982
Repeat	LTE Band 4	20Mhz	50	0	Back Side	20300	1745	1.035	0.941	0.974

15. Multiple Transmitters Evaluation

Simultaneous Evaluation:

No.	Simultaneous transmission Condition	Head	Body-worn
1	GSM/GPRS/EDGE + WLAN 2.4GHz	Yes	Yes
2	WCDMA + WLAN 2.4GHz	Yes	Yes
3	LTE + WLAN 2.4GHz	Yes	Yes
4	GSM/GPRS/EDGE + WLAN 5GHz	Yes	Yes
5	WCDMA + WLAN 5GHz	Yes	Yes
6	LTE + WLAN 5GHz	Yes	Yes
7	GSM/GPRS/EDGE + Bluetooth	Yes	Yes
8	WCDMA + Bluetooth	Yes	Yes
9	LTE + Bluetooth	Yes	Yes

Note:

1. When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the Wi-Fi transmitter and another WWAN transmitter. Both transmitter often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. The "Portable Hotspot" feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

2. The hotspot SAR result may overlap with the body-worn accessory SAR requirements, per KDB 941225 D06, the more conservative configurations can be considered, thus excluding some unnecessary body-worn accessory SAR tests.

3. GSM supports voice and data transmission, though not simultaneously. WCDMA supports voice and data transmission simultaneously.

4. Simultaneous Transmission SAR evaluation is not required for BT and Wi-Fi , because the software mechanism have been incorporated to guarantee that the WLAN and Bluetooth transmitters would not simultaneously operate.

5. Per KDB 447498D01v06, Simultaneous Transmission SAR Evaluation procedures is as followed:

   Step 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.

   Step 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.

Step 3: If the ratio of SAR to peak separation distance is ≤ 0.04, Simultaneous SAR measurement is not required.

Step 4: If the ratio of SAR to peak separation distance is > 0.04, Simultaneous SAR measurement is required and simultaneous transmission SAR value is calculated.

(The ratio is determined by: (SAR1 + SAR2) ^ 1.5/Ri ≤ 0.04,

Ri is the separation distance between the peak SAR locations for the antenna pair in mm)

Applicable Multiple Scenario Evaluation

Test Position	Main Ant. SAR_{Max} (W/Kg)	Bluetooth SAR(W/Kg)	Wi-Fi SAR_{Max}(W/Kg)	∑1-g SAR_{Max} (W/Kg)	
				BT&Main Ant	Wi-Fi &Main Ant
Head	0.247	0.168	0.181	0.415	0.428
Body-worn	1.168	0.084	0.400	1.252	1.568

Simultaneous Transmission SAR evaluation is not required for Wi-Fi and WCDMA&GSM&LTE, because the sum of 1g SAR_{Max} is **1.568** W/Kg < 1.6W/Kg for Wi-Fi and WCDMA&GSM&LTE.

Simultaneous Transmission SAR evaluation is not required for BT and WCDMA&GSM&LTE, because the sum of 1g SAR_{Max} is **1.252**W/Kg < 1.6W/Kg for BT and WCDMA&GSM&LTE.

(According to KDB 447498D01v06, the sum of the Highest *reported* SAR of each antenna does not exceed the limit, simultaneous transmission SAR evaluation is not required.)

END OF REPORT

Annex A General Information

1. Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Department:	Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
ResponsibleTest Lab Manager:	Mr. Su Feng
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

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

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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)	2017-5-24	1year
3	Network Emulator	Rohde&Schwarz (CMW500,SN:124534)	2017-5-25	1year
4	Network Analyzer	Agilent(E5071B ,SN:MY42404762)	2017-5-25	1year
5	Voltmeter	Keithley (2000, SN:1000572)	2017-7-8	1year
6	Synthetizer	Rohde&Schwarz (SML_03, SN:101868)	2017-8-24	1year
7	Signal Generator	Rohde&Schwarz (SMP_02)	2017-7-8	1year
8	Power Amplifier	PRANA (Ap32 SV125AZ)	2017-7-8	1year
9	Power Meter	Agilent (E4416A, SN:MY45102093)	2017-7-8	1year
10	Power Sensor	Agilent (N8482A, SN:MY41091706)	2017-7-8	1year
11	Power Meter	Rohde&Schwarz (NRVD, SN:101066)	2017-7-8	1year
12	Power Sensor	MA2411B	2017-7-8	1year
13	Directional coupler	Giga-tronics(SN:1829112)	2017-7-24	1year
14	Probe	Satimo (SN:SN 37/08 EP80)	2017-7-5	1year
15	Probe	Satimo (SN:SN 37/13 EPG193)	2017-7-5	1year
16	Dielectric Probe Kit	Agilent (85033E)	2017-7-5	1year
17	Phantom	Satimo (SN:SN_36_08_SAM62)	N/A	N/A
18	Liquid	Satimo(Last Calibration: 2018-01-08 to 2018-04-19)	N/A	N/A
19	Dipole 750MHz	Satimo (SN30/13 DIP0G750)	2017-7-5	1year
20	Dipole 835MHz	Satimo (SN 20/08 DIPC99)	2017-7-5	1year
21	Dipole 1800MHz	Satimo (SN 36/08 DIPF101)	2017-7-5	1year
22	Dipole 2000MHz	Satimo (SN 20/08 DIPI102)	2017-7-5	1year
23	Dipole 2450MHz	Satimo (SN 30/13 DIP2G450-263)	2017-7-5	1year
24	Dipole 2600MHz	Satimo (SN 30/13 DIP2G600-265)	2017-7-5	1year
25	Dipole 5-6GHz	Satimo (SN 41/12 WGA21)	2017-7-5	1year
26	Thermo meter	KTJ(mode-01)	2017-6-10	1year

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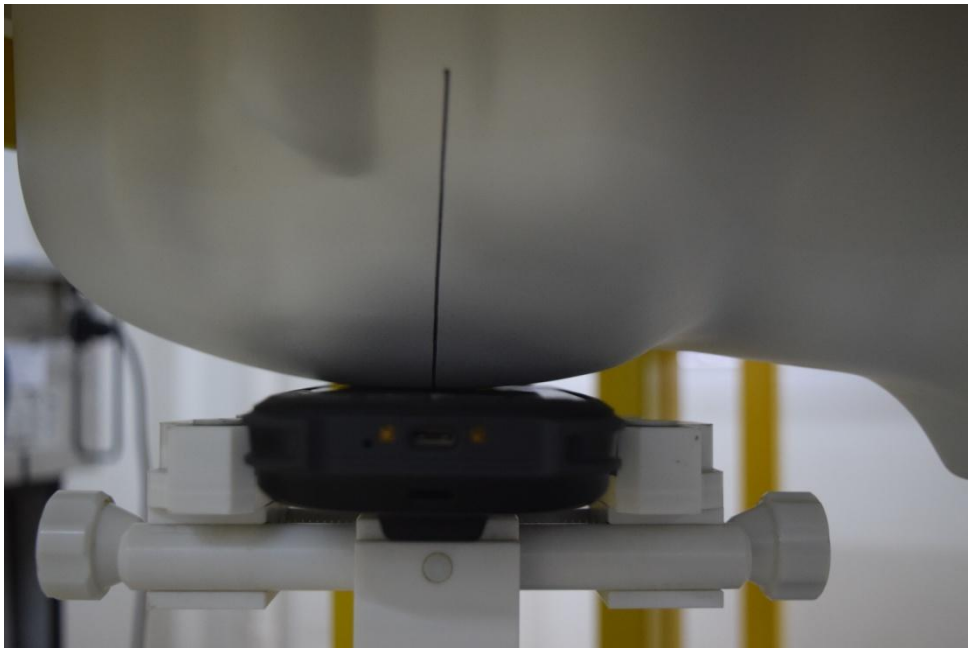
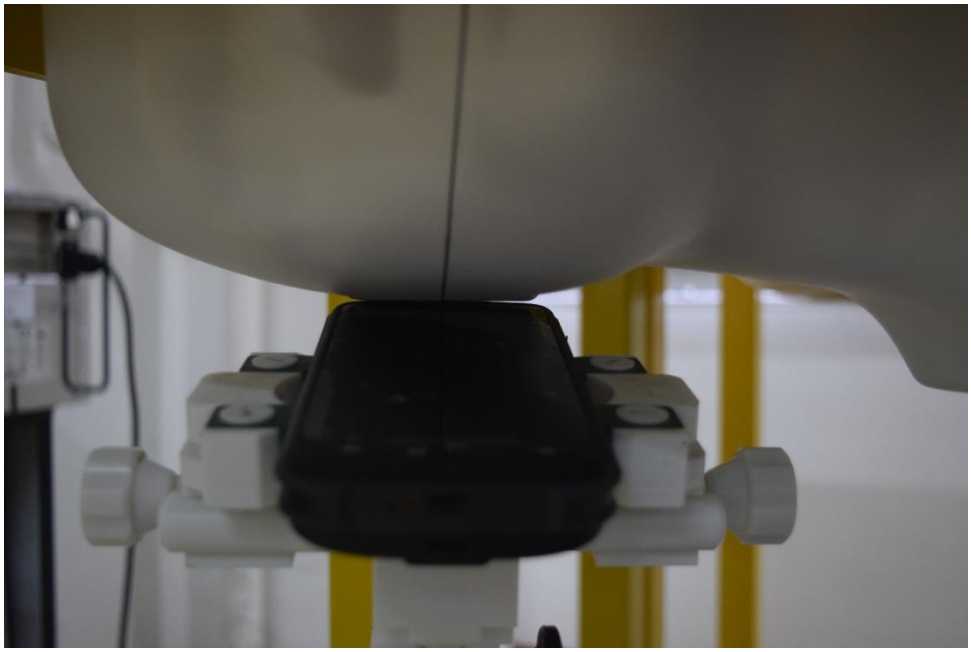
Annex B Test Setup Photos

Head



Right Cheek



Right Tilt

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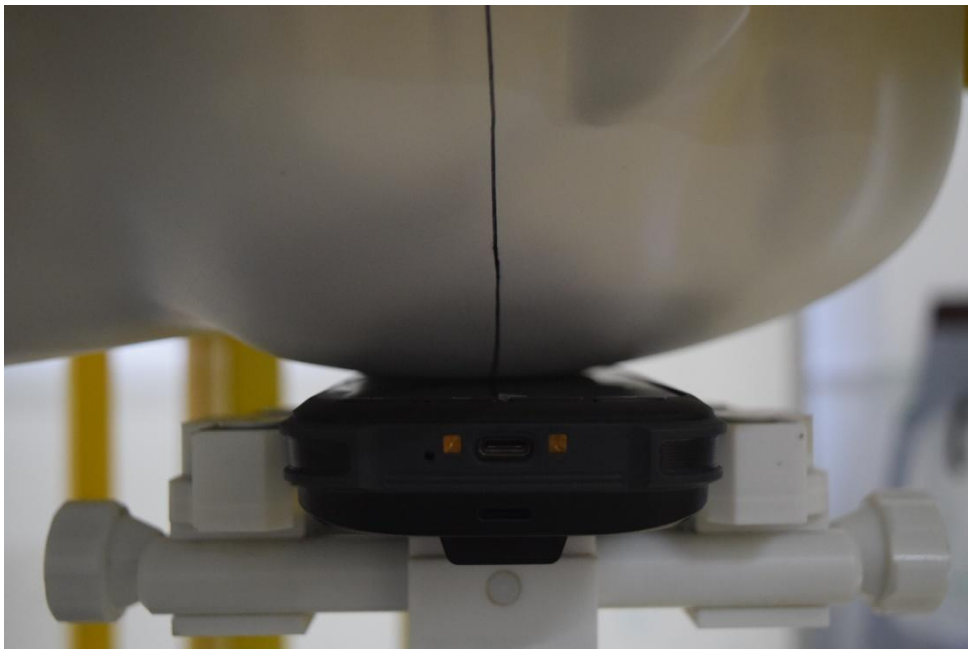
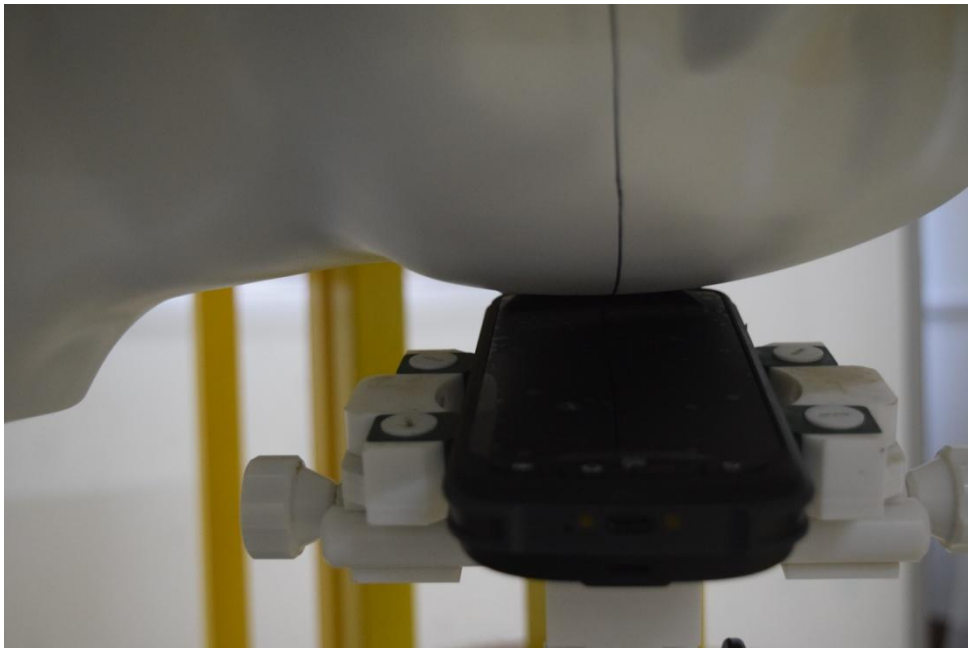


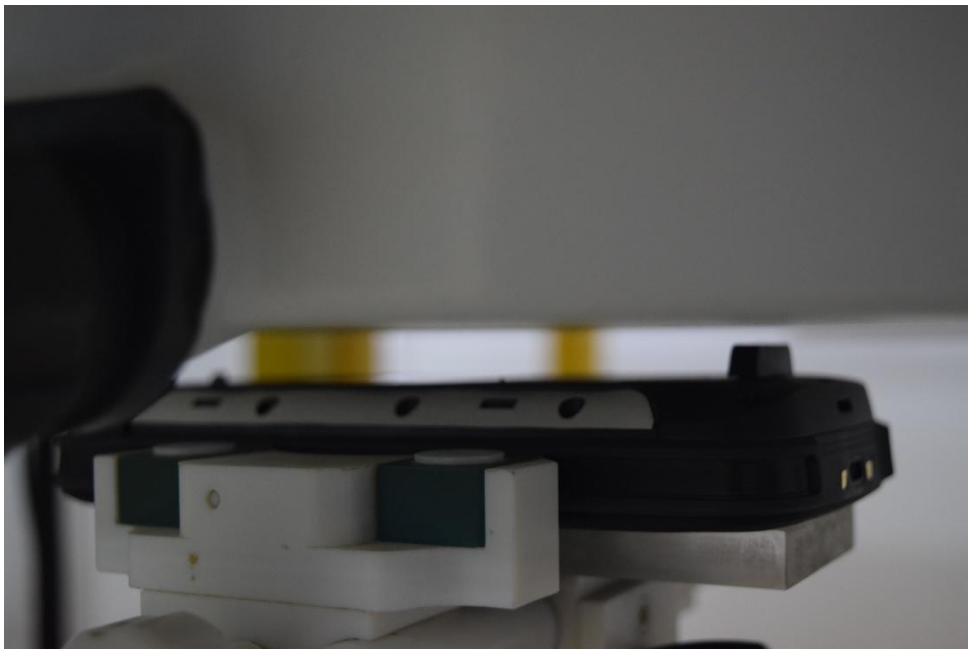
Left Cheek



Left Tilt

Body

Front Side_10mm

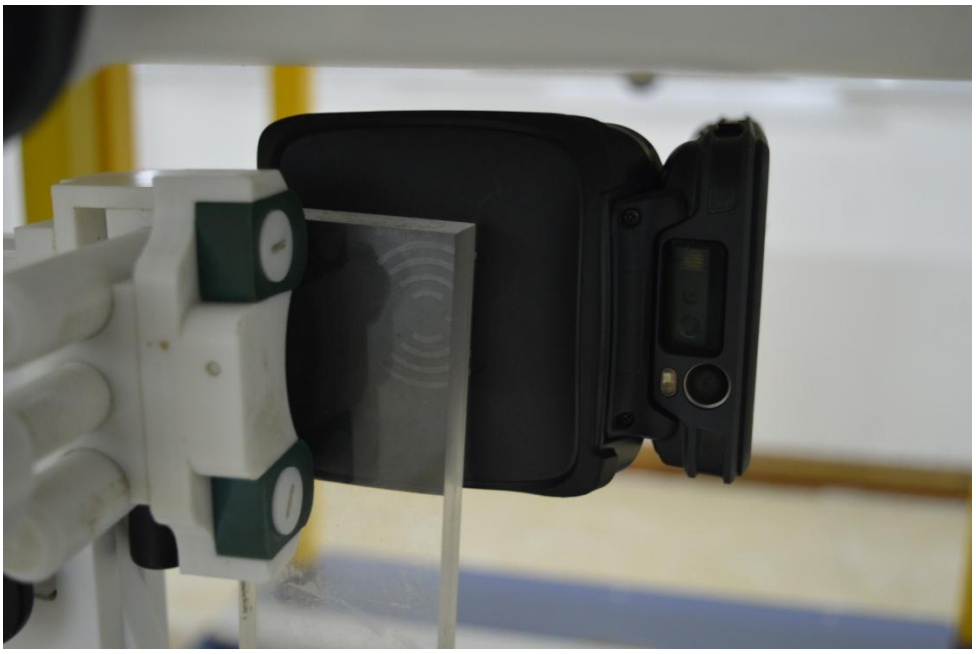


Back Side_10mm

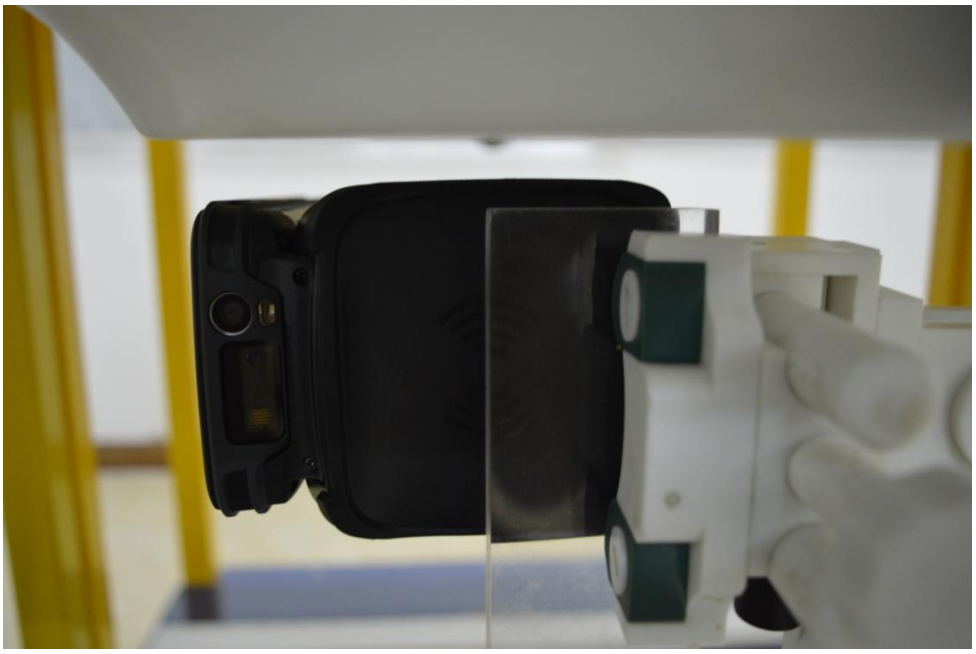
RFID test position

Top Side_10mm

Front Side_10mm



Left Side_10mm



Right Side_10mm

Annex C Plots of System Performance Check

System Performance Check Data (750MHz Head)

Type: Phone measurement (Complete)

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

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

Date of measurement: 2018.02.23

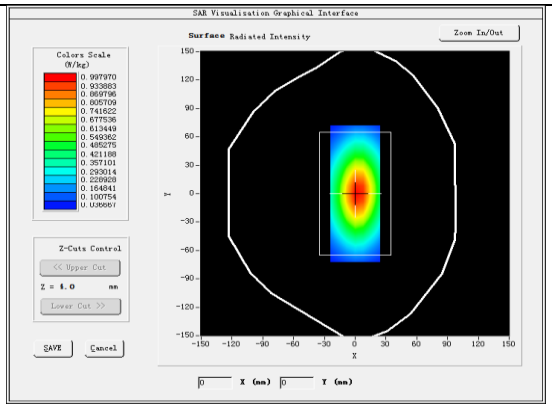
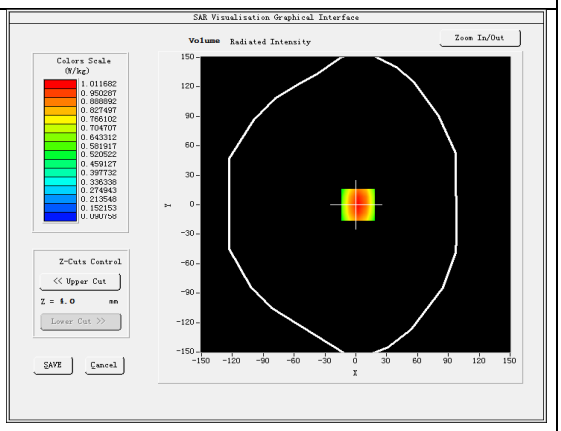
Measurement duration: 13 minutes 28 seconds

A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	
Band	750MHz
Channels	
Signal	CW

B. SAR Measurement Results

Frequency (MHz)	750.000000
Relative permittivity (real part)	41.350601
Conductivity (S/m)	0.885608
Power drift (%)	1.030000
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.44
Crest factor:	1:1

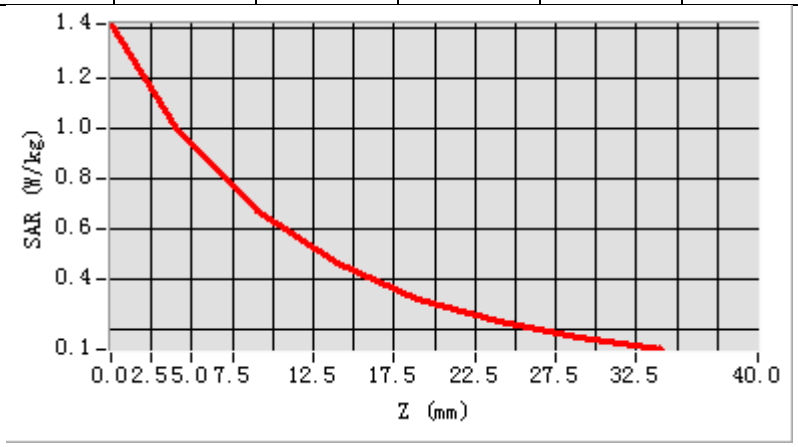
SURFACE SAR	VOLUME SAR
	

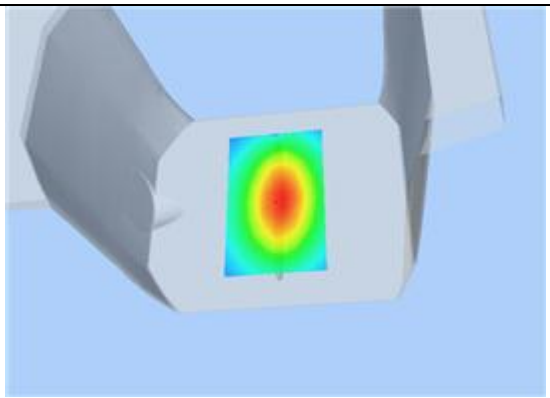
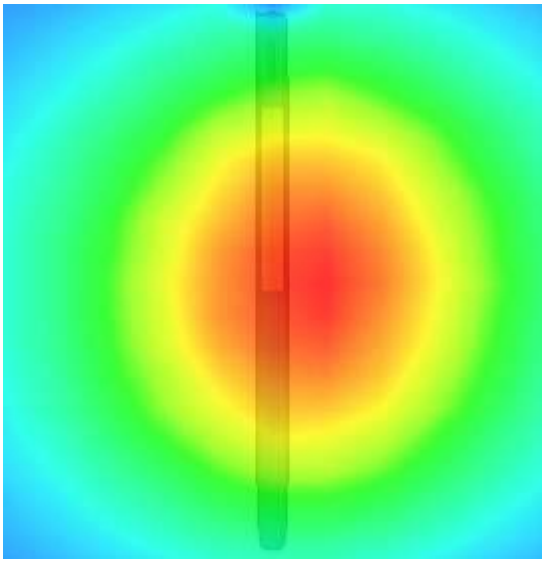
Maximum location: X=2.00, Y=0.00

SAR 10g (W/Kg)	0.539271
SAR 1g (W/Kg)	0.783215

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.4197	1.0117	0.6692	0.4600	0.3210	0.2279	0.1624



3D sceen shot	Hot spot position
	

System Performance Check Data (750MHz Body)

Type: Phone measurement (Complete)

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

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

Date of measurement: 2018.02.12

Measurement duration: 13 minutes 36 seconds

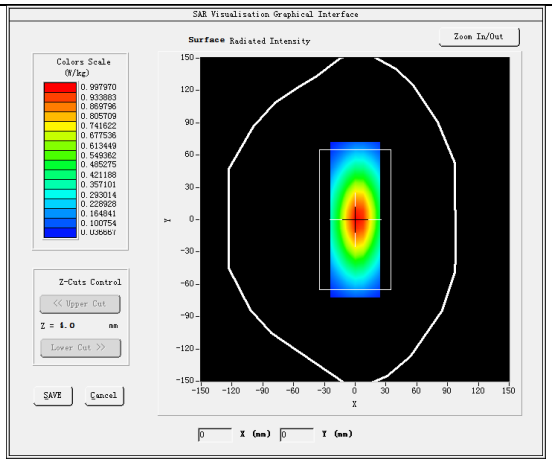
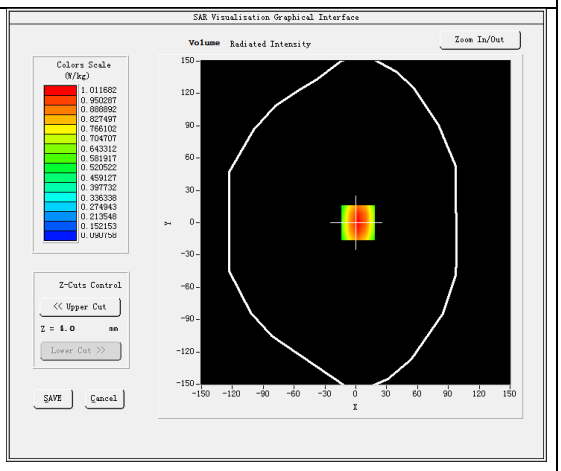
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	
Band	750MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

Frequency (MHz)	750.000000
Relative permittivity (real part)	53.517799
Conductivity (S/m)	1.031025
Power drift (%)	0.320000
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.68
Crest factor:	1:1

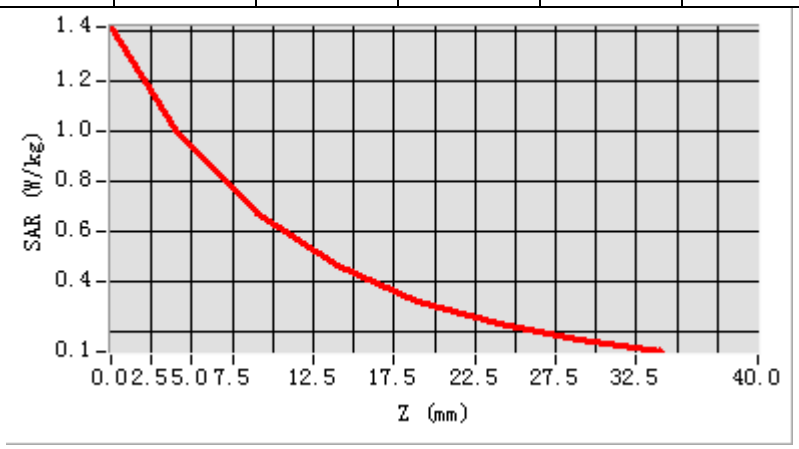
SURFACE SAR	VOLUME SAR
	

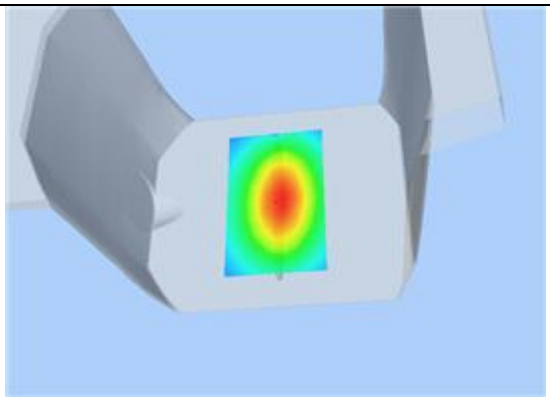
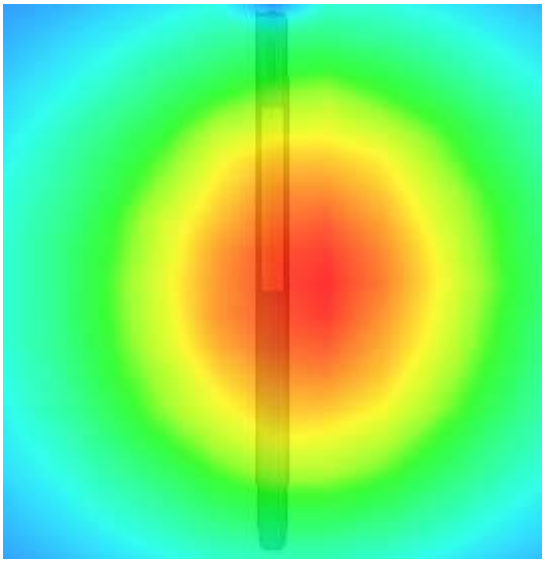
Maximum location: X=2.00, Y=0.00

SAR 10g (W/Kg)	0.609663
SAR 1g (W/Kg)	0.905411

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.4197	1.0117	0.6692	0.4600	0.3210	0.2279	0.1624



3D sceen shot	Hot spot position
	

System Performance Check Data (835MHz Head)

Type: Phone measurement (Complete)

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

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

Date of measurement: 2018.02.23

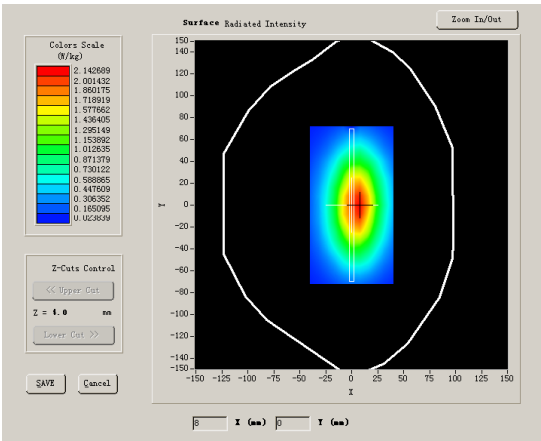
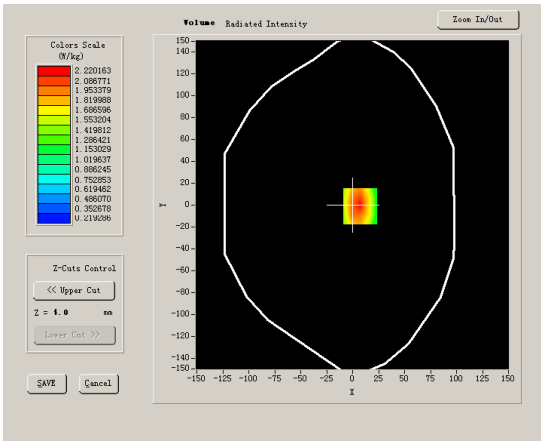
Measurement duration: 13 minutes 35 seconds

A. Experimental conditions.

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

B. SAR Measurement Results

Frequency (MHz)	835.000000
Relative permittivity (real part)	41.182291
Conductivity (S/m)	0.891718
Power drift (%)	1.070000
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.13
Crest factor:	1:1

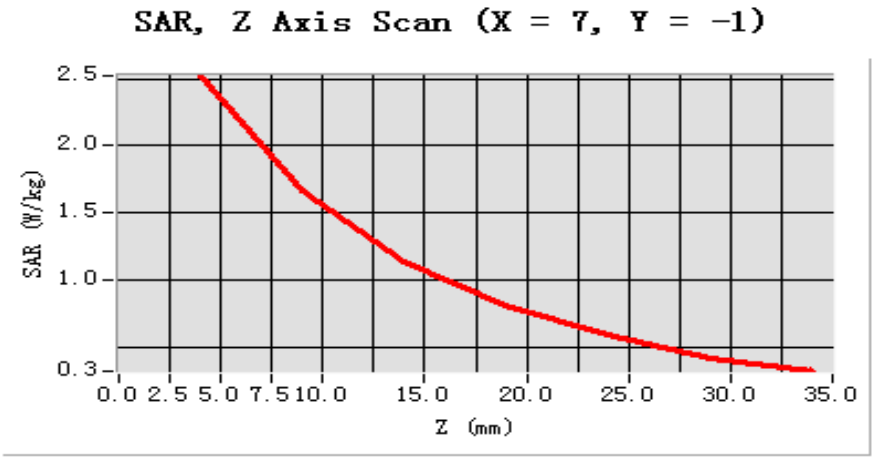
SURFACE SAR	VOLUME SAR
	

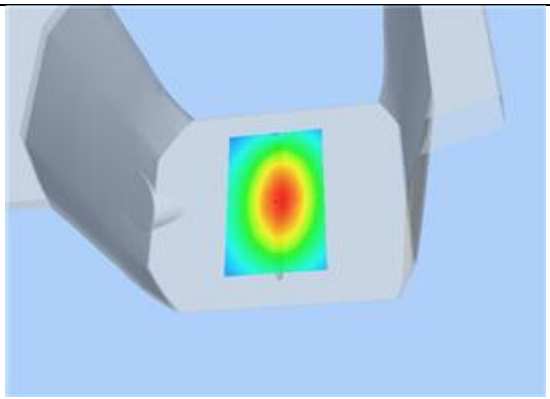
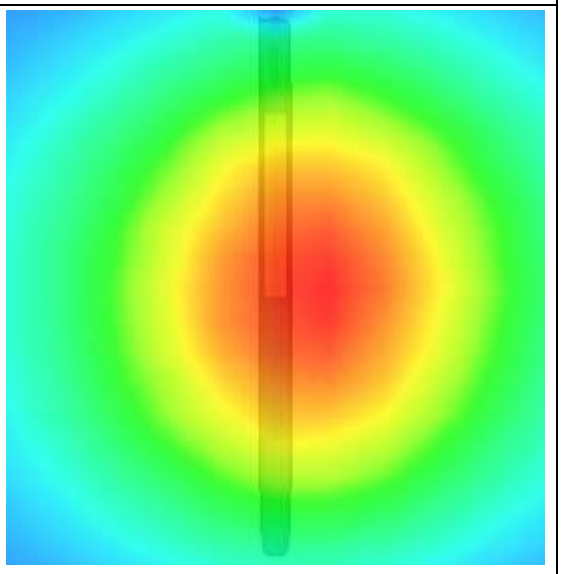
Maximum location: X=7.00, Y=-1.00

SAR 10g (W/Kg)	0.622151
SAR 1g (W/Kg)	0.968476

Z Axis Scan

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



3D sceen shot	Hot spot position
	

System Performance Check Data (835MHz Body)

Type: Phone measurement (Complete)

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

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

Date of measurement: 2018.02.22

Measurement duration: 13 minutes 28 seconds

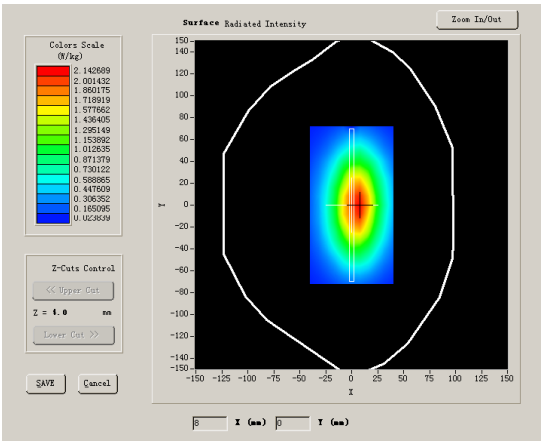
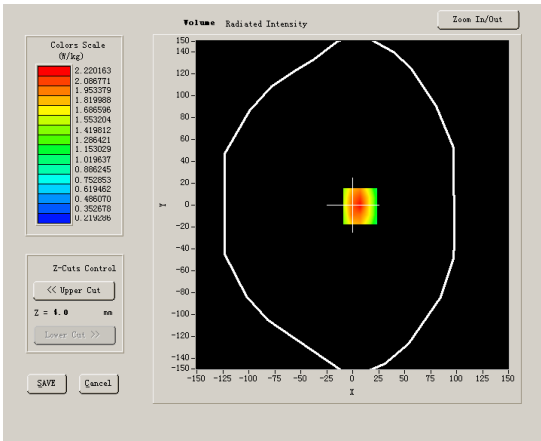
A. Experimental conditions.

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

B. SAR Measurement Results

Band SAR

Frequency (MHz)	835.000000
Relative permittivity (real part)	55.382291
Conductivity (S/m)	0.972171
Power drift (%)	1.070000
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.37
Crest factor:	1:1

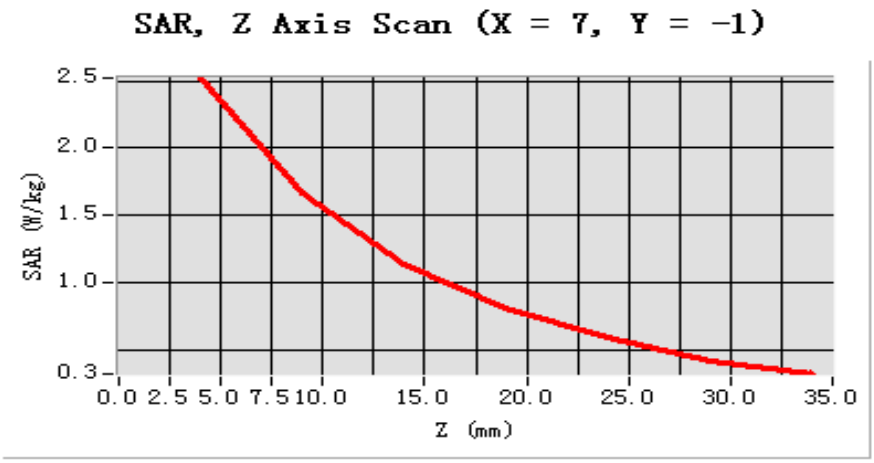
SURFACE SAR	VOLUME SAR
	

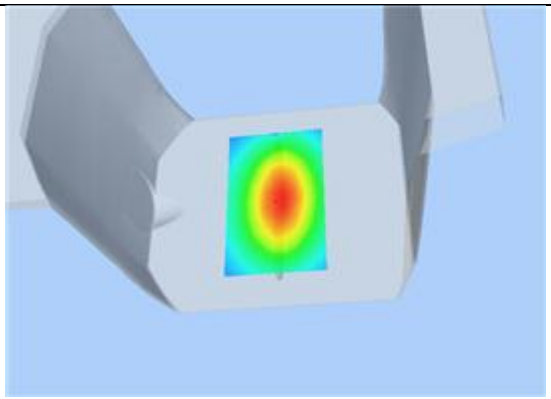
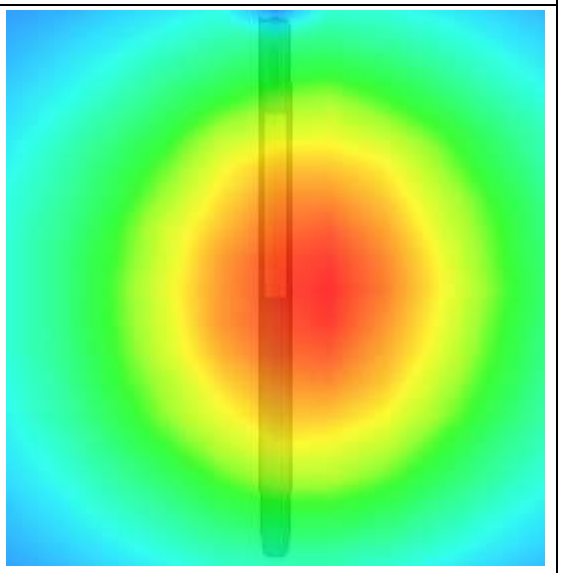
Maximum location: X=7.00, Y=-1.00

SAR 10g (W/Kg)	0.629151
SAR 1g (W/Kg)	0.986576

Z Axis Scan

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



3D sceen shot	Hot spot position
	

System Performance Check Data(1800MHz Head)

Type: Phone measurement (Complete)

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

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

Date of measurement: 2018.02.24

Measurement duration: 13 minutes 27 seconds

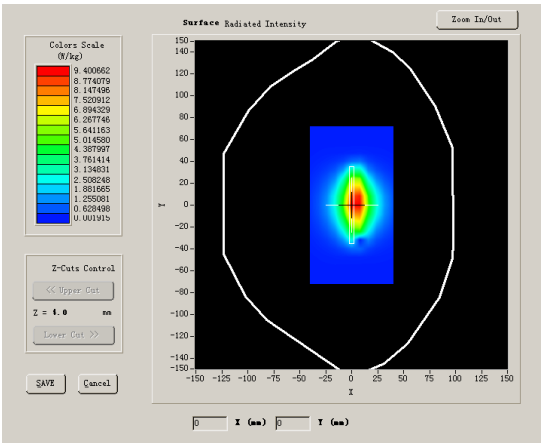
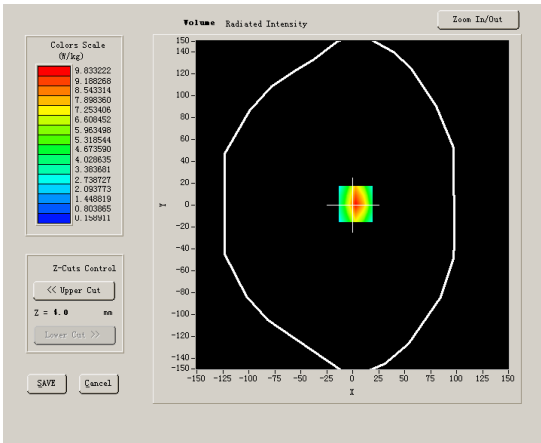
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	
Band	1800MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

Frequency (MHz)	1800.000000
Relative permittivity (real part)	40.095167
Conductivity (S/m)	1.365073
Power drift (%)	0.310000
Ambient Temperature:	22.3°C
Liquid Temperature:	22.6°C
ConvF:	5.21
Crest factor:	1:1

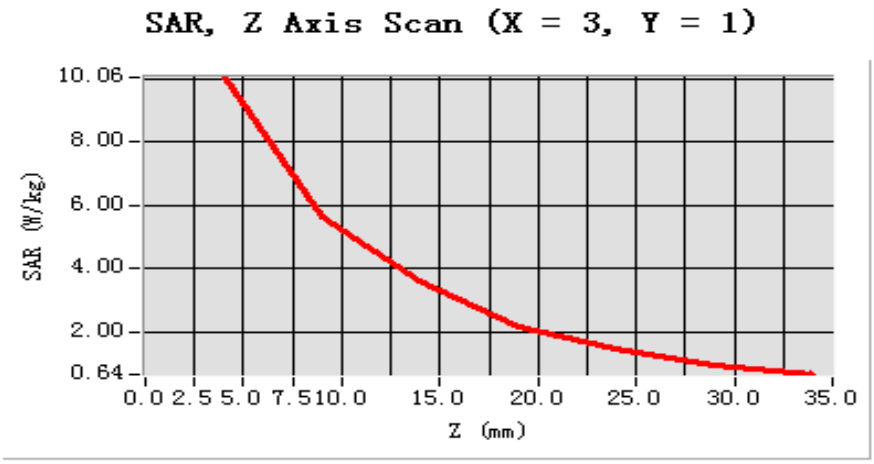
SURFACE SAR	VOLUME SAR
	

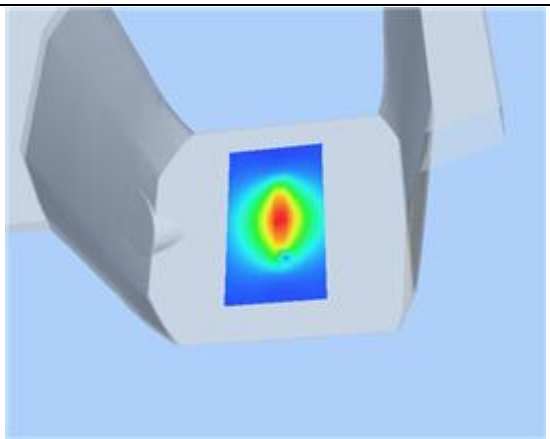
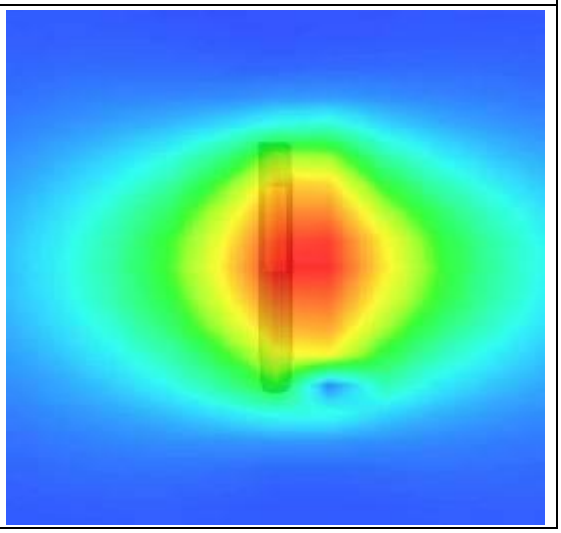
Maximum location: X=3.00, Y=1.00

SAR 10g (W/Kg)	2.048386
SAR 1g (W/Kg)	3.698154

Z Axis Scan

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



3D sceen shot	Hot spot position
	

System Performance Check Data(1800MHz Body)

Type: Phone measurement (Complete)

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

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

Date of measurement: 2018.02.09

Measurement duration: 13 minutes 27 seconds

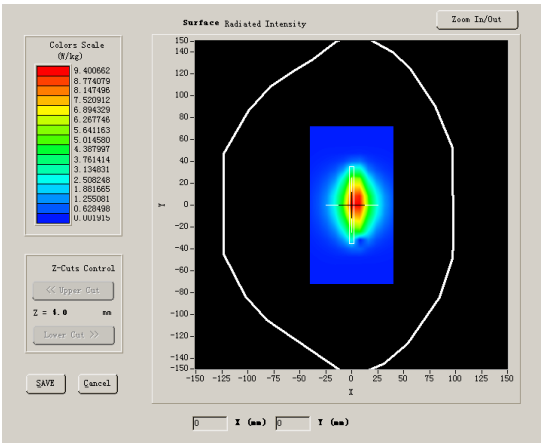
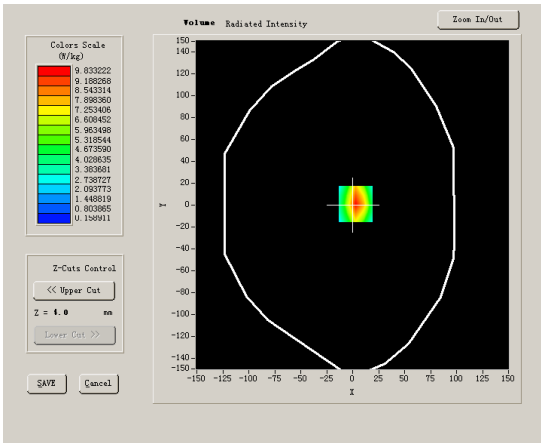
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	
Band	1800MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

Frequency (MHz)	1800.000000
Relative permittivity (real part)	53.295167
Conductivity (S/m)	1.515073
Power drift (%)	0.310000
Ambient Temperature:	22.3°C
Liquid Temperature:	22.6°C
ConvF:	5.38
Crest factor:	1:1

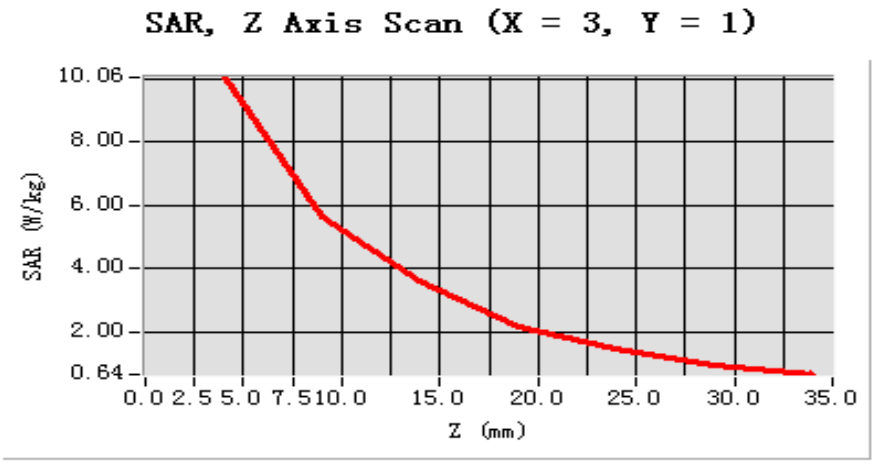
SURFACE SAR	VOLUME SAR
	

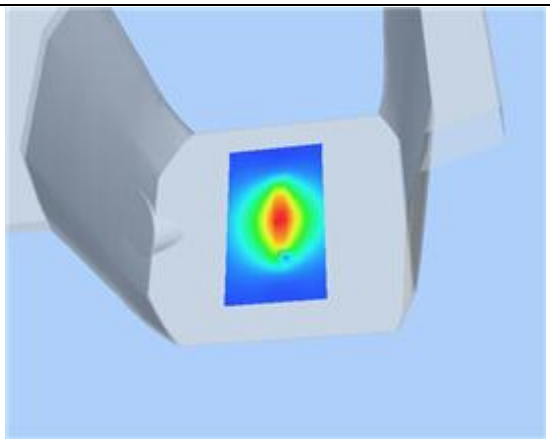
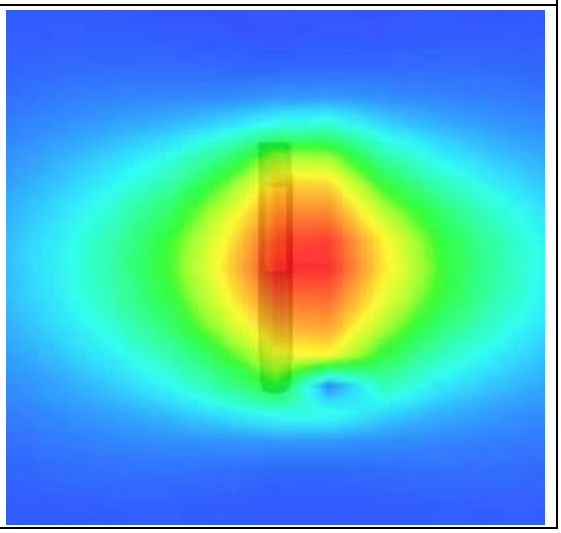
Maximum location: X=3.00, Y=1.00

SAR 10g (W/Kg)	2.038386
SAR 1g (W/Kg)	3.753454

Z Axis Scan

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



3D sceen shot	Hot spot position
	

System Performance Check Data(2000MHz Head)

Type: Phone measurement (Complete)

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

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

Date of measurement: 2018.02.24

Measurement duration: 13 minutes 27 seconds

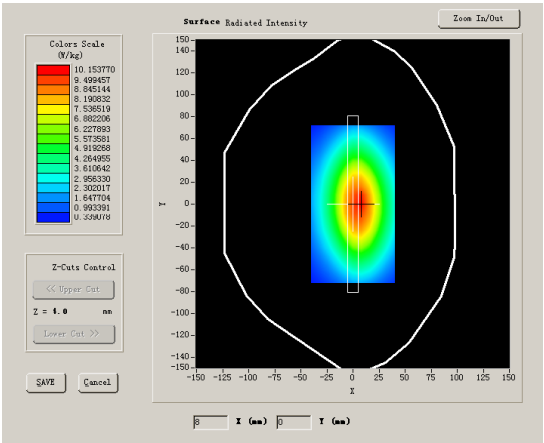
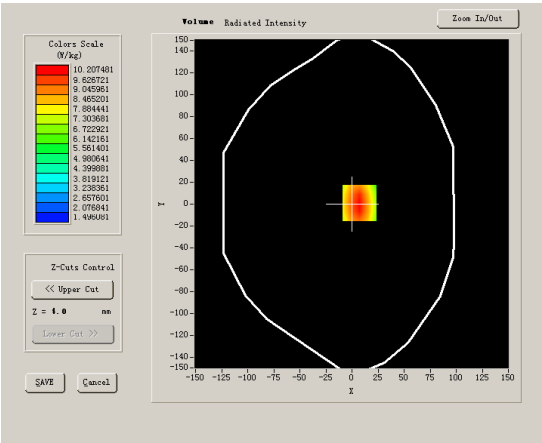
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	
Band	2000MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

Frequency (MHz)	2000.000000
Relative permittivity (real part)	39.984477
Conductivity (S/m)	1.414283
Power drift (%)	-0.830000
Ambient Temperature:	22.1°C
Liquid Temperature:	22.4°C
ConvF:	5.61
Crest factor:	1:1

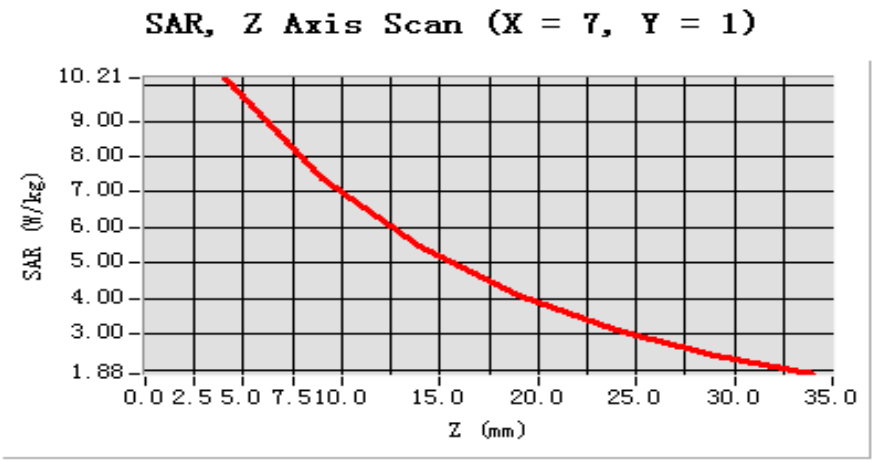
SURFACE SAR	VOLUME SAR
	

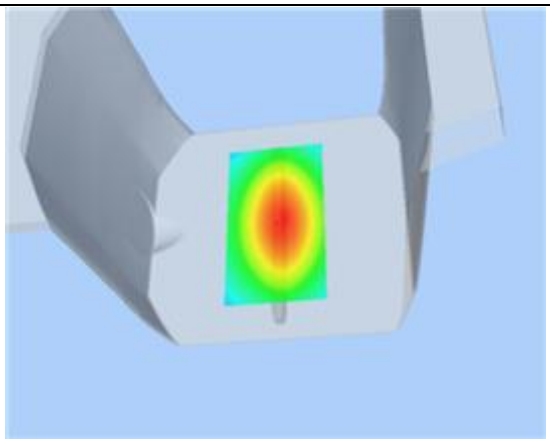
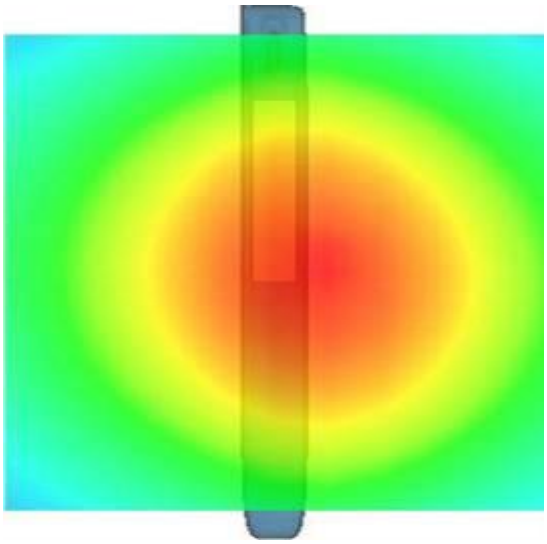
Maximum location: X=7.00, Y=1.00

SAR 10g (W/Kg)	1.992518
SAR 1g (W/Kg)	4.255954

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



3D sceen shot	Hot spot position
	

System Performance Check Data(2000MHz Body)

Type: Phone measurement (Complete)

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

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

Date of measurement: 2018.02.09

Measurement duration: 13 minutes 27 seconds

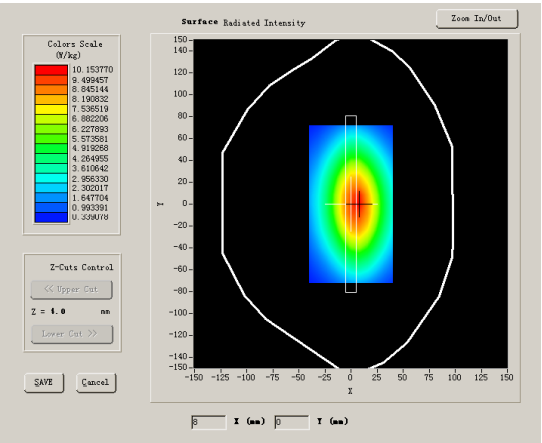
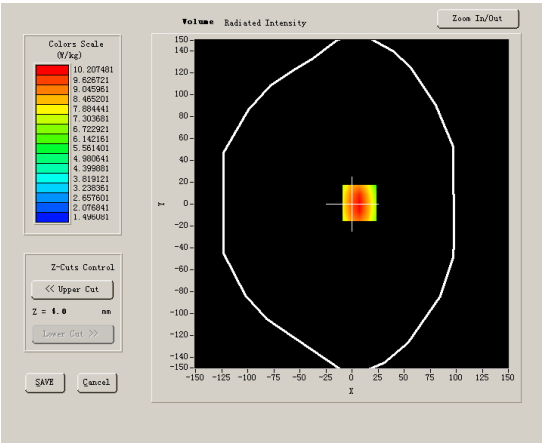
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	
Band	2000MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

Frequency (MHz)	2000.000000
Relative permittivity (real part)	53.285167
Conductivity (S/m)	1.514073
Power drift (%)	-1.860000
Ambient Temperature:	22.1°C
Liquid Temperature:	22.4°C
ConvF:	5.71
Crest factor:	1:1

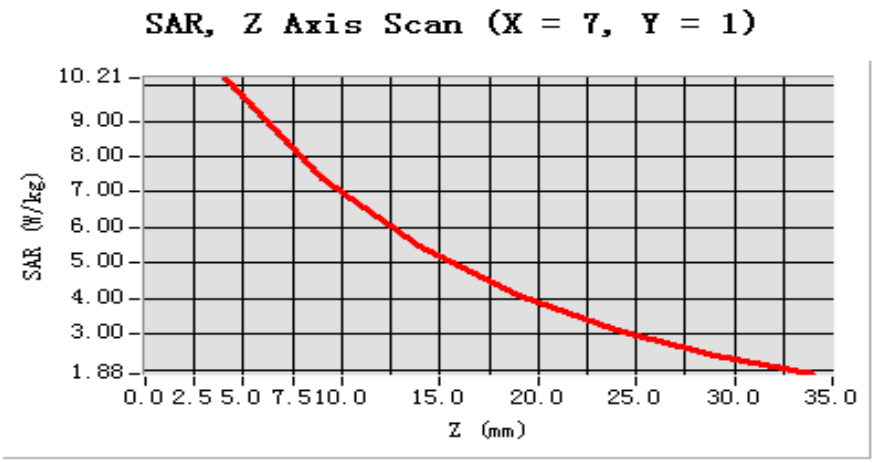
SURFACE SAR	VOLUME SAR
	

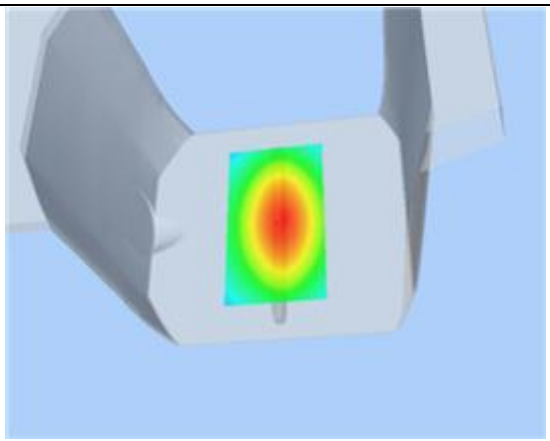
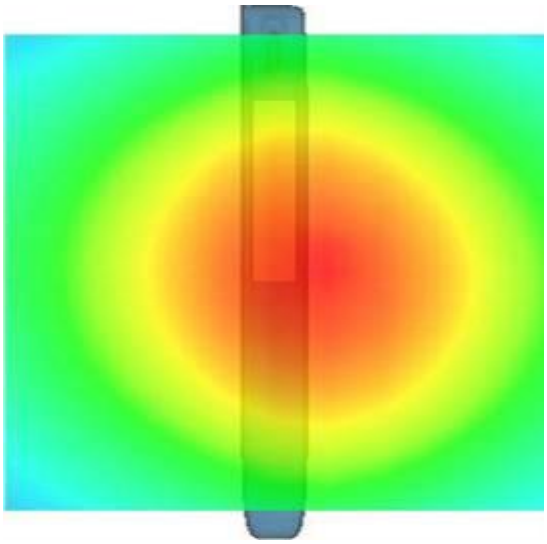
Maximum location: X=7.00, Y=1.00

SAR 10g (W/Kg)	2.092518
SAR 1g (W/Kg)	4.119540

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



3D sceen shot	Hot spot position
	

System Performance Check Data(2450MHz Head)

Type: Phone measurement (Complete)

Area scan resolution: dx=12mm,dy=12mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=4mm

Date of measurement: 2018.02.24

Measurement duration: 13 minutes 31 seconds

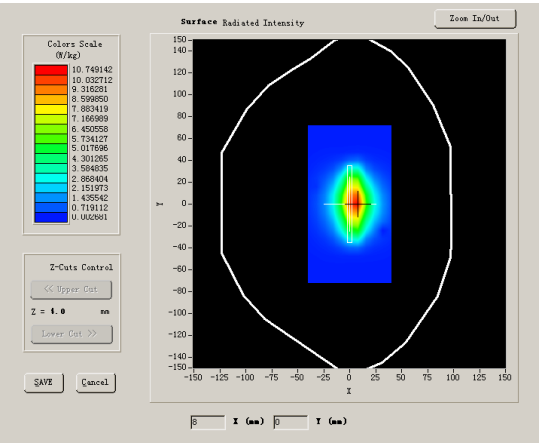
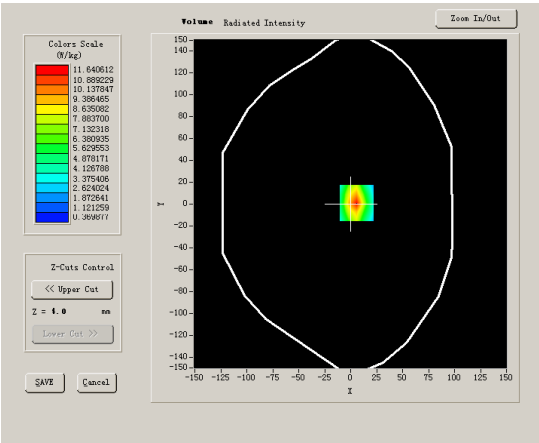
A. Experimental conditions.

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

B. SAR Measurement Results

Band SAR

Frequency (MHz)	2450.000000
Relative permittivity (real part)	39.284446
Conductivity (S/m)	1.836061
Power Drift (%)	1.080000
Ambient Temperature:	22.0°C
Liquid Temperature:	21.8°C
ConvF:	4.74
Crest factor:	1:1

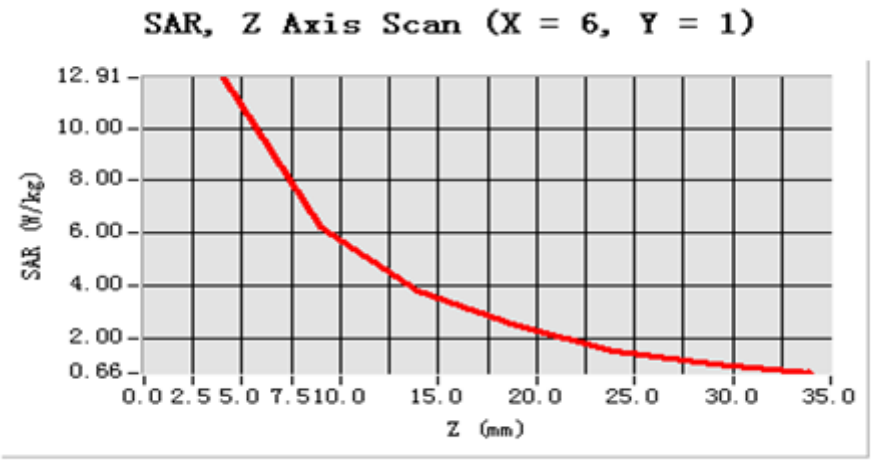
SURFACE SAR	VOLUME SAR
	

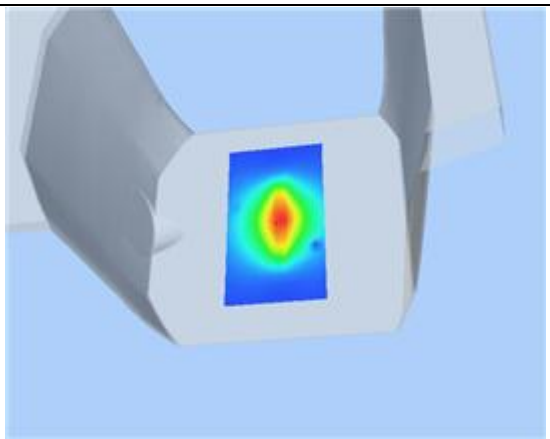
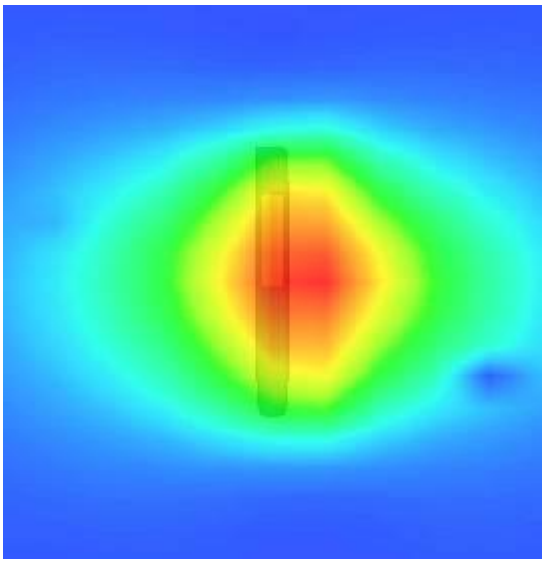
Maximum location: X=6.00, Y=1.00

SAR 10g (W/Kg)	2.377250
SAR 1g (W/Kg)	5.326074

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	12.9615	6.2096	3.8187	2.4504	1.5036	1.0219



3D sceen shot	Hot spot position
	

System Performance Check Data(2450MHz Body)

Type: Phone measurement (Complete)

Area scan resolution: dx=12mm,dy=12mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=4mm

Date of measurement: 2018.02.08

Measurement duration: 13 minutes 31 seconds

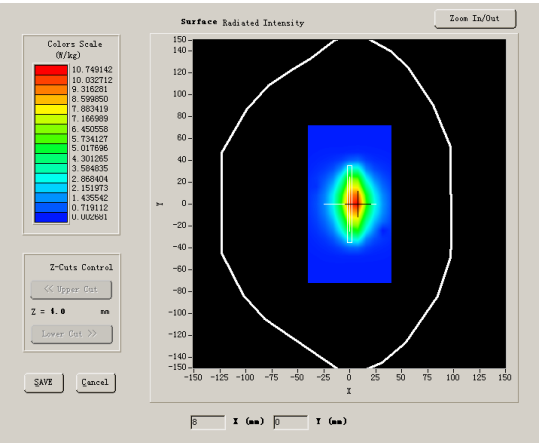
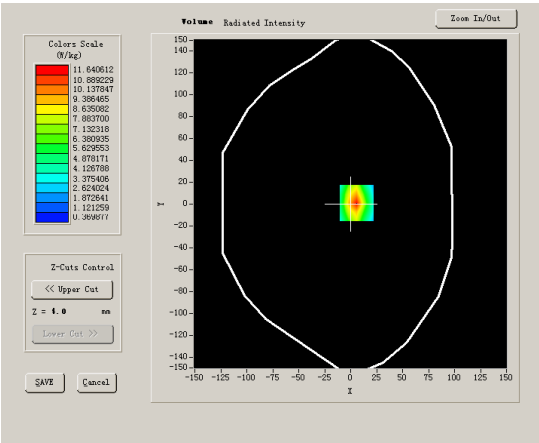
A. Experimental conditions.

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

B. SAR Measurement Results

Band SAR

Frequency (MHz)	2450.000000
Relative permittivity (real part)	52.884446
Conductivity (S/m)	1.966143
Power Drift (%)	1.080000
Ambient Temperature:	22.0°C
Liquid Temperature:	21.8°C
ConvF:	4.93
Crest factor:	1:1

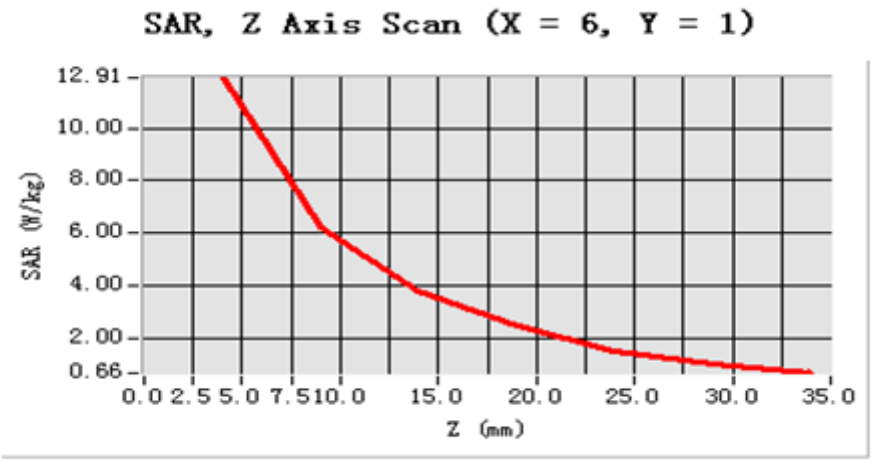
SURFACE SAR	VOLUME SAR
	

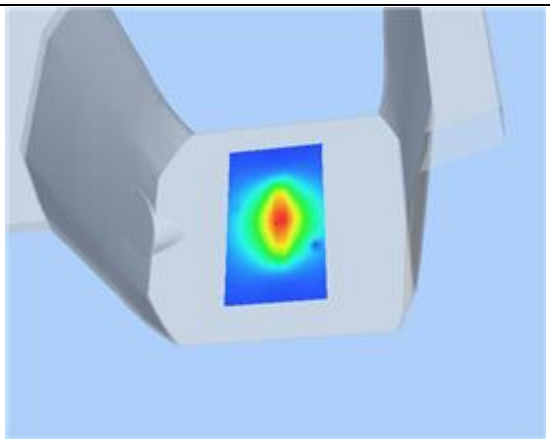
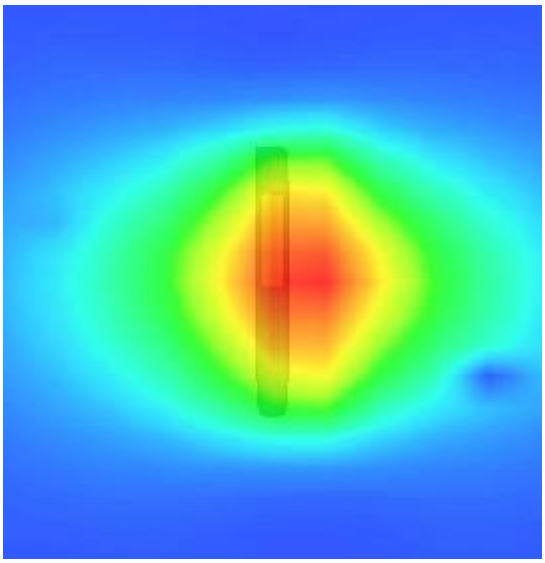
Maximum location: X=6.00, Y=1.00

SAR 10g (W/Kg)	2.377250
SAR 1g (W/Kg)	5.081074

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	12.9615	6.2096	3.8187	2.4504	1.5036	1.0219



3D sceen shot	Hot spot position
	

System Performance Check Data(2600MHz Head)

Type: Phone measurement (Complete)

Area scan resolution: dx=12mm,dy=12mm

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

Date of measurement: 2018.02.26

Measurement duration: 13 minutes 31 seconds

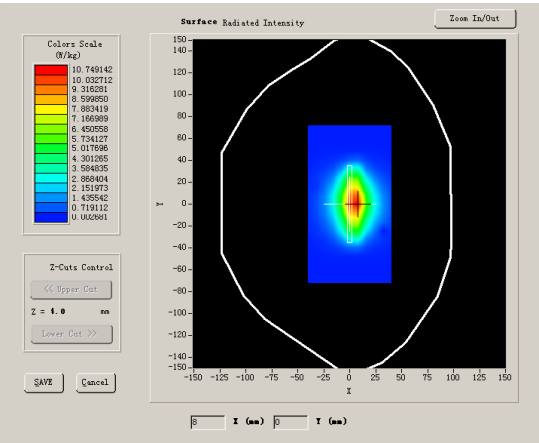
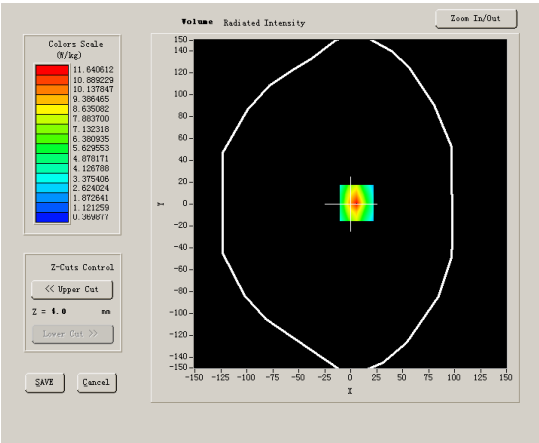
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	
Band	2600MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

Frequency (MHz)	2600.000000
Relative permittivity (real part)	39.024564
Conductivity (S/m)	1.975236
Power Drift (%)	1.080000
Ambient Temperature:	22.0°C
Liquid Temperature:	21.8°C
ConvF:	4.74
Crest factor:	1:1

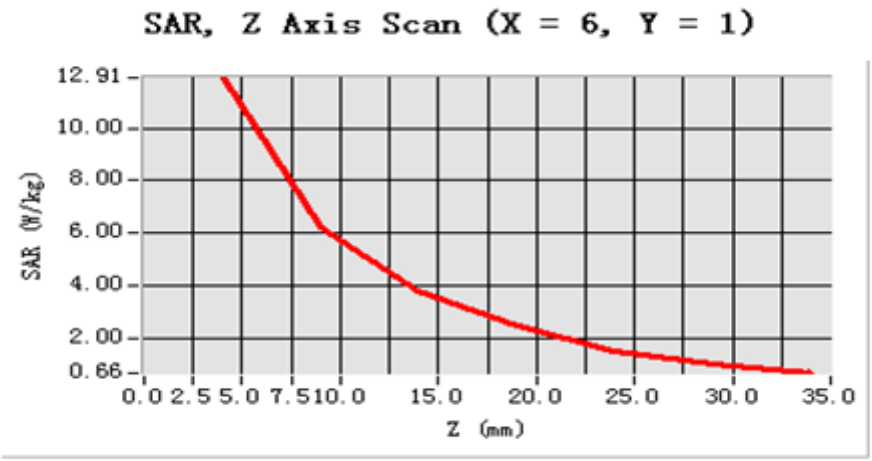
SURFACE SAR	VOLUME SAR
	

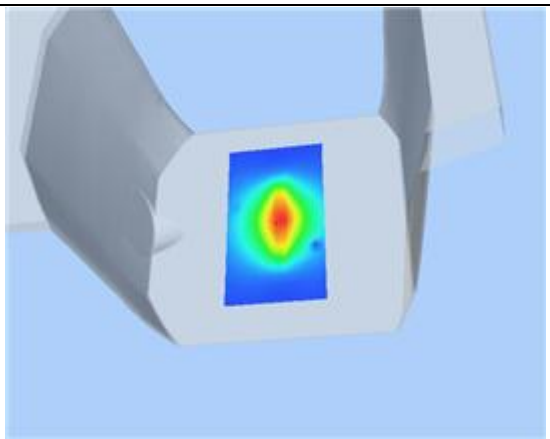
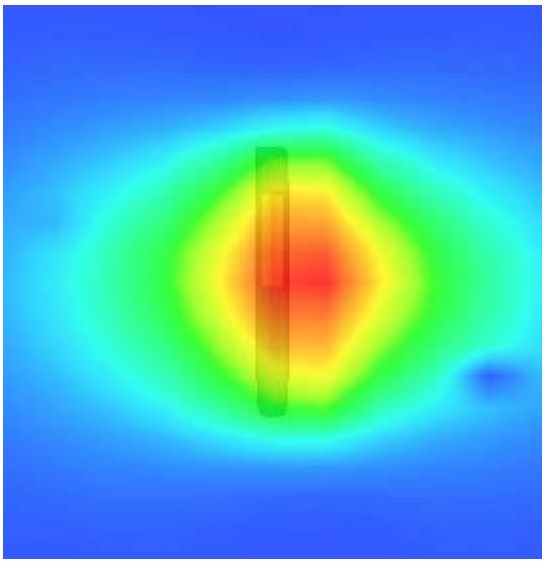
Maximum location: X=6.00, Y=1.00

SAR 10g (W/Kg)	2.498154
SAR 1g (W/Kg)	5.681472

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	12.9745	6.2193	3.8245	2.4624	1.5033	1.0220



3D sceen shot	Hot spot position
	

System Performance Check Data(2600MHz Body)

Type: Phone measurement (Complete)

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

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

Date of measurement: 2018.02.09

Measurement duration: 13 minutes 31 seconds

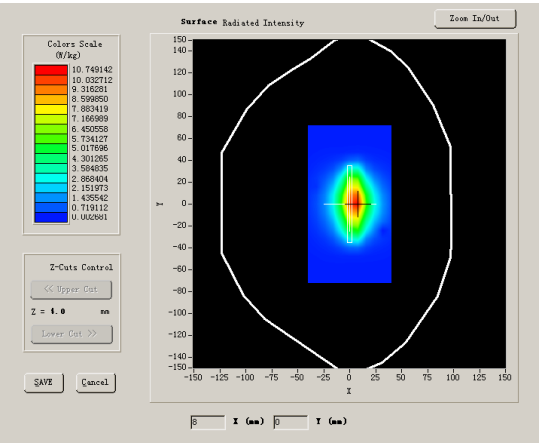
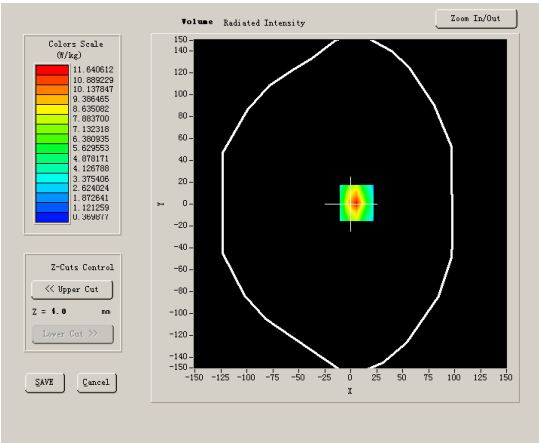
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	
Band	2600MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

Frequency (MHz)	2600.000000
Relative permittivity (real part)	52.362564
Conductivity (S/m)	2.105256
Power Drift (%)	1.380000
Ambient Temperature:	22.0°C
Liquid Temperature:	21.8°C
ConvF:	4.93
Crest factor:	1:1

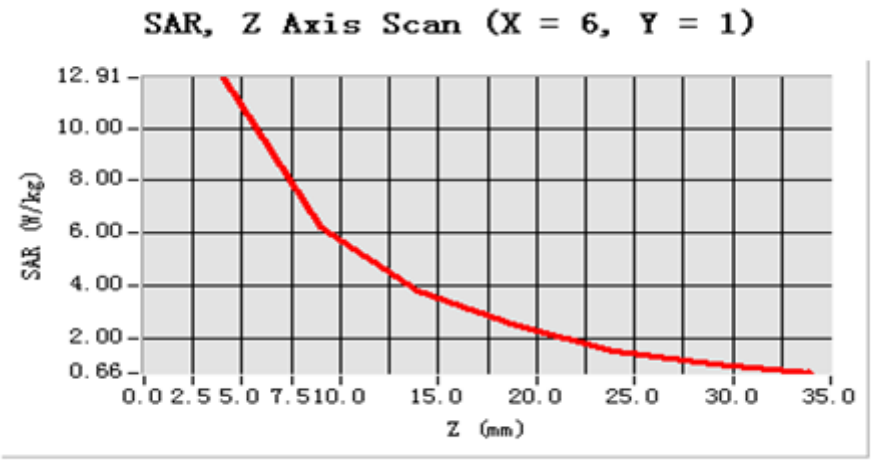
SURFACE SAR	VOLUME SAR
	

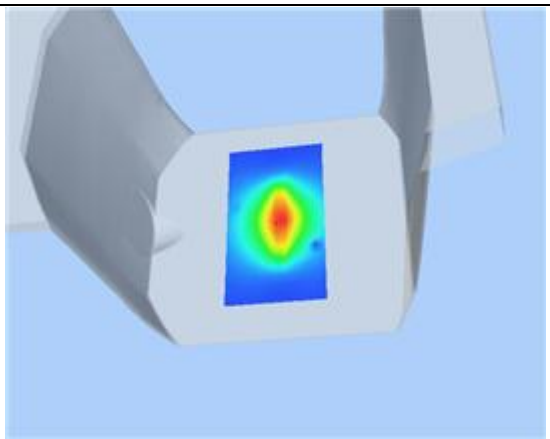
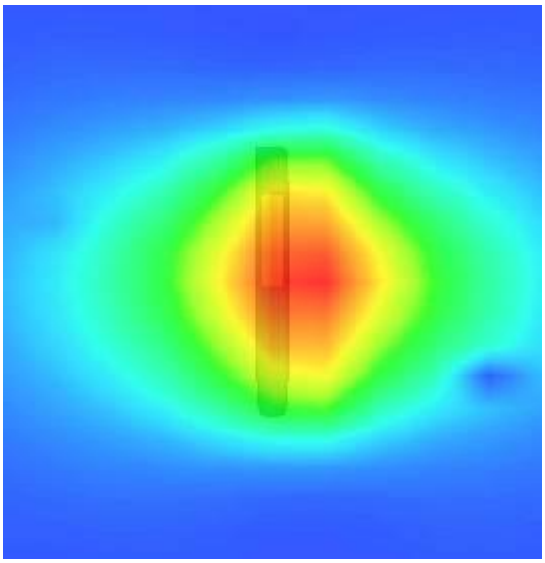
Maximum location: X=6.00, Y=1.00

SAR 10g (W/Kg)	2.369854
SAR 1g (W/Kg)	5.386472

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	12.9745	6.2193	3.8245	2.4624	1.5033	1.0220



3D sceen shot	Hot spot position
	

System Performance Check Data(5200MHz Head)

Type: Phone measurement (Complete)

Area scan resolution: dx=10mm,dy=10mm

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2018.04.14

Measurement duration: 23 minutes 27 seconds

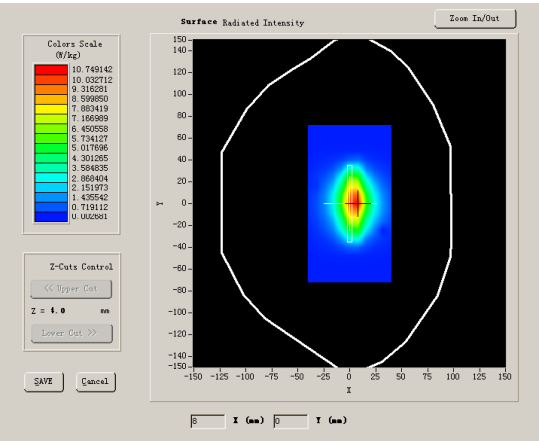
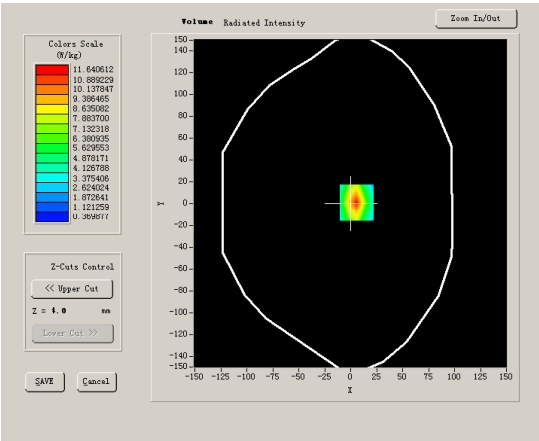
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	
Band	5200MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

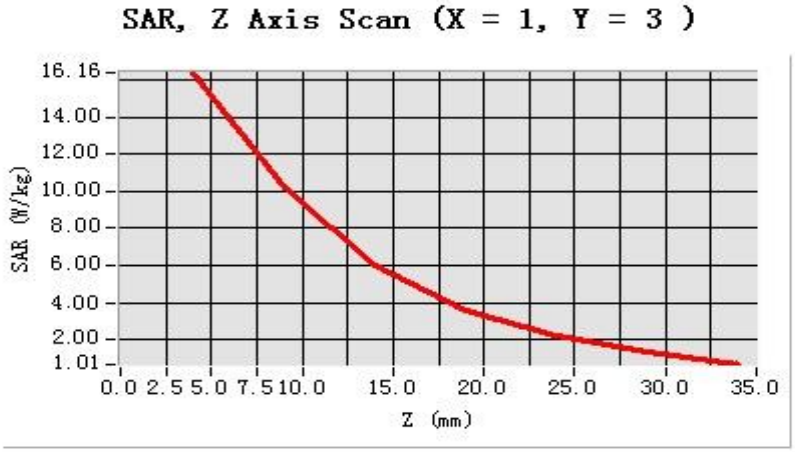
Frequency (MHz)	5200.000000
Relative permittivity (real part)	36.123014
Conductivity (S/m)	4.665260
Power Drift (%)	2.310000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	21.61
Crest factor:	1:1

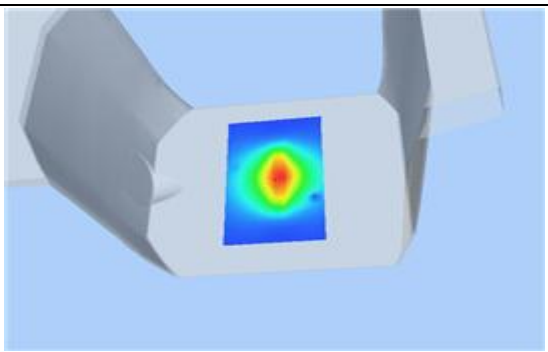
SURFACE SAR	VOLUME SAR
	

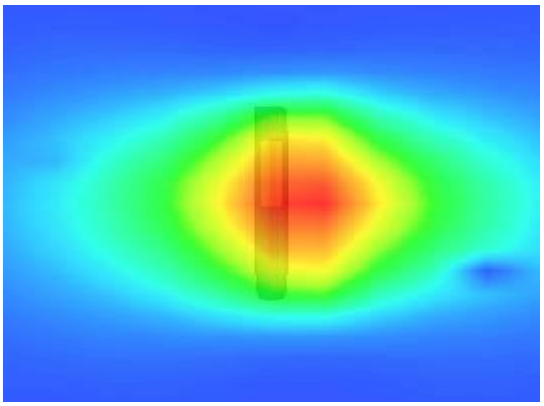
Maximum location: X=1.00, Y=3.00

SAR 10g (W/Kg)	5.651263
SAR 1g (W/Kg)	16.398864

Z Axis Scan







System Performance Check Data(5600MHz Head)

Type: Phone measurement (Complete)

Area scan resolution: dx=10mm,dy=10mm

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2018.04.14

Measurement duration: 13 minutes 27 seconds

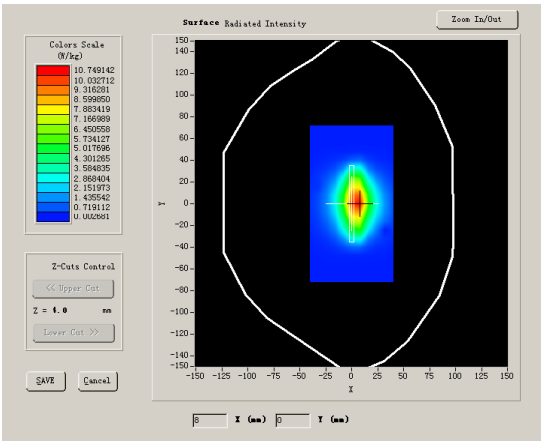
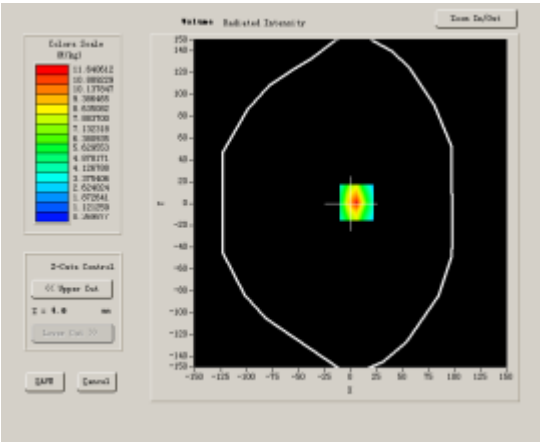
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	
Band	5600MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

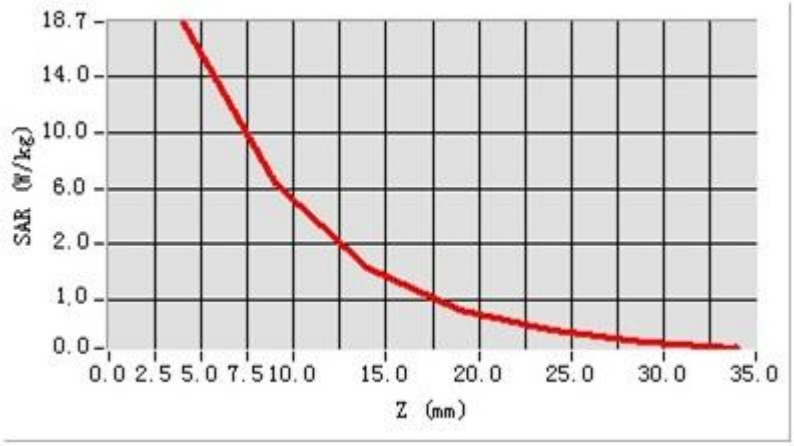
Frequency (MHz)	5600.000000
Relative permittivity (real part)	35.562139
Conductivity (S/m)	5.100255
Power Drift (%)	1.080000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	22.92
Crest factor:	1:1

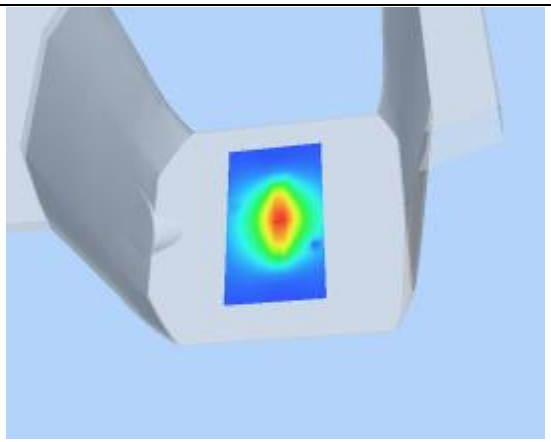
SURFACE SAR	VOLUME SAR
	

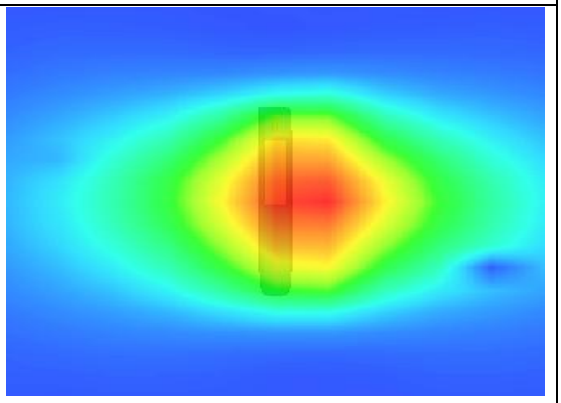
Maximum location: X=-1.00, Y=-5.00

SAR 10g (W/Kg)	6.0553669
SAR 1g (W/Kg)	17.144263

Z Axis Scan







System Performance Check Data(5800MHz Head)

Type: Phone measurement (Complete)

Area scan resolution: dx=10mm,dy=10mm

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2018.04.14

Measurement duration: 13 minutes 27 seconds

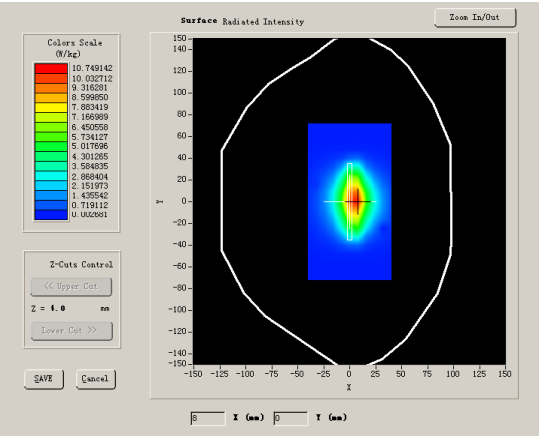
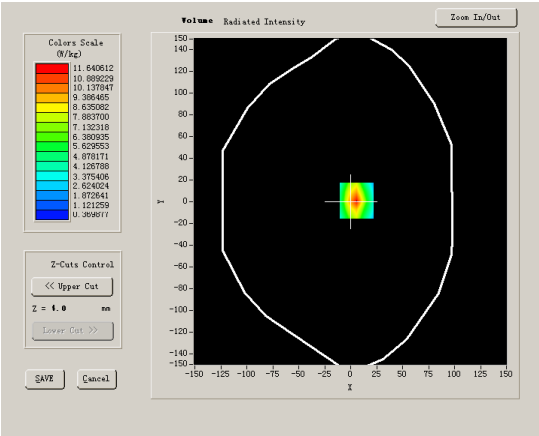
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	
Band	5800MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

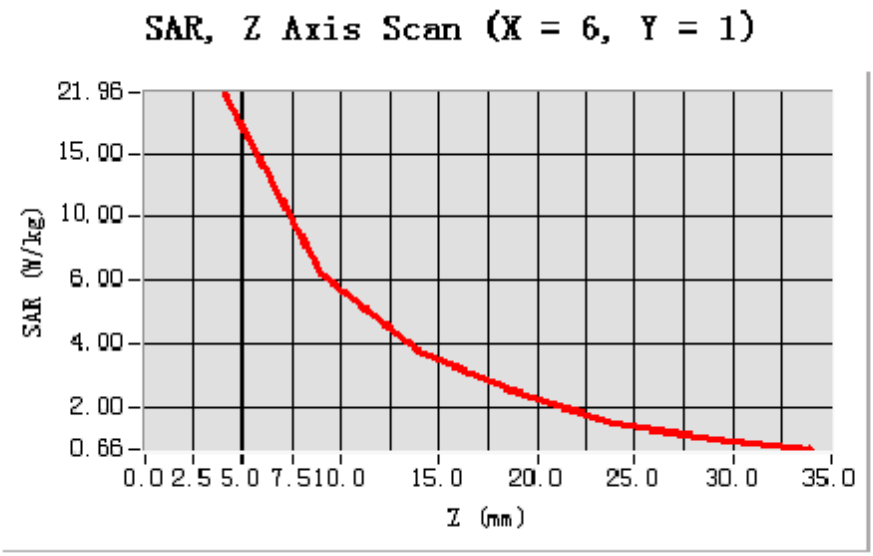
Frequency (MHz)	5800.000000
Relative permittivity (real part)	35.334675
Conductivity (S/m)	5.310226
Power Drift (%)	1.260000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	22.42
Crest factor:	1:1

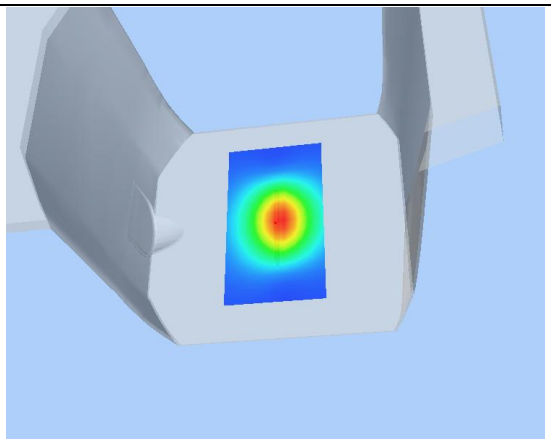
SURFACE SAR	VOLUME SAR
	

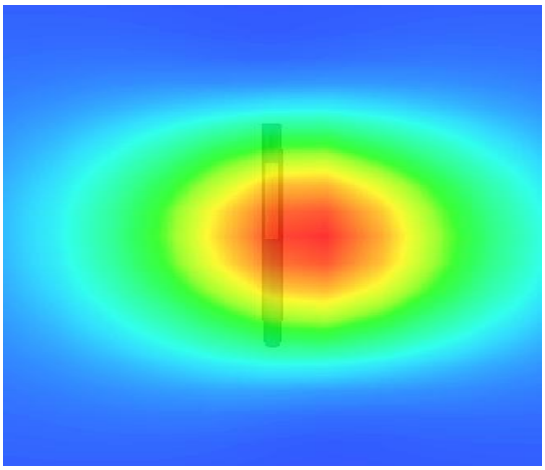
Maximum location: X=-6.00, Y=-1.00

SAR 10g (W/Kg)	5.994412
SAR 1g (W/Kg)	17.711256

Z Axis Scan







System Performance Check Data(5200MHz Body)

Type: Phone measurement (Complete)

Area scan resolution: dx=10mm,dy=10mm

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2018.04.14

Measurement duration: 23 minutes 27 seconds

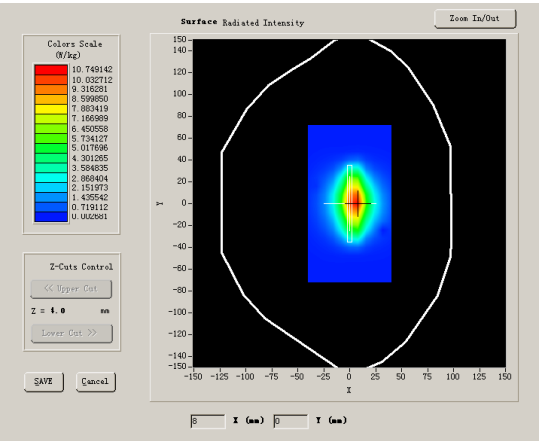
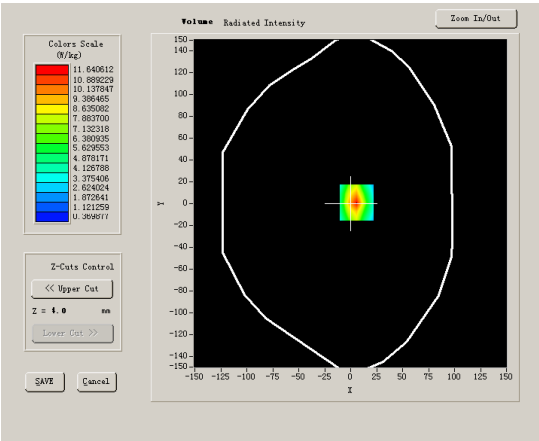
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	
Band	5200MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

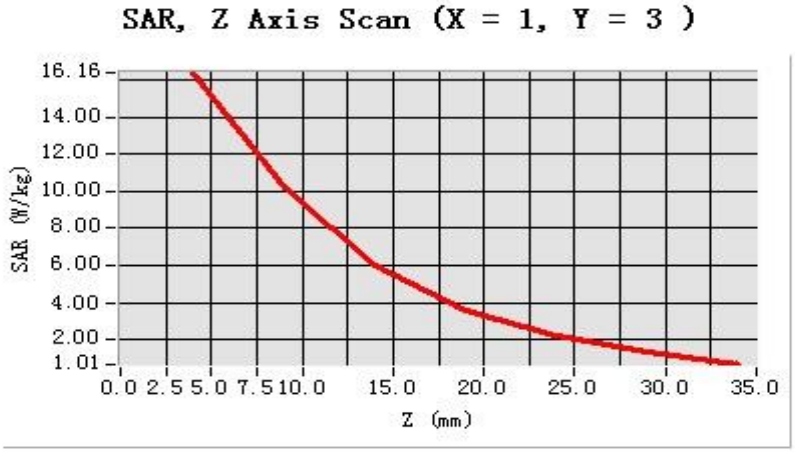
Frequency (MHz)	5200.000000
Relative permittivity (real part)	48.273014
Conductivity (S/m)	5.543260
Power Drift (%)	2.310000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	22.11
Crest factor:	1:1

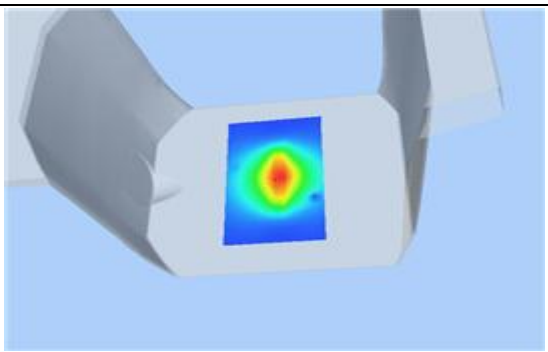
SURFACE SAR	VOLUME SAR
	

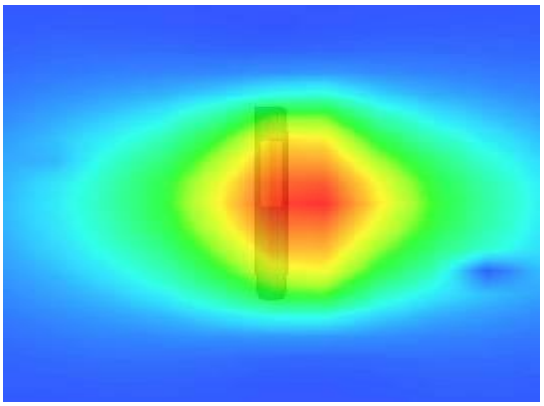
Maximum location: X=1.00, Y=3.00

SAR 10g (W/Kg)	5.624355
SAR 1g (W/Kg)	16.28442

Z Axis Scan







System Performance Check Data(5600MHz Body)

Type: Phone measurement (Complete)

Area scan resolution: dx=10mm,dy=10mm

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2018.04.14

Measurement duration: 13 minutes 27 seconds

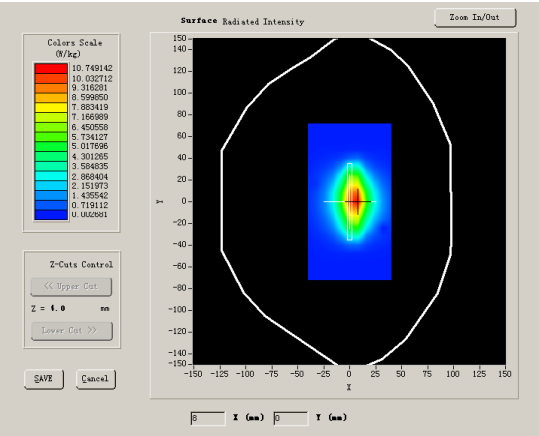
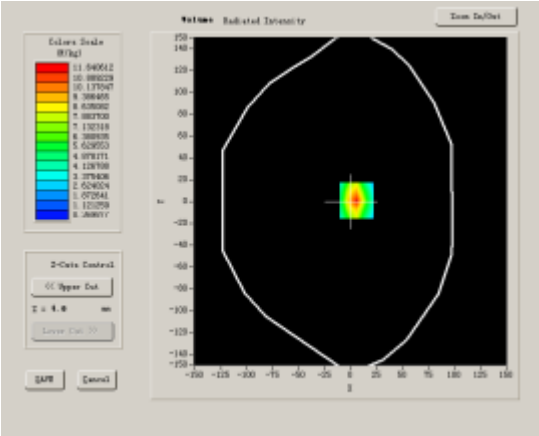
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	
Band	5600MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

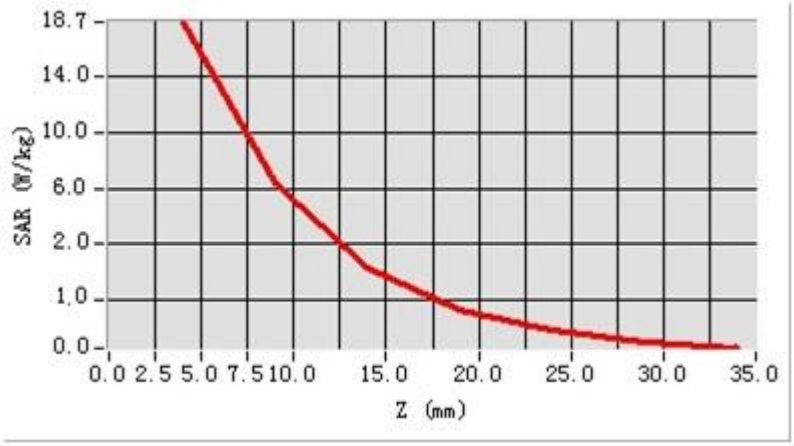
Frequency (MHz)	5600.000000
Relative permittivity (real part)	48.394381
Conductivity (S/m)	5.7432600
Power Drift (%)	1.080000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	23.69
Crest factor:	1:1

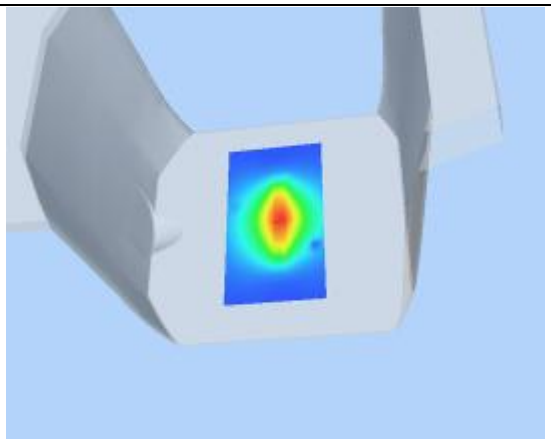
SURFACE SAR	VOLUME SAR
	

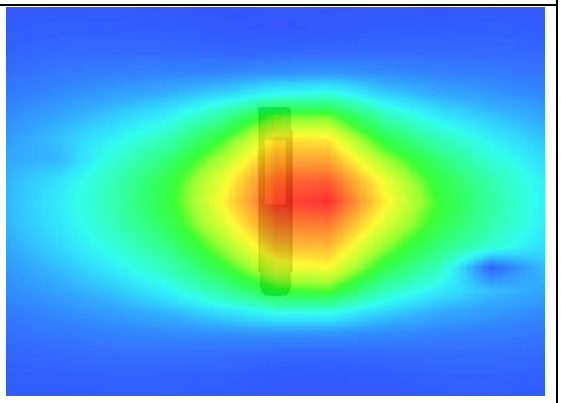
Maximum location: X=-1.00, Y=-5.00

SAR 10g (W/Kg)	5.906961
SAR 1g (W/Kg)	17.19624

Z Axis Scan







System Performance Check Data(5800MHz Body)

Type: Phone measurement (Complete)

Area scan resolution: dx=10mm,dy=10mm

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2018.04.14

Measurement duration: 23 minutes 27 seconds

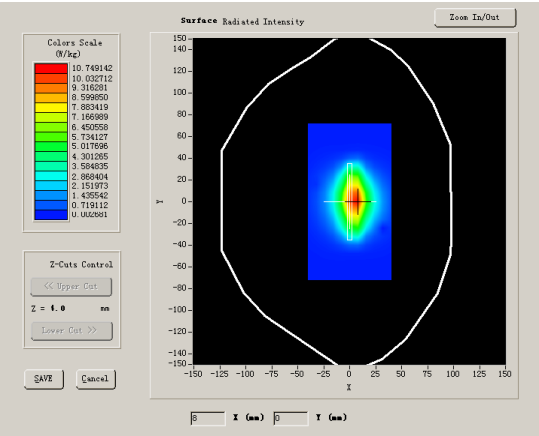
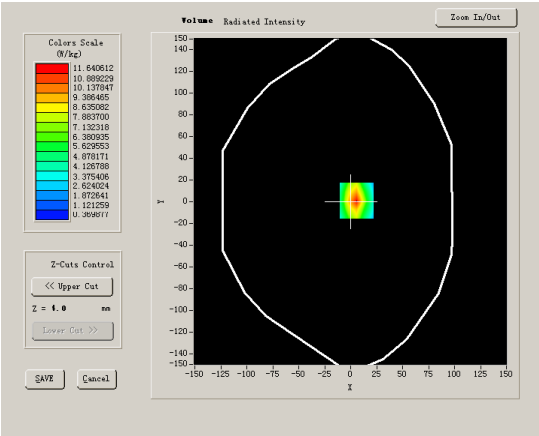
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	
Band	5800MHz
Channels	
Signal	CW

B. SAR Measurement Results

Band SAR

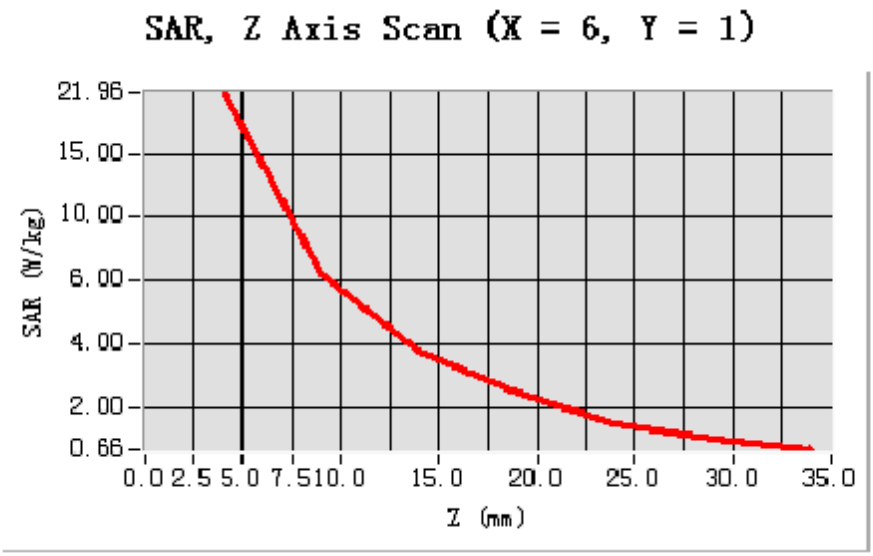
Frequency (MHz)	5800.000000
Relative permittivity (real part)	48.093428
Conductivity (S/m)	5.930716
Power Drift (%)	1.260000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	23.02
Crest factor:	1:1

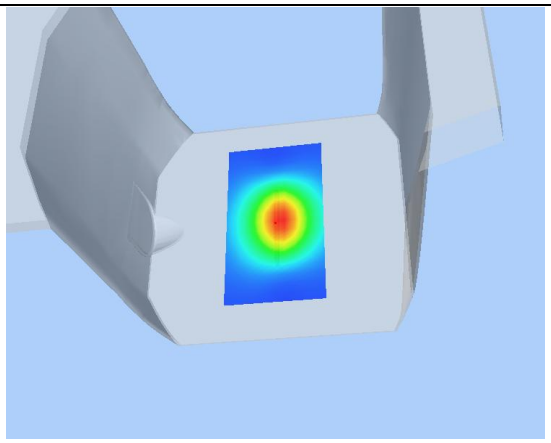
SURFACE SAR	VOLUME SAR
	

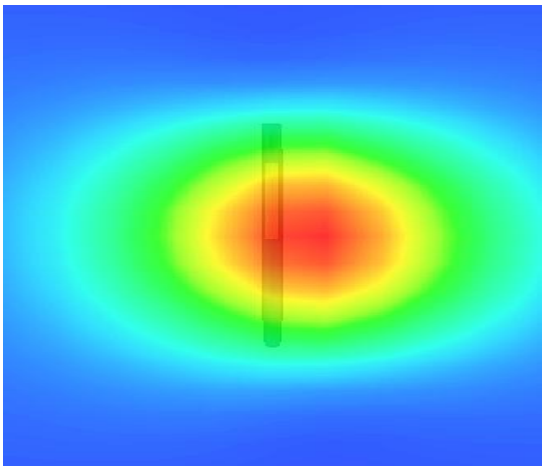
Maximum location: X=-6.00, Y=-1.00

SAR 10g (W/Kg)	5.982634
SAR 1g (W/Kg)	17.695290

Z Axis Scan







Annex D Plots of Maximum SAR Test Results

MEASUREMENT 1

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.23

Measurement duration: 16 minutes 29 seconds

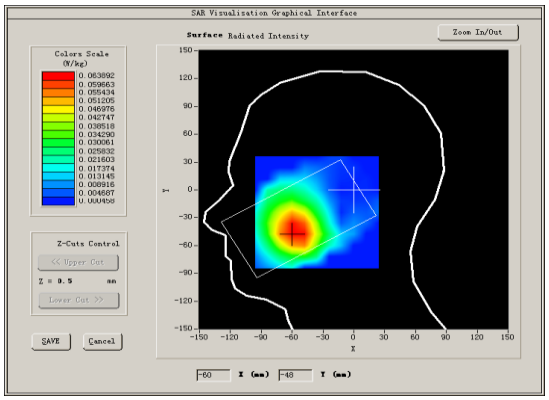
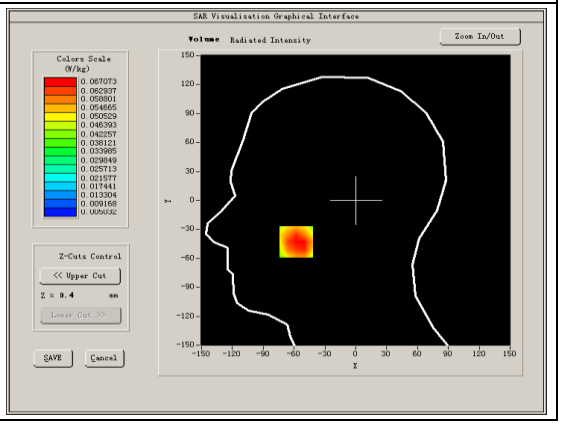
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Right head
Device Position	Cheek
Band	CUSTOM (GPRS850_4Tx)
Channels	High
Signal	GPRS

B. SAR Measurement Results

Higher Band SAR (Channel 251):

Frequency (MHz)	848.799988
Relative permittivity (real part)	41.150000
Conductivity (S/m)	0.914818
Power drift (%)	0.150002
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.13
Crest factor:	1:2.08

SURFACE SAR	VOLUME SAR
	

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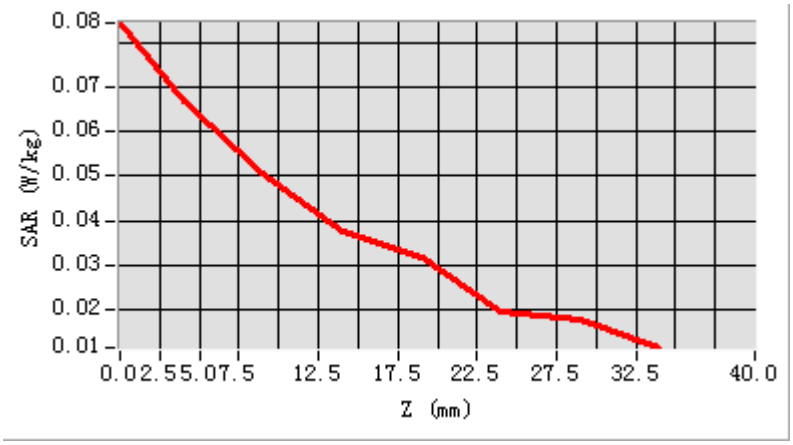
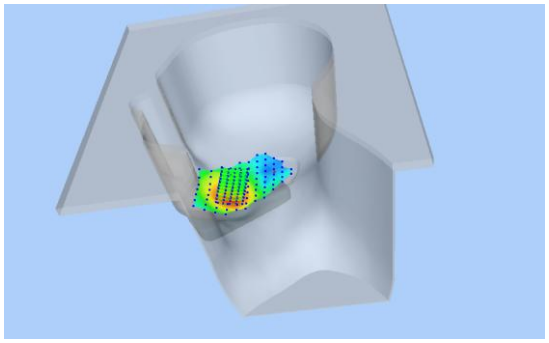
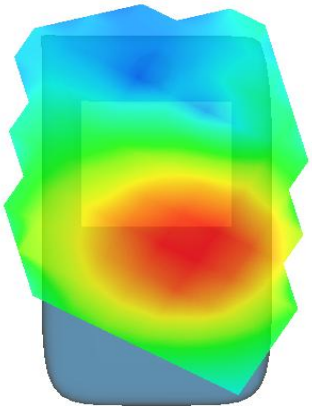
Maximum location: X=-58.00, Y=-43.00

SAR Peak: 0.09 W/kg

SAR 10g (W/Kg)	0.047486
SAR 1g (W/Kg)	0.065845

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.0845**	**0.0671**	**0.0505**	**0.0377**	**0.0315**	**0.0194**	**0.0177**



3D screen shot	Hot spot position
	

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MEASUREMENT 2

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.24

Measurement duration: 16 minutes 25 seconds

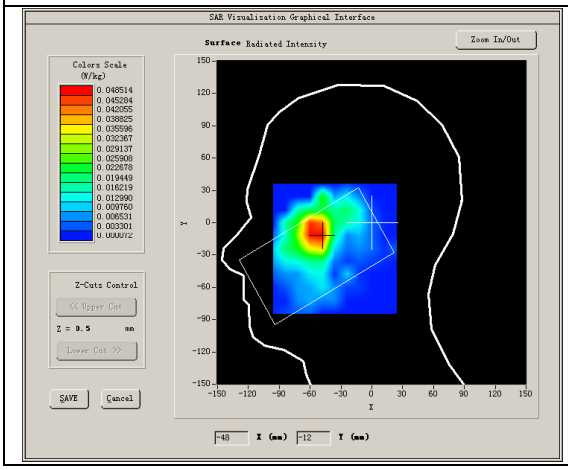
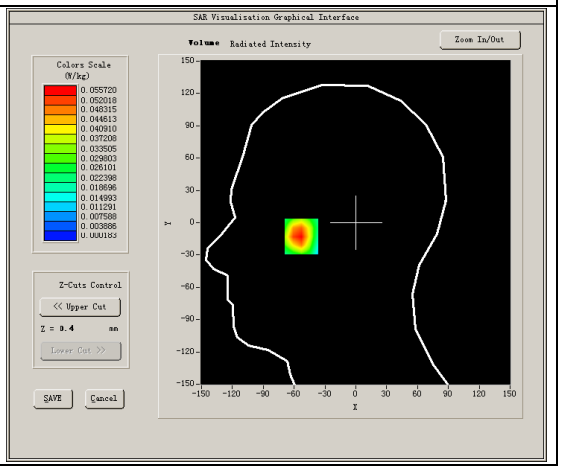
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Left head
Device Position	Cheek
Band	CUSTOM (GPRS1900_4Tx)
Channels	High
Signal	GPRS

B. SAR Measurement Results

Higher Band SAR (Channel 810):

Frequency (MHz)	1909.800049
Relative permittivity (real part)	40.250000
Conductivity (S/m)	1.400023
Power drift (%)	0.250000
Ambient Temperature:	22.1°C
Liquid Temperature:	22.4°C
ConvF:	5.61
Duty cycle:	1:2.08

SURFACE SAR	VOLUME SAR
	

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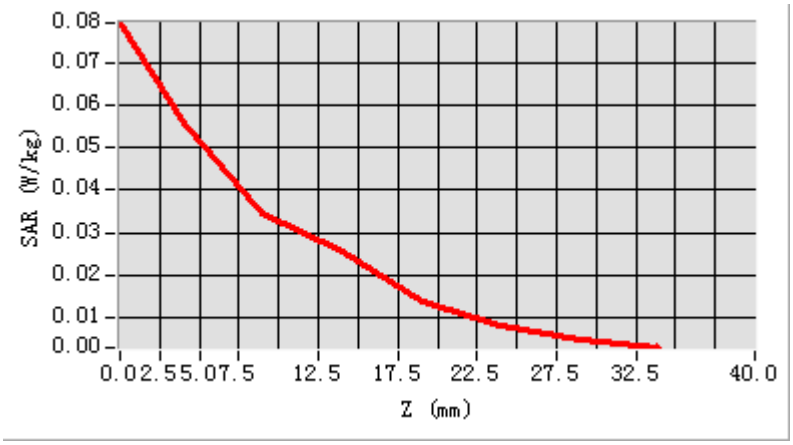
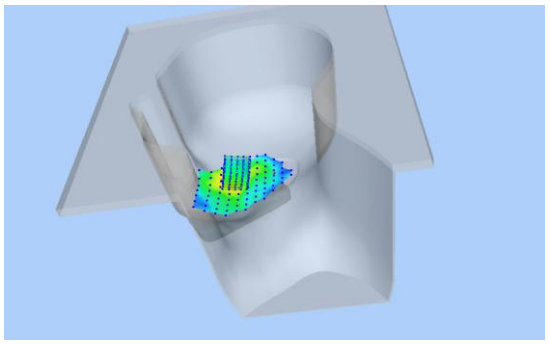
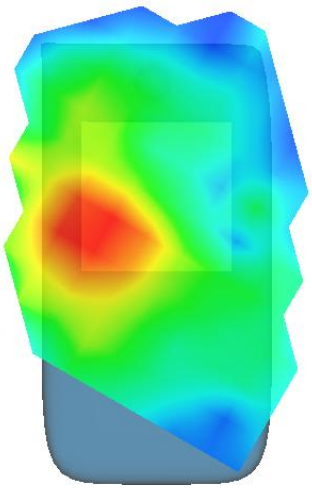
Maximum location: X=-53.00, Y=-11.00

SAR Peak: 0.08 W/kg

SAR 10g (W/Kg)	0.080173
SAR 1g (W/Kg)	0.121036

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.0792**	**0.0557**	**0.0345**	**0.0258**	**0.0139**	**0.0084**	**0.0052**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 3

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.24

Measurement duration: 16 minutes 13 seconds

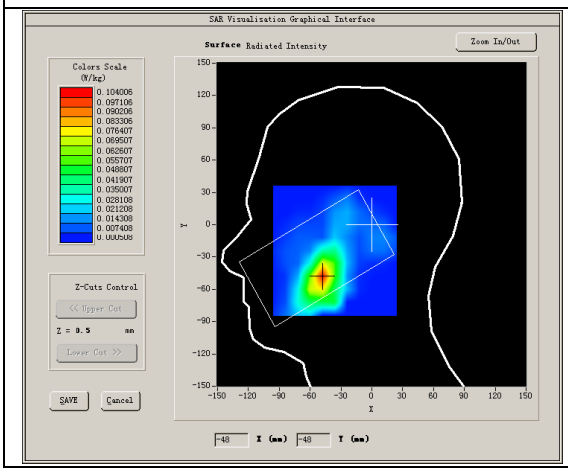
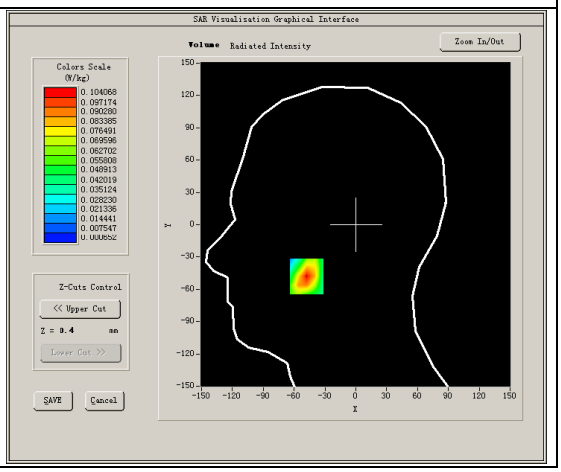
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Left head
Device Position	Cheek
Band	Band2_WCDMA1900
Channels	High
Signal	RMC

B. SAR Measurement Results

Higher Band SAR (Channel 9538):

Frequency (MHz)	1907.599976
Relative permittivity (real part)	40.250000
Conductivity (S/m)	1.400023
Power drift (%)	0.520000
Ambient Temperature:	22.1°C
Liquid Temperature:	22.4°C
ConvF:	5.71
Duty cycle:	1:1

SURFACE SAR	VOLUME SAR
	

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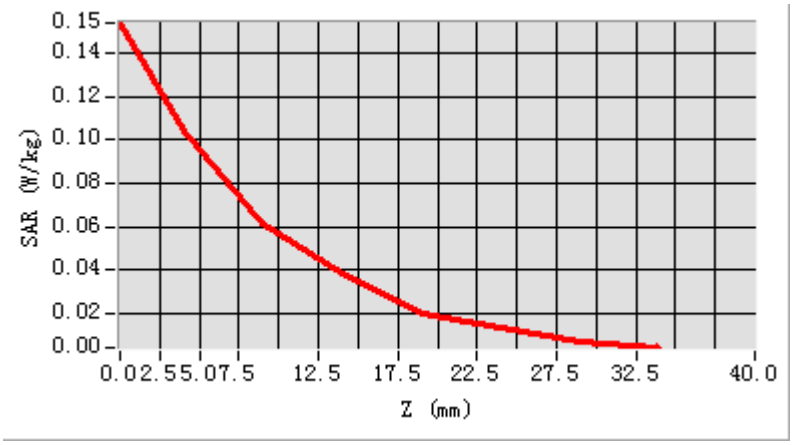
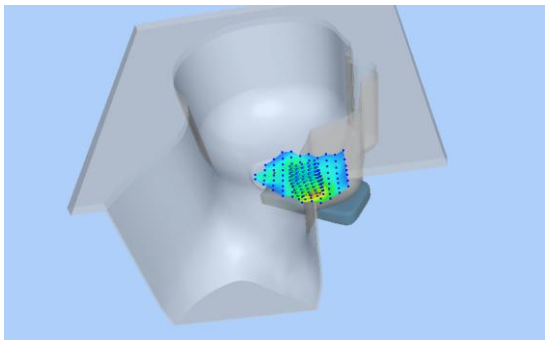
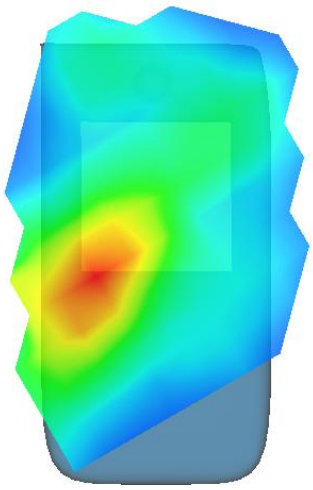
Maximum location: X=-48.00, Y=-48.00

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.051254
SAR 1g (W/Kg)	0.097002

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.1542**	**0.1041**	**0.0616**	**0.0381**	**0.0200**	**0.0134**	**0.0065**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 4

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.09

Measurement duration: 16 minutes 53 seconds

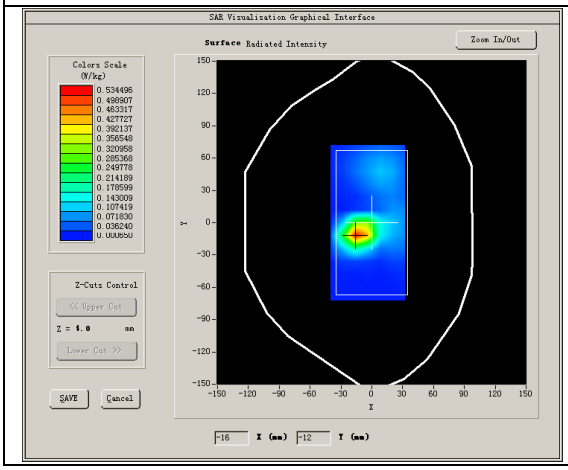
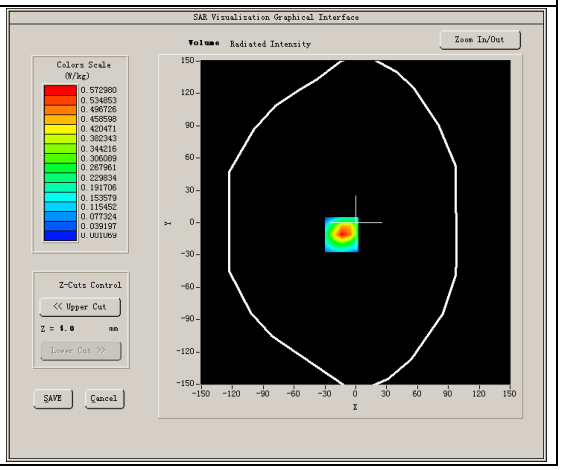
A. Experimental conditions.

Phantom File	surf_sam_plan.txt,
Phantom	Flat
Device Position	Body
Band	Band2_WCDMA1900
Channels	High
Signal	RMC

B. SAR Measurement Results

Higher Band SAR (Channel 9538):

Frequency (MHz)	1907.599976
Relative permittivity (real part)	53.499999
Conductivity (S/m)	1.500281
Power drift (%)	0.420000
Ambient Temperature:	22.1°C
Liquid Temperature:	22.4°C
ConvF:	5.71
Duty cycle:	1:1

SURFACE SAR	VOLUME SAR
	

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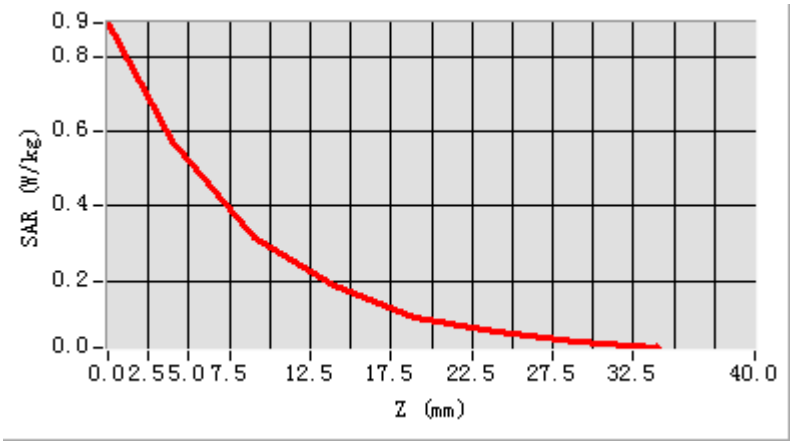
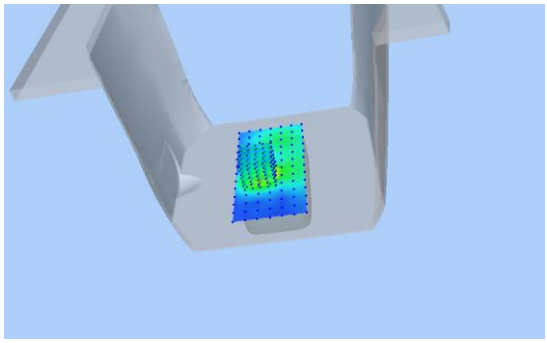
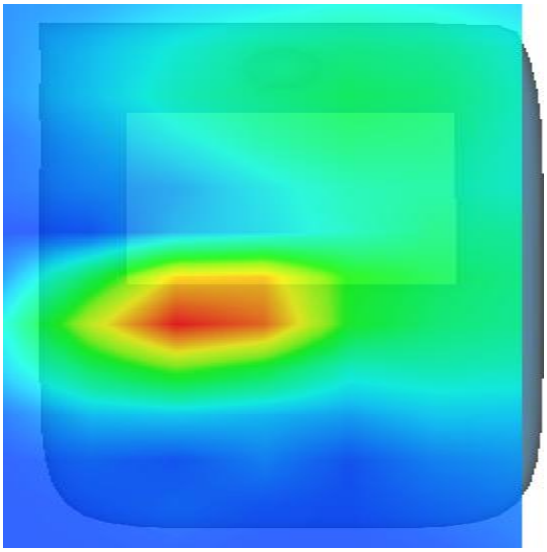
Maximum location: X=-14.00, Y=-11.00

SAR Peak: 0.94 W/kg

SAR 10g (W/Kg)	0.253668
SAR 1g (W/Kg)	0.539670

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.8927**	**0.5730**	**0.3169**	**0.1856**	**0.0994**	**0.0616**	**0.0357**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 5

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.09

Measurement duration: 16 minutes 18 seconds

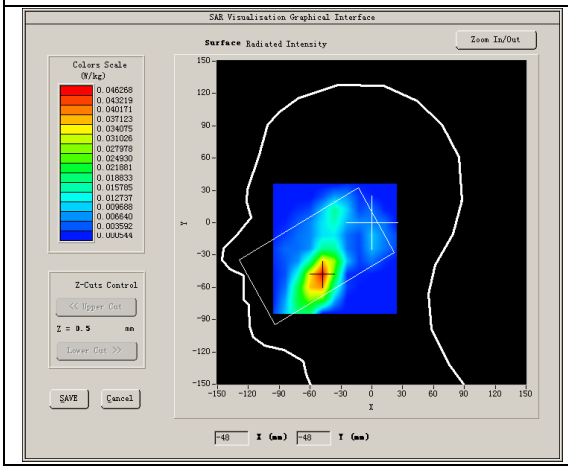
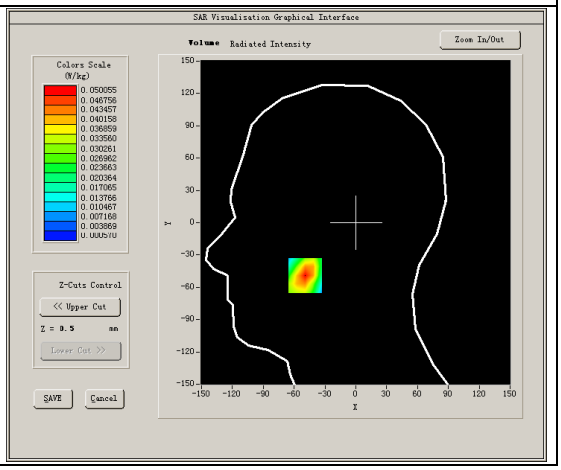
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Left head
Device Position	Cheek
Band	Band4_WCDMA1700
Channels	High
Signal	RMC

B. SAR Measurement Results

Higher Band SAR (Channel 1513):

Frequency (MHz)	1752.000000
Relative permittivity (real part)	40.296001
Conductivity (S/m)	1.371076
Power drift (%)	-3.670000
Ambient Temperature:	22.3°C
Liquid Temperature:	22.6°C
ConvF:	5.21
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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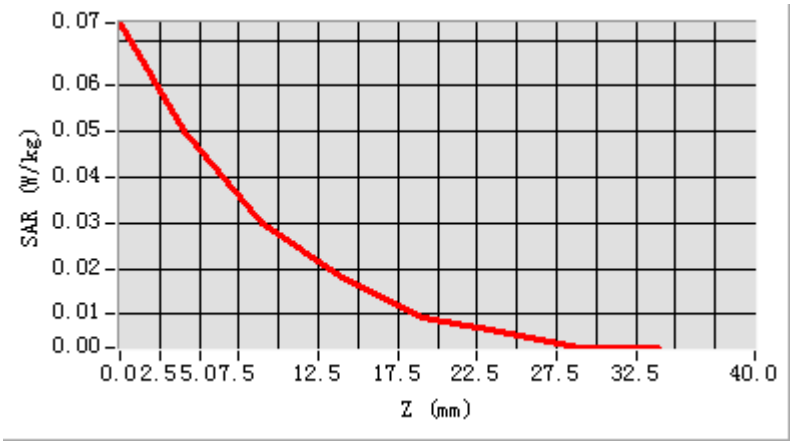
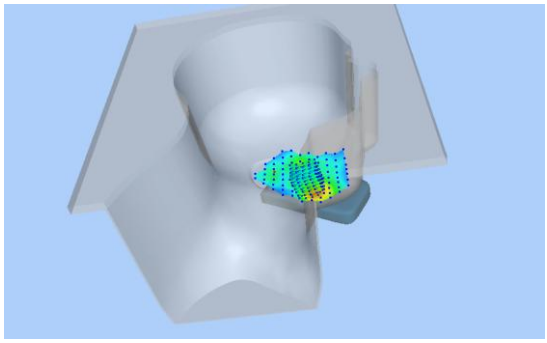
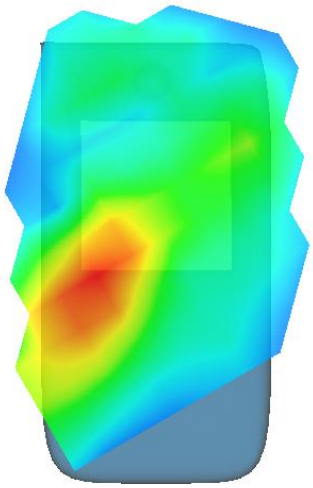
Maximum location: X=-49.00, Y=-49.00

SAR Peak: 0.08 W/kg

SAR 10g (W/Kg)	0.024932
SAR 1g (W/Kg)	0.046596

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.0738**	**0.0501**	**0.0299**	**0.0180**	**0.0095**	**0.0060**	**0.0029**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 6

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.09

Measurement duration: 16 minutes 50 seconds

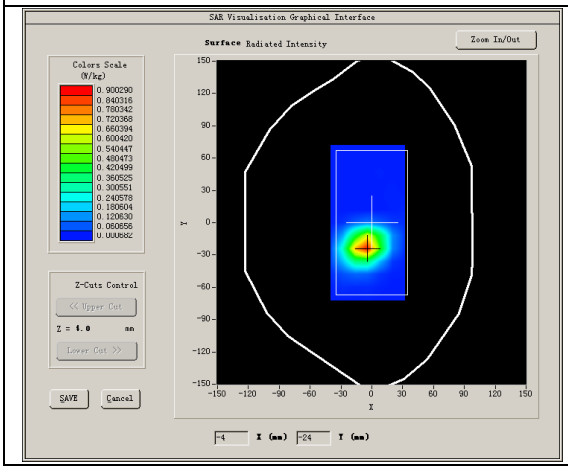
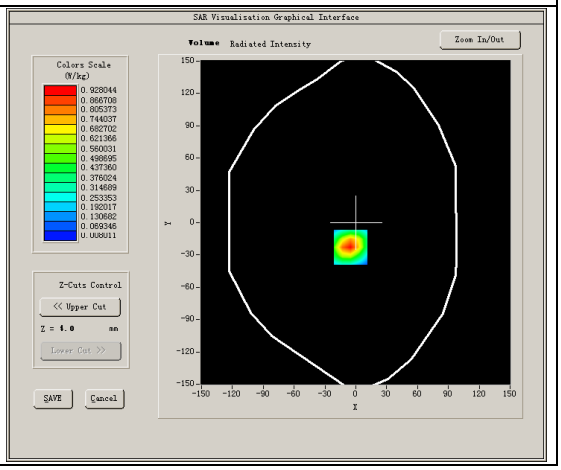
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	Body
Band	Band4_WCDMA1700
Channels	High
Signal	RMC

B. SAR Measurement Results

Higher Band SAR (Channel 1513):

Frequency (MHz)	1752.000000
Relative permittivity (real part)	53.426315
Conductivity (S/m)	1.490532
Power drift (%)	-0.580000
Ambient Temperature:	22.3°C
Liquid Temperature:	22.6°C
ConvF:	5.38
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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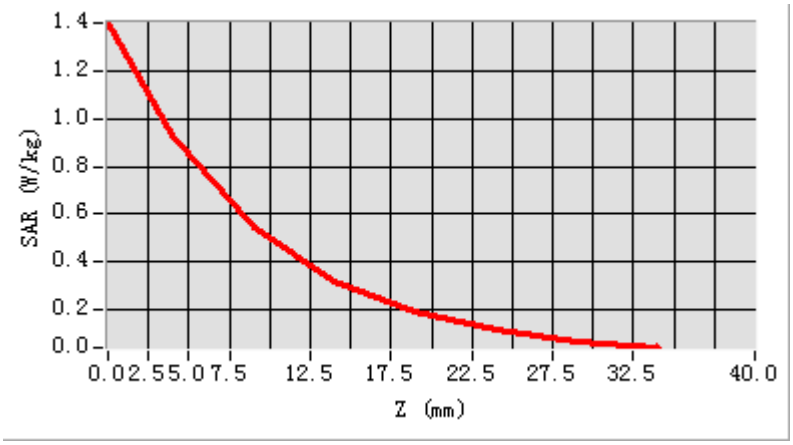
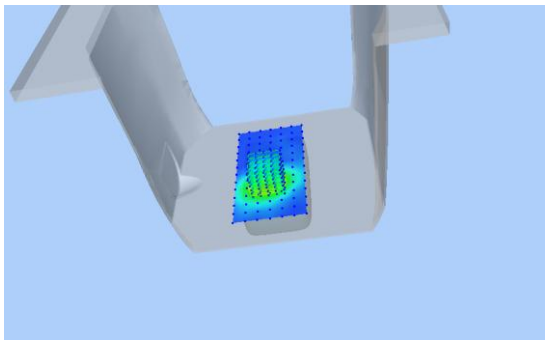
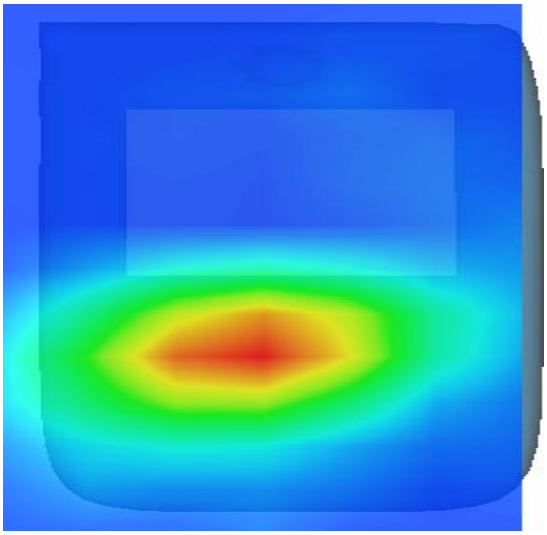
Maximum location: X=-5.00, Y=-23.00

SAR Peak: 1.43 W/kg

SAR 10g (W/Kg)	0.442378
SAR 1g (W/Kg)	0.868714

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.4037	0.9280	0.5446	0.3181	0.1911	0.1145	0.0663



3D screen shot	Hot spot position
	

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MEASUREMENT 7

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.23

Measurement duration: 16 minutes 15 seconds

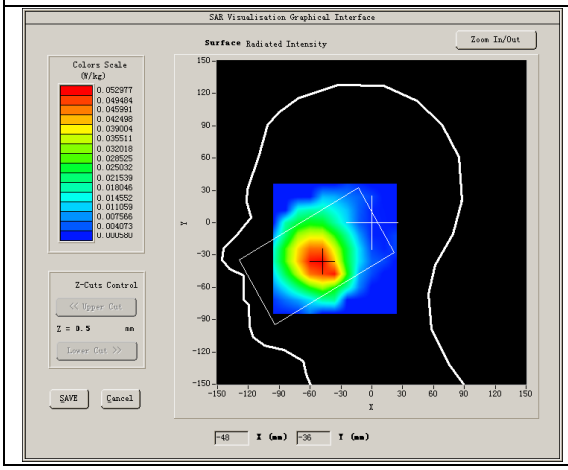
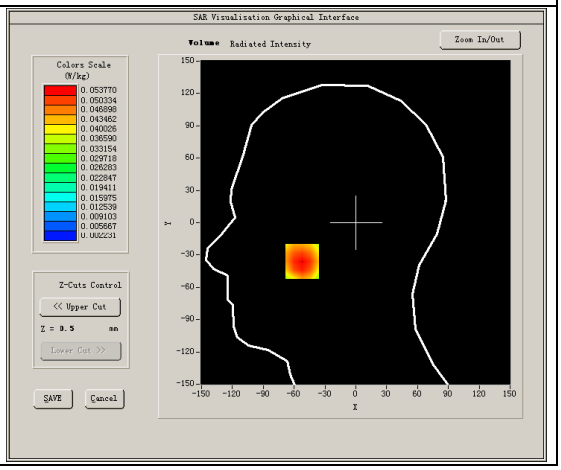
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Right head
Device Position	Cheek
Band	Band5_WCDMA850
Channels	Low
Signal	RMC

B. SAR Measurement Results

Lower Band SAR (Channel 4132):

Frequency (MHz)	846.599976
Relative permittivity (real part)	41.000000
Conductivity (S/m)	0.899780
Power drift (%)	1.700000
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.13
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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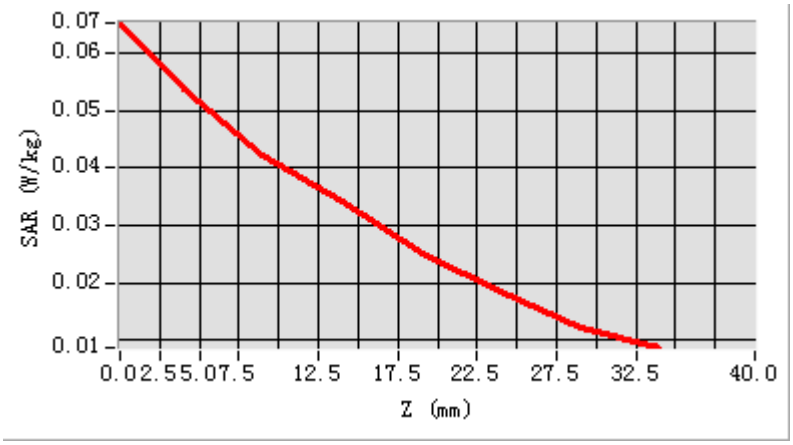
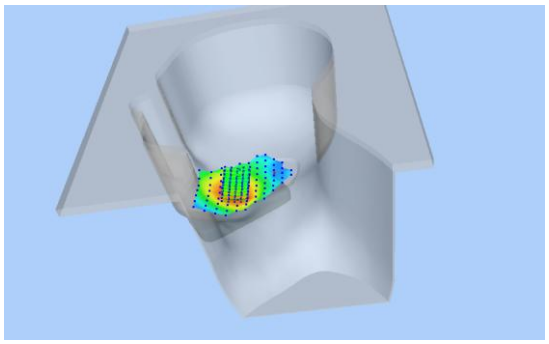
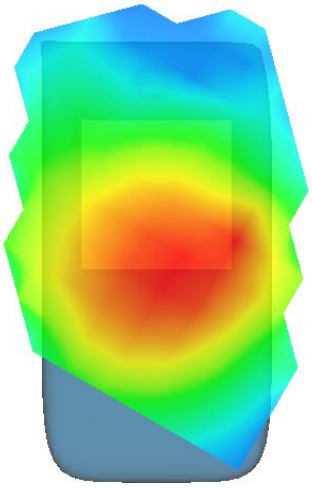
Maximum location: X=-52.00, Y=-36.00

SAR Peak: 0.07 W/kg

SAR 10g (W/Kg)	0.038002
SAR 1g (W/Kg)	0.052841

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.0652**	**0.0538**	**0.0423**	**0.0341**	**0.0250**	**0.0185**	**0.0124**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 8

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.22

Measurement duration: 16 minutes 51 seconds

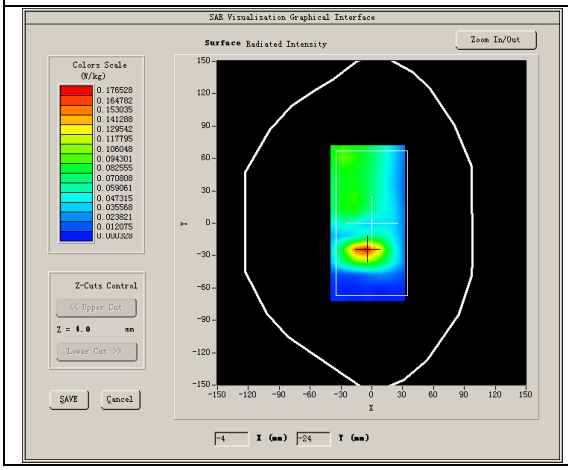
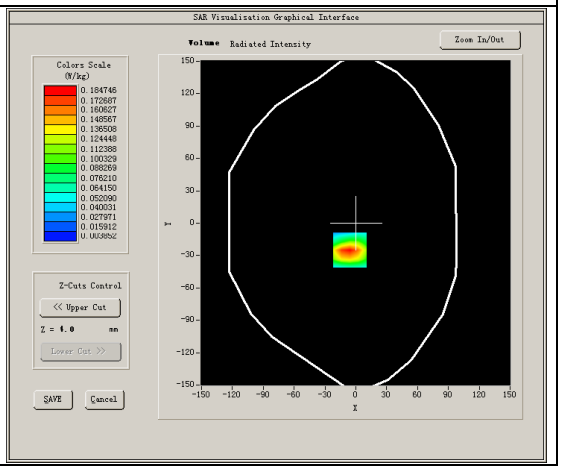
A. Experimental conditions.

Phantom File	surf_sam_plan.txt,
Phantom	Flat
Device Position	Body
Band	Band5_WCDMA850
Channels	Low
Signal	RMC

B. SAR Measurement Results

Lower Band SAR (Channel 4132):

Frequency (MHz)	826.400024
Relative permittivity (real part)	55.433505
Conductivity (S/m)	0.972171
Power drift (%)	-3.850000
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.37
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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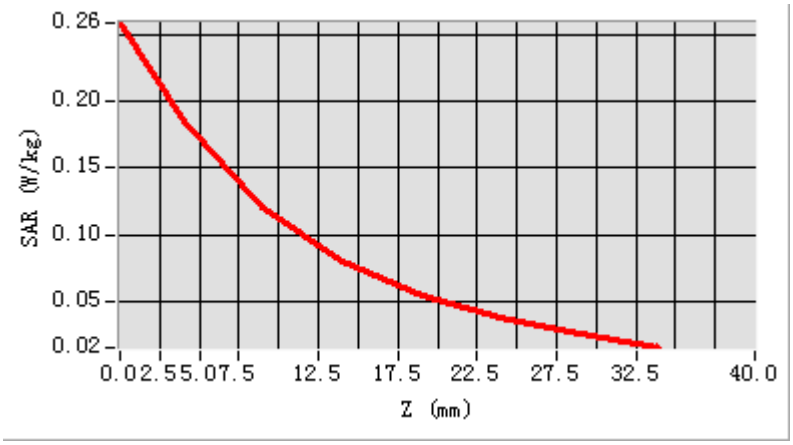
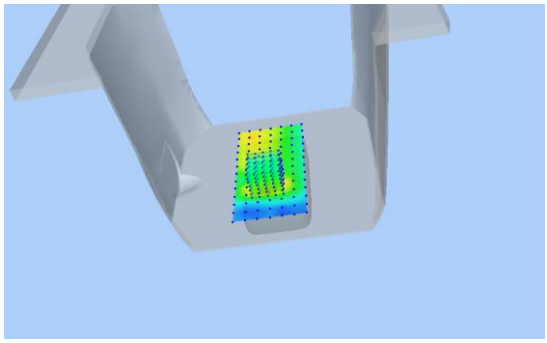
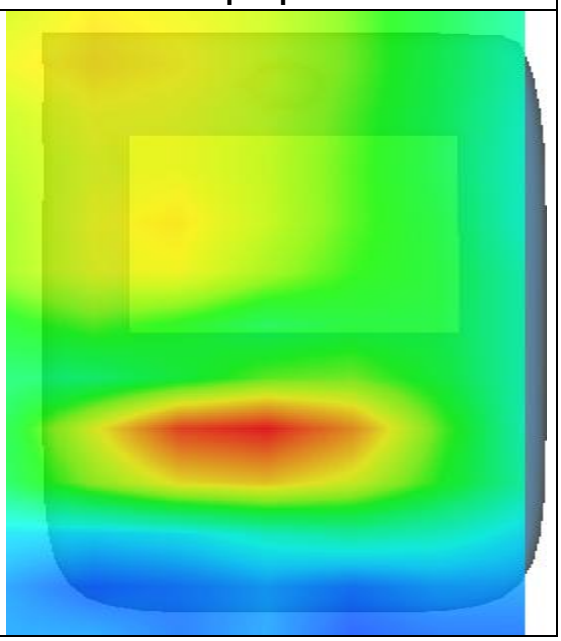
Maximum location: X=-6.00, Y=-25.00

SAR Peak: 0.26 W/kg

SAR 10g (W/Kg)	0.097789
SAR 1g (W/Kg)	0.172739

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.2588**	**0.1847**	**0.1210**	**0.0794**	**0.0546**	**0.0379**	**0.0259**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 9

Type: Phone measurement (Complete)

Area scan resolution: dx=10mm,dy=10mm

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2018.04.14

Measurement duration: 27 minutes 30 seconds

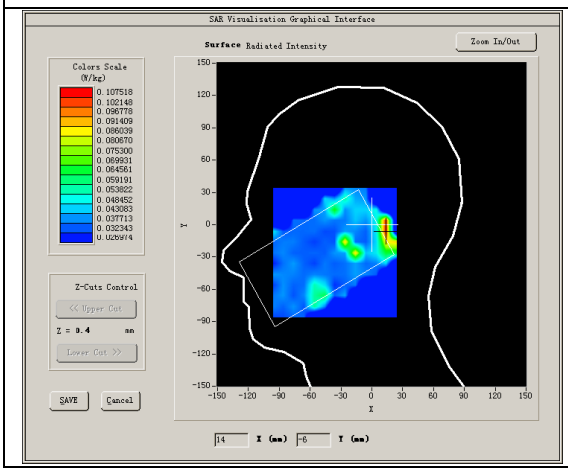
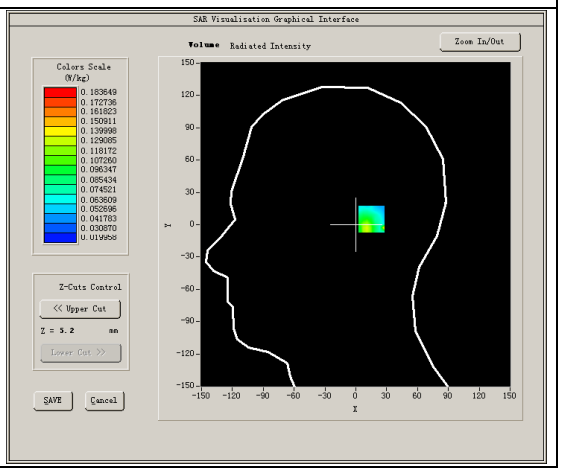
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Right head
Device Position	Cheek
Band	IEEE 802.11a U-NII
Channels	High
Signal	OFDM

B. SAR Measurement Results

Higher Band SAR (Channel 60):

Frequency (MHz)	5300.000000
Relative permittivity (real part)	35.975001
Conductivity (S/m)	4.767514
Power Drift (%)	2.440000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	21.61
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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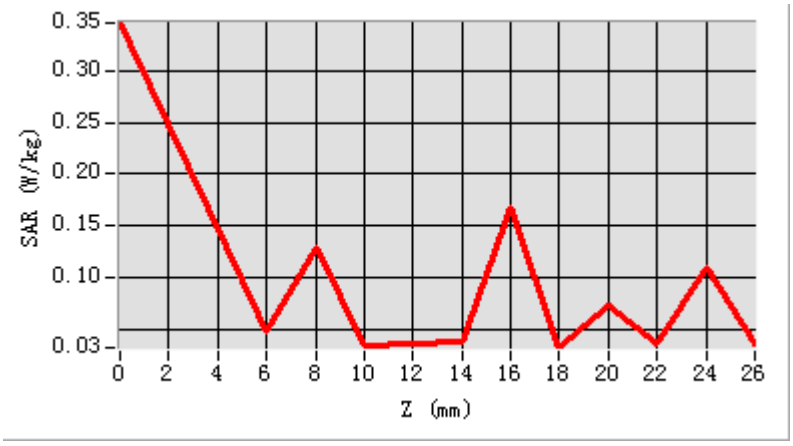
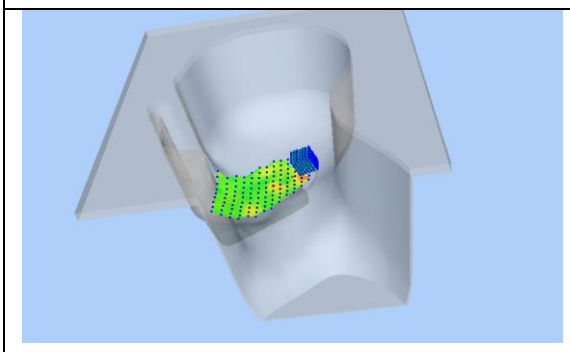
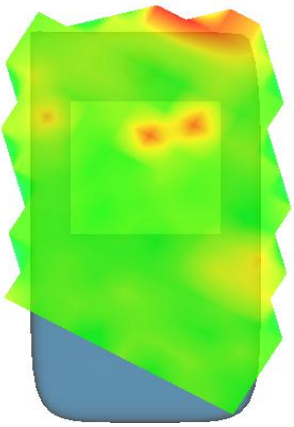
Maximum location: X=24.00, Y=5.00

SAR Peak: 0.34 W/kg

SAR 10g (W/Kg)	0.066371
SAR 1g (W/Kg)	0.115865

Z (mm)	**0.00**	**4.00**	**6.00**	**8.00**	**10.00**	**12.00**	**14.00**	**16.00**	**18.00**	**20.00**	**22.00**	**24.00**
SAR (W/Kg)	**0.3466**	**0.1461**	**0.0480**	**0.1282**	**0.0349**	**0.0366**	**0.0374**	**0.1680**	**0.0321**	**0.0726**	**0.0352**	**0.1101**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 10

Type: Phone measurement (Complete)

Area scan resolution: dx=10mm,dy=10mm

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2018.04.14

Measurement duration: 27 minutes 22 seconds

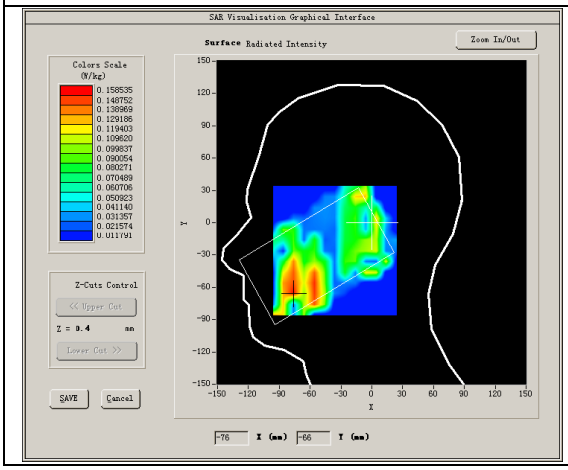
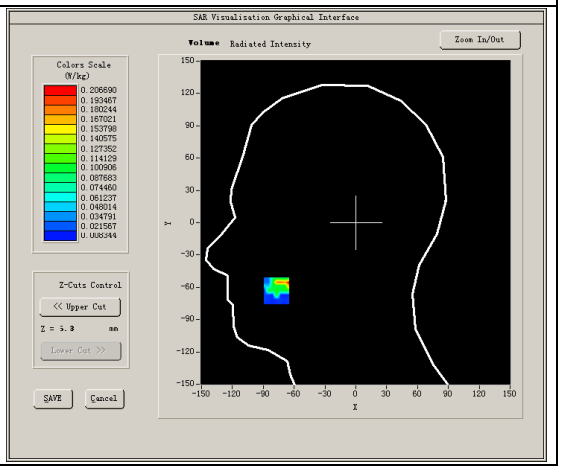
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Left head
Device Position	Tilt
Band	IEEE 802.11a U-NII
Channels	High
Signal	OFDM

B. SAR Measurement Results

Higher Band SAR (Channel 140):

Frequency (MHz)	5700.000000
Relative permittivity (real part)	35.300002
Conductivity (S/m)	5.171167
Power Drift (%)	2.210000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	22.42
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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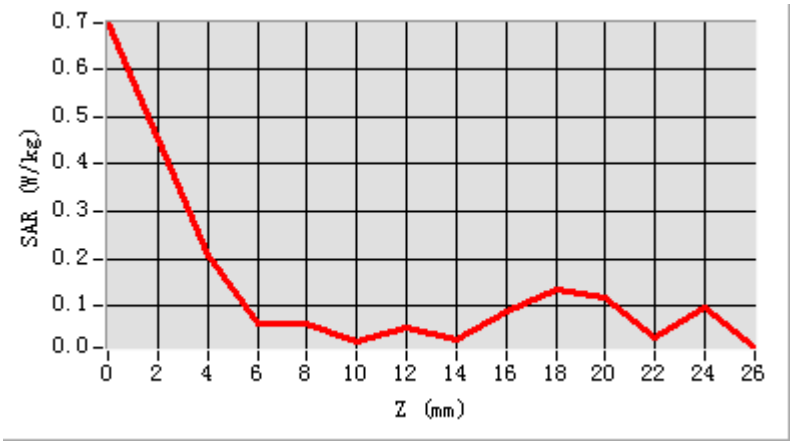
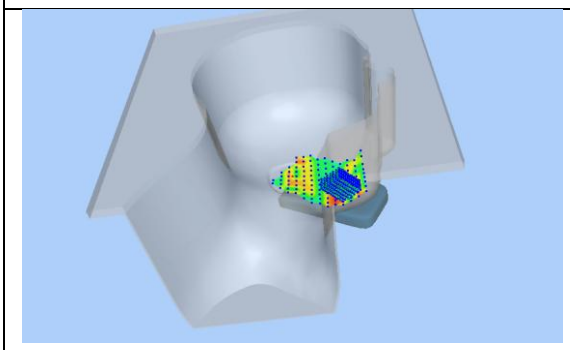
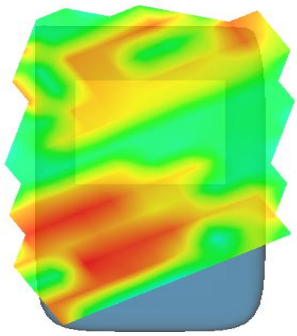
Maximum location: X=-77.00, Y=-63.00

SAR Peak: 0.62 W/kg

SAR 10g (W/Kg)	0.088095
SAR 1g (W/Kg)	0.146265

Z (mm)	**0.00**	**4.00**	**6.00**	**8.00**	**10.00**	**12.00**	**14.00**	**16.00**	**18.00**	**20.00**	**22.00**	**24.00**
SAR (W/Kg)	**0.6975**	**0.2067**	**0.0647**	**0.0624**	**0.0257**	**0.0533**	**0.0304**	**0.0873**	**0.1339**	**0.1186**	**0.0345**	**0.0953**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 11

Type: Phone measurement (Complete)

Area scan resolution: dx=10mm,dy=10mm

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2018.04.14

Measurement duration: 27 minutes 19 seconds

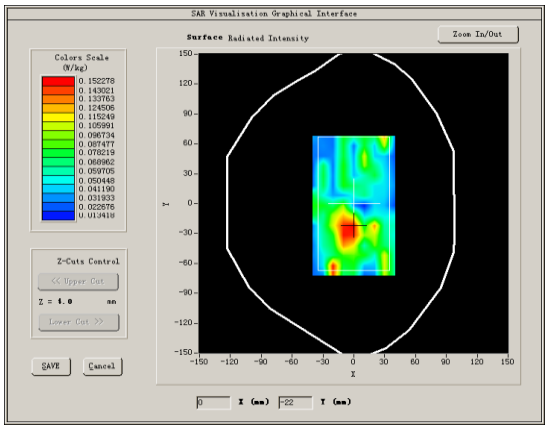
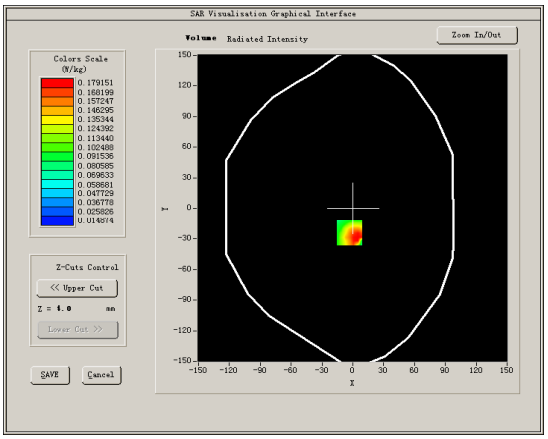
A. Experimental conditions.

Phantom File	surf_sam_plan.txt,
Phantom	Flat
Device Position	Body
Band	IEEE 802.11a U-NII
Channels	Middle
Signal	OFDM

B. SAR Measurement Results

Middle Band SAR (Channel 60):

Frequency (MHz)	5300.000000
Relative permittivity (real part)	48.300002
Conductivity (S/m)	5.859694
Power Drift (%)	-3.120001
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	23.02
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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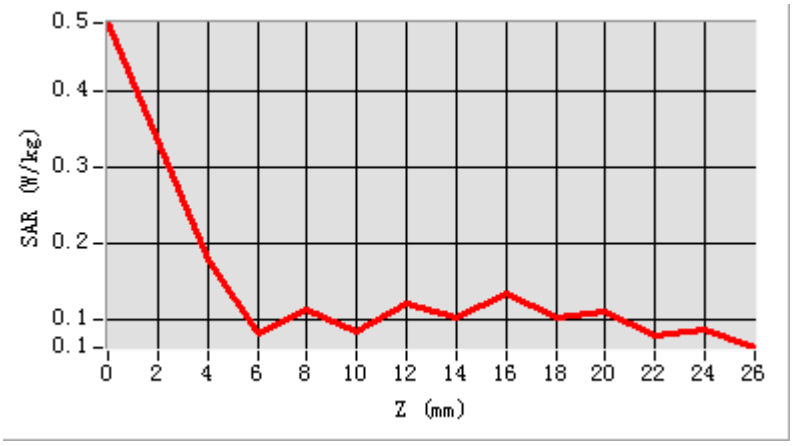
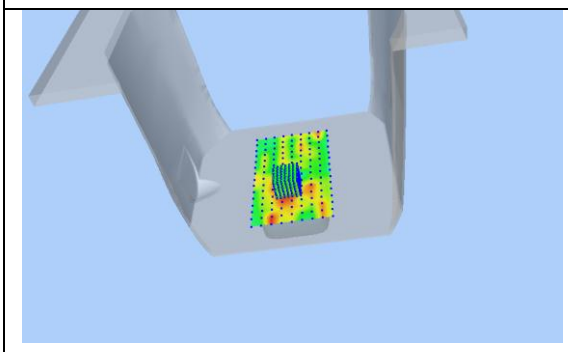
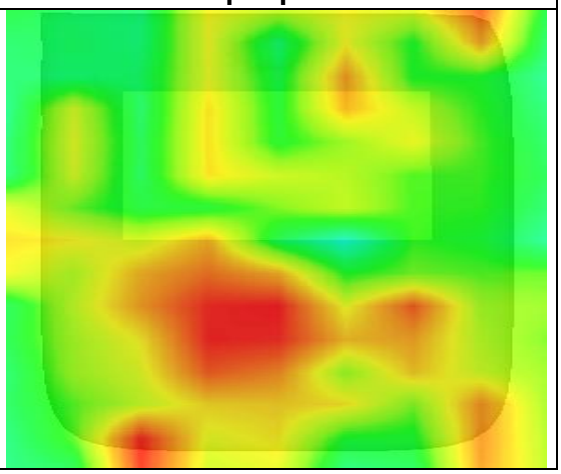
Maximum location: X=-3.00, Y=-24.00

SAR Peak: 0.69 W/kg

SAR 10g (W/Kg)	0.101124
SAR 1g (W/Kg)	0.170542

Z (mm)	**0.00**	**4.00**	**6.00**	**8.00**	**10.00**	**12.00**	**14.00**	**16.00**	**18.00**	**20.00**	**22.00**	**24.00**
SAR (W/Kg)	**0.4899**	**0.1792**	**0.0815**	**0.1112**	**0.0827**	**0.1208**	**0.1006**	**0.1335**	**0.1004**	**0.1089**	**0.0771**	**0.0853**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 12

Type: Phone measurement (Complete)

Area scan resolution: dx=10mm,dy=10mm

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2018.04.14

Measurement duration: 27 minutes 18 seconds

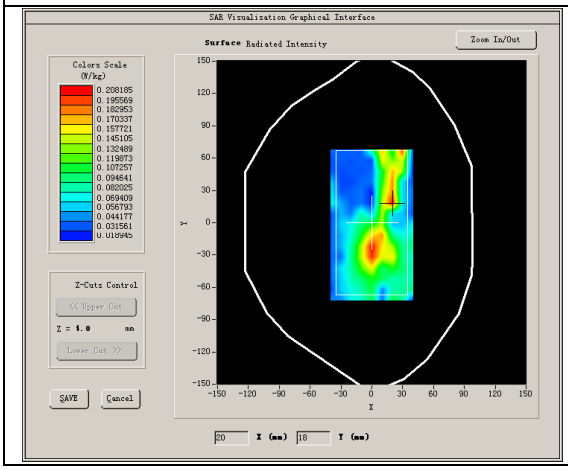
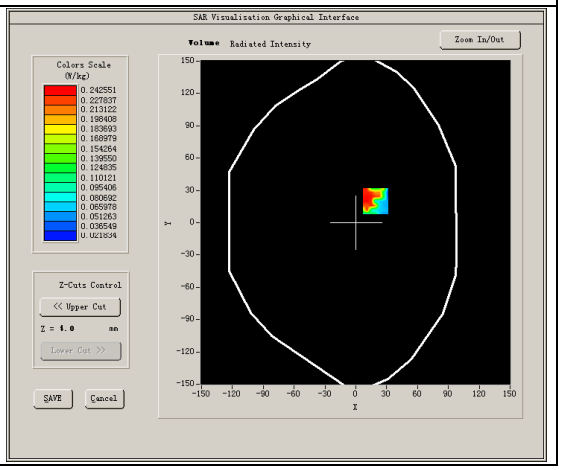
A. Experimental conditions.

Phantom File	surf_sam_plan.txt,
Phantom	Flat
Device Position	Body
Band	IEEE 802.11a U-NII
Channels	High
Signal	DSSS

B. SAR Measurement Results

Higher Band SAR (Channel 140):

Frequency (MHz)	5700.000000
Relative permittivity (real part)	48.400002
Conductivity (S/m)	5.871167
Power Drift (%)	1.770000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	23.02
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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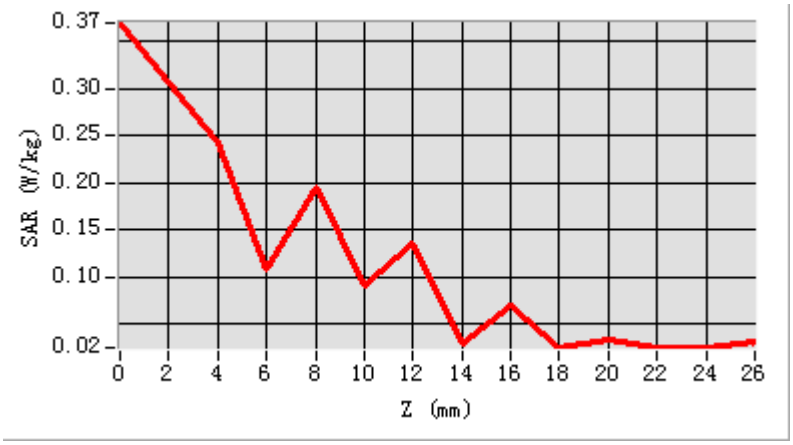
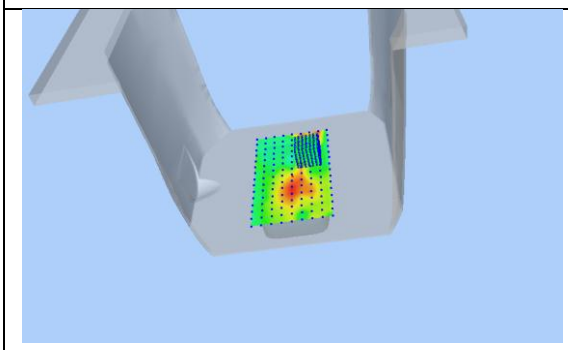
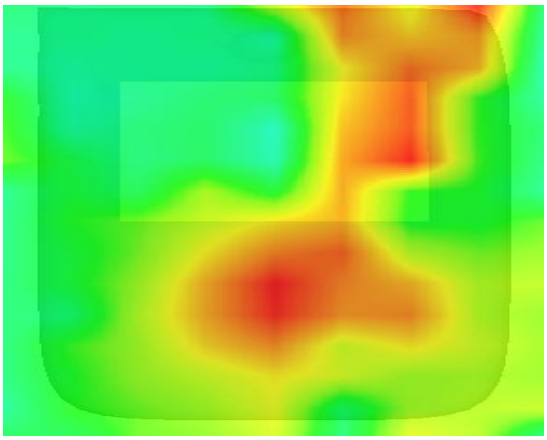
Maximum location: X=19.00, Y=20.00

SAR Peak: 0.58 W/kg

SAR 10g (W/Kg)	0.116325
SAR 1g (W/Kg)	0.165312

Z (mm)	**0.00**	**4.00**	**6.00**	**8.00**	**10.00**	**12.00**	**14.00**	**16.00**	**18.00**	**20.00**	**22.00**	**24.00**
SAR (W/Kg)	**0.3699**	**0.2426**	**0.1087**	**0.1960**	**0.0905**	**0.1364**	**0.0298**	**0.0704**	**0.0248**	**0.0328**	**0.0259**	**0.0253**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 13

Type: Phone measurement (Complete)

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

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2018.04.14

Measurement duration: 27 minutes 18 seconds

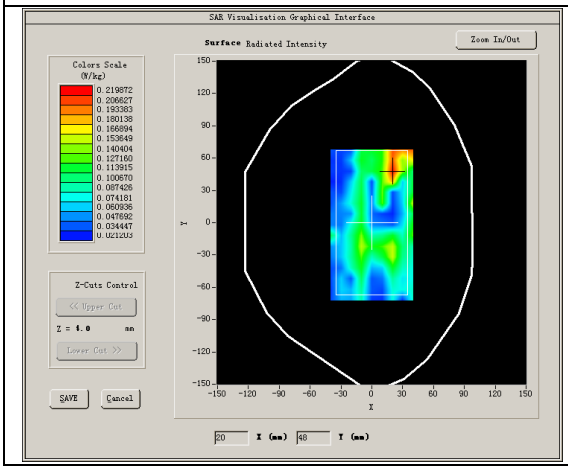
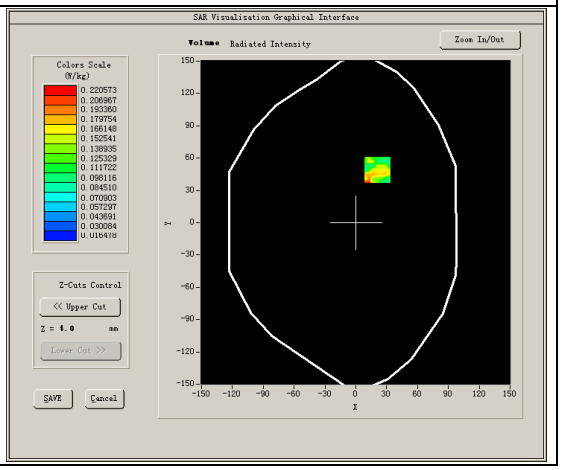
A. Experimental conditions.

Phantom File	surf_sam_plan.txt,
Phantom	Flat
Device Position	Body
Band	IEEE 802.11a U-NII
Channels	High
Signal	OFDM

B. SAR Measurement Results

Higher Band SAR (Channel 165):

Frequency (MHz)	5825.000000
Relative permittivity (real part)	48.075002
Conductivity (S/m)	5.997514
Power Drift (%)	1.450000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	23.02
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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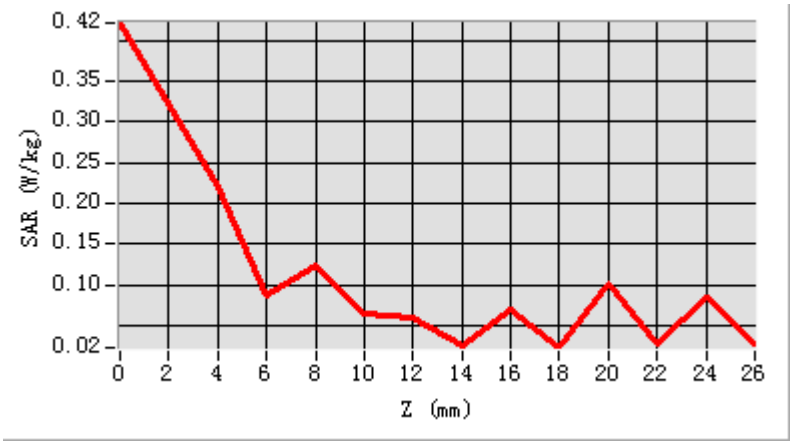
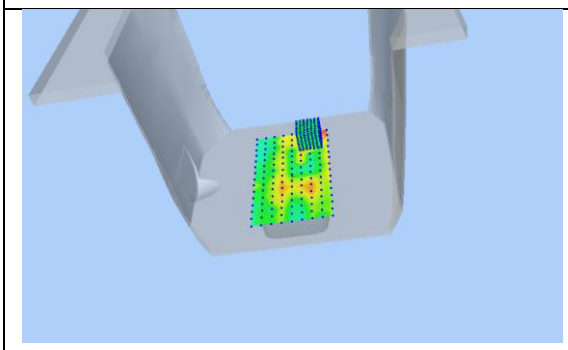
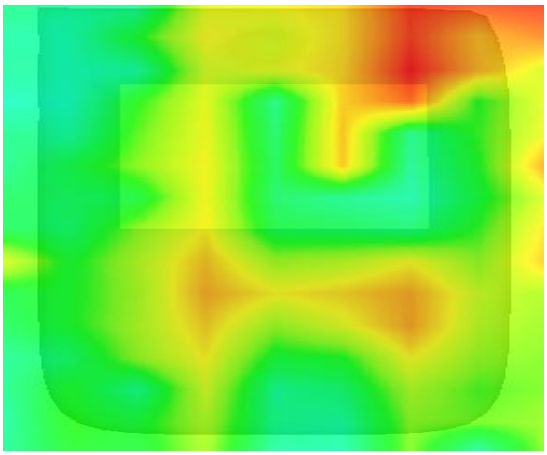
Maximum location: X=21.00, Y=49.00

SAR Peak: 0.60 W/kg

SAR 10g (W/Kg)	0.149778
SAR 1g (W/Kg)	0.194641

Z (mm)	**0.00**	**4.00**	**6.00**	**8.00**	**10.00**	**12.00**	**14.00**	**16.00**	**18.00**	**20.00**	**22.00**	**24.00**
SAR (W/Kg)	**0.4209**	**0.2206**	**0.0860**	**0.1249**	**0.0642**	**0.0604**	**0.0258**	**0.0708**	**0.0230**	**0.1005**	**0.0284**	**0.0854**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 14

Type: Phone measurement (Complete)

Area scan resolution: dx=12mm,dy=12mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=4mm

Date of measurement: 2018.02.24

Measurement duration: 16 minutes 18 seconds

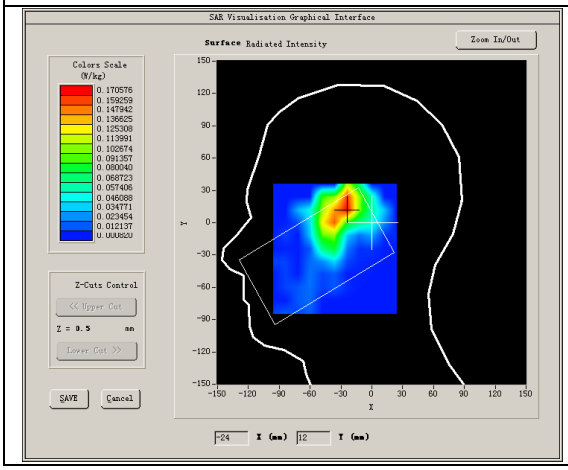
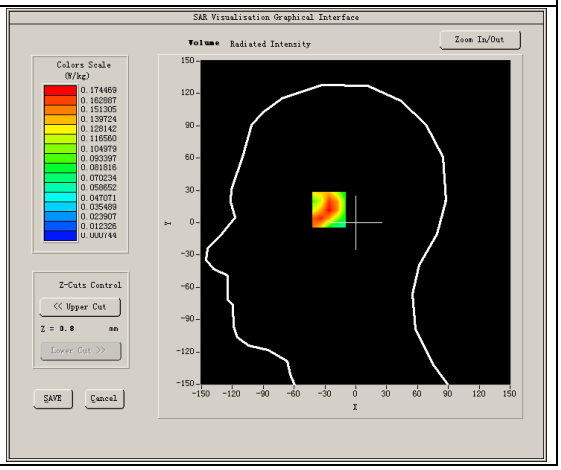
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Left head
Device Position	Cheek
Band	IEEE 802.11b ISM
Channels	Middle
Signal	DSSS

B. SAR Measurement Results

Middle Band SAR (Channel 6):

Frequency (MHz)	2437.000000
Relative permittivity (real part)	39.626002
Conductivity (S/m)	1.788081
Power Drift (%)	0.440000
Ambient Temperature:	22.0°C
Liquid Temperature:	21.8°C
ConvF:	4.74
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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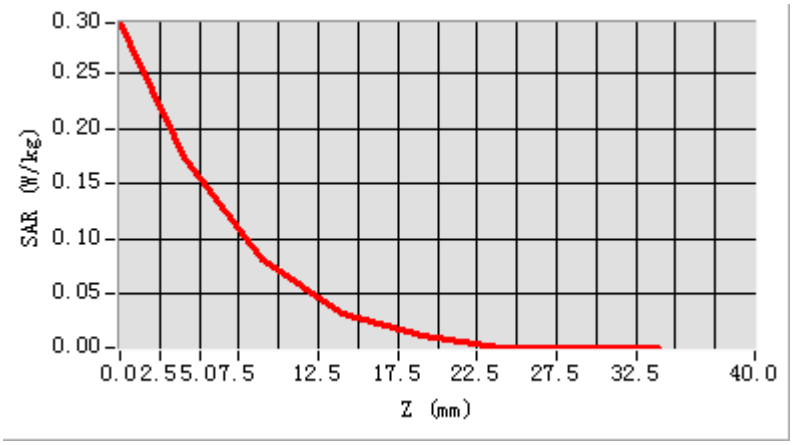
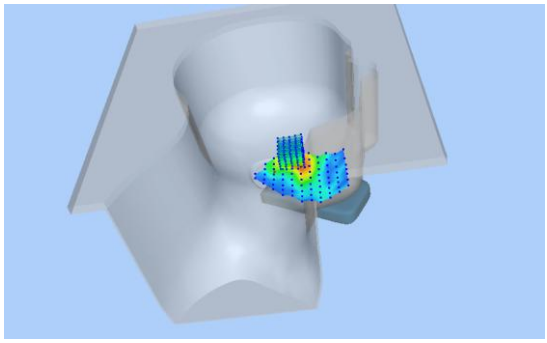
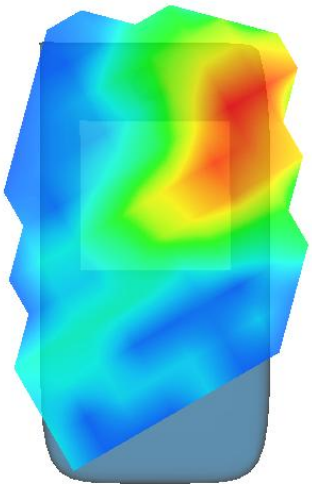
Maximum location: X=-25.00, Y=15.00

SAR Peak: 0.31 W/kg

SAR 10g (W/Kg)	0.079221
SAR 1g (W/Kg)	0.165300

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.2962**	**0.1745**	**0.0807**	**0.0327**	**0.0110**	**0.0012**	**0.0009**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 15

Type: Phone measurement (Complete)

Area scan resolution: dx=12mm,dy=12mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=4mm

Date of measurement: 2018.02.08

Measurement duration: 16 minutes 42 seconds

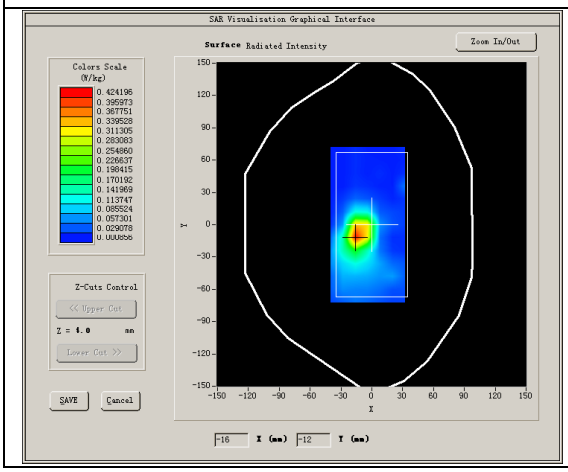
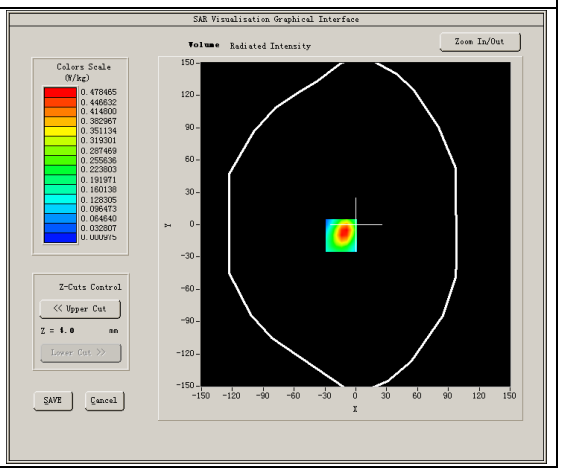
A. Experimental conditions.

Phantom File	surf_sam_plan.txt,
Phantom	Flat
Device Position	Body
Band	IEEE 802.11b ISM
Channels	Middle
Signal	DSSS

B. SAR Measurement Results

Middle Band SAR (Channel 6):

Frequency (MHz)	2437.000000
Relative permittivity (real part)	53.084927
Conductivity (S/m)	1.937580
Power Drift (%)	-4.650000
Ambient Temperature:	22.0°C
Liquid Temperature:	21.8°C
ConvF:	4.93
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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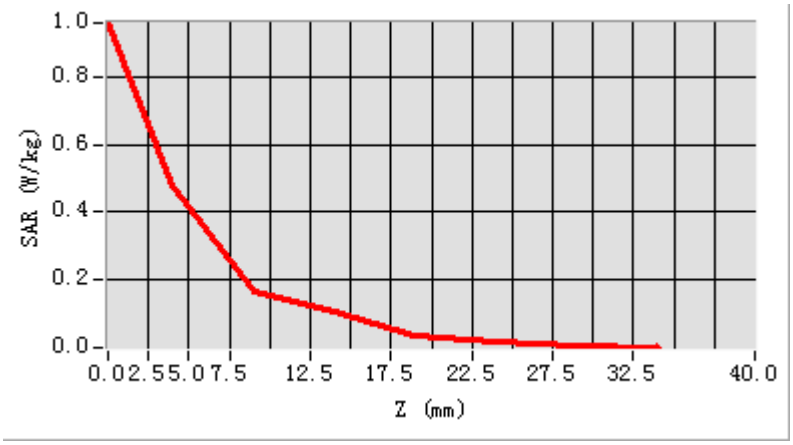
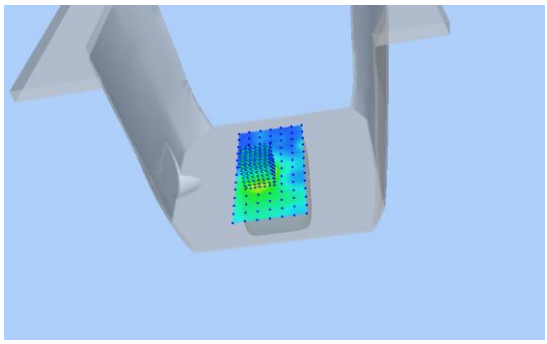
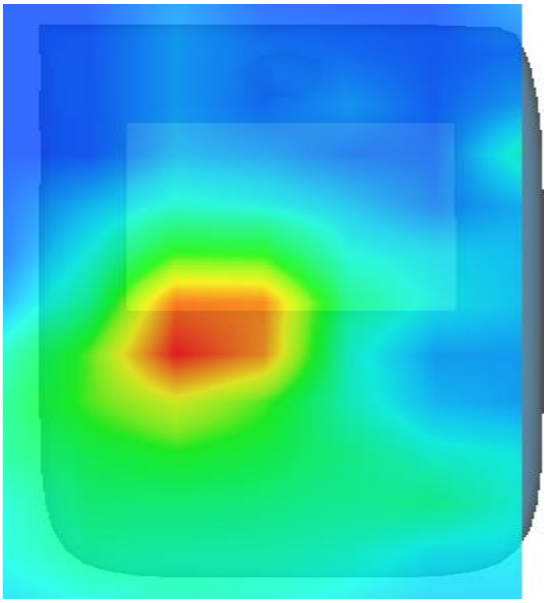
Maximum location: X=-14.00, Y=-10.00

SAR Peak: 0.83 W/kg

SAR 10g (W/Kg)	0.192644
SAR 1g (W/Kg)	0.364189

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.9575	0.4785	0.1638	0.1051	0.0368	0.0168	0.0087



3D screen shot	Hot spot position
	

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MEASUREMENT 16

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.09

Measurement duration: 16 minutes 43 seconds

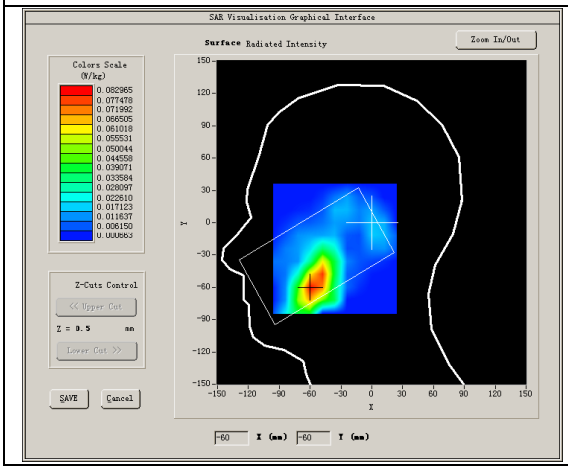
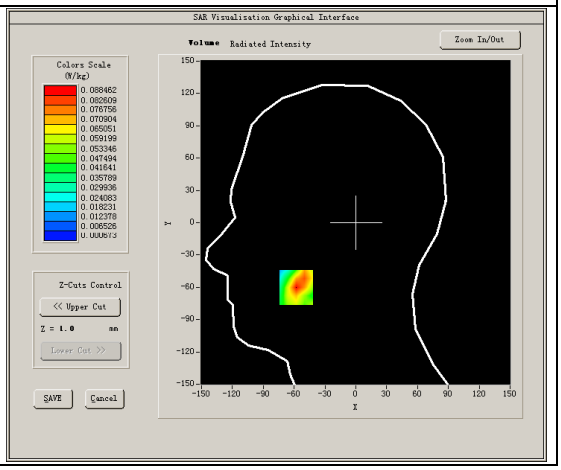
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Left head
Device Position	Cheek
Band	LTE band 2
Channels	Middle
Signal	LTE_

B. SAR Measurement Results

Middle Band SAR (Channel 18900):

Frequency (MHz)	1860.000000
Relative permittivity (real part)	40.299999
Conductivity (S/m)	1.520724
Power drift (%)	2.350000
Ambient Temperature:	22.1°C
Liquid Temperature:	22.4°C
ConvF:	5.61
Duty cycle:	1:1

SURFACE SAR	VOLUME SAR
	

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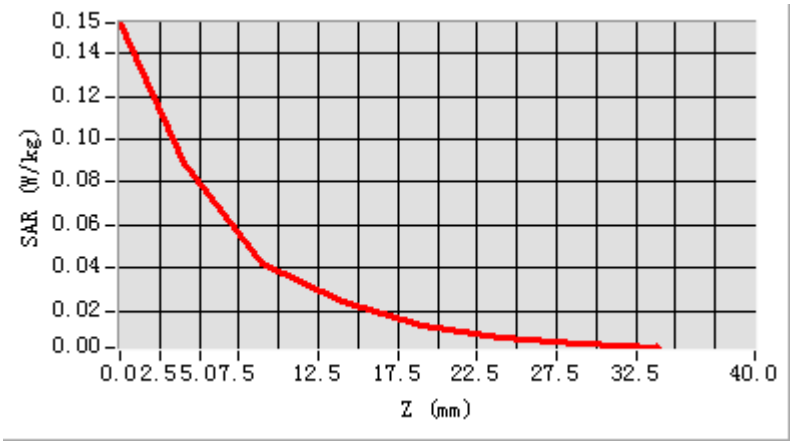
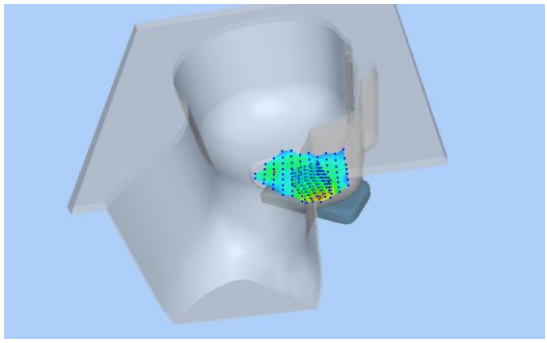
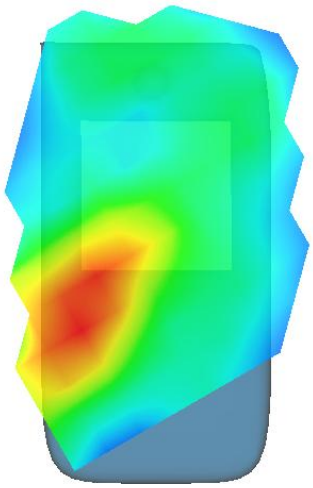
Maximum location: X=-58.00, Y=-60.00

SAR Peak: 0.15 W/kg

SAR 10g (W/Kg)	0.041149
SAR 1g (W/Kg)	0.083255

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.1542**	**0.0885**	**0.0420**	**0.0240**	**0.0131**	**0.0075**	**0.0046**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 17

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.09

Measurement duration: 16 minutes 51 seconds

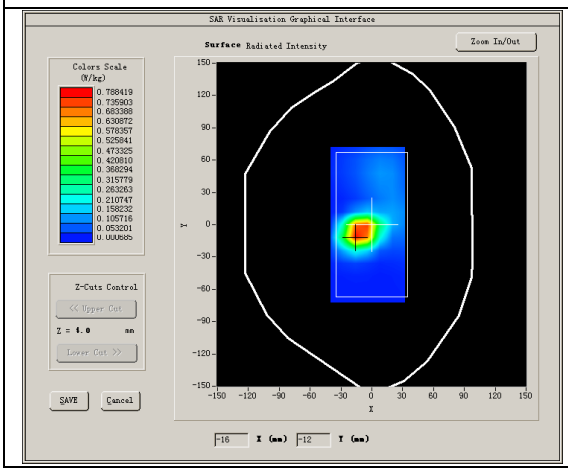
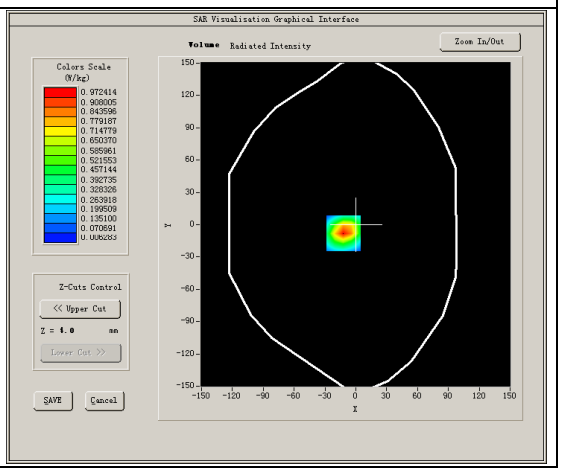
A. Experimental conditions.

Phantom File	surf_sam_plan.txt,
Phantom	Flat
Device Position	Body
Band	LTE band 2
Channels	Middle
Signal	LTE

B. SAR Measurement Results

Middle Band SAR (Channel 18900):

Frequency (MHz)	1879.500000
Relative permittivity (real part)	53.499999
Conductivity (S/m)	1.500724
Power drift (%)	0.470000
Ambient Temperature:	22.1°C
Liquid Temperature:	22.4°C
ConvF:	5.71
Duty cycle:	1:1

SURFACE SAR	VOLUME SAR
	

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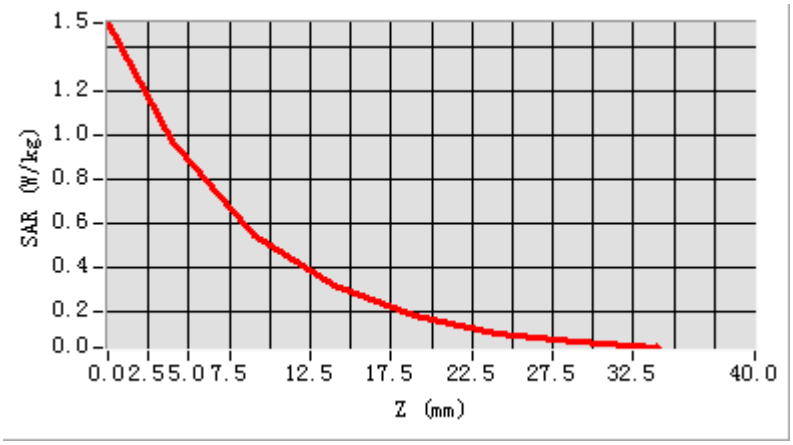
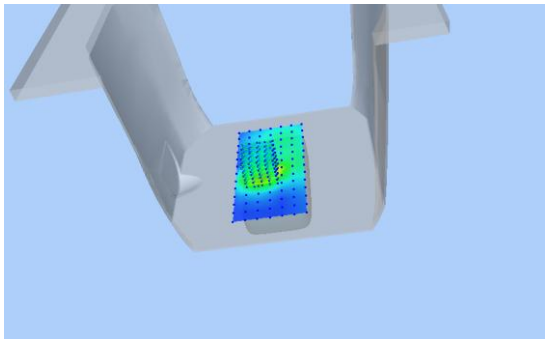
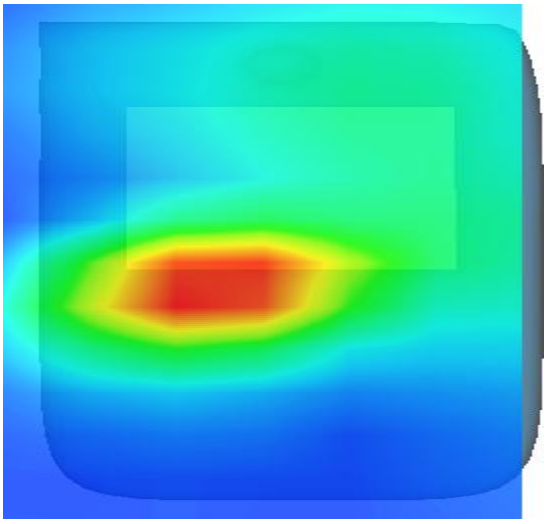
Maximum location: X=-12.00, Y=-8.00

SAR Peak: 1.55 W/kg

SAR 10g (W/Kg)	0.439813
SAR 1g (W/Kg)	0.911517

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.5096	0.9724	0.5485	0.3159	0.1809	0.1034	0.0583



3D screen shot	Hot spot position
	

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MEASUREMENT 18

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.24

Measurement duration: 16 minutes 17 seconds

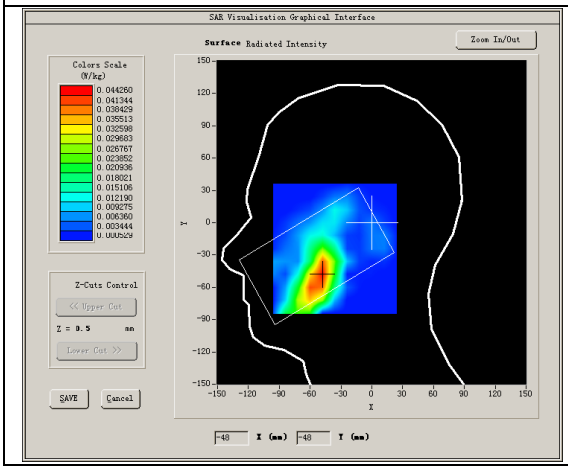
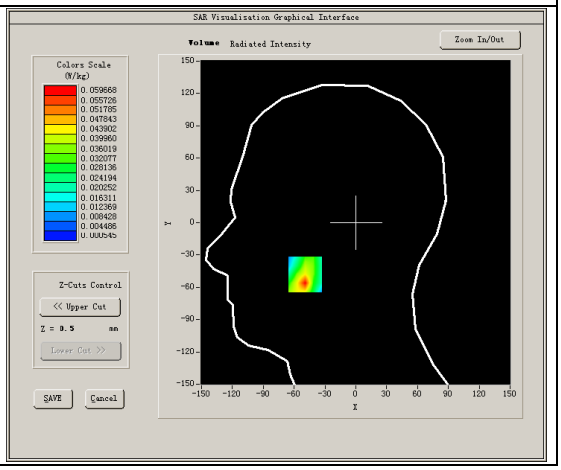
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Left head
Device Position	Cheek
Band	LTE band 4
Channels	High
Signal	LTE

B. SAR Measurement Results

Higher Band SAR (Channel 20300):

Frequency (MHz)	1744.500000
Relative permittivity (real part)	40.305000
Conductivity (S/m)	1.356961
Power drift (%)	2.720001
Ambient Temperature:	22.3°C
Liquid Temperature:	22.6°C
ConvF:	5.21
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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Tel: 86-755-36698555 Fax: 86-755-36698525

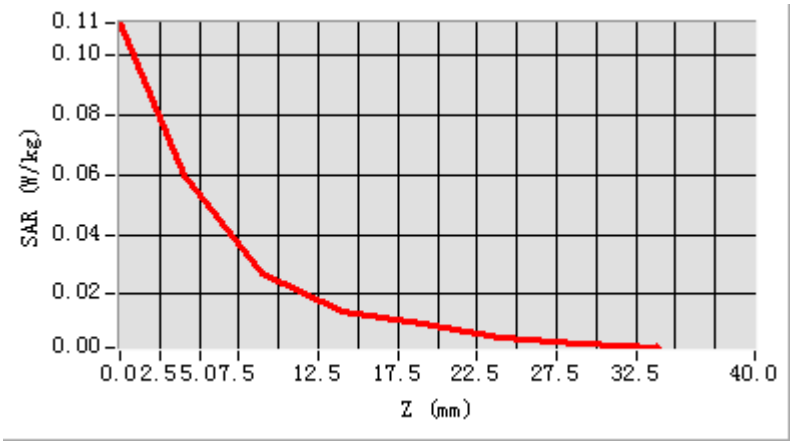
Http://www.morlab.cn E-mail: service@morlab.cn

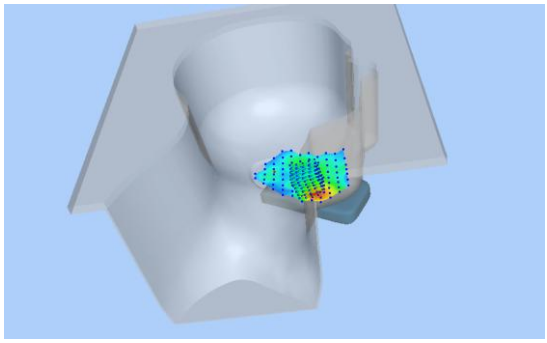
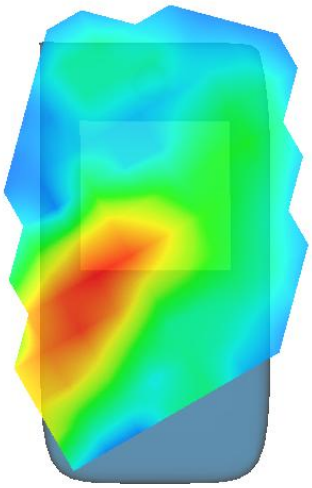
Maximum location: X=-49.00, Y=-48.00

SAR Peak: 0.11 W/kg

SAR 10g (W/Kg)	0.025585
SAR 1g (W/Kg)	0.053463

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.1110**	**0.0597**	**0.0269**	**0.0145**	**0.0104**	**0.0057**	**0.0035**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 19

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.09

Measurement duration: 16 minutes 39 seconds

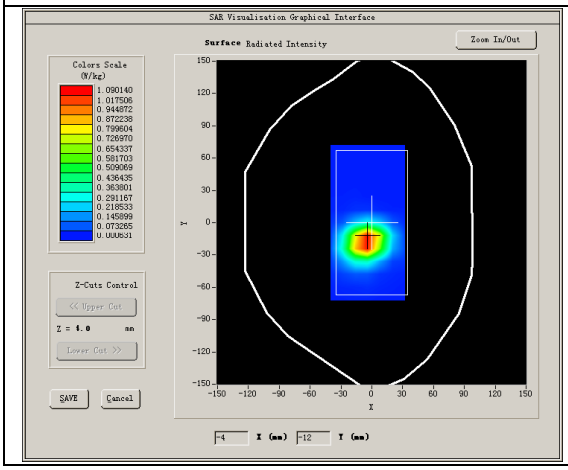
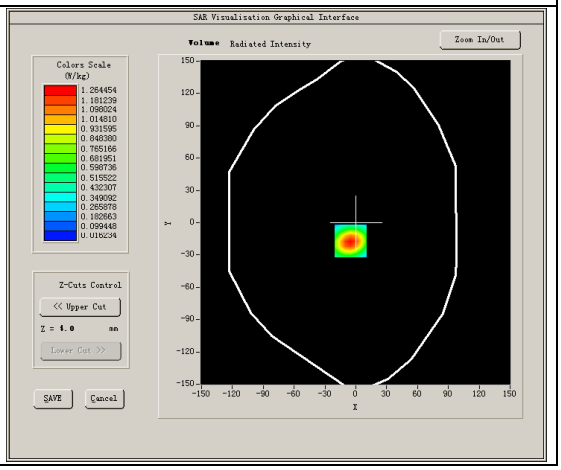
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	Body
Band	LTE band 4
Channels	High
Signal	LTE

B. SAR Measurement Results

Higher Band SAR (Channel 20300):

Frequency (MHz)	1744.500000
Relative permittivity (real part)	53.446053
Conductivity (S/m)	1.485873
Power drift (%)	1.600000
Ambient Temperature:	22.2°C
Liquid Temperature:	22.6°C
ConvF:	5.38
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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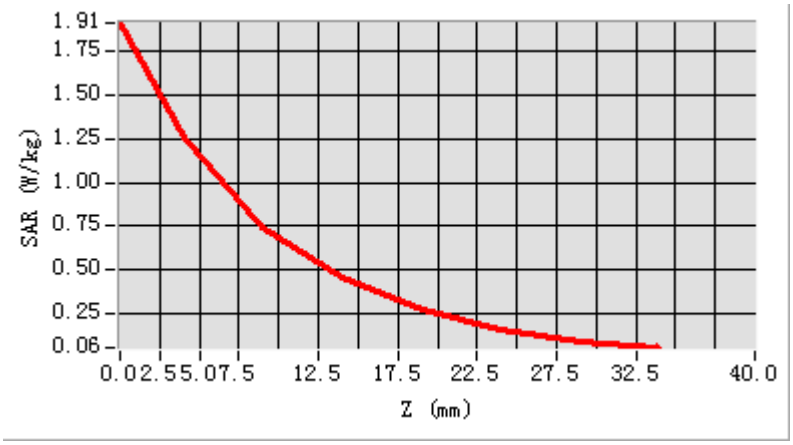
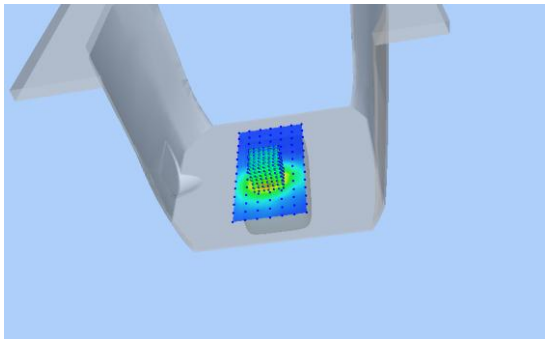
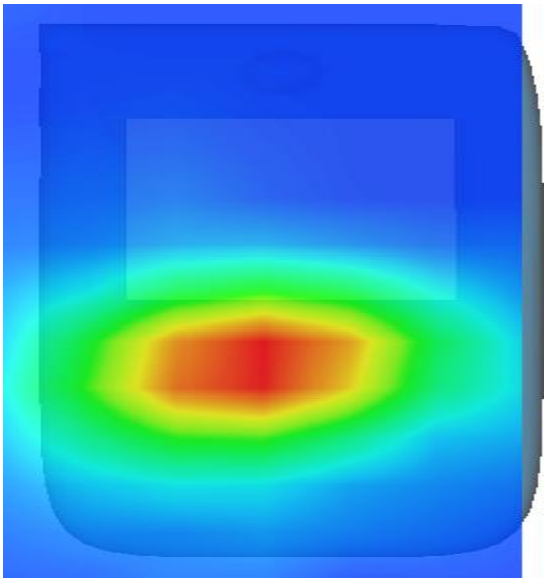
Maximum location: X=-5.00, Y=-17.00

SAR Peak: 1.90 W/kg

SAR 10g (W/Kg)	0.621824
SAR 1g (W/Kg)	1.165548

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**1.9115**	**1.2645**	**0.7439**	**0.4534**	**0.2717**	**0.1632**	**0.0962**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 20

Type: Phone measurement (Complete)

Area scan resolution: dx=12mm,dy=12mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=4mm

Date of measurement: 2018.02.26

Measurement duration: 16 minutes 23 seconds

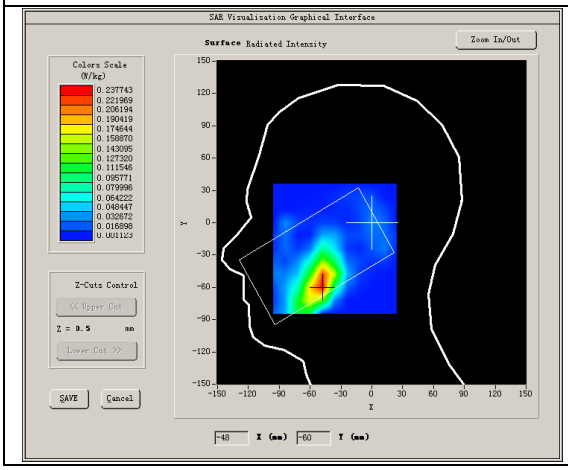
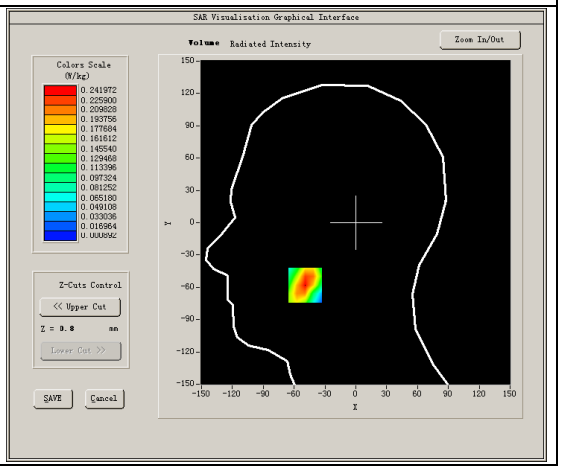
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Left head
Device Position	Cheek
Band	LTE band 7
Channels	High
Signal	LTE

B. SAR Measurement Results

Higher Band SAR (Channel 21350):

Frequency (MHz)	2560.000000
Relative permittivity (real part)	39.253333
Conductivity (S/m)	1.916681
Power Drift (%)	-2.630000
Ambient Temperature:	22.0°C
Liquid Temperature:	21.8°C
ConvF:	4.74
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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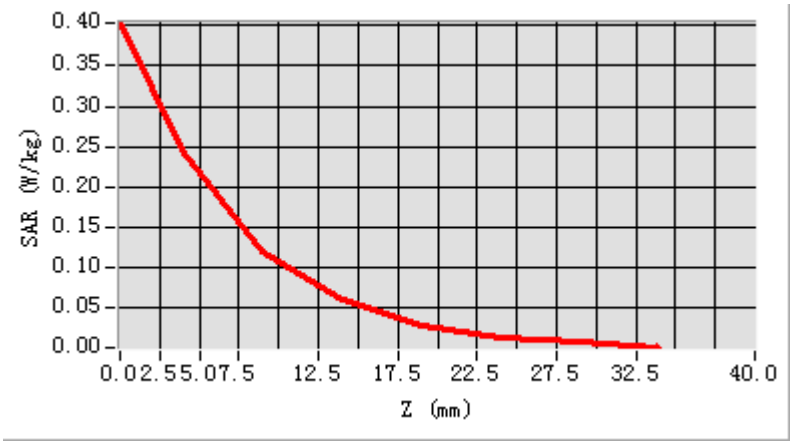
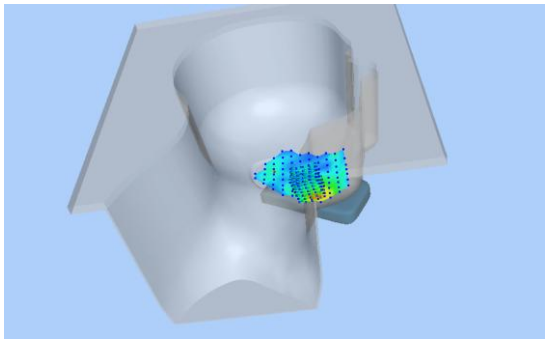
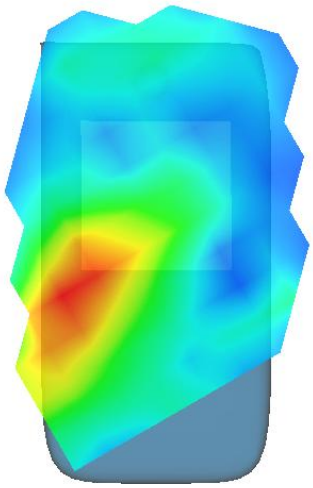
Maximum location: X=-49.00, Y=-58.00

SAR Peak: 0.40 W/kg

SAR 10g (W/Kg)	0.113651
SAR 1g (W/Kg)	0.228890

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.4033**	**0.2420**	**0.1194**	**0.0603**	**0.0293**	**0.0136**	**0.0077**



3D screen shot	Hot spot position
	

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MEASUREMENT 21

Type: Phone measurement (Complete)

Area scan resolution: dx=12mm,dy=12mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=4mm

Date of measurement: 2018.02.09

Measurement duration: 16 minutes 41 seconds

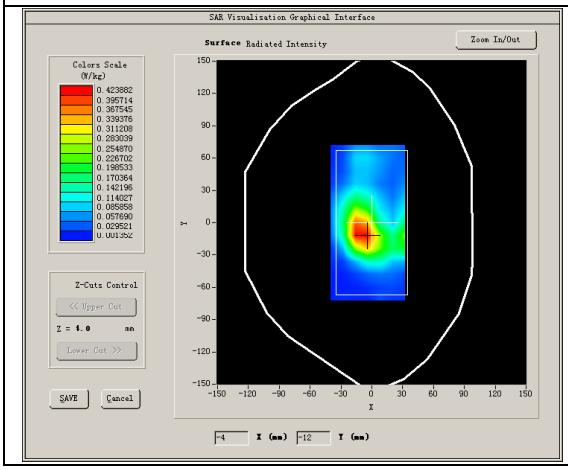
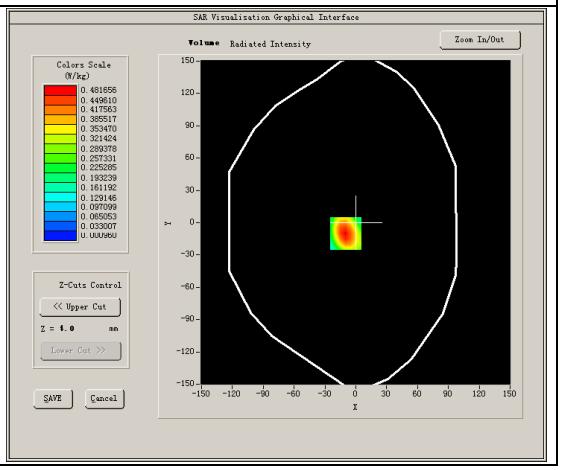
A. Experimental conditions.

Phantom File	surf_sam_plan.txt, h= 5.00 mm
Phantom	Flat
Device Position	Body
Band	LTE band 7
Channels	High
Signal	LTE

B. SAR Measurement Results

Higher Band SAR (Channel 21350):

Frequency (MHz)	2560.000000
Relative permittivity (real part)	52.560001
Conductivity (S/m)	2.096356
Power Drift (%)	1.060000
Ambient Temperature:	22.0°C
Liquid Temperature:	21.8°C
ConvF:	4.93
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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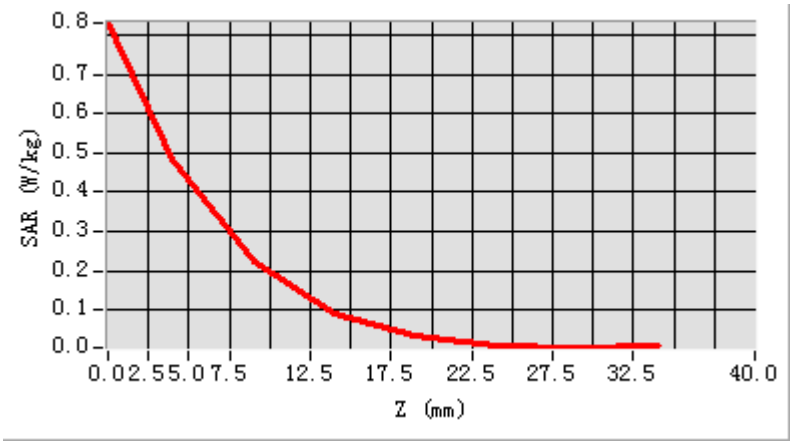
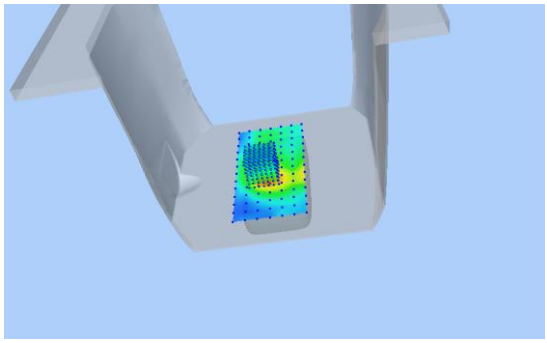
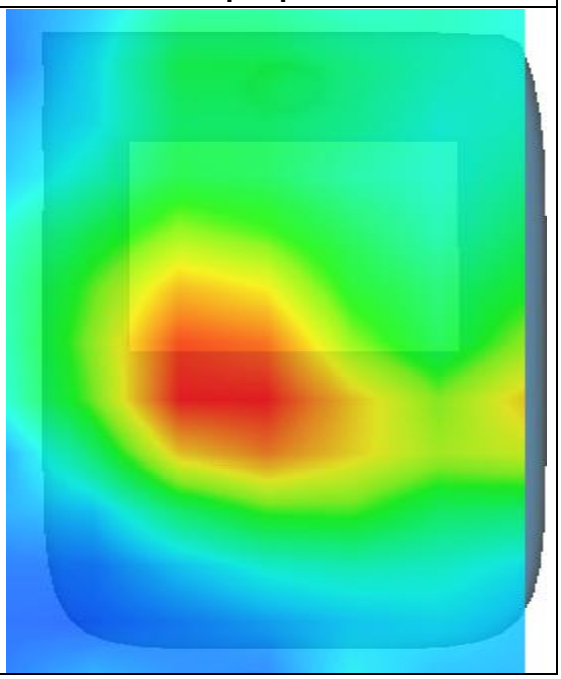
Maximum location: X=-10.00, Y=-10.00

SAR Peak: 0.84 W/kg

SAR 10g (W/Kg)	0.214116
SAR 1g (W/Kg)	0.453377

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.8302**	**0.4817**	**0.2241**	**0.0908**	**0.0364**	**0.0112**	**0.0037**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 22

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.23

Measurement duration: 16 minutes 16 seconds

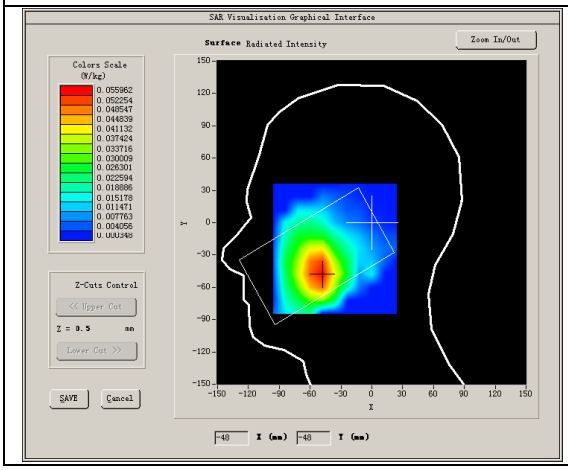
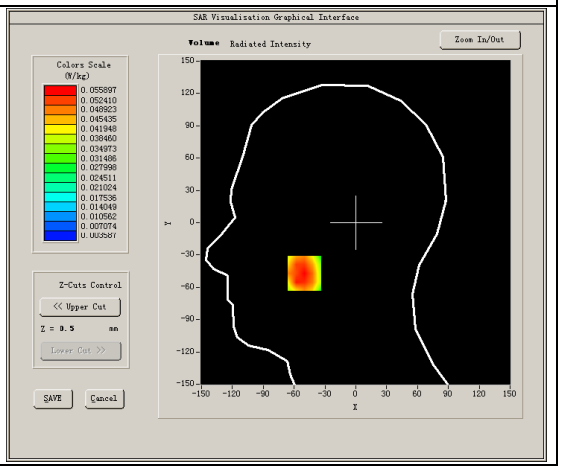
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Right head
Device Position	Cheek
Band	LTE band 12
Channels	Middle
Signal	LTE

B. SAR Measurement Results

Middle Band SAR (Channel 23095):

Frequency (MHz)	707.500000
Relative permittivity (real part)	42.826667
Conductivity (S/m)	0.814404
Power drift (%)	2.050003
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.44
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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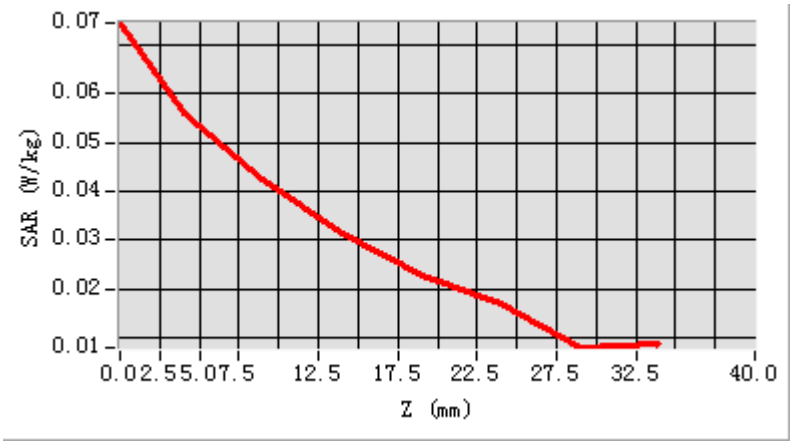
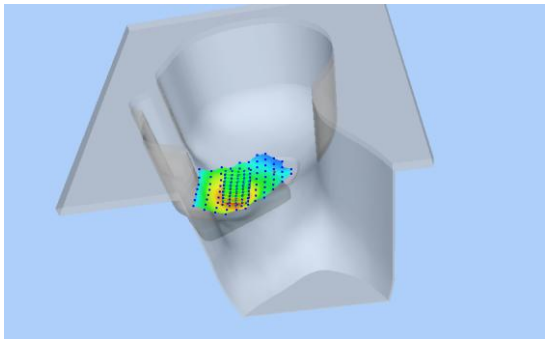
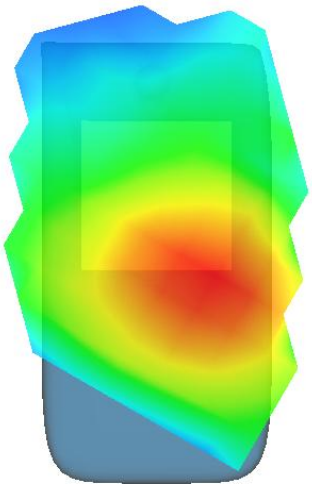
Maximum location: X=-50.00, Y=-47.00

SAR Peak: 0.08 W/kg

SAR 10g (W/Kg)	0.037951
SAR 1g (W/Kg)	0.056328

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.0744**	**0.0559**	**0.0425**	**0.0313**	**0.0228**	**0.0169**	**0.0080**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 23

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.12

Measurement duration: 16 minutes 54 seconds

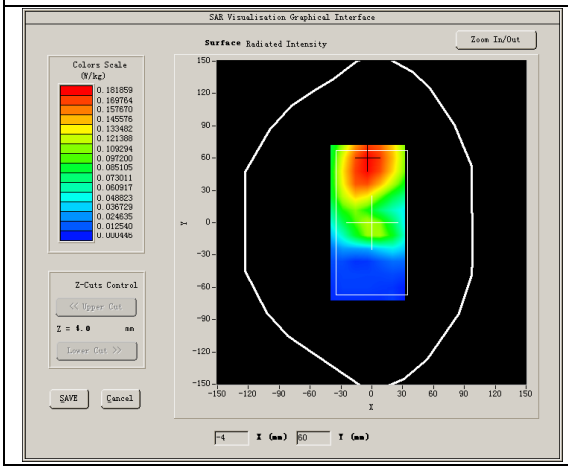
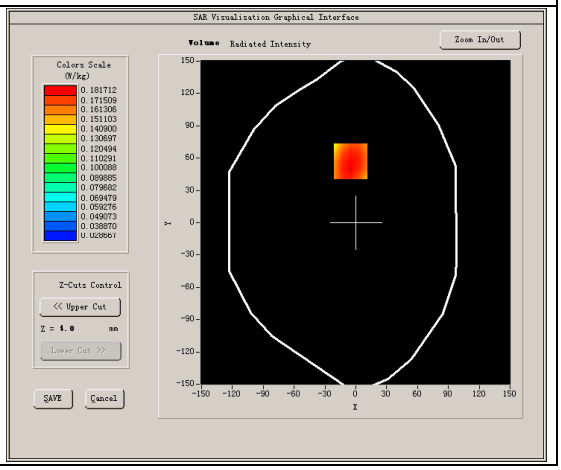
A. Experimental conditions.

Phantom File	surf_sam_plan.txt,
Phantom	Flat
Device Position	Body
Band	LTE band 12
Channels	Middle
Signal	LTE

B. SAR Measurement Results

Middle Band SAR (Channel 23095):

Frequency (MHz)	707.500000
Relative permittivity (real part)	55.696754
Conductivity (S/m)	1.019129
Power drift (%)	2.340000
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.68
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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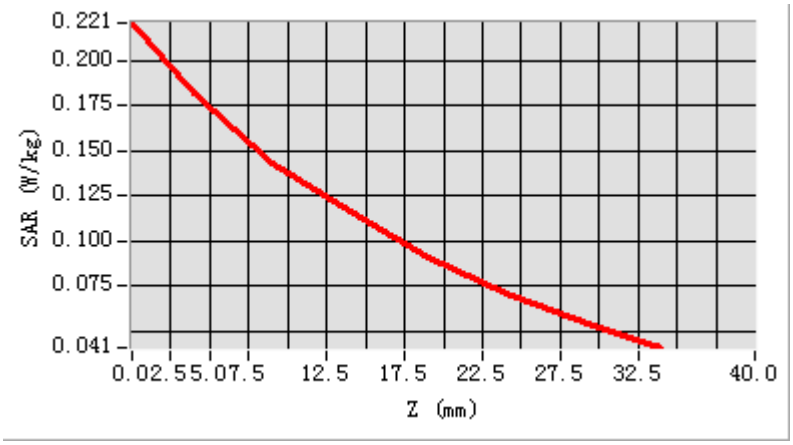
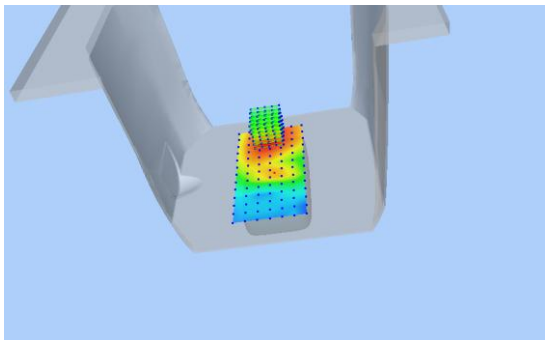
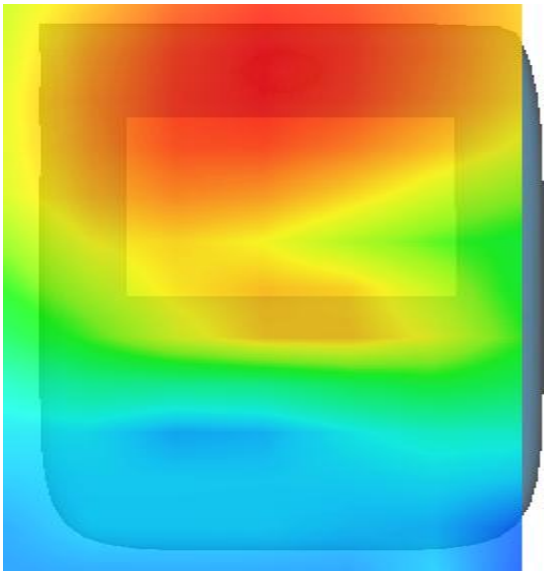
Maximum location: X=-5.00, Y=57.00

SAR Peak: 0.25 W/kg

SAR 10g (W/Kg)	0.141297
SAR 1g (W/Kg)	0.190350

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.2207	0.1817	0.1427	0.1161	0.0905	0.0707	0.0553



3D screen shot	Hot spot position
	

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MEASUREMENT 24

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.23

Measurement duration: 16 minutes 18 seconds

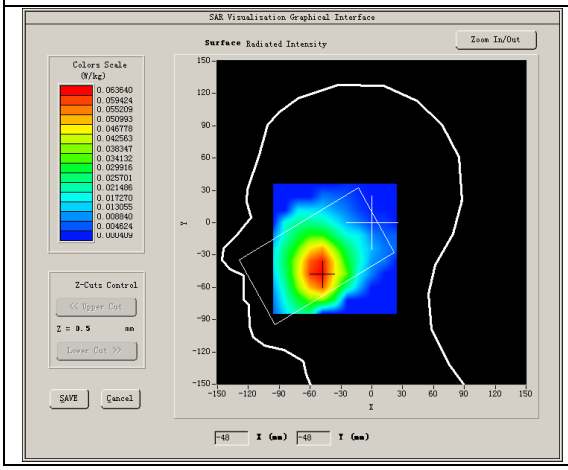
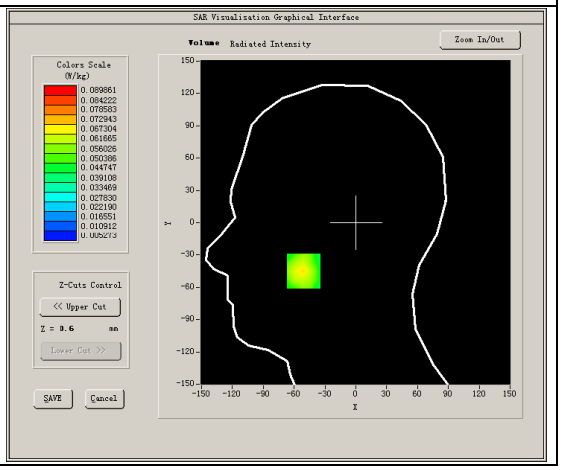
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Right head
Device Position	Cheek
Band	LTE band 17
Channels	Low
Signal	LTE

B. SAR Measurement Results

Lower Band SAR (Channel 23780):

Frequency (MHz)	709.000000
Relative permittivity (real part)	42.826667
Conductivity (S/m)	0.814404
Power drift (%)	0.670000
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.44
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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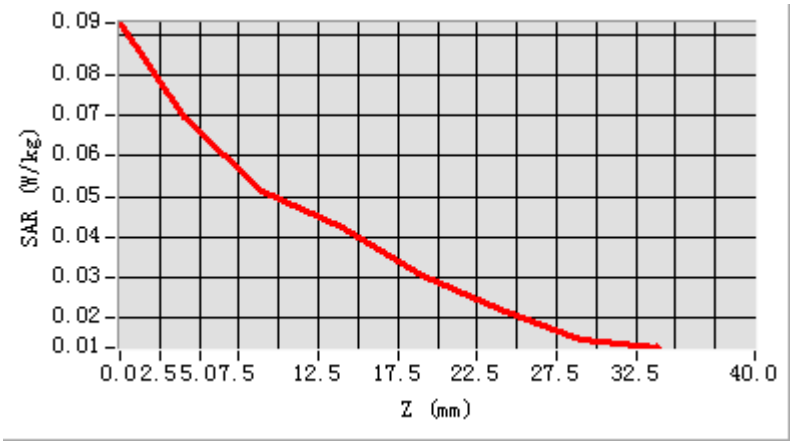
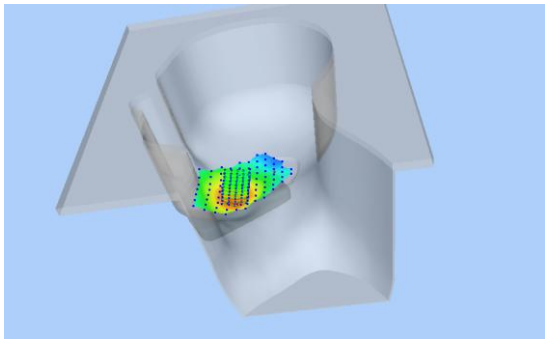
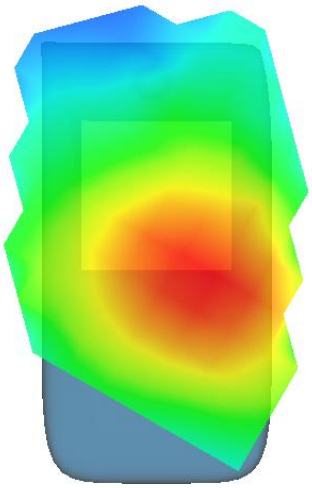
Maximum location: X=-51.00, Y=-45.00

SAR Peak: 0.09 W/kg

SAR 10g (W/Kg)	0.046388
SAR 1g (W/Kg)	0.068536

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.0930**	**0.0697**	**0.0512**	**0.0424**	**0.0305**	**0.0219**	**0.0146**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 25

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.12

Measurement duration: 16 minutes 55 seconds

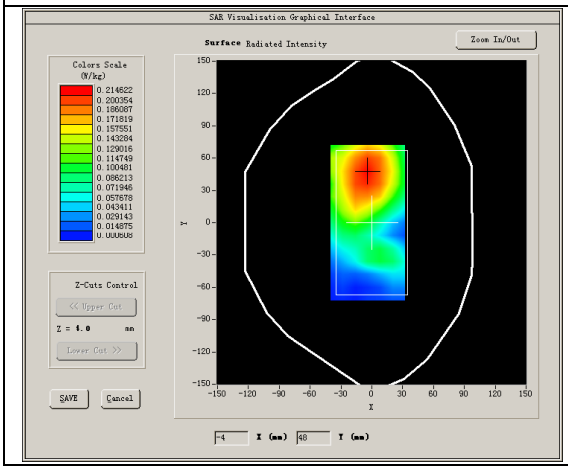
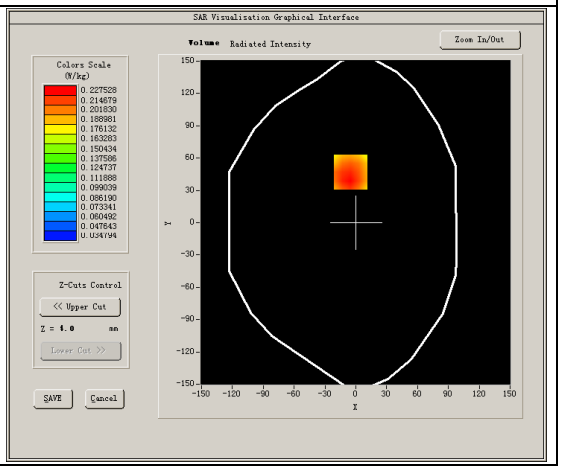
A. Experimental conditions.

Phantom File	surf_sam_plan.txt,
Phantom	Flat
Device Position	Body
Band	LTE band 17
Channels	Low
Signal	LTE

B. SAR Measurement Results

Lower Band SAR (Channel 23780)

Frequency (MHz)	709.000000
Relative permittivity (real part)	55.696754
Conductivity (S/m)	1.019129
Power drift (%)	1.459999
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.68
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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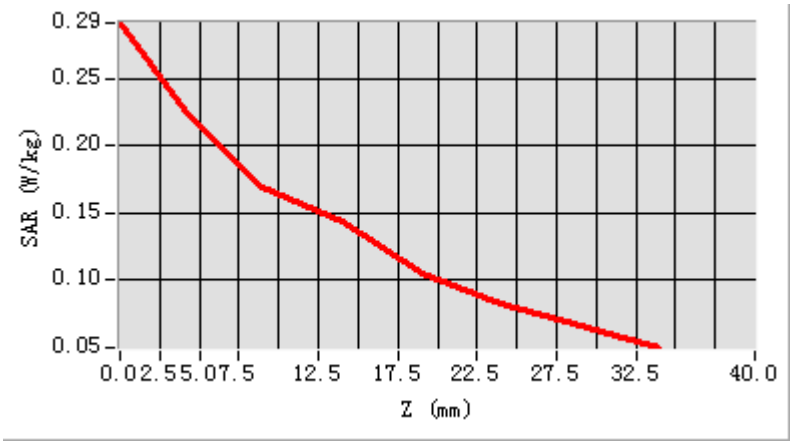
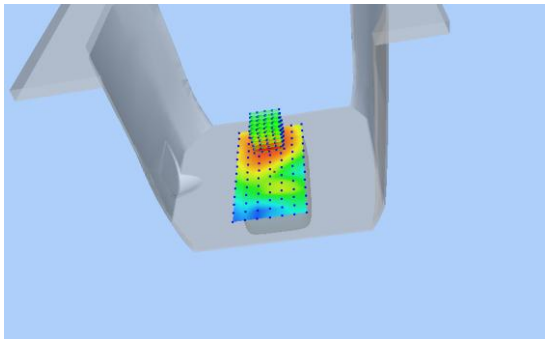
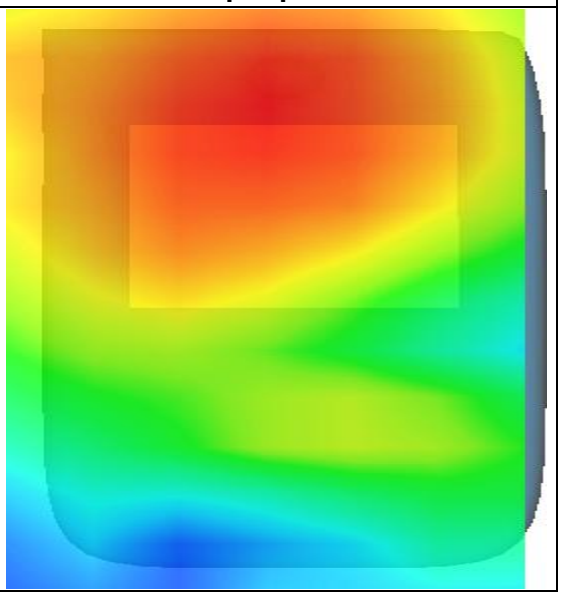
Maximum location: X=-5.00, Y=47.00

SAR Peak: 0.28 W/kg

SAR 10g (W/Kg)	0.171528
SAR 1g (W/Kg)	0.232407

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.2913**	**0.2275**	**0.1686**	**0.1432**	**0.1056**	**0.0830**	**0.0660**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 26

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.22

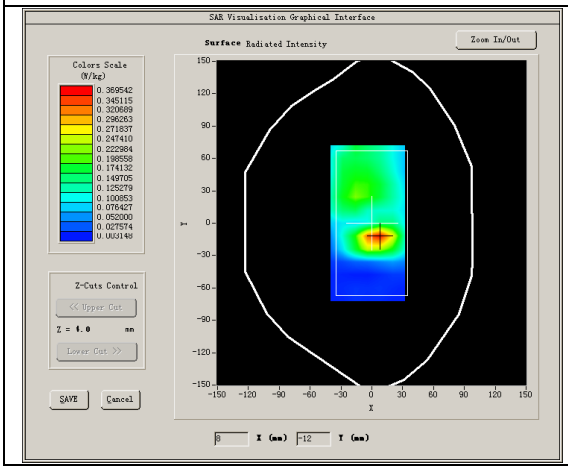
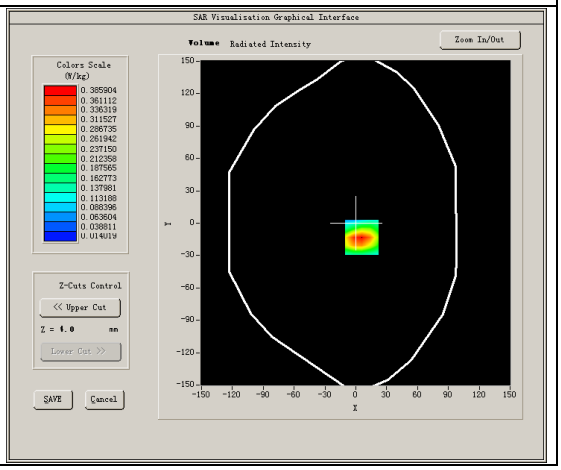
Measurement duration: 16 minutes 51 seconds

A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	Body
Band	CUSTOM (GPRS850_4Tx)
Channels	High
Signal	GPRS

B. SAR Measurement Results

Frequency (MHz)	848.799988
Relative permittivity (real part)	55.237426
Conductivity (S/m)	0.986924
Power drift (%)	3.750000
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.37
Crest factor:	1:2.08

SURFACE SAR	VOLUME SAR
	

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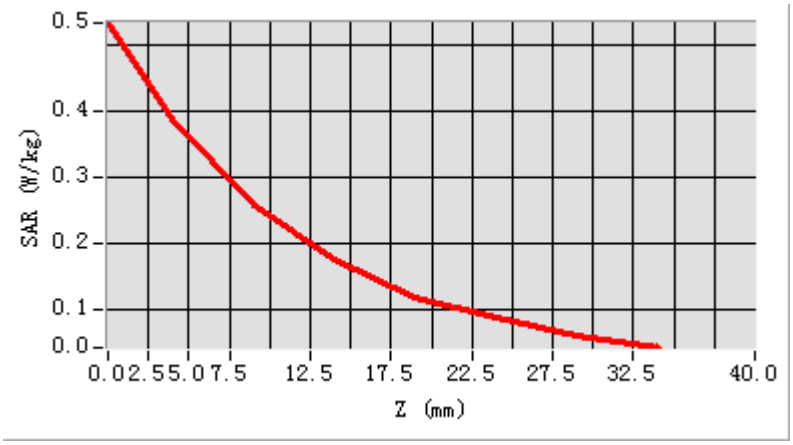
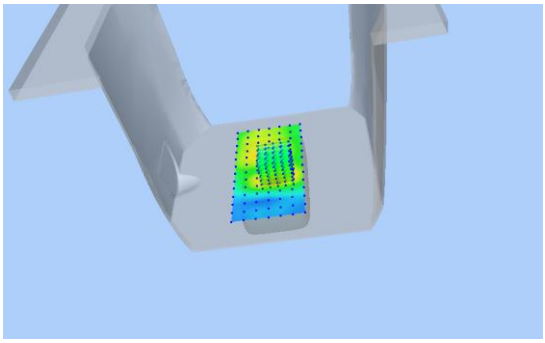
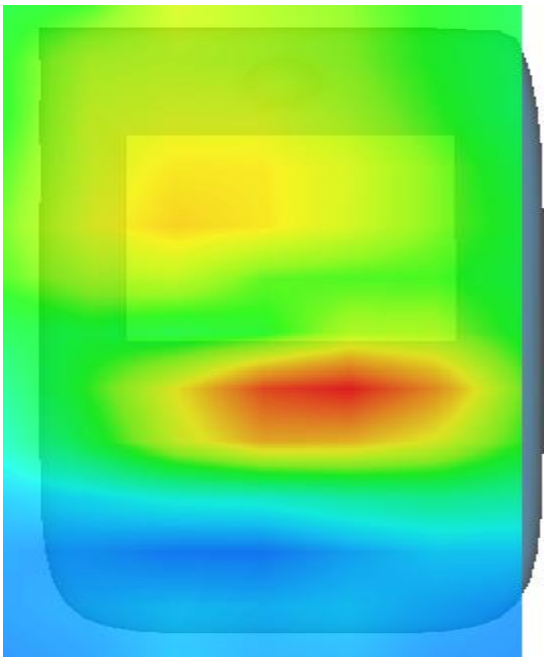
Maximum location: X=6.00, Y=-13.00

SAR Peak: 0.55 W/kg

SAR 10g (W/Kg)	0.210968
SAR 1g (W/Kg)	0.368605

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**0.5324**	**0.3859**	**0.2568**	**0.1767**	**0.1190**	**0.0868**	**0.0610**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 27

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement : 2018.02.09

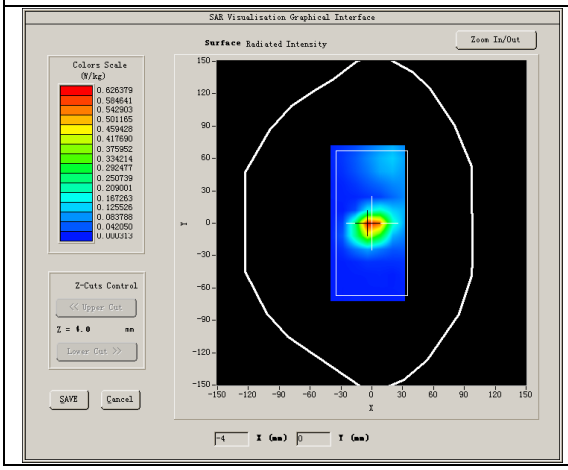
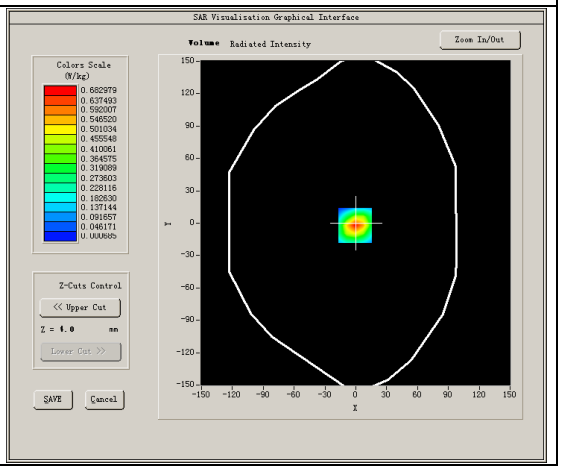
Measurement duration: 16 minutes 53 seconds

A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	Body
Band	CUSTOM (GPRS1900_4Tx)
Channels	High
Signal	GPRS

B. SAR Measurement Results

Frequency (MHz)	1909.800049
Relative permittivity (real part)	53.484287
Conductivity (S/m)	1.514073
Power drift (%)	0.820000
Ambient Temperature:	22.1°C
Liquid Temperature:	22.4°C
ConvF:	5.71
Duty cycle:	1:2.08

SURFACE SAR	VOLUME SAR
	

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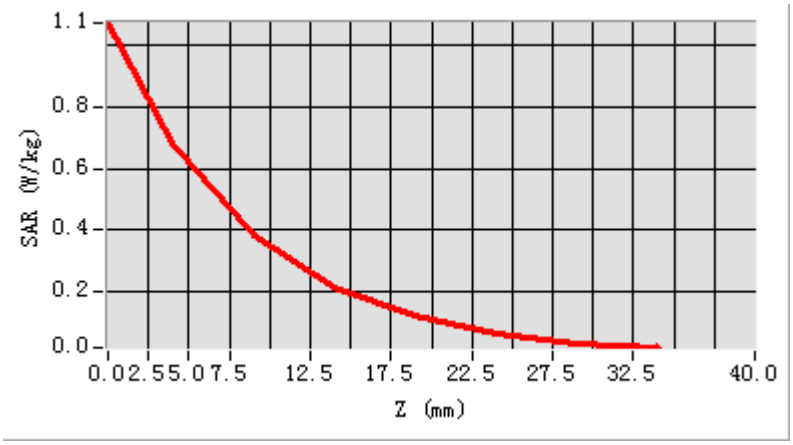
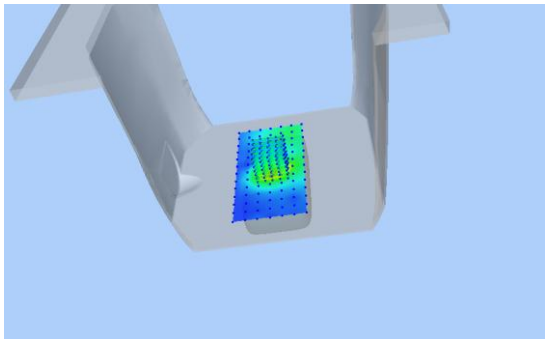
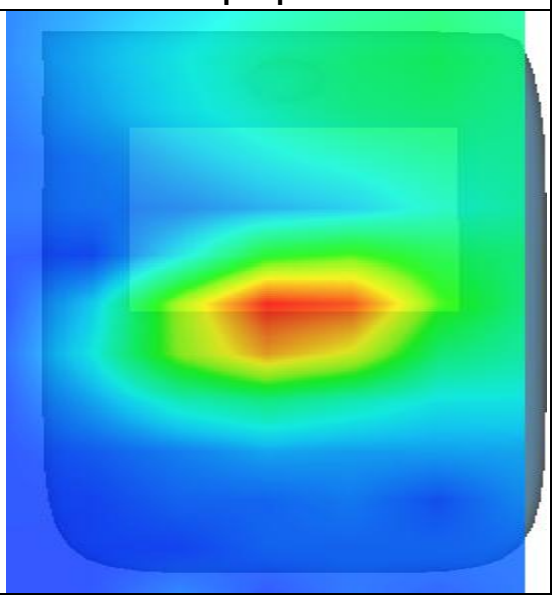
Maximum location: X=-1.00, Y=-2.00

SAR Peak: 1.06 W/kg

SAR 10g (W/Kg)	0.301010
SAR 1g (W/Kg)	0.621083

Z (mm)	**0.00**	**4.00**	**9.00**	**14.00**	**19.00**	**24.00**	**29.00**
SAR (W/Kg)	**1.0709**	**0.6830**	**0.3824**	**0.2143**	**0.1228**	**0.0673**	**0.0332**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 28

Type: Phone measurement (Complete)

Area scan resolution: dx=10mm,dy=10mm

Zoom scan resolution: dx=4mm, dy=4mm, dz=2mm

Date of measurement: 2018.04.17

Measurement duration: 27 minutes 26 seconds

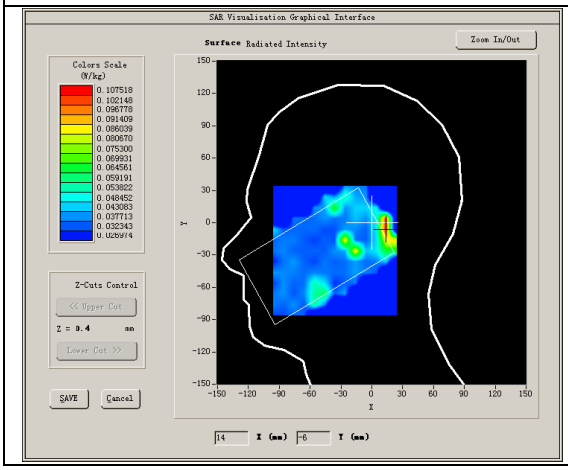
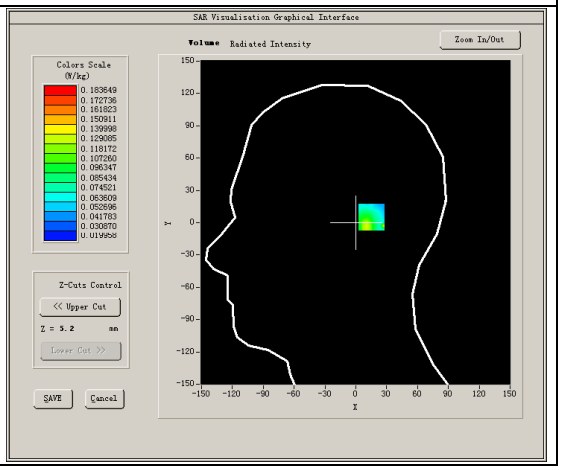
A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Left head
Device Position	Cheek
Band	IEEE 802.11a U-NII
Channels	Middle
Signal	OFDM

B. SAR Measurement Results

Middle Band SAR (Channel 165):

Frequency (MHz)	5825.000000
Relative permittivity (real part)	35.275001
Conductivity (S/m)	5.297514
Power Drift (%)	2.440000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	21.61
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

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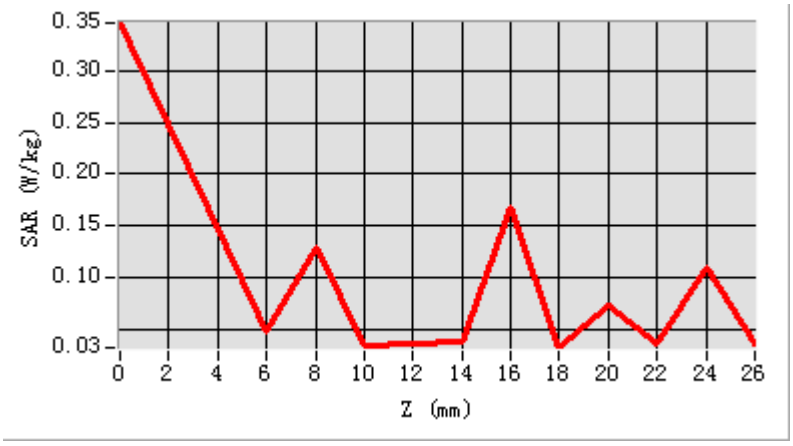
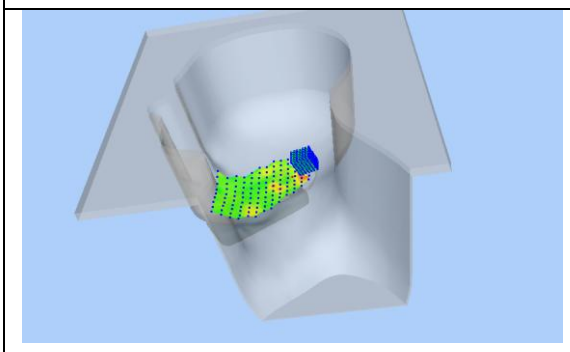
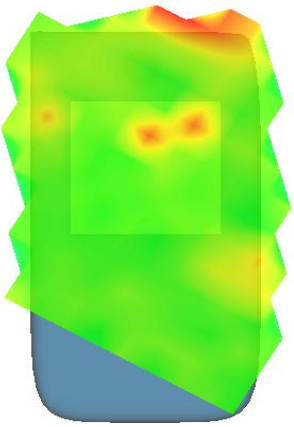
Maximum location: X=24.00, Y=5.00

SAR Peak: 0.34 W/kg

SAR 10g (W/Kg)	0.066371
SAR 1g (W/Kg)	0.127865

Z (mm)	**0.00**	**4.00**	**6.00**	**8.00**	**10.00**	**12.00**	**14.00**	**16.00**	**18.00**	**20.00**	**22.00**	**24.00**
SAR (W/Kg)	**0.3466**	**0.1461**	**0.0480**	**0.1282**	**0.0349**	**0.0366**	**0.0374**	**0.1680**	**0.0321**	**0.0726**	**0.0352**	**0.1101**



3D screen shot	**Hot spot position**
	

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MEASUREMENT 29

Type: Phone measurement (Complete)

Area scan resolution: dx=15mm,dy=15mm

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

Date of measurement: 2018.02.22

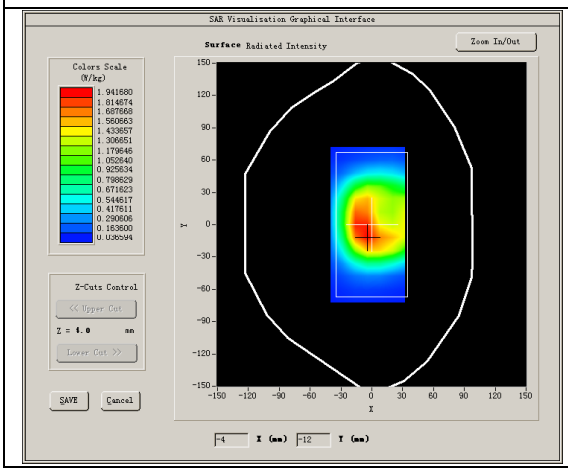
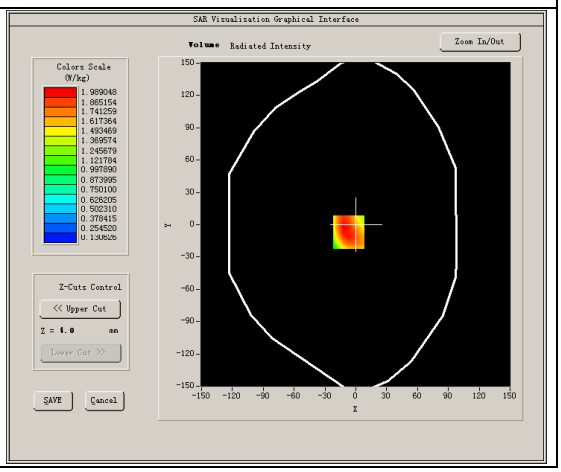
Measurement duration: 16 minutes 44 seconds

A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Flat
Device Position	Body
Frequency	902.75MHz
Signal	RFID

B. SAR Measurement Results

Frequency (MHz)	902.750000
Relative permittivity (real part)	55.060925
Conductivity (S/m)	1.025559
Power drift (%)	-0.120000
Ambient Temperature:	22.6°C
Liquid Temperature:	21.2°C
ConvF:	6.37
Crest factor:	1:1

SURFACE SAR	VOLUME SAR
	

Maximum location: X=-3.00, Y=-24.00

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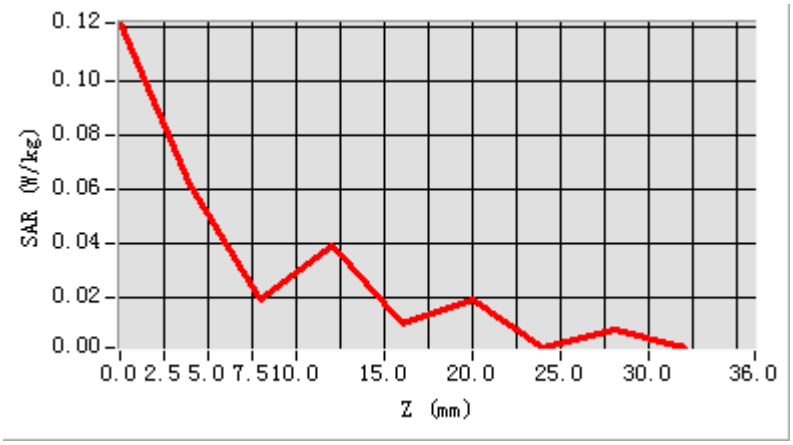
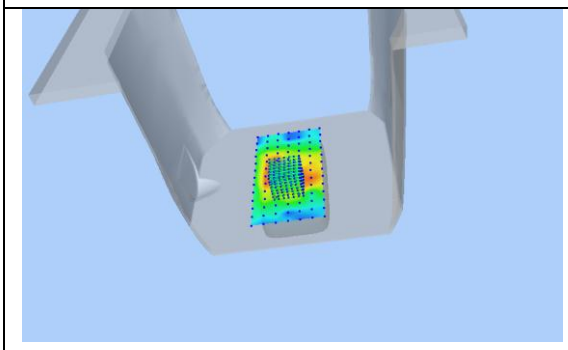
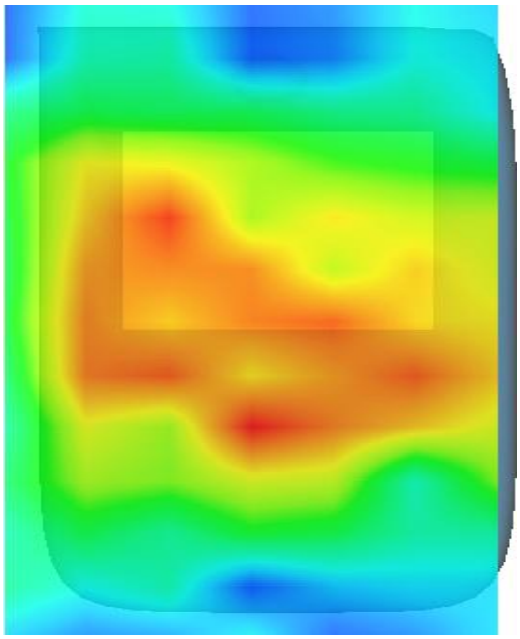
SAR Peak: 0.12 W/kg

SAR 10g (W/Kg)	0.029223
SAR 1g (W/Kg)	0.047761

Z (mm)	**0.00**	**4.00**	**8.00**	**12.00**	**16.00**	**20.00**	**24.00**
SAR (W/Kg)	**0.1215**	**0.0615**	**0.0193**	**0.0395**	**0.0103**	**0.0191**	**0.0016**



3D screen shot	**Hot spot position**
	

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