SAR Test Report

Product Name	:	GSM/WCDMA MOBILE PHONE
Model No.	:	M4TEL SS770
FCC ID	:	CLNSS770

Prepared By:	:	Inventec Appliances(Pudong) Corporation
Address:	:	No.789 Pu Xing Road,Shanghai,PRC
Date of Receipt	:	2012.08.29
Date of Test	:	2012.08.31-2012.09.19
Report No.	:	20120829SAR

Test Report Certification

Date of Issue : Sep.19.2012

Report No. : 20120829SAR

Product Name	:	GSM/WCDMA MOBILE PHONE
Model No.	:	M4TEL SS770
Trade Name	:	M4TEL
Applicant	:	MFOURTEL MEXICO S.A. DE C.V.
Address	:	Montecito 38, Piso 23, Oficina 15. Colonia Nápoles. C.P. 03810 Mexico
Standard	:	FCC 47 CFR Part2 (2.1093) IEEE C95.1-1999 IEEE 1528-2003 FCC OET Bulletin 65 supplement C FCC KDB 648474 D01 v01r05 FCC KDB 941225 D01 v02 FCC KDB 941225 D03 v01 FCC KDB 941225 D04 v01 FCC KDB 941225 D06 v01 FCC KDB 248227 D01 v01r02
Test Result	:	Head :1.337W/kg(1g) ; 0.705W/kg(10g) Body:1.221W/kg(1g); 0.821W/kg(10g)

The Test Results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of Inventec Appliances(Pudong) Corporation

Documented By : _____, Sep.19.2012
Judy Ge/Engineer

Tested By : _____, Sep.19.2012
Alice Lee/Engineer

Approved By : _____, Sep.19.2012
Jeff Huang/Director of Operations

TABLE OF CONTENTS

Description Page

1. GENERAL INFORMATION 4

1.1. APPLICANT 4
1.2. MANUFACTURER 4
1.3. TEST ENVIRONMENT 4

2. SAR MEASUREMENT SYSTEM 5

2.1. ALSAS-10U SYSTEM DESCRIPTION 5
2.2. ISOTROPIC E-FIELD PROBE 7
2.3. BOUNDARY DETECTION UNIT AND PROBE MOUNTING DEVICE 8
2.4. DAQ-PAQ (ANALOG TO DIGITAL ELECTRONICS) 9
2.5. AXIS ARTICULATED ROBOT 9
2.6. ALSAS UNIVERSAL WORKSTATION 10
2.7. UNIVERSAL DEVICE POSITIONER 10
2.8. PHONTOM TYPES 11

3. TISSUE SIMULATING LIQUID 12

3.1. THE COMPOSITION OF THE TISSUE SIMULATING LIQUID 12
3.2. TISSUE CALIBRATION RESULT 13
3.3. TISSUE DIELECTRIC PARAMETERS FOR HEAD AND BODY PHANTOMS 15

4. SAR MEASUREMENT PROCEDURE 16

4.1. SAR SYSTEM VALIDATION 16
4.2. ARRANGEMENT ASSESSMENT SETUP 25
4.3. SAR MEASUREMENT PROCEDURE 28

5. SAR EXPOSURE LIMITS 29

6. TEST EQUIPMENT LIST 30

7. MEASUREMENT UNCERTAINTY 31

8. SAR TEST RESULTS SUMMARY 33

8.1. EXPOSURE POSITIONS CONSIDERATION 33
8.2. SIMULTANEOUS TRANSMITTING CONFIGURATIONS 34
8.3. CONDUCTED POWER(UNIT:DBM) 35
8.4. TEST RECORDS FOR HEAD SAR TEST 37
8.5. TEST RECORDS FOR BODY-WORN / HOTSPOT SAR TEST 40
8.6. TEST RECORDS FOR BODY-WORN SAR TEST 43
8.7. SIMULTANEOUS MULTI-BAND TRANSMISSION 46
8.8. SAR MEASUREMENT DATA 48

1. GENERAL INFORMATION

1.1. Applicant

Company Name: MFOURTEL MEXICO S.A. DE C.V.

Address: Montecito 38, Piso 23, Oficina 15. Colonia Nápoles. C.P. 03810 Mexico

1.2. Manufacturer

Company Name: CK Telecom Limited

Address: Technology Road.High-Tech Development Zone. Heyuan, Guangdong,P.R.China.

1.3. Test Environment

Ambient conditions in the laboratory:

Items	Required	Actural
Temperature(℃)	15~30	21.4
Humidity(%RH)	30~70	46

2. SAR Measurement System

2.1. ALSAS-10U System Description

ALSAS-10-U is fully compliant with the technical and scientific requirements of IEEE 1528, IEC 62209, CENELEC, ARIB, ACA, and the Federal Communications Commission. The system comprises of a six axes articulated robot which utilizes a dedicated controller. ALSAS-10U uses the latest methodologies and FDTD order to provide a platform which is repeatable with minimum uncertainty.

2.1.1. Applications

Predefined measurement procedures compliant with the guidelines of CENELEC, IEEE, IEC, FCC, etc are utilized during the assessment for the device. Automatic detection for all SAR maxima are embedded within the core architecture for the system, ensuring that peak locations used for centering the zoom scan are within a 1mm resolution and a 0.05mm repeatable position. System operation range currently is available up to 6 GHz in simulated tissue.

2.1.2. Area Scans

Area Scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a $10mm^2$ step integral, with 1mm interpolation used to locate the peak SAR area used for zoom scan assessments.

Where the system identifies multiple SAR peaks (which are within 25% of peak value) the system will provide the user with the option of assessing each peak location individually for zoom scan averaging.

2.1.3. Zoom Scan (Cube Scan Averaging)

The averaging zoom scan volume utilized in the ALSAS-10U software is in the shape of a cube and the side dimension of a 1g or 10g mass is dependent on the density of the liquid representing the simulated tissue. A density of $1000Kg/m^3$ is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1g cube is 10mm, with the side length of the 10g cube 21.5mm.

When the cube intersects with the surFront of the phantom, it is oriented so that 3 vertices touch the surFront of the shell or the center of a Front is tangent to the surFront.

The zoom Scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications (including FCC) utilize a physical step of 5×5×8 (8mm×8mm×5mm) providing a volume of 32mm in the X & Y axis, and 35mm in the Z axis.

2.1.4. ALSAS-10U Interpolation and Extrapolation Uncertainty

The overall uncertainty for the methodology and algorithms the used during the SAR calculation was evaluated using the data from IEEE 1528 based on the example f3 algorithm:

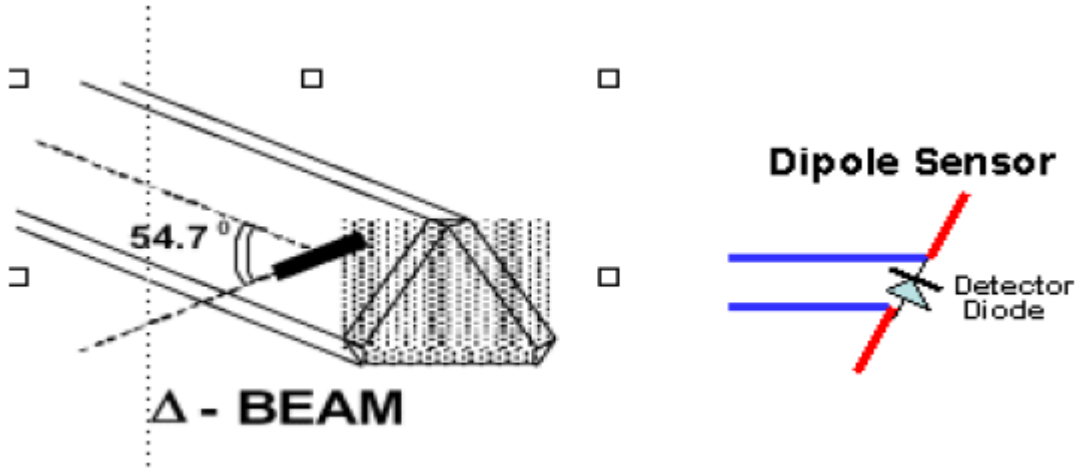
$$f_3(x, y, z) = A \frac{a^2}{\frac{a^2}{4} + x'^2 + y'^2} \cdot \left(e^{-\frac{2z}{a}} + \frac{a^2}{2(a + 2z)^2} \right)$$

2.2. Isotropic E-Field Probe

The isotropic E-Field probe has been fully calibrated and assessed for isotropic, and boundary effect within a controlled environment. Depending on the frequency for which the probe is calibrated the method utilized for calibration will change. A number of methods is used for calibrating probes, and these are outlined in the table below:

Calibration Frequency	Air Calibration	Tissue Calibration
900MHz	TEM Cell	Temperature
1800MHz	TEM Cell	Temperature

The E-Field probe utilizes a triangular sensor arrangement as detailed in the diagram below:



SAR is assessed with a calibrated probe which moves at a default height of 5mm from the center of the diode, which is mounted to the sensor, to the phantom surFront (in the Z Axis). The 5mm offset height has been selected so as to minimize any resultant boundary effect due to the probe being in close proximity to the phantom surFront.

The following algorithm is an example of the function used by the system for linearization of the output from the probe when measuring complex modulation schemes.

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

2.2.1. Isotropic E-Field Probe Specification

Calibration in Air	Frequency Dependent Below 2GHz Calibration in air performed in a TEM Cell Above 2GHz Calibration in air performed in waveguide
Sensitivity	0.70 μV/(V/m)^2 to 0.85 μV/(V/m)^2
Dynamic Range	0.0005 W/kg to 100W/kg
Isotropic Response	Better than 0.2dB
Diode Compression point (DCP)	Calibration for Specific Frequency
Probe Tip Radius	< 5mm
Sensor Offset	1.56 (+/- 0.02mm)
Probe Length	290mm
Video Bandwidth	@ 500 Hz: 1dB @1.02 KHz: 3dB
Boundary Effect	Less than 2% for distance greater than 2.4mm
Spatial Resolution	Diameter less than 5mm Compliant with Standards

Probe model no: ALS-E-020, S/N:500-00273

2.3. Boundary detection Unit and Probe Mounting Device

ALSAS-10U incorporates a boundary detection unit with a sensitivity of 0.05mm for detecting all types of surFronts. The robust design allows for detecting during probe tilt (probe normalize) exercises, and utilizes a second stage emergency sTop. The signal electronics are directly into the robot controller for high accuracy surFront detection in lateral and axial detection modes (X, Y, &Z).
The probe is mounted directly onto the Boundary Detection unit for accurate tooling and displacement calculations controlled by the robot kinematics. The probe is connected to an isolated probe interconnect where the output stage of the probe is fed directly into the amplifier stage of the Daq-Paq.

2.4. Daq-Paq (Analog to Digital Electronics)

ALSAS-10U incorporates a fully calibrated Daq-Paq (analog to digital conversion system) which has a 4 channel input stage, sent via a 2 stage auto-set amplifier module. The input signal is amplified accordingly so as to offer a dynamic range from 5 μV to 800mV. Integration of the fields measured is carried out at board level utilizing a Co-Processor which then sends the measured fields down into the main computational module in digitized form via a RS232 communications port. Probe linearity and duty cycle compensation is carried out within the main Daq-Paq module.

ADC	12 Bit
Amplifier Range	20mV to 200mV and 150mV to 800mV
Field Integration	Local Co-Processor utilizing proprietary integration algorithms
Number of Input Channels	4 in total 3 dedicated and 1 spare
Communication	Packet data via RS232

2.5. Axis Articulated Robot

ALSAS-10U utilizes a six articulated robot, which is controlled using a Pentium based real-time movement controller. The movement kinematics engine utilizes proprietary (Thermo CRS) interpolation and extrapolation algorithms, which allow full freedom of movement for each of the six joints within the working envelop. Utilization of joint 6 allows for full probe rotation with a tolerance better than 0.05mm around the central axis.

Robot/Controller Manufacturer	Thermo CRS
Number of Axis	Six independently controlled axis
Positioning Repeatability	0.05mm
Controller Type	Single phase Pentium based C500C
Robot Reach	710mm
Communication	RS232 and LAN compatible

2.6. ALSAS Universal Workstation

ALSAS Universal workstation allows for repeatability and fast adaptability. It allows users to do calibration, testing and measurement using different types of phantoms with one set up, which significantly speeds up the measurement process.

2.7. Universal Device Positioner

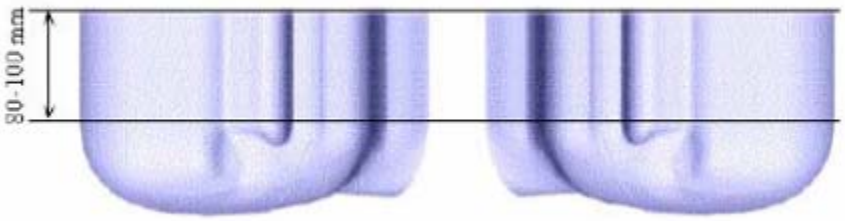
The universal device positioner allows complete freedom of movement of the EUT. Developed to hold a EUT in a free-space scenario any additional loading attributable to the material used in the construction of the positioner has been eliminated. Repeatability has been enhanced through the linear scales which form the design used to indicate positioning for any given test scenario in all major axes. A 15° tilt movements for head SAR analysis. Overall uncertainty for measurements has been reduced due to the design of the Universal device positioner, which allows positioning of a device in as near to a free-space scenario as possible, and by providing the means for complete repeatability.

2.8. Phontom Types

The ALSAS-10U allows the integration of multiple phantom types. SAM Phantoms fully compliant with IEEE 1528, Universal Phantom, and Universal Flat.

2.8.1. APREL SAM Phantoms

The SAM phantoms developed using the IEEE SAM CAD file. They are fully compliant with the requirements for both IEEE 1528 and FCC Supplement C. Both the left and right SAM phantoms are interchangeable, transparent and include the IEEE 1528 grid with visible NF and MB lines.



2.8.2. APREL Laboratories Universal Phantom

The Universal Phantom is used on the ALSAS-10U as a system validation phantom. The Universal Phantom has been fully validated both experimentally from 800MHz to 6GHz and numerically using XFDTD numerical software. The shell thickness is 2mm overall, with a 4mm spacer located at the NF/MB intersection providing an overall thickness of 6mm in line with the requirements of IEEE-1528.

The design allows for fast and accurate measurements, of handsets , by allowing the conservative SAR to be evaluated at on frequency for both left and right head experiments in one measurement.

3. Tissue Simulating Liquid

3.1. The composition of the tissue simulating liquid

INGREDIENT (% Weight)	850MHz Head	1900MHZ Head	850MHZ Body	1900MHz Body	2450MHz Head	2450MHz Body
Water	**40.45%**	**54.9%**	**45.0%**	**70.17%**	**55%**	**73.2%**
Salt	**1.45%**	**0.18%**	**52.4%**	**0.39%**	**0%**	**0%**
Sugar	**57.6%**	**0%**	**1.4%**	**0%**	**0%**	**0%**
HEC	**0.4%**	**0%**	**1.0%**	**0%**	**0%**	**0%**
Preventol	**0.1%**	**0%**	**0.1%**	**0%**	**0%**	**0%**
DGBE	**0%**	**44.92%**	**0%**	**29.44%**	**45%**	**26.76%**

3.2. Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to SAR evaluation using APREL Dielectric Probe Kit and Agilent E5071B Vector Network Analyzer.

Head Tissue Simulate Measurement				
Frequency (MHz)	Description	Dielectric Parameters		Tissue Temp.(℃)
		ε_r	σ (s/m)	
850MHz	Reference result	41.5	0.90	NA
	+/-5% window	39.425to43.575	0.855to0.945	
	10-Sep-12	40.27	0.92	20.7
1900MHz	Reference result	40.0	1.40	NA
	+/-5% window	38to42	1.33 to 1.47	
	10-Sep -12	41.55	1.41	20.7
2450MHz	Reference result	39.2	1.80	NA
	+/-5% window	37.24to41.16	1.71to1.89	
	10-Sep -12	40.24	1.83	20.7

Body Tissue Simulate Measurement				
Frequency (MHz)	Description	Dielectric Parameters		Tissue Temp.(℃)
		ε_r	σ (s/m)	
850MHz	Reference result	55.2	0.97	NA
	+/-5% window	52.44to57.96	0.922to1.019	
	10-Sep -12	53.32	0.93	20.7
1900MHz	Reference result	53.3	1.52	NA
	+/-5% window	50.635to55.965	1.444to1.596	
	10-Sep -12	52.94	1.55	20.7
2450MHz	Reference result	52.7	1.95	NA
	+/-5% window	50.065to55.335	1.852to2.0475	
	10-Sep -12	53.39	1.91	20.7

3.3. Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in PP1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1428 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

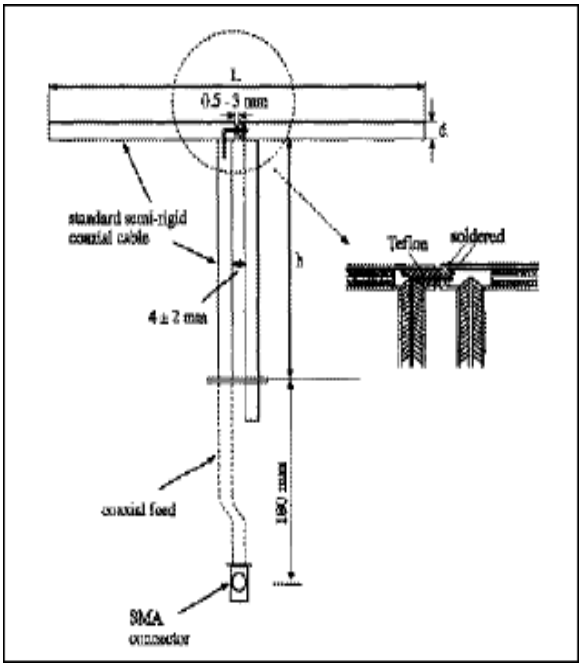
Target Frequency	Head		Body	
(MHz)	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7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

(ε_r =relative permittivity, σ =conductivity and ρ =1000 Kg/m^3)

4. SAR Measurement Procedure

4.1. SAR System Validation

4.1.1. Validation Dipoles



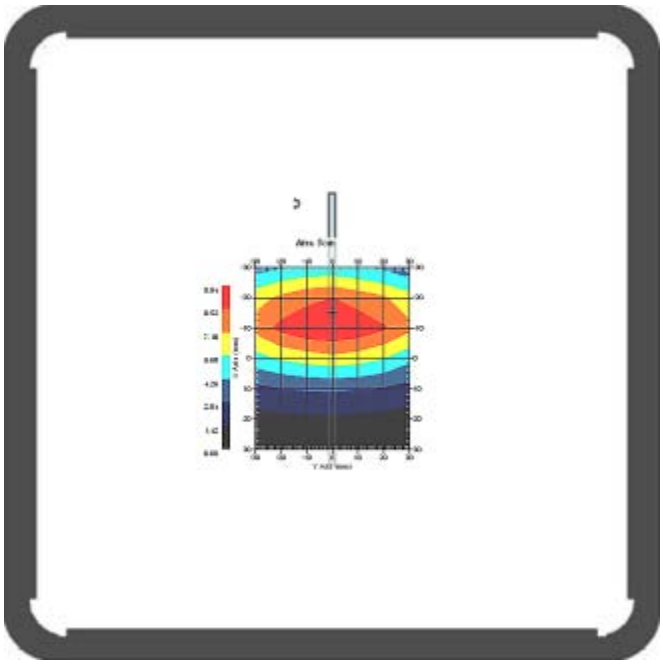
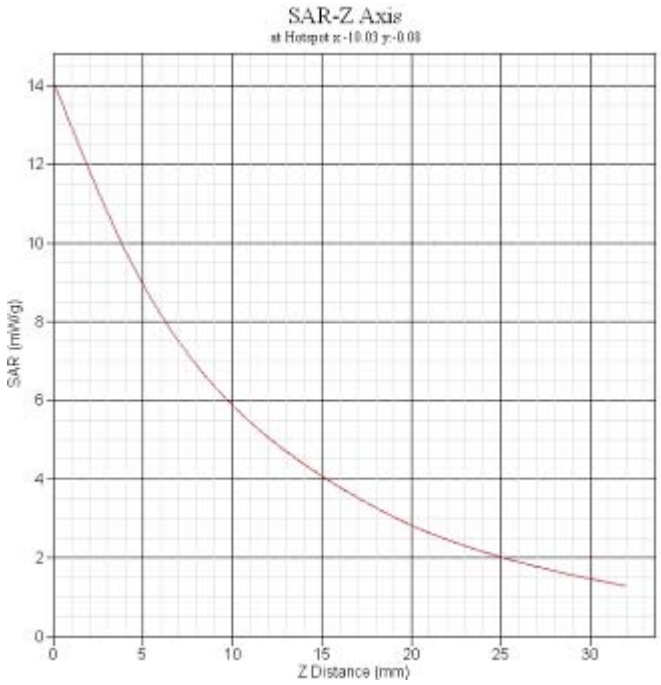
The dipoles used are based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of both IEEE and FCC Supplement C. The table below provides details for the mechanical and electrical specifications for the dipoles.

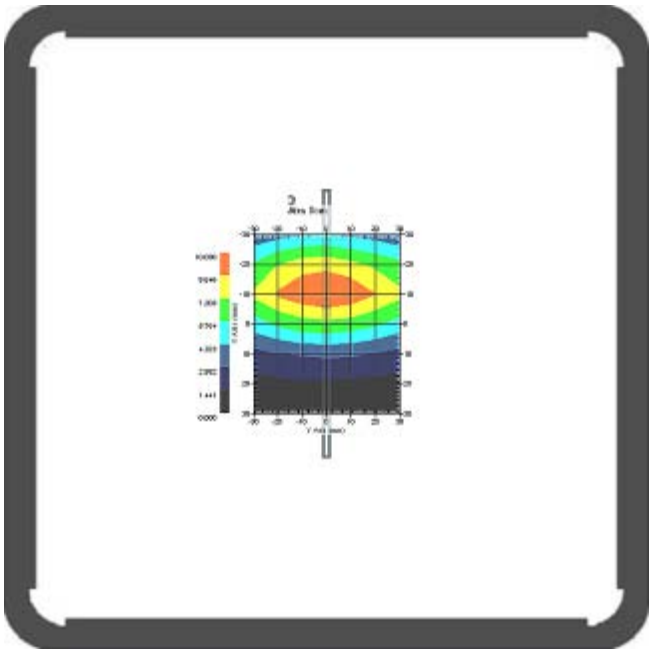
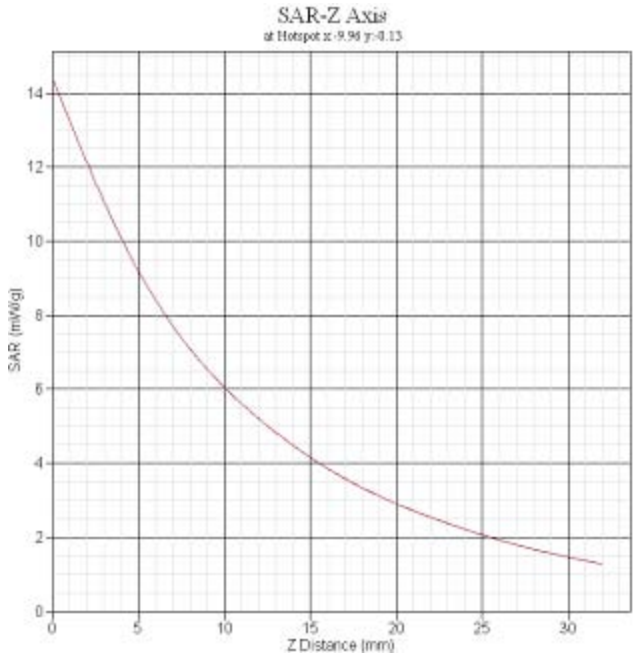
Frequency	L(mm)	h(mm)	d(mm)
850MHz	161	89.8	3.6
1900MHz	67.1	38.9	3.6
2450MHz	51.5	30.4	3.6

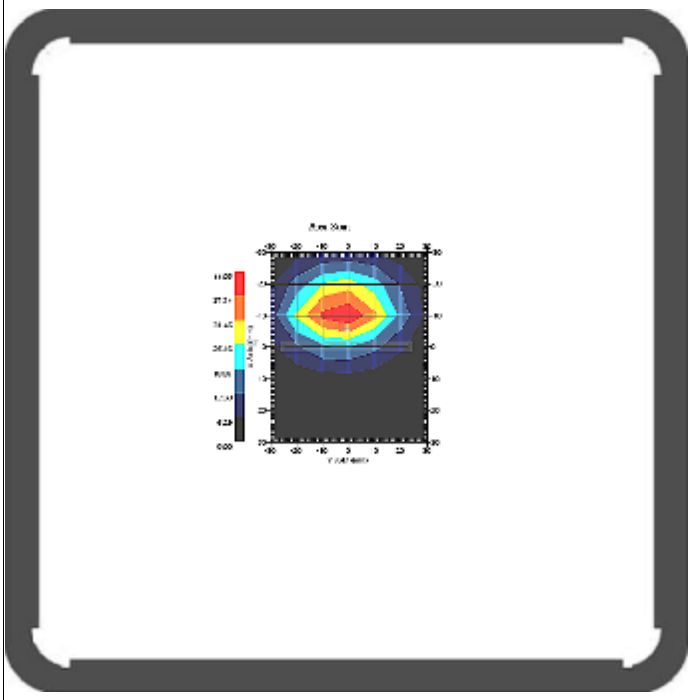
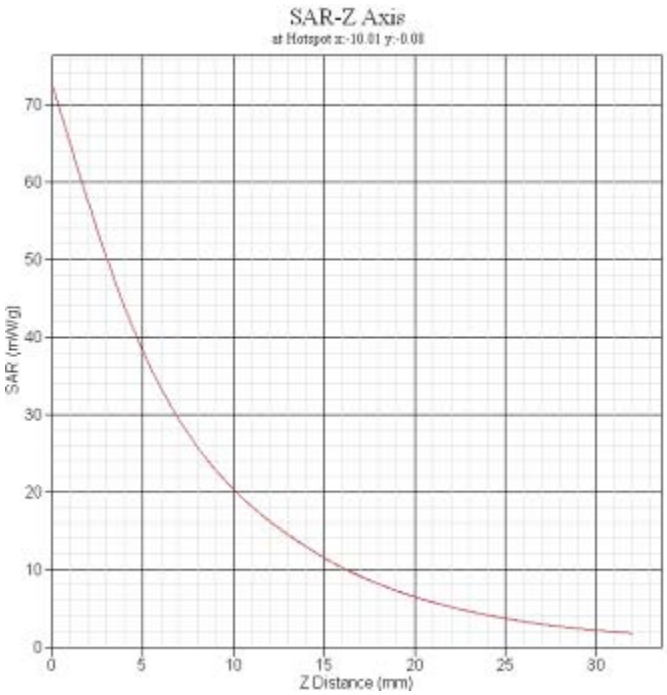
4.1.2. Validation Result

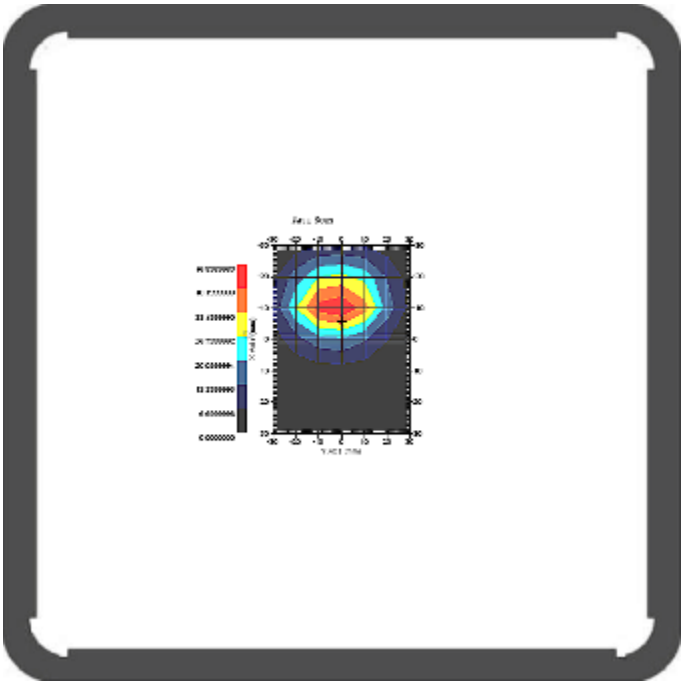
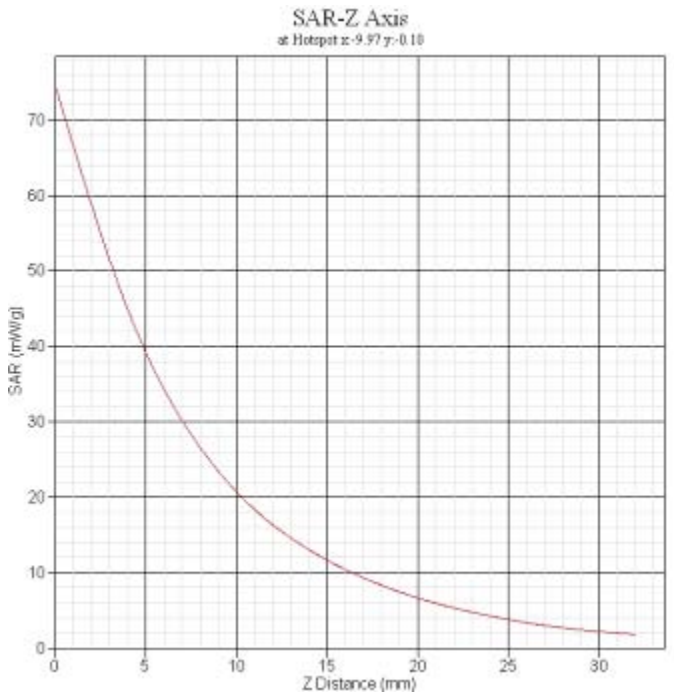
Head System Performance Check at 850MHz&1900MHz&2450MHz				
Validation Kit: ASL-D-850-S-2				
Frequency(MHz)	Description	SAR(W/Kg) 1g	SAR(W/Kg) 10g	Tissue Temp.(℃)
850MHz	Reference result	9.590	6.003	N/A
	+/-5%window	9.110to10.07	5.702to6.303	
	10-Sep-12(1W)	9.453	5.859	20.7
Validation Kit: ASL-D-1900-S-2				
Frequency(MHz)	Description	SAR(W/Kg) 1g	SAR(W/Kg) 10g	Tissue Temp.(℃)
1900MHz	Reference result	39.378	19.668	N/A
	+/-5%window	37.418to41.356	18.685to20.651	
	10-Sep -12(1W)	38.663	19.224	20.7
Validation Kit: ASL-D-2450-S-2				
Frequency(MHz)	Description	SAR(W/Kg) 1g	SAR(W/Kg) 10g	Tissue Temp.(℃)
2450MHz	Reference result	52.456	23.603	N/A
	+/-5%window	49.833to55.078	22.423to24.783	
	10-Sep -12(1W)	51.871	22.733	20.7
Note: All SAR values are normalized to 1 W forward power.				

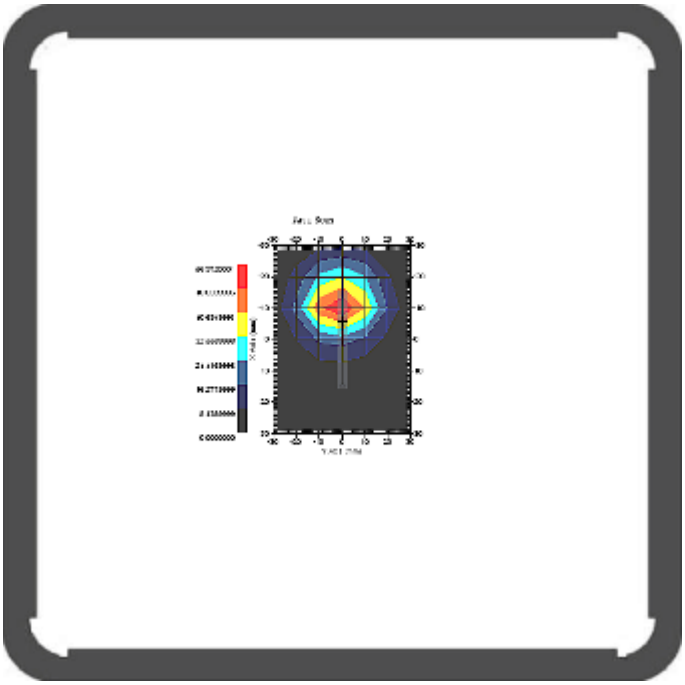
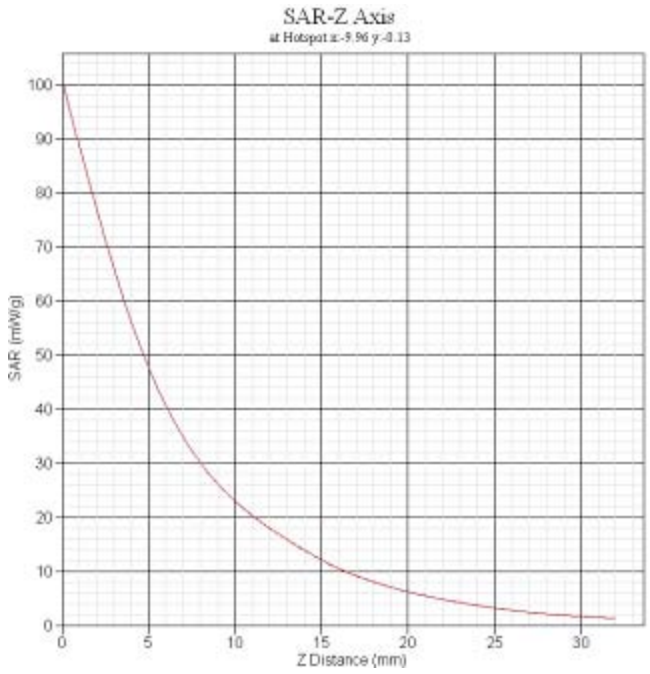
Body System Performance Check at 850MHz&1900MHz&2450MHz				
Validation Kit: ASL-D-850-S-2				
Frequency(MHz)	Description	SAR(W/Kg) 1g	SAR(W/Kg) 10g	Tissue Temp.(℃)
850MHz	Reference result	9.981	6.006	N/A
	+/-5%window	9.482to10.48	5.706to6.306	
	10-Sep -12(1W)	9.522	5.867	20.7
Validation Kit: ASL-D-1900-S-2				
Frequency(MHz)	Description	SAR(W/Kg) 1g	SAR(W/Kg) 10g	Tissue Temp.(℃)
1900MHz	Reference result	39.654	19.668	N/A
	+/-5%window	37.671to41.637	18.685to20.651	
	10-Sep -12(1W)	39.618	19.726	20.7
Validation Kit: ASL-D-2450-S-2				
Frequency(MHz)	Description	SAR(W/Kg) 1g	SAR(W/Kg) 10g	Tissue Temp.(℃)
2450MHz	Reference result	52.592	24.461	N/A
	+/-5%window	49.962to55.222	23.238to25.684	
	10-Sep -12(1W)	51.284	24.317	20.7
Note: All SAR values are normalized to 1W forward power.				

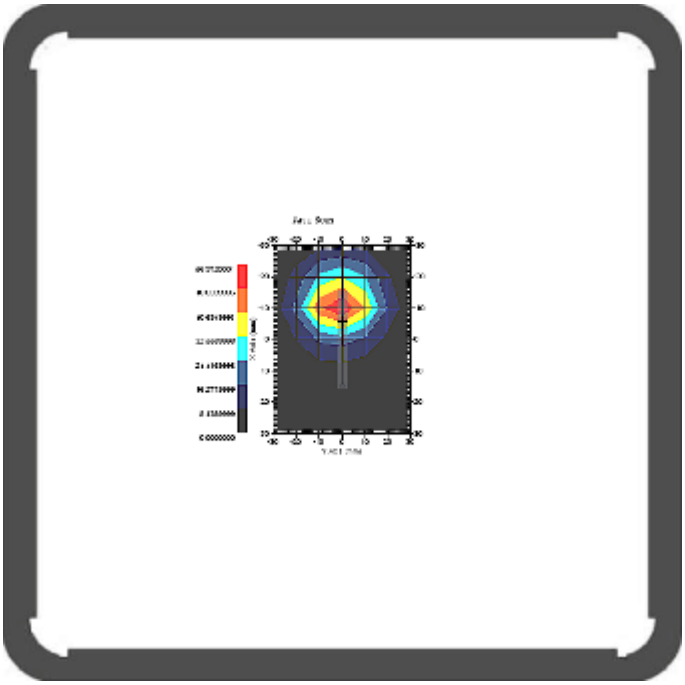
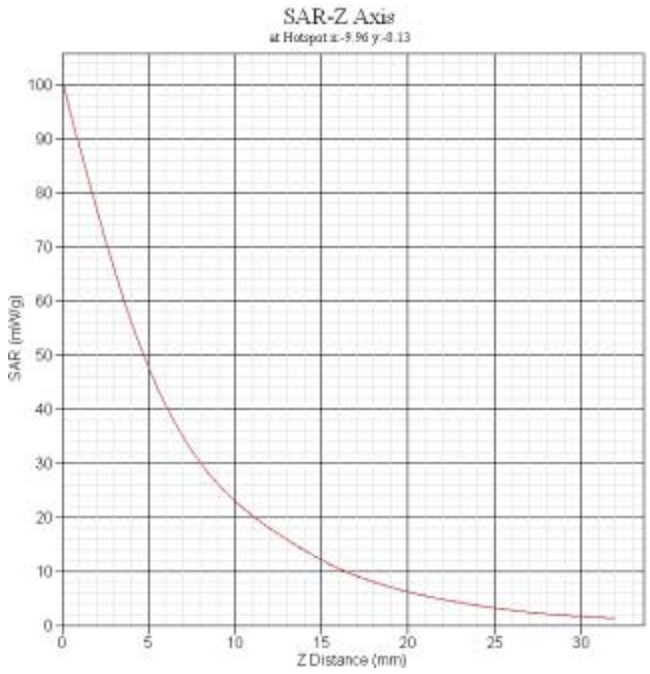
Frequency(MHz)	850
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	-0.983
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	9.453
SAR 10g(W/Kg)	5.859

Frequency(MHz)	850
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	0.762
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	9.522
SAR 10g(W/Kg)	5.867

Frequency(MHz)	1900
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	1.489
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	38.663
SAR 10g(W/Kg)	19.224

Frequency(MHz)	1900
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	-1.268
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	39.618
SAR 10g(W/Kg)	19.726

Frequency(MHz)	2450
Relative permittivity(real part)	40.24
Conductivity(S/m)	1.83
Variation(%)	1.032
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	51.871
SAR 10g(W/Kg)	22.733

Frequency(MHz)	2450
Relative permittivity(real part)	53.39
Conductivity(S/m)	1.91
Variation(%)	0.456
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	51.284
SAR 10g(W/Kg)	24.317

4.2. Arrangement Assessment Setup

4.2.1. Test Positions of Device Relative to Head

This specifies exactly two test positions for the handset against the head phantom, the "cheek" position and the "tilted" position. The handset should be tested in both positions on the left and right sides of the SAM phantom. If the handset construction is such that it cannot be positioned using the handset positioning procedures described in 4.2.2.1 and 4.2.2.2 to represent normal use conditions (e.g. asymmetric handset), alternative alignment procedures should be considered with details provided in the test report.

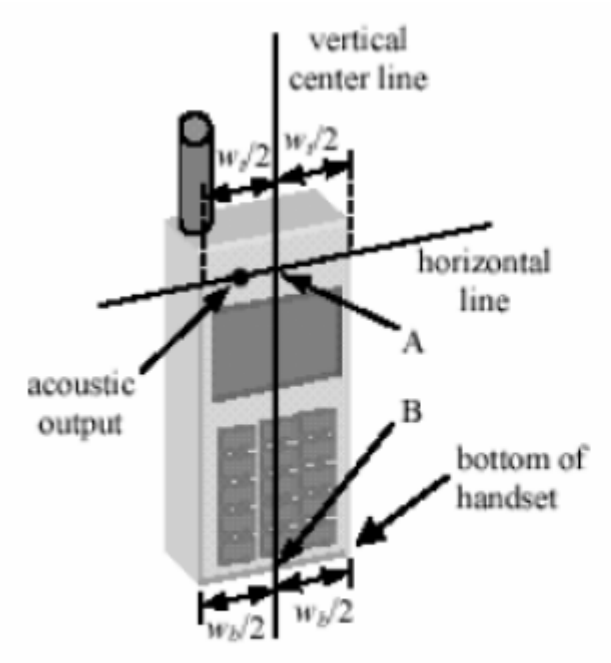


Figure 4.1a Internal Case

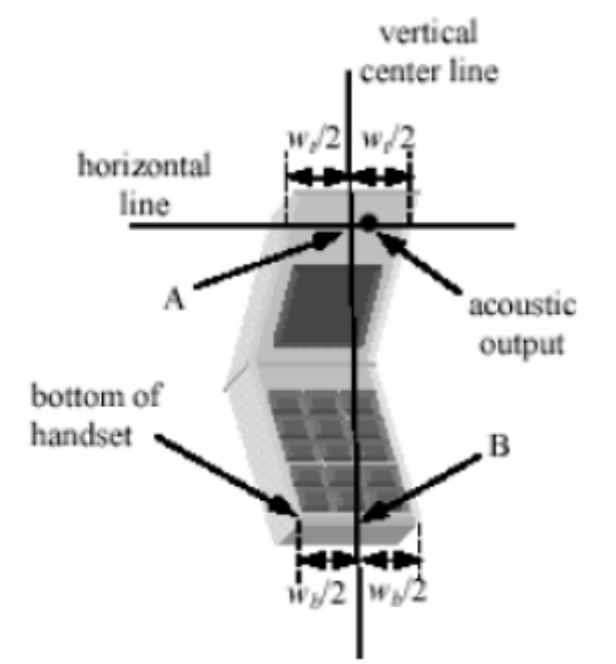


Figure4.1b Clam Shell

4.2.2.1. Definition of the "Cheek" Position

The "cheek" position is defined as follows:

a. Ready the handset for talk operation, if necessary. For example, for hand sets with a cover piece, open the cover. (If the handset can also be used with the cover closed both configurations must be tested.)
b. Define two imaginary lines on the handset: the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset: the midpoint of the width wt of the handset at the level of the acoustic output (point A on Figures 4.1 a and 4.1 b), and the midpoint of the width wb of the

Back of the handset through the center of the acoustic output (see Figure 4.1 a). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output. However, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front Front of the handset (see Figure 4.1 b), especially for clamshell handsets, handsets with flip pieces, and other irregularly-shaped handsets.

c. Position the handset close to the surFront of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see 4.2), such that the plan defined by the vertical center line and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
d. Translate the handset towards the phantom along the line passing through RE and LE until the handset touches the pinna.
e. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to MB-NF including the line MB (called the reference plane).
f. Rotate the handset around the vertical centerline until the handset (horizontal line) is symmetrical with respect to the line NF.

While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE and maintaining the handset contact with the pinna, rotate the handset about the line NF until any point on the handset is in contact with a phantom point below the pinna (cheek). See Figure 4.2 the physical angles of rotation should be noted.

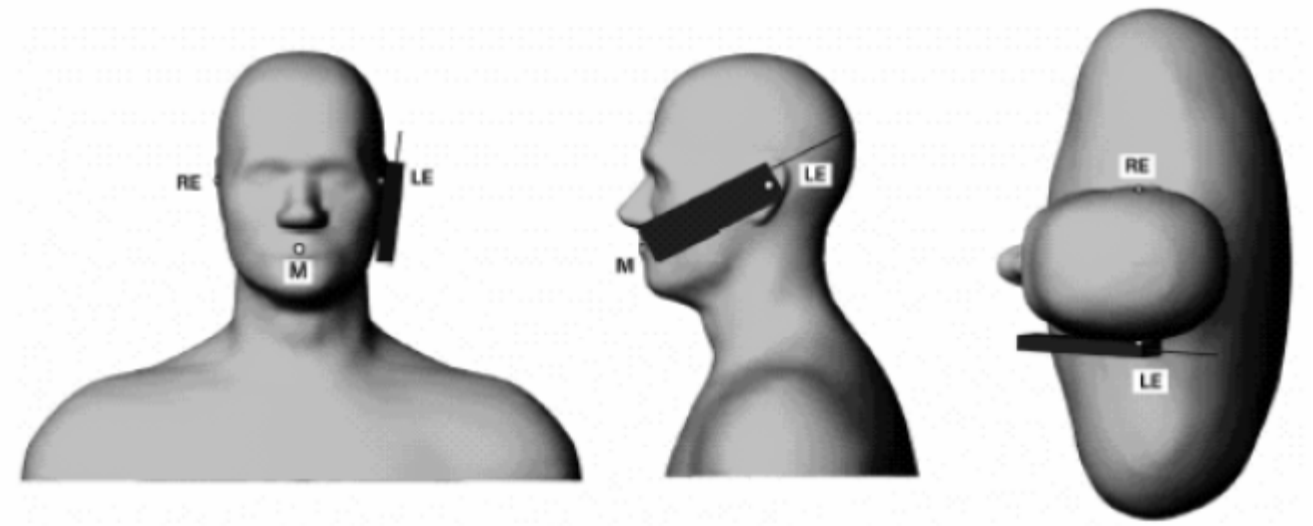


Figure 4.2 – Phone position 1, “cheek” or “touch” position.

4.2.1.2 Definition of the “Tilted” Position

The “tilted” position is defined as follows:

a. Repeat steps (a) – (g) of 4.2.1.1 to place the device in the “cheek position”.

b. While maintaining the orientation of the handset move the handset away from the pinna along the line passing through RE and LE in order to enable a rotation of the handset by 15 degrees.

c. Rotate the handset around the horizontal line by 15 degrees.

d. While maintaining the orientation of the handset, move the handset towards the phantom on a line passing through RE and LE until any part of the handset touches the ear. The tilted position is obtained when the contact is on the pinna. If the contact is at any location other than the pinna (e.g. the antenna with the Back of the phantom head), the angle of the handset should be reduced. In this case, the tilted position is obtained if any part of the handset is in contact with the pinna as well as a second part of the handset is contact with the phantom (e.g. the antenna with Back of the head).

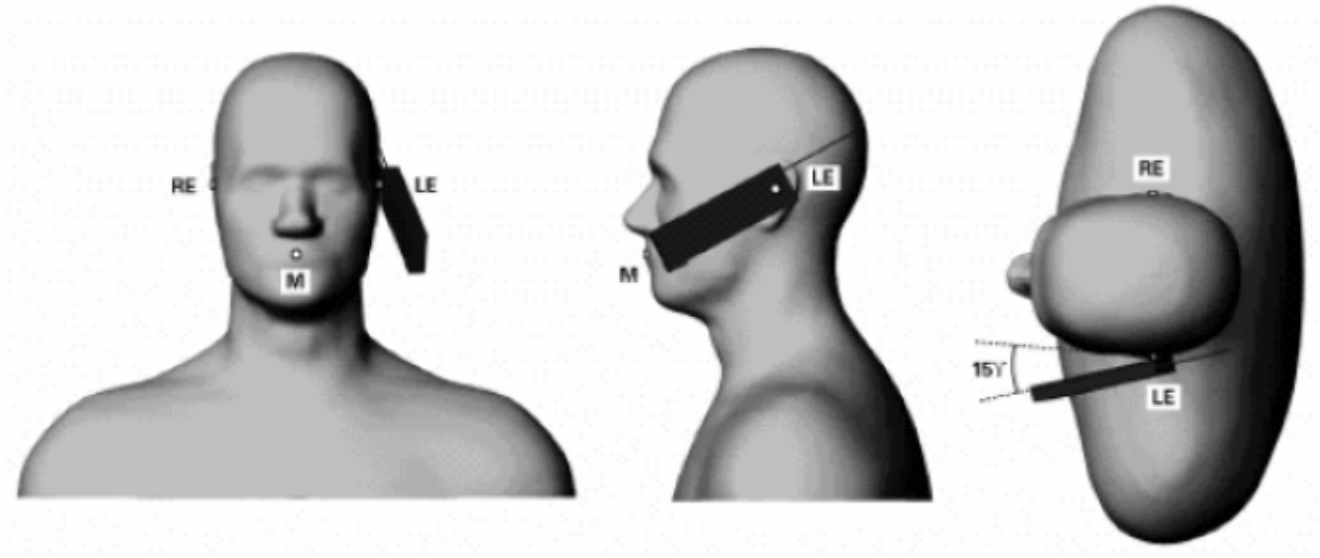


Figure 4.3 – Phone position 2, “tilted” position.

4.2.2. Test Positions for body-worn

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. A separation distance of 1.5 cm between the Back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances. Other separation distance may be use, but not exceed 2.5cm.

4.3. SAR Measurement Procedure

The ALSAS-10U calculates SAR using the following equation,

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

σ :represents the simulated tissue conductivity
ρ :represents the tissue density

The EUT is set to transmit at the required power in line with product specification, at each frequency relating to the LOW, MID, and HIGH channel settings.

Pre-scans are made on the device to establish the location for the transmitting antenna, using a large area scan in either air or tissue simulation fluid.

The EUT is placed against the Universal Phantom where the maximum area scan dimensions are large than the physical size of the resonating antenna. When the scan size is not large enough to cover the peak SAR distribution, it is modified by either extending the area scan size in both the X and Y directions, or the device is shifted within the predefined area.

The area scan is then run to establish the peak SAR location (interpolated resolution set at 1 mm^2) which is then used to orient the center of the zoom scan. The zoom scan is then executed and the 1g and 10g averages are derived from the zoom scan volume (interpolated resolution set at 1 mm^3).

5. SAR Exposure Limits

SAR assessments have been made in line with the requirements of IEEE C95.1-1999, IEEE 1528-2003 , FCC OET Bulletin 65 supplement C.

Type Exposure (W/kg)	Uncontrolled Environment Limit
Spatial Peak SAR (10g cube tissue for head and trunk)	1.60 W/kg
Spatial Average SAR (whole body)	0.08 W/kg
Spatial Peak SAR (10g for limb)	4.00 W/kg

6. Test Equipment List

Instrument	Manufacture	Model No.	Serial No.	Last Calibration
Universal Work Station	Aprel	ALS-UWS	100-00154	NCR
Data Acquisition Package	Aprel	ALS-DAQ-PAQ-3	110-00215	NCR
Probe Mounting Device and Boundary Detection Sensor System	Aprel	ALS-PMDPS-3	120-00265	NCR
Miniature E-Field Probe	Aprel	ALS-E-020	500-00282	Oct.01,2011
Left ear SAM Phantom	Aprel	ALS-P-SAM-L	130-00312	NCR
Right ear SAM Phantom	Aprel	ALS-P-SAM-R	140-00362	NCR
Universal SAM Phantom	Aprel	ALS-P-SU-1	150-00410	NCR
Reference Validation Dipole 850MHz	Aprel	ALS-D-850-S-2	180-00556	May.19,2011
Reference Validation Dipole 1900MHz	Aprel	ALS-D-1900-S-2	210-00707	May.16,2011
Reference Validation Dipole 2450MHz	Aprel	ALS-D-2450-S-2	220-00755	May.19,2011
Dielectric Probe Kit	Aprel	ALS-PR-DIEL	260-00955	NCR
Device Holder 2.0	Aprel	ALS-H-E-SET-2	170-00506	NCR
SAR software	Aprel	ALS-SAR-AL-10	Ver.2.3.8	NCR
CRS C500C Controller	Thermo	ALS-C500	RCF0504291	NCR
CRS F3 Robot	Aprel	ALS-F3-SW	N/A	NCR
Power Amplifier	Mini-Circuit	ZHL- 42	040306	Jul.15,2012
Directional Coupler	Agilent	778D-012	51011	Jul.15,2012
Universal Radio Communication Tester	Agilent	E5515C	104845	Mar.1,2012
Vector Network	Agilent	E5071B	MY4230146	Jul.19,2012
Signal Generator	Agilent	E8257D	N/A	Dec.05,2011
Power Meter	Rohde&Schwarz	NRP	N/A	Dec.05,2011

Note: All equipment upon which need to be calibrated are with calibration period of 1 year, except validation dipole antenna of every 3 years.

7. Measurement Uncertainty

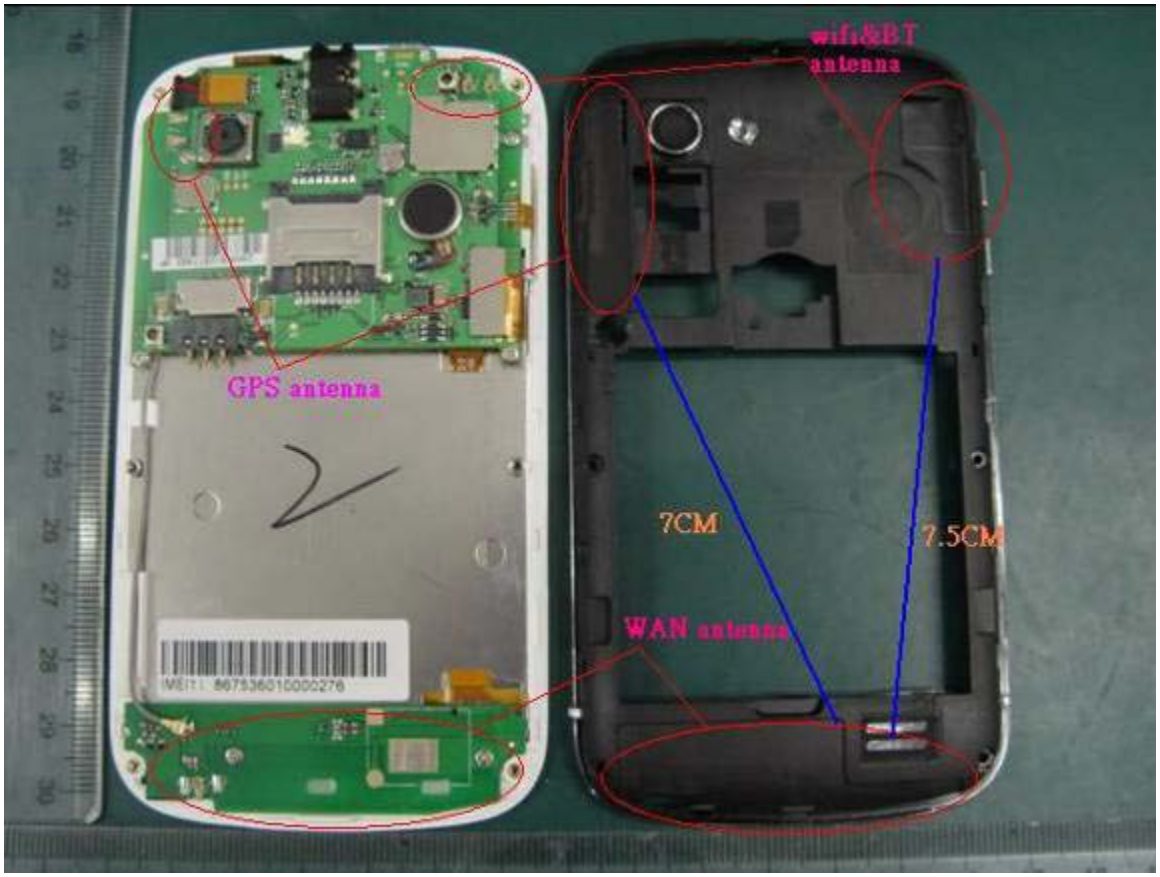
Exposure Assessment Measurement Uncertainty

Source of Uncertainty	Tolerance Value	Probability Distribution	Divisor	c_i^1 (1-g)	c_i^1 (10-g)	Standard Uncertainty (1-g) %	Standard Uncertainty (10-g) %
Measurement System							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	$(1-cp)^{1/2}$	1.5	1.5
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	$\sqrt{cp}$	$\sqrt{cp}$	4.4	4.4
Boundary Effect	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	rectangular	$\sqrt{3}$	1	1	2.7	2.7
Detection Limit	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Readout Electronics	1.0	normal	1	1	1	1.0	1.0
Response Time	0.8	rectangular	$\sqrt{3}$	1	1	0.5	0.5
Integration Time	1.7	rectangular	$\sqrt{3}$	1	1	1.0	1.0
RF Ambient Condition	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech.	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2
Restriction							
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1
Test Sample Positioning	4.0	normal	1	1	1	4.0	4.0
Device Holder Uncertainty	2.0	normal	1	1	1	2.0	2.0
Drift of Output Power	0.6	rectangular	$\sqrt{3}$	1	1	0.3	0.3
Phantom and Setup							
Phantom Uncertainty(shape & thickness tolerance)	3.4	rectangular	$\sqrt{3}$	1	1	2.0	2.0
Liquid Conductivity(target)	5.0	rectangular	$\sqrt{3}$	0.7	0.5	2.0	1.4

Liquid Conductivity(meas.)	0.0	normal	1	0.7	0.5	0.0	0.0
Liquid Permittivity(target)	5.0	rectangular	$\sqrt{3}$	0.6	0.5	1.7	1.4
Liquid Permittivity(meas.)	2.4	normal	1	0.6	0.5	1.4	1.2
Combined Uncertainty		RSS				9.3	9.2
Combined Uncertainty (coverage factor=2)		Normal(k=2)				18.7	18.3

8. SAR Test Results Summary

8.1. Exposure Positions Consideration



Sides for SAR tests; Hotspot mode Test distance: 10 mm						
Band	Back	Front	Top	Back	Right	Left
GSM 850	✓	✓	X	✓	✓	✓
GSM 1900	✓	✓	X	✓	✓	✓
WCDMA Band II	✓	✓	X	✓	✓	✓
WCDMA Band V	✓	✓	X	✓	✓	✓
WLAN 11b/g 2.4GHz	✓	✓	✓	X	✓	X

Sides for SAR tests; Body-worn mode Test distance: 10 mm						
Band	Back	Front	Top	Back	Right	Left
GSM 850	✓	X	X	X	X	X
GSM 1900	✓	X	X	X	X	X
WCDMA Band II	✓	X	X	X	X	X
WCDMA Band V	✓	X	X	X	X	X
WLAN 11b/g 2.4GHz	✓	X	X	X	X	X

Note:

1:Only Back worst Mode of Hotspot as Test Mode

2:The product supports wireless router function (hot spot）

8.2. Simultaneous Transmitting Configurations

Simultaneous Transmitting Configuration	Applicable Combination
Simultaneous Transmission	WWAN+BT
	WWAN+WIFI

1. WLAN and BT share the same antenna, thus they cannot transmit simultaneously.
2. Per KDB KDB 648474 D01, Bluetooth (6.76 dBm) output power ≤ 60/f and the distance to other antennas ≥ 5cm, therefore, stand-alone SAR is not required; the simultaneous transmission SAR for WWAN and Bluetooth were not required, because Bluetooth standalone SAR is not required

8.3. Conducted Power(Unit:dBm)

8.3.1 WWAN Conducted Power

Band	GSM850			GSM1900		
Channel	128	190	251	512	661	810
Frequency(MHz)	824.2	836.6	848.8	1850.2	1880.0	1909.8
GSM	31.86	**31.92**	31.91	29.12	**29.16**	29.02
Band	WCDMA band Ⅱ			WCDMA band Ⅴ		
Channel	9262	9400	9538	4132	4183	4233
Frequency(MHz)	1852.4	1880.0	1907.6	826.4	836.6	846.6
WCDMA	21.93	**22.17**	22.03	22.08	**22.35**	22.11

Band	Conducted Power (dBm)			Factor (dB)	Average Power (dBm)		
Channel	128	190	251		128	190	251
Frequency(MHz)	824.2	836.6	848.8		824.2	836.6	848.8
GPRS8(1up)	31.85	31.90	31.91	**-9.03**	22.82	22.87	22.88
GPRS10(2up)	30.08	30.25	30.38	**-6.02**	24.06	24.23	24.36
GPRS12(4up)	28.17	28.46	28.51	**-3.01**	25.16	25.45	25.50

Band	Conducted Power (dBm)			Factor (dB)	Average Power (dBm)		
Channel	512	661	810		512	661	810
Frequency(MHz)	1850.2	1880.0	1909.8		1850.2	1880.0	1909.8
GPRS8(1up)	29.15	29.11	29.01	**-9.03**	20.12	20.08	19.98
GPRS10(2up)	27.41	27.37	27.25	**-6.02**	21.39	21.35	21.23
GPRS12(4up)	25.53	25.55	25.48	**-3.01**	22.52	22.54	22.47

NOTES:

Division Factors:
To average the power, the division factor is as follows:
1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB
2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB
3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB
4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

1. For Head SAR testing, GSM should be evaluated, therefore the DUT was set in GSM for GSM850 and GSM1900 due to its highest source-based time-average power.
2. For Body-worn SAR testing, GPRS should be evaluated, therefore the DUT was set in GPRS 12 for GSM850 and set in GPRS 12 for GSM1900 due to its highest source-based time-average power.
3. Per 2010/10 workshop, the maximum output power channel is used for SAR testing and for further SAR test reduction.
4. The DUT do not support DTM and VOIP function.

8.3.2 BT conducted power

Channel	Frequency	Bluetooth RF Output Power (dBm)		
		Data Rate / Modulation		
		GFSK	π /4-DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	6.39	6.68	**6.76**
Ch39	2441MHz	6.11	6.38	6.44
Ch78	2480MHz	5.97	6.23	6.31

Bluetooth standalone SAR is not required because the Bluetooth highest average power (**6.76dBm**) is less than 60/f.

8.3.3 WiFi conducted power

Channel	Frequency	2.4GHz 802.11b RF Power (dBm)			
		At DSSS Data Rate			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
CH 01	2412 MHz	14.15	14.12	14.09	14.11
CH 06	2437 MHz	14.21	14.15	14.12	14.14
CH 11	2462 MHz	**14.86**	14.52	14.47	14.42

Channel	Frequency	2.4GHz 802.11g RF Power (dBm)							
		At OFDM Data Rate							
		6	9	12	18	24	36	48	54
		Mbps	Mbps	Mbps	Mbps	Mbps	Mbps	Mbps	Mbps
CH01	2412MHz	15.90	15.86	15.87	15.75	15.76	15.58	15.40	15.26
CH06	2437MHz	16.01	15.92	15.91	15.82	15.77	15.61	15.53	15.29
CH11	2462MHz	**16.33**	16.25	16.23	16.21	16.15	15.67	15.57	15.38

Note:

1. Per KDB 248227, 11b output power is less than 1/4 dB higher than 11g mode, Thus choose the test data of 802.11b/g..
2. Per 2010/4 TCB workshop, choose the highest output power channel to test SAR and determine further SAR exclusion, and CH11 is chosen here.

8.4. Test Records for Head SAR Test

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: GSM850					
Test Position Head	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Left-Cheek	Internal	190	836.6	0.573	1.6
Left-Tilted	Internal	190	836.6	0.440	1.6
Right- Cheek	Internal	190	836.6	0.567	1.6
Right – Tilted	Internal	190	836.6	0.407	1.6
Left-Cheek	Internal	128	824.2	0.578	1.6
Left-Cheek	Internal	251	848.8	0.532	1.6

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product:GSM/WCDMA MOBILE PHONE					
Test Mode: PCS 1900					
Test Position Head	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Left-Cheek	Internal	661	1880.0	0.912	1.6
Left- Tilted	Internal	661	1880.0	0.336	1.6
Right-Cheek	Internal	661	1880.0	0.627	1.6
Right -Tilted	Internal	661	1880.0	0.262	1.6
Left-Cheek	Internal	512	1850.2	1.096	1.6
Left-Cheek	Internal	810	1909.8	0.684	1.6

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: WCDMA band II					
Test Position Head	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Left-Cheek	Internal	9400	1880.0	1.077	1.6
Left- Tilted	Internal	9400	1880.0	0.582	1.6
Right-Cheek	Internal	9400	1880.0	1.337	1.6
Right -Tilted	Internal	9400	1880.0	0.536	1.6
Left-Cheek	Internal	9262	1852.4	1.322	1.6
Left-Cheek	Internal	9538	1907.6	0.981	1.6
Right-Cheek	Internal	9262	1852.4	1.324	1.6
Right-Cheek	Internal	9538	1907.6	0.804	1.6

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: WCDMA band V					
Test Position Head	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Left-Cheek	Internal	4183	836.6	0.375	1.6
Left- Tilted	Internal	4183	836.6	0.309	1.6
Right-Cheek	Internal	4183	836.6	0.327	1.6
Right -Tilted	Internal	4183	836.6	0.349	1.6
Left-Cheek	Internal	4233	846.6	0.313	1.6
Left-Cheek	Internal	4132	826.4	0.382	1.6

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: 802.11b					
Test Position Head	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Left-Cheek	Internal	11	2472	0.081	1.6
Left- Tilted	Internal	11	2472	0.082	1.6
Right-Cheek	Internal	11	2472	0.251	1.6
Right -Tilted	Internal	11	2472	0.225	1.6

Note: Per KDB 648474, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: 802.11g					
Test Position Head	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Left-Cheek	Internal	11	2472	0.149	1.6
Left- Tilted	Internal	11	2472	0.158	1.6
Right-Cheek	Internal	11	2472	0.255	1.6
Right -Tilted	Internal	11	2472	0.246	1.6

Note: Per KDB 648474, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

8.5. Test Records for Body-worn / Hotspot SAR Test

DUT with Flat Phantom 10mm Gap

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product:GSM/WCDMA MOBILE PHONE					
Test Mode: GPRS850(GPRS12)					
Test Position Body	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Body Front	Internal	190	836.6	0.781	1.6
Body Back	Internal	128	824.2	1.221	1.6
Body Back	Internal	190	836.6	1.106	1.6
Body Back	Internal	251	848.8	0.918	1.6
Body Left	Internal	190	836.6	0.551	1.6
Body Right	Internal	190	836.6	0.715	1.6
Body Bottom	Internal	190	836.6	0.660	1.6

DUT with Flat Phantom 10mm Gap

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: GPRS 1900(GPRS12)					
Test Position Body	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Body Front	Internal	661	1880.0	0.282	1.6
Body Back	Internal	512	1850.2	0.412	1.6
Body Back	Internal	661	1880.0	0.348	1.6
Body Back	Internal	810	1909.8	0.279	1.6
Body Left	Internal	661	1880.0	0.143	1.6
Body Right	Internal	661	1880.0	0.138	1.6
Body Bottom	Internal	661	1880.0	0.093	1.6

DUT with Flat Phantom 10mm Gap

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: WCDMA band II					
Test Position Body	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Body Front	Internal	9400	1880.0	0.394	1.6
Body Back	Internal	9262	1852.4	0.733	1.6
Body Back	Internal	9400	1880.0	0.599	1.6
Body Back	Internal	9538	1907.6	0.434	1.6
Body Left	Internal	9400	1880.0	0.084	1.6
Body Right	Internal	9400	1880.0	0.134	1.6
Body Bottom	Internal	9400	1880.0	0.071	1.6

Note:
Per KDB 648474, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

DUT with Flat Phantom 10mm Gap

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: WCDMA band V					
Test Position Body	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Body Front	Internal	4183	836.6	0.455	1.6
Body Back	Internal	4132	826.4	0.680	1.6
Body Back	Internal	4183	836.6	0.710	1.6
Body Back	Internal	4233	846.6	0.731	1.6
Body Left	Internal	4183	836.6	0.335	1.6
Body Right	Internal	4183	836.6	0.361	1.6
Body Bottom	Internal	4183	836.6	0.303	1.6

DUT with Flat Phantom 10mm Gap

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: 802.11b					
Test Position Body	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Body Front	Internal	11	2472	0.032	1.6
Body Back	Internal	11	2472	0.050	1.6
Body Left	Internal	11	2472	0.054	1.6
Body Top	Internal	11	2472	0.032	1.6

Note:
Per KDB 648474, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: 802.11g					
Test Position Body	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Body Front	Internal	11	2472	0.032	1.6
Body Back	Internal	11	2472	0.182	1.6
Body Left	Internal	11	2472	0.073	1.6
Body Top	Internal	11	2472	0.053	1.6

Note:
Per KDB 648474, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

Note:
1. Per KDB 941225 D06, for DUT dimension ≥ 9cm*5cm, the test distance is 1cm. SAR must be measured for all surFronts and sides with a transmitting antenna located within 2.5cm from that surFront or edge.
2. As in (1), SAR for Front/Back/ Back Side/Left Side/Right Side is necessary.
3. Per KDB 648474, if the highest output channel SAR for each exposure position≤ 0.8 W/ kg other channels SAR tests are not necessary.

8.6. Test Records for Body-worn SAR Test

DUT with Flat Phantom 10mm Gap

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product:GSM/WCDMA MOBILE PHONE					
Test Mode: GPRS850(GPRS12)+Earphone					
Test Position Body	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Body Back	Internal	128	824.2	0.892	1.6
Body Back	Internal	190	836.6	0.909	1.6
Body Back	Internal	251	848.8	0.663	1.6

Note:
Per KDB 648474, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

Only Back worst Mode of Hotspot as Test Mode

DUT with Flat Phantom 10mm Gap

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: GPRS 1900(GPRS12)+Earphone					
Test Position Body	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Body Back	Internal	661	1880.0	0.280	1.6

Note:
Per KDB 648474, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

Only Back worst Mode of Hotspot as Test Mode

DUT with Flat Phantom 10mm Gap

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: WCDMA band II +Earphone					
Test Position Body	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Body Back	Internal	9400	1800.0	0.364	1.6

Note:
Per KDB 648474, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

Only Back worst Mode of Hotspot as Test Mode

DUT with Flat Phantom 10mm Gap

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: WCDMA band V +Earphone					
Test Position Body	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Body Back	Internal	4183	836.6	0.508	1.6

Note:
Per KDB 648474, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

Only Back worst Mode of Hotspot as Test Mode

DUT with Flat Phantom 10mm Gap

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: 802.11b+Earphone					
Test Position Body	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Body Back	Internal	11	2472	0.042	1.6

Note:
Per KDB 648474, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

Only Back worst Mode of Hotspot as Test Mode

DUT with Flat Phantom 10mm Gap

SAR MEASUREMENT					
Ambient Temperature (°C): 21.2 ± 2				Relative Humidity (%): 46	
Liquid Temperature (°C): 20.5 ± 2				Depth of Liquid (cm):>15	
Product: GSM/WCDMA MOBILE PHONE					
Test Mode: 802.11g+Earphone					
Test Position Body	Antenna Position	Frequency		SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz		
Body Back	Internal	11	2472	0.174	1.6

Note:
Per KDB 648474, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

Only Back worst Mode of Hotspot as Test Mode

8.7. Simultaneous Multi-band Transmission

Maximum SAR list for each band and position

	GSM 850	GSM 1900	WCDMA Band II	WCDMA Band V	802.11 b	802.11 g	Max.SAR Summation	Hotspot Separation	Result
Left-Cheek	0.573	0.912	1.077	0.375	0.081	0.149	**1.226**	**1**	pass
Left- Tilted	0.440	0.336	0.582	0.309	0.082	0.158	**0.740**	**1**	pass
Right-Cheek	0.567	0.627	1.337	0.327	0.251	0.255	**1.592**	**1**	pass
Right -Tilted	0.407	0.262	0.536	0.349	0.225	0.246	**0.782**	**1**	pass
Left-Cheek	0.578	1.096	1.322	0.313				1	pass
Left-Cheek	0.532	0.684	0.981	0.382				1	pass
Right-Cheek			1.324					1	pass
Right-Cheek			0.804					1	pass
Body Front	0.781	0.282	0.394	0.455	0.032	0.032	**0.813**	**1**	pass
Body Back	1.221	0.412	0.733	0.680	0.050	0.182	**1.403**	**1**	pass
Body Back	1.106	0.348	0.599	0.710				1	
Body Back	0.918	0.279	0.434	0.731				1	
Body Left	0.551	0.143	0.084	0.335	0.054	0.073	0.624	**1**	pass
Body Right	0.715	0.138	0.134	0.361				1	pass
Body Top					0.032	0.053		1	pass
Body Bottom	0.660	0.093	0.071	0.303				1	pass

Note:

1. The maximum SAR summation is calculated based on the same configuration and test position.
2. According to KDB 648474, for 1-g SAR scalar summation <1.6c,simultaneous SAR measurement is not necessary.

References：

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] IEEE Std. C95.1-1999, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, 1999

[3] IEEE Std. 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, December 2003

[4] FCC OET Bulletin 65 (Edition 97-01) Supplement C (Edition 01-01), “Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields”, June 2001

[5] SPEAG DASY System Handbook

[6] FCC KDB 248227 D01 v01r02, “SAR Measurement Procedures for 802.11 a/b/g Transmitters”, May 2007

[7] FCC KDB 447498 D01 v04, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, November 2009

[8] FCC KDB 447498 D02 v02, “SAR Measurement Procedures for USB Dongle Transmitters”, November 2009

[9] FCC KDB 616217 D01 v01r01, “SAR Evaluation Considerations for LapTop Computers with Antennas Built-in on Display Screens”, November 2009

[10] FCC KDB 616217 D03 v01, “SAR Evaluation Considerations for LapTop/Notebook/Netbook and Tablet Computers”, November 2009

[11] FCC KDB 648474 D01 v01r05, “SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas”, September 2008

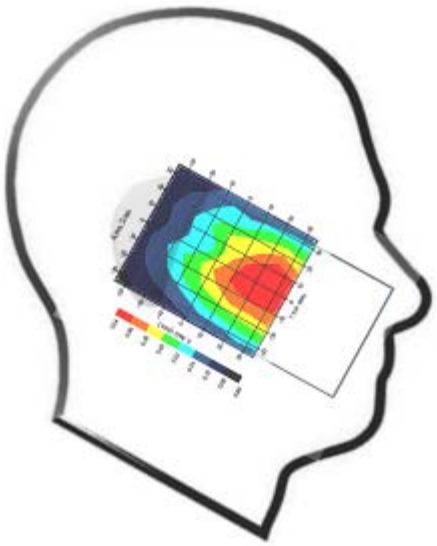
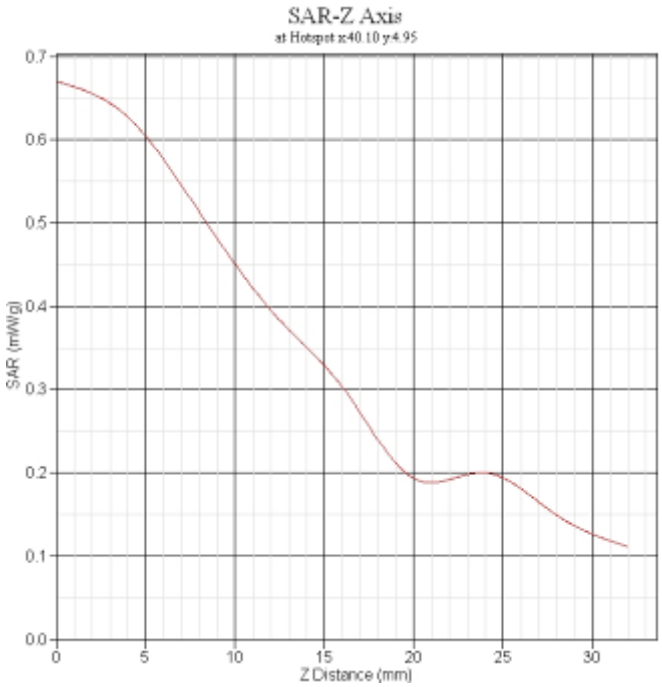
[12] FCC KDB 941225 D01 v02, “SAR Measurement Procedures for 3G Devices – CDMA 2000 / Ev-Do / WCDMA / HSDPA / HSPA”, October 2007

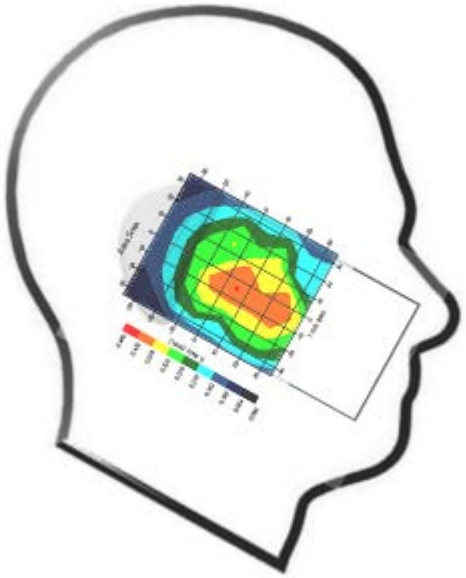
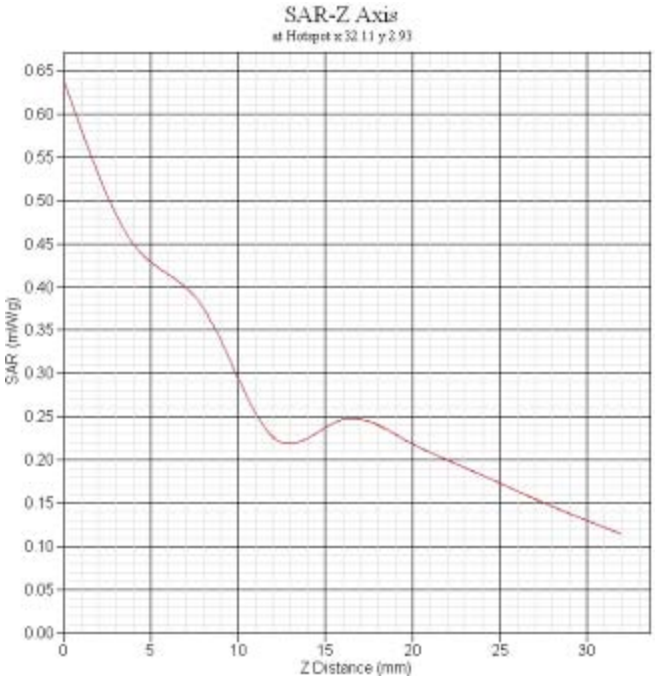
[13] FCC KDB 941225 D03 v01, “Recommended SAR Test Reduction Procedures for GSM / GPRS /EDGE”, December 2008

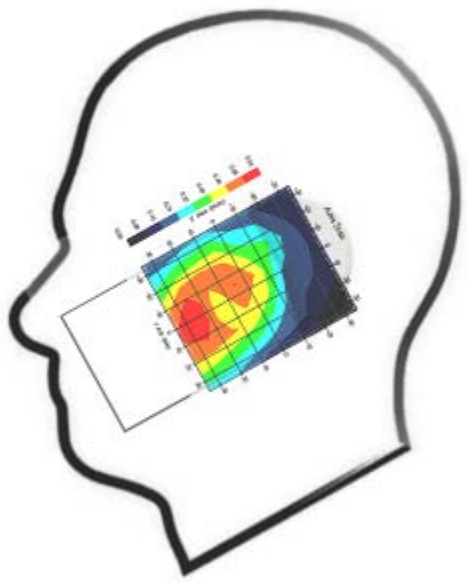
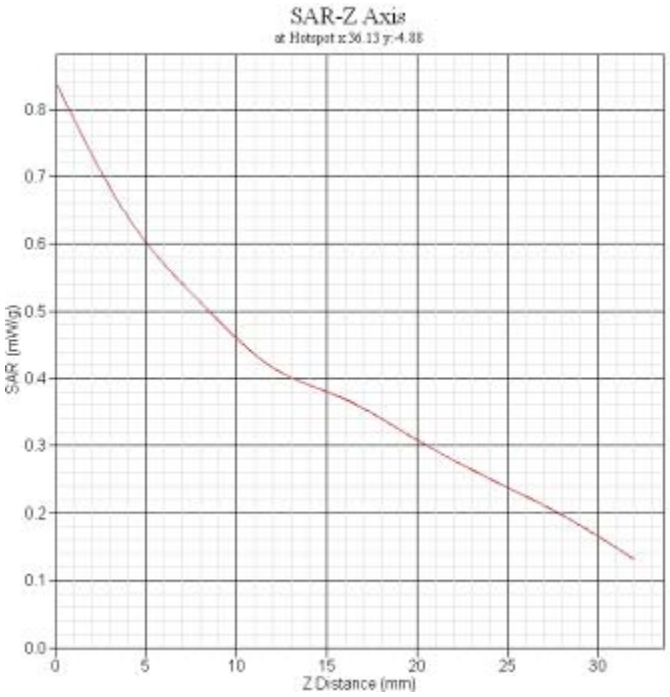
[14] KDB 941225 D04 SAR for GSM E GPRS Dual Xfer Mode v01

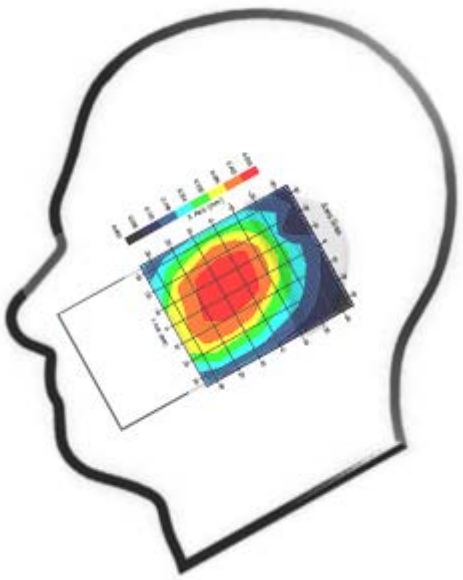
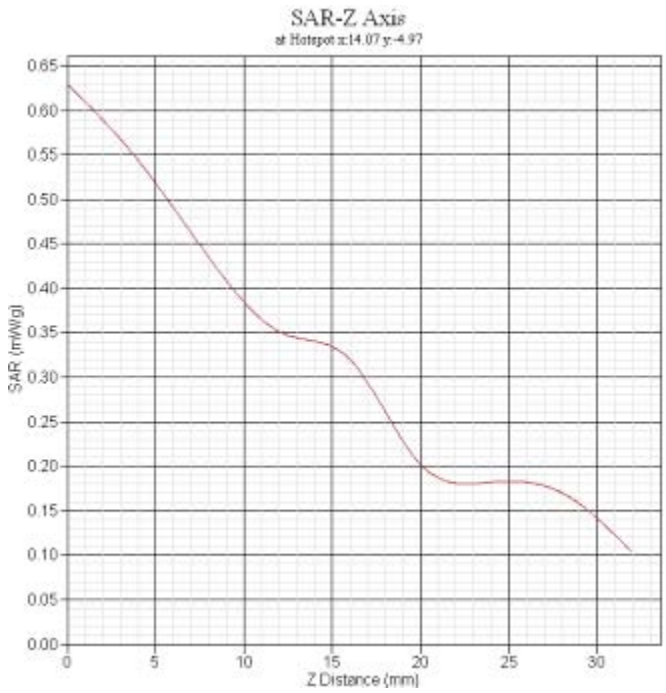
[15] 941225 D06 Hot Spot SAR v01

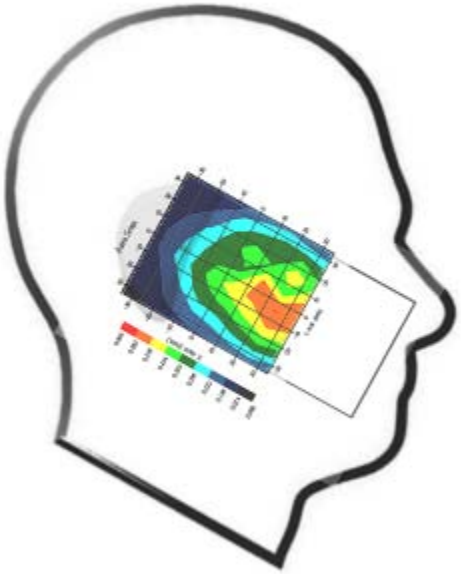
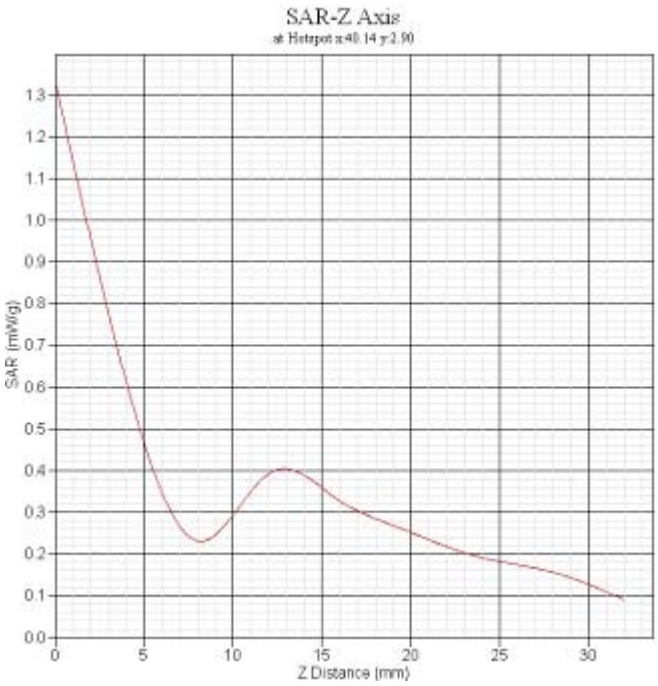
8.8. SAR Measurement Data

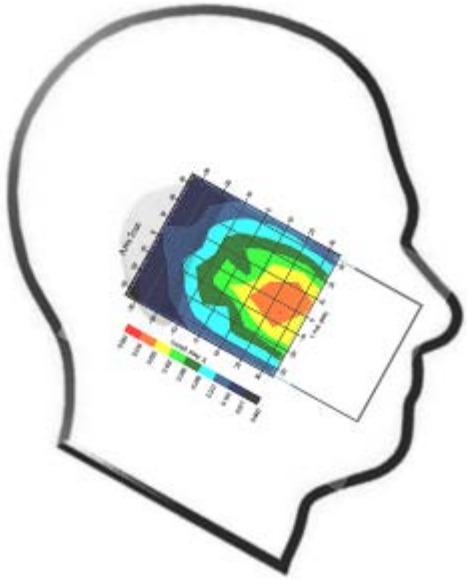
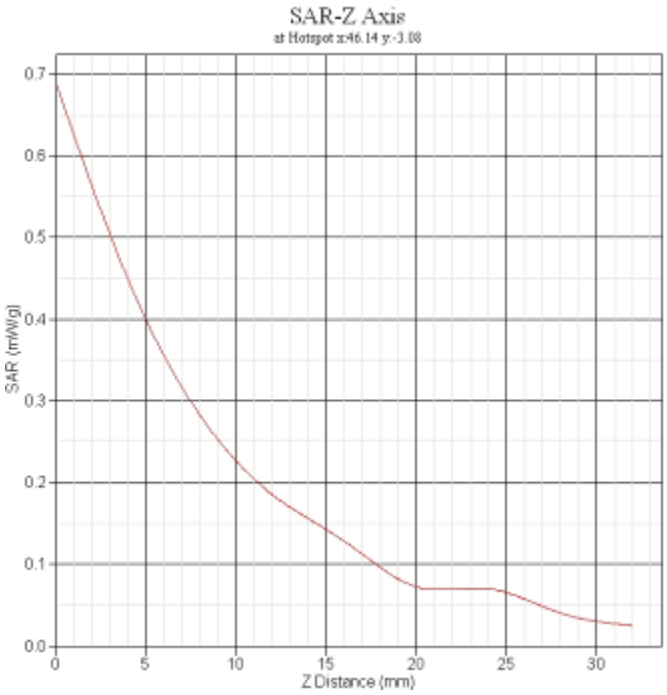
GSM850 left cheek ch190	
Frequency(MHz)	836.6
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	2.382
Duty Cycle Factor	8
Crest factor	8
4Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.573
SAR 10g(W/Kg)	0.367

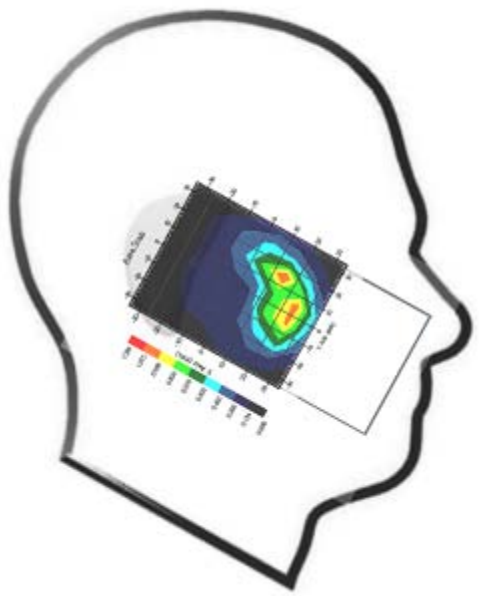
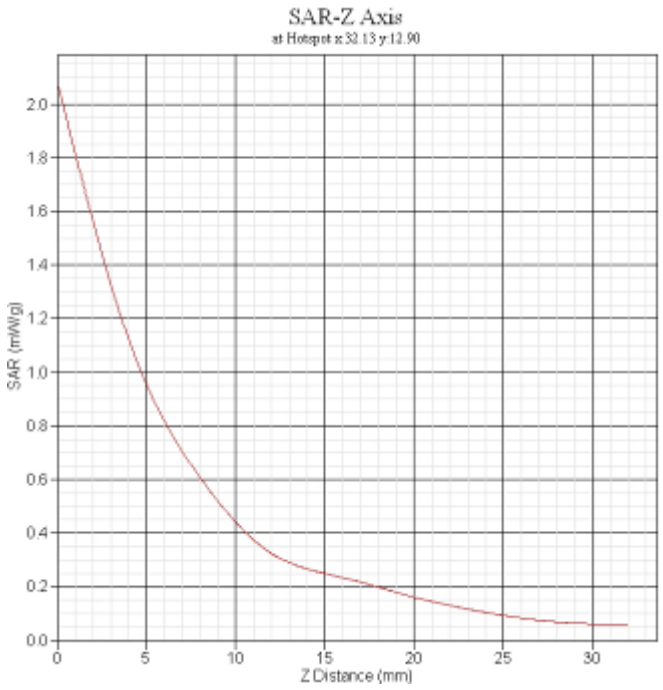
GSM850 left tilt ch190	
Frequency(MHz)	836.6
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	-2.235
Duty Cycle Factor	8
Crest factor	8
Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.440
SAR 10g(W/Kg)	0.297

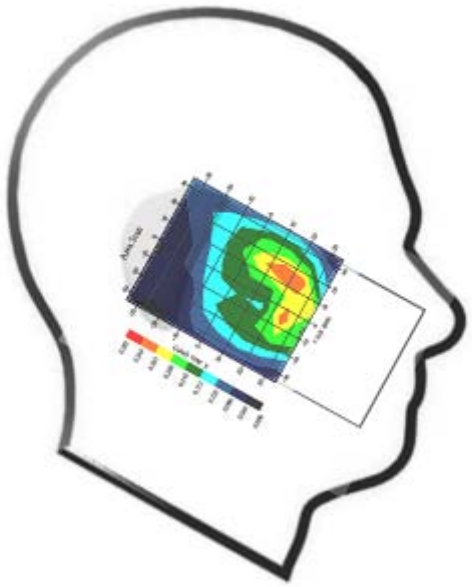
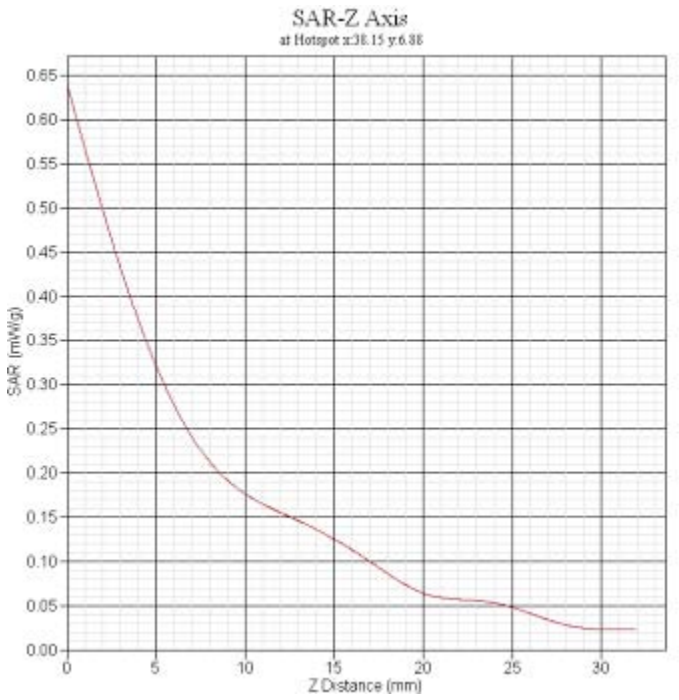
GSM850 Right cheek ch190	
Frequency(MHz)	836.6
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	-4.004
Duty Cycle Factor	8
Crest factor	8
Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.567
SAR 10g(W/Kg)	0.415

GSM850 Right tilt CH190	
Frequency(MHz)	836.6
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	-2.257
Duty Cycle Factor	8
Crest factor	8
Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.407
SAR 10g(W/Kg)	0.267

GSM850 Left cheek ch128	
Frequency(MHz)	824.2
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	1.440
Duty Cycle Factor	8
Crest factor	8
Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.578
SAR 10g(W/Kg)	0.378

GSM850 Left cheek ch251	
Frequency(MHz)	848.8
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	2.827
Duty Cycle Factor	8
Crest factor	8
Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.532
SAR 10g(W/Kg)	0.339

GSM1900 Left cheek CH661	
Frequency(MHz)	1880.0
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	-2.547
Duty Cycle Factor	8
Crest factor	8
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.921
SAR 10g(W/Kg)	0.413

GSM1900 Left tilt CH661	
Frequency(MHz)	1880.0
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	-1.497
Duty Cycle Factor	8
Crest factor	8
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.336
SAR 10g(W/Kg)	0.181

GSM1900 Right cheek CH661	
Frequency(MHz)	1880.0
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	-2.418
Duty Cycle Factor	8
Crest factor	8
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
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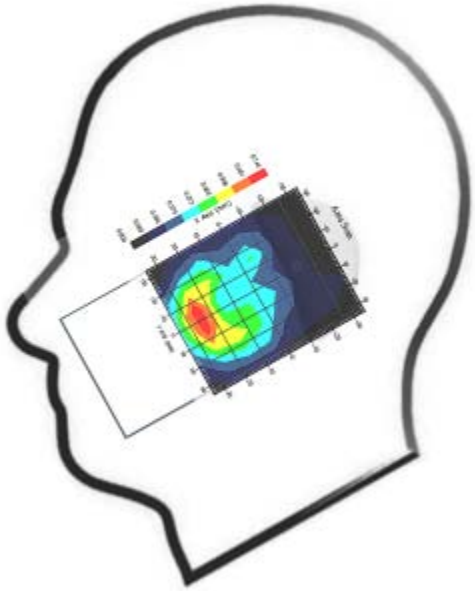	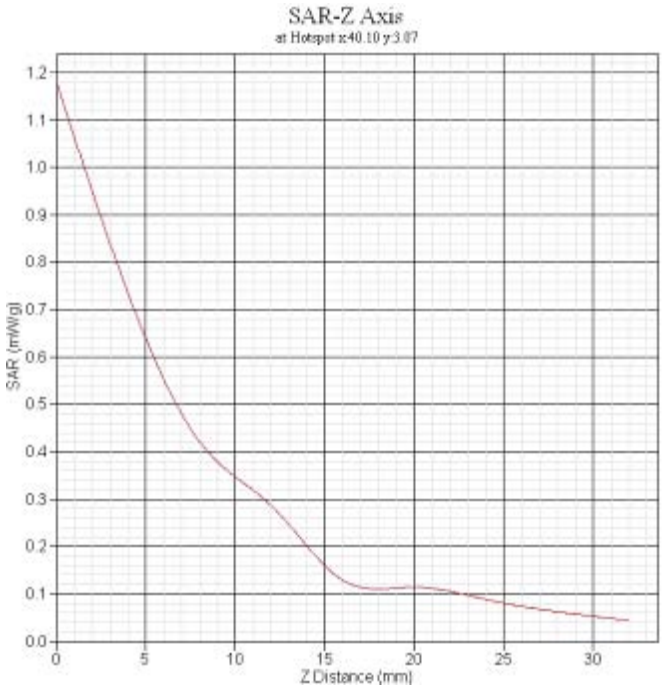
SAR 1g(W/Kg)	0.627
SAR 10g(W/Kg)	0.376

GSM1900 Right tilt CH661	
Frequency(MHz)	1880.0
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	-1.995
Duty Cycle Factor	8
Crest factor	8
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
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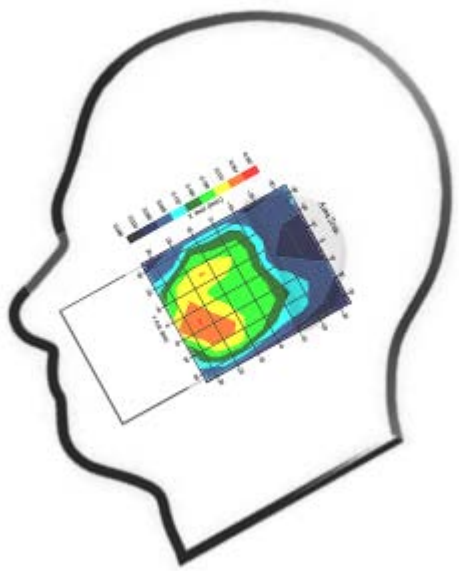
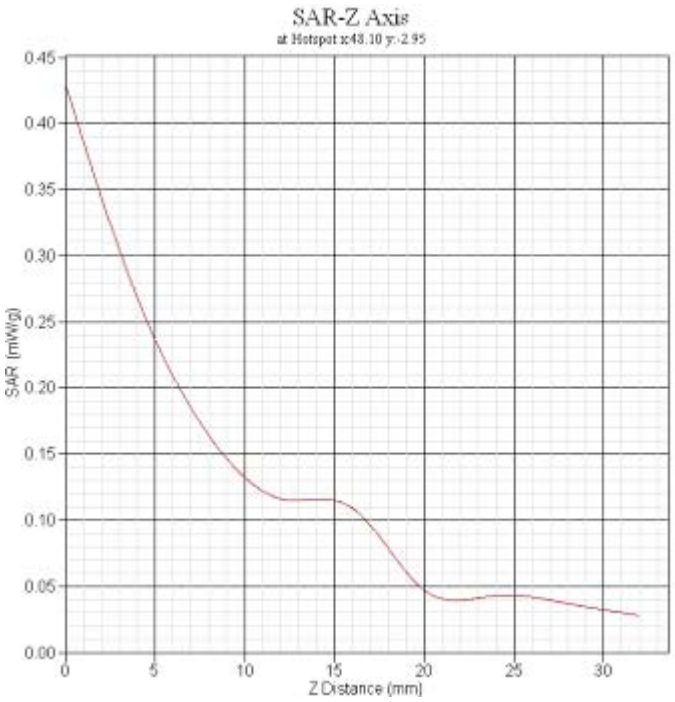
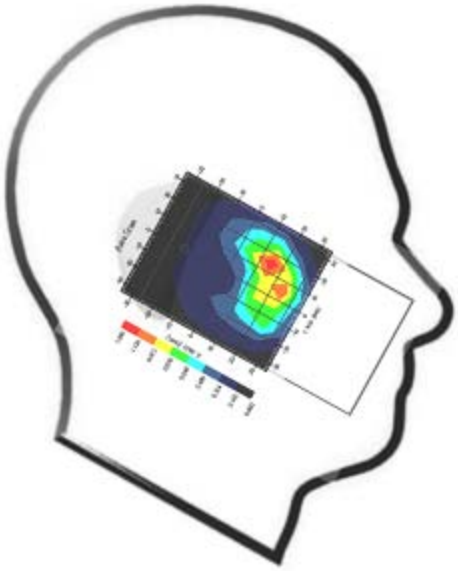
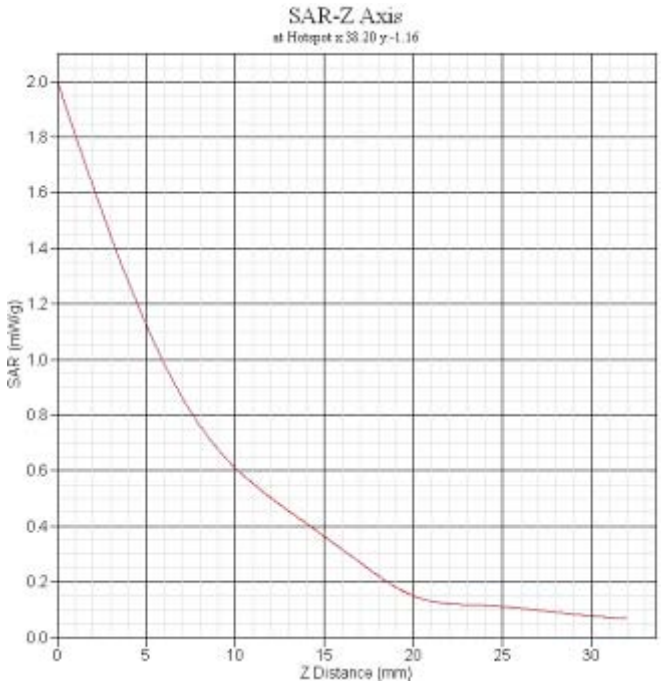
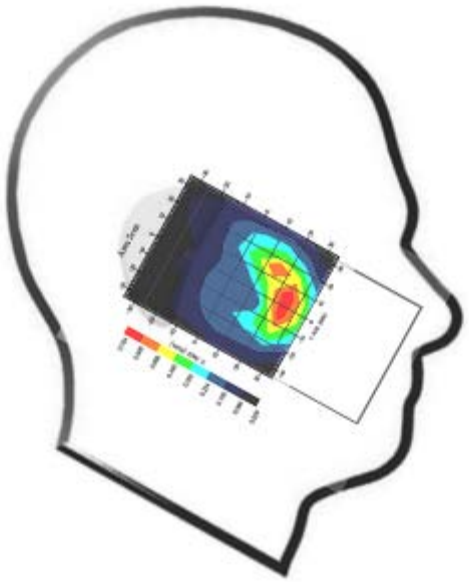
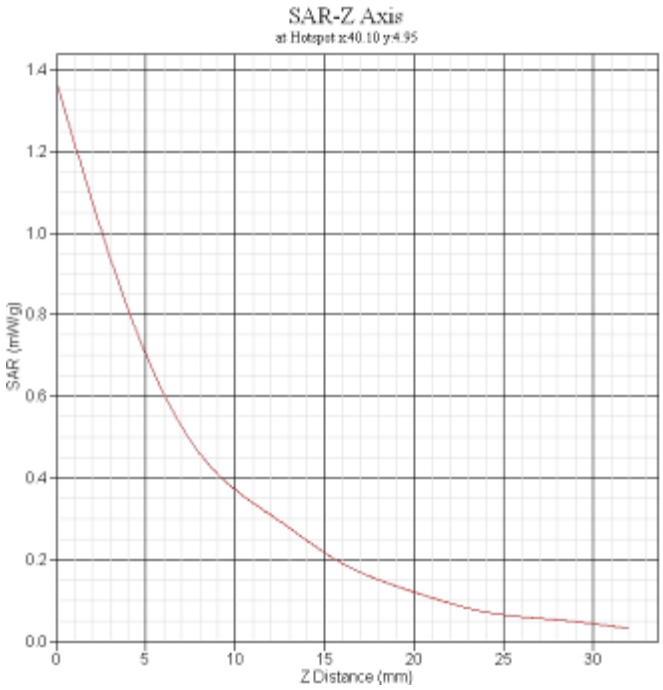
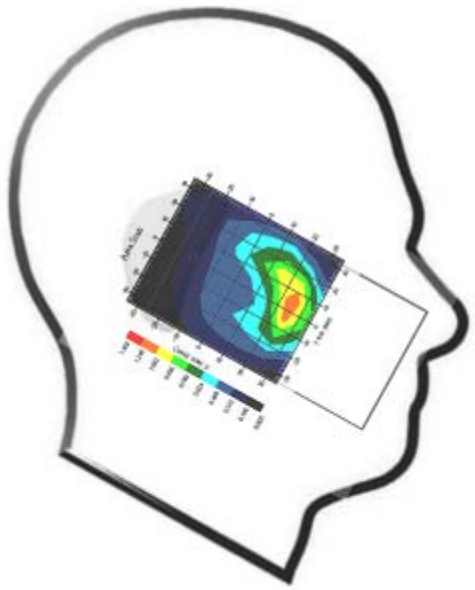
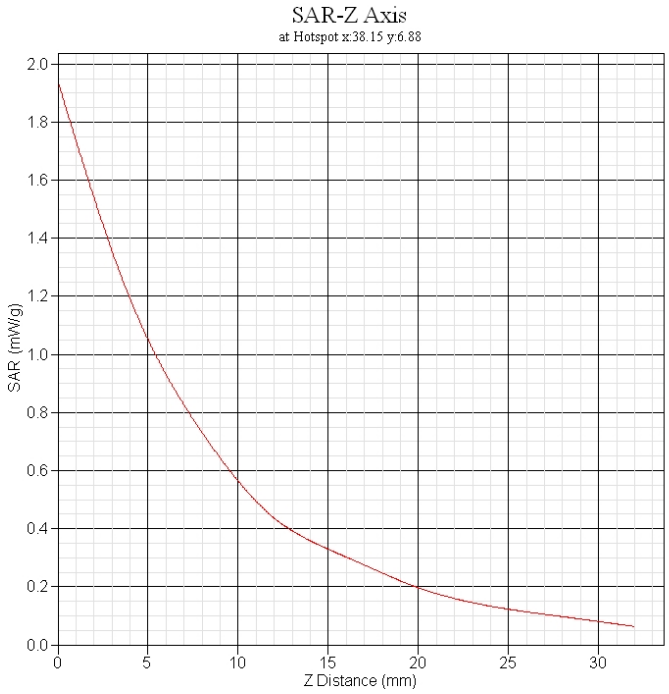
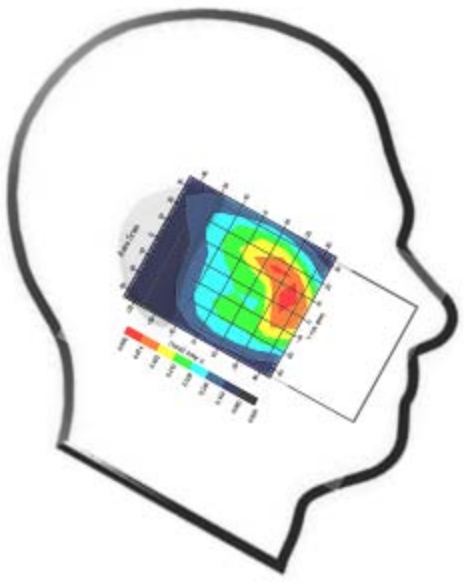
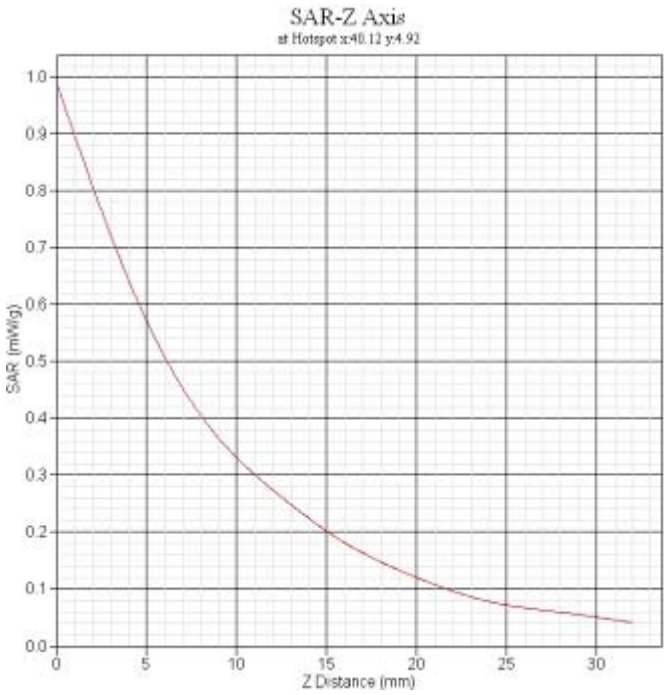
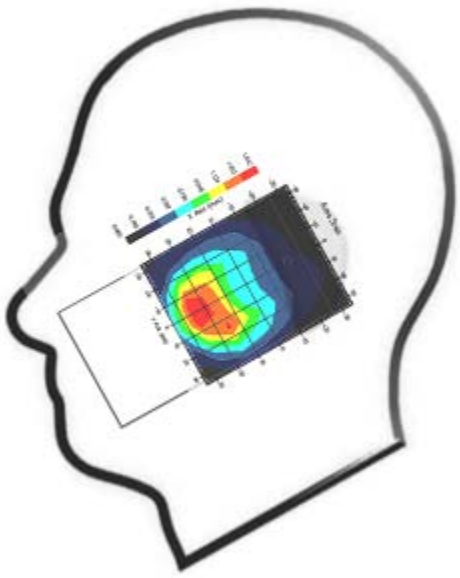
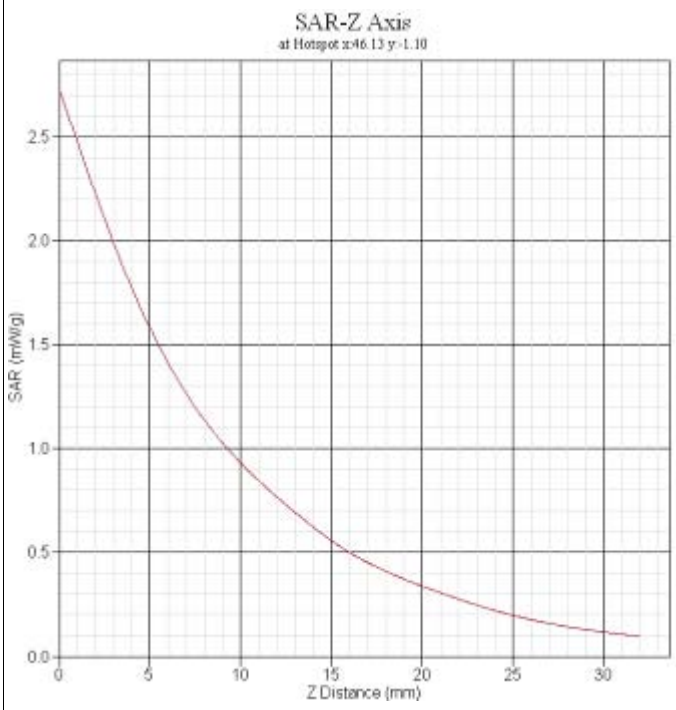
	
SAR 1g(W/Kg)	0.262
SAR 10g(W/Kg)	0.149

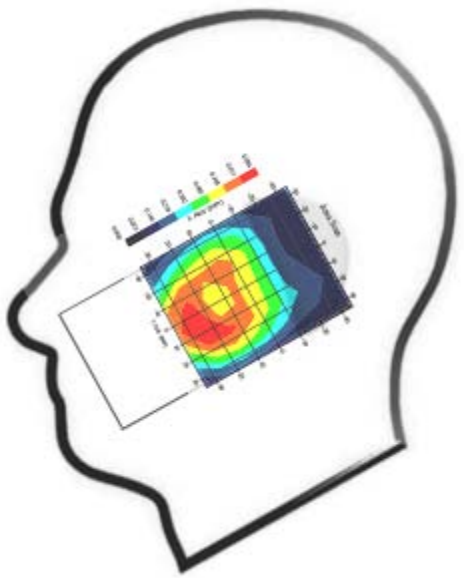
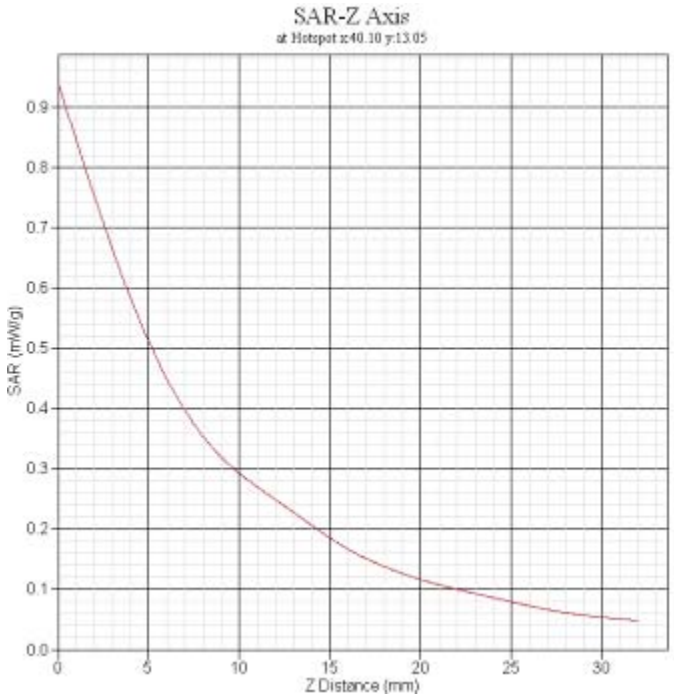
GSM1900 Left cheek CH512	
Frequency(MHz)	1850.2
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	4.029
Duty Cycle Factor	8
Crest factor	8
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	1.096
SAR 10g(W/Kg)	0.518

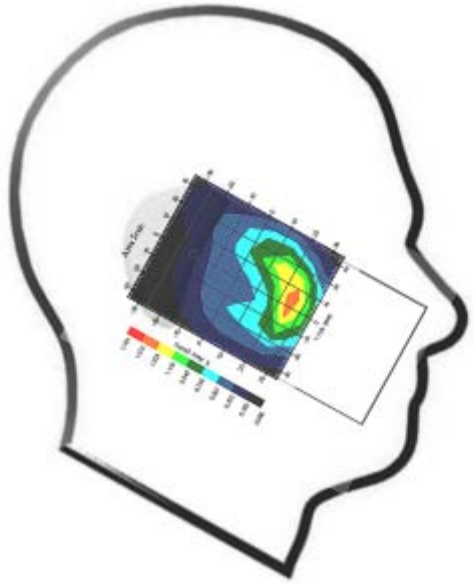
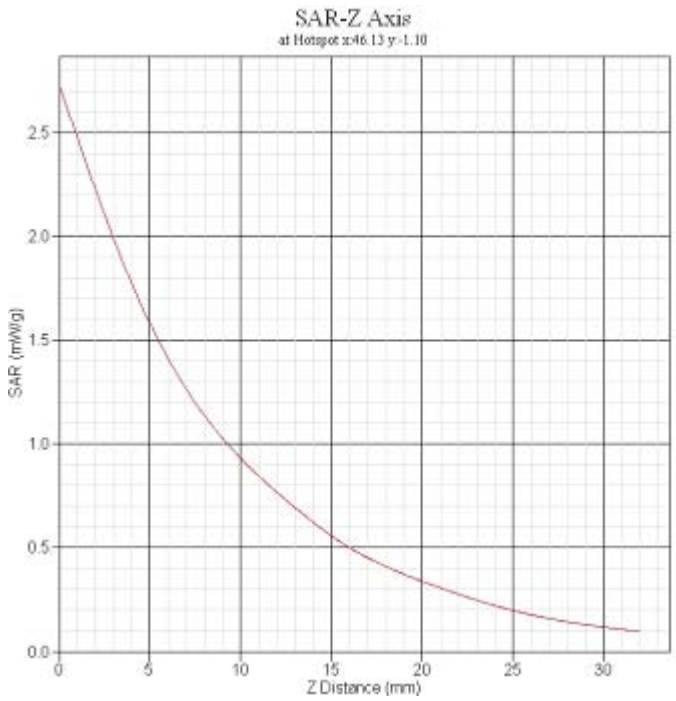
GSM1900 Left cheek CH810	
Frequency(MHz)	1909.8
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	-2.813
Duty Cycle Factor	8
Crest factor	8
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.684
SAR 10g(W/Kg)	0.347

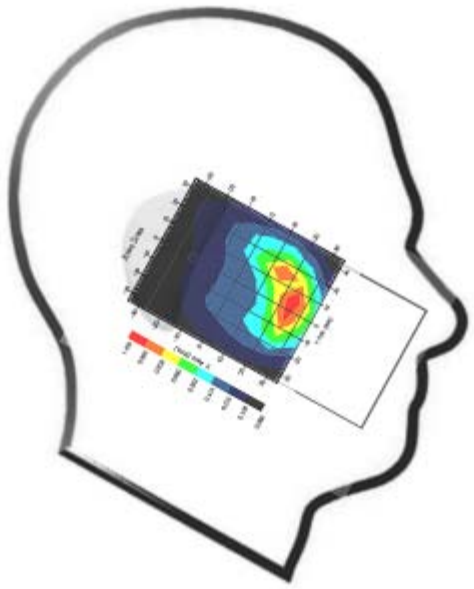
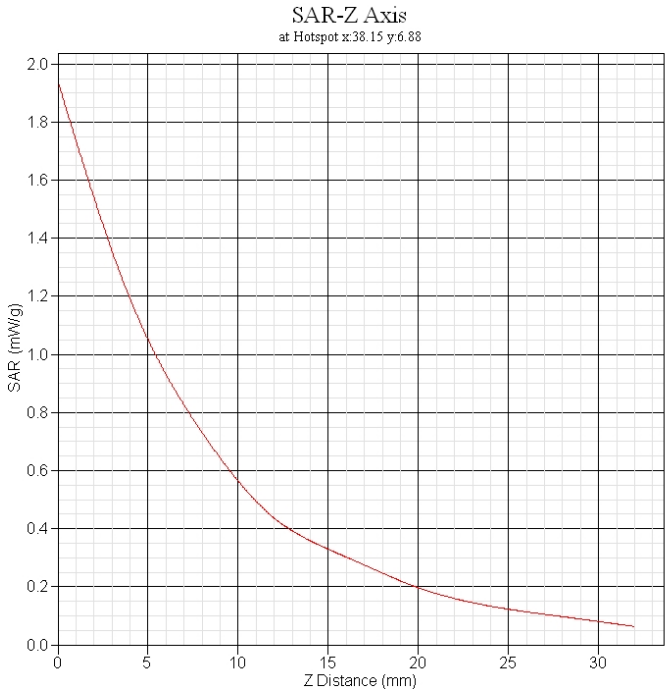
WCDMA Band Ⅱ Left cheek CH9400	
Frequency(MHz)	1800.0
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	-2.423
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	1.077
SAR 10g(W/Kg)	0.551

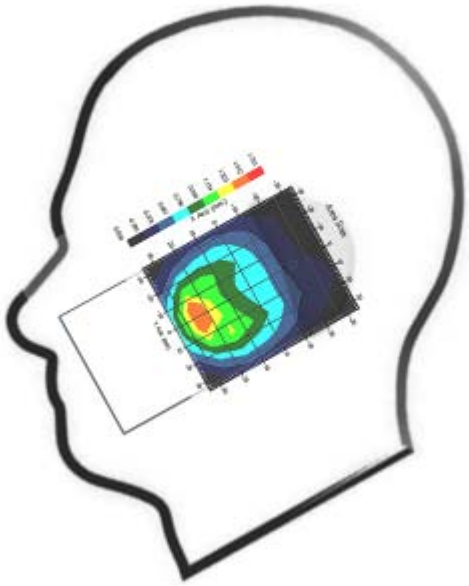
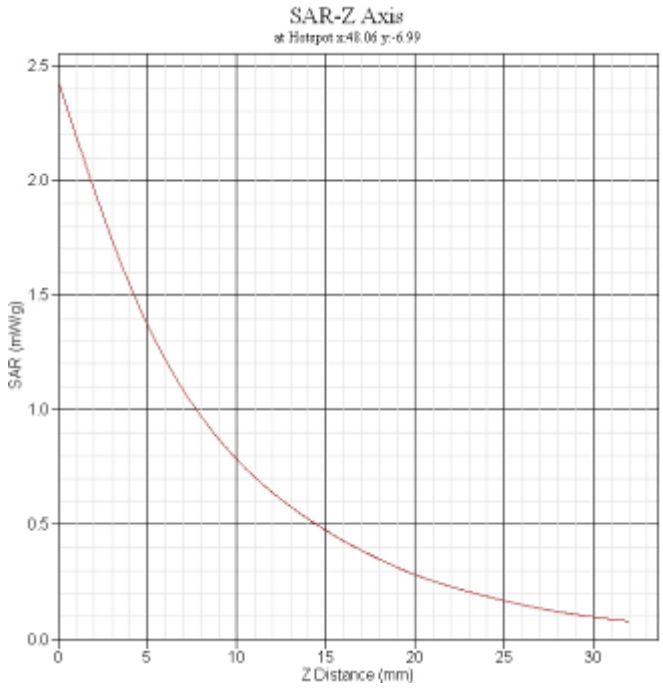
WCDMA BandⅡ Left tilt CH9400	
Frequency(MHz)	1800.0
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	-3.683
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.582
SAR 10g(W/Kg)	0.327

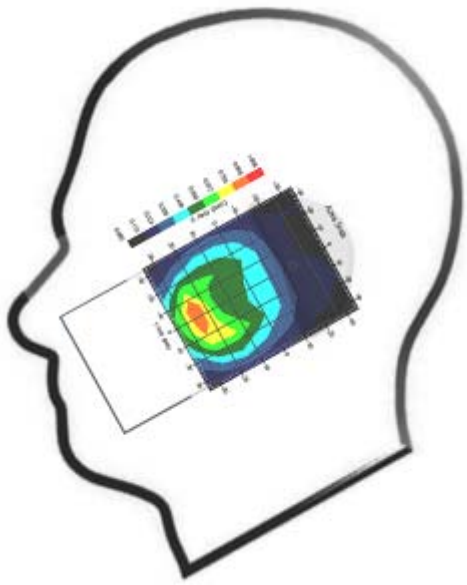
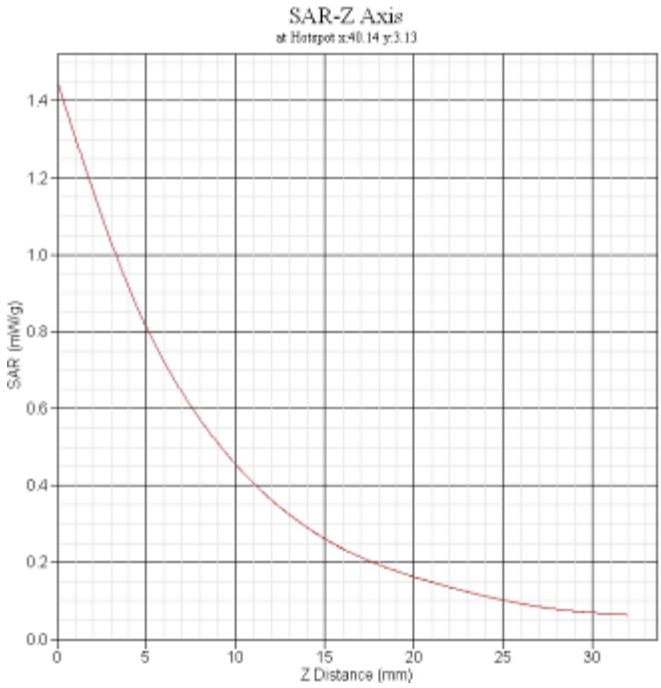
WCDMA Band Ⅱ Right cheek CH9400	
Frequency(MHz)	1800.0
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	1.662
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	1.337
SAR 10g(W/Kg)	0.705

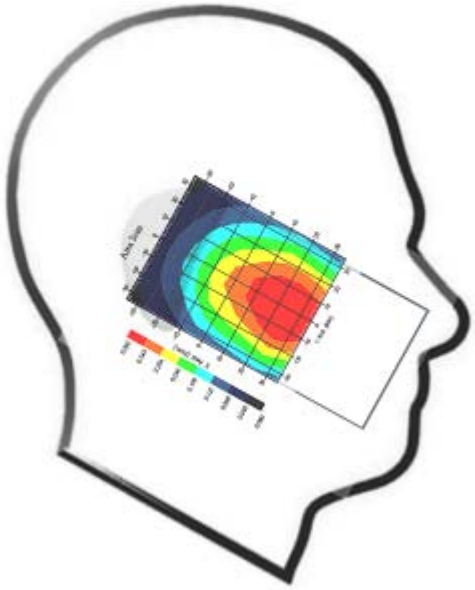
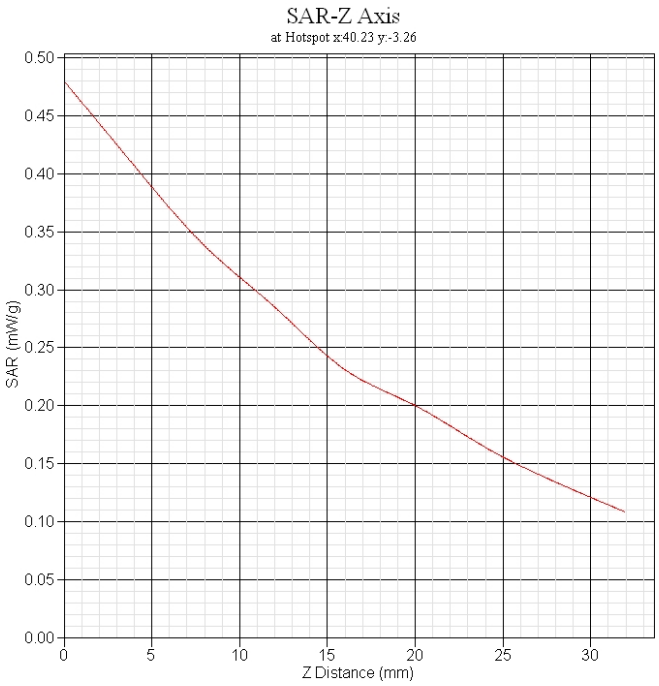
WCDMA Band Ⅱ Right tilt CH9400	
Frequency(MHz)	1800.0
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	-0.728
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.536
SAR 10g(W/Kg)	0.301

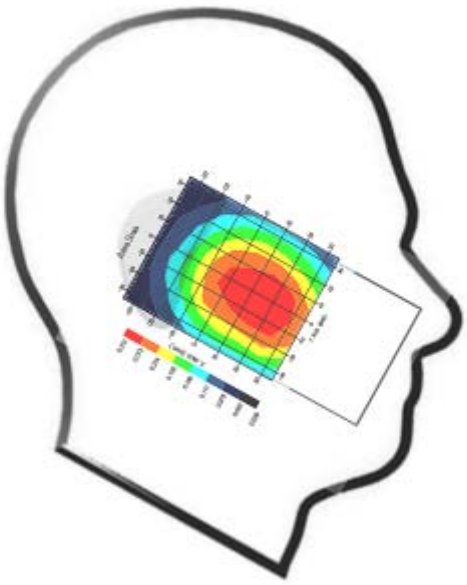
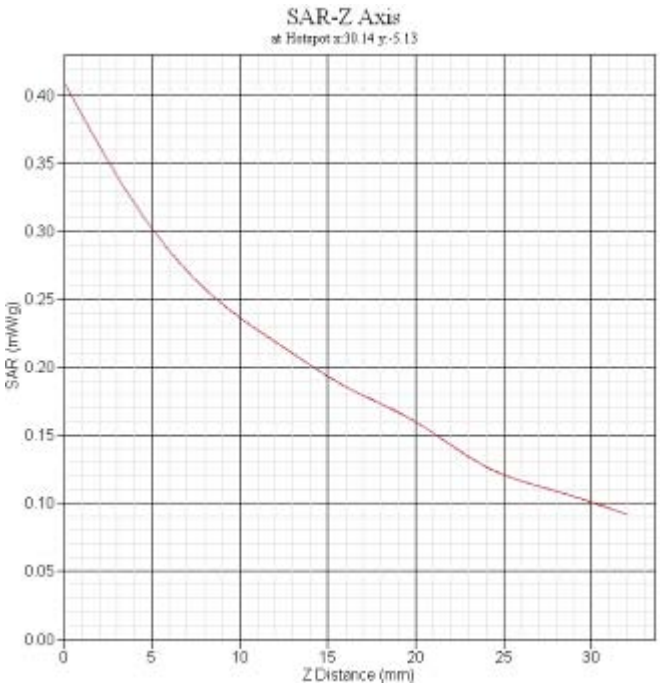
WCDMA Band Ⅱ Left cheek CH9262	
Frequency(MHz)	1852.4
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	-0.112
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	1.322
SAR 10g(W/Kg)	0.661

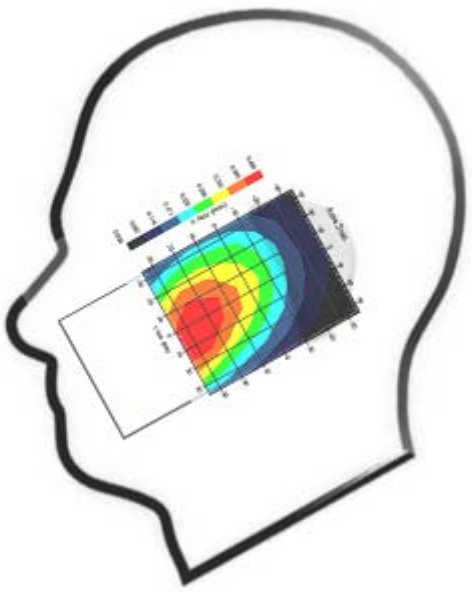
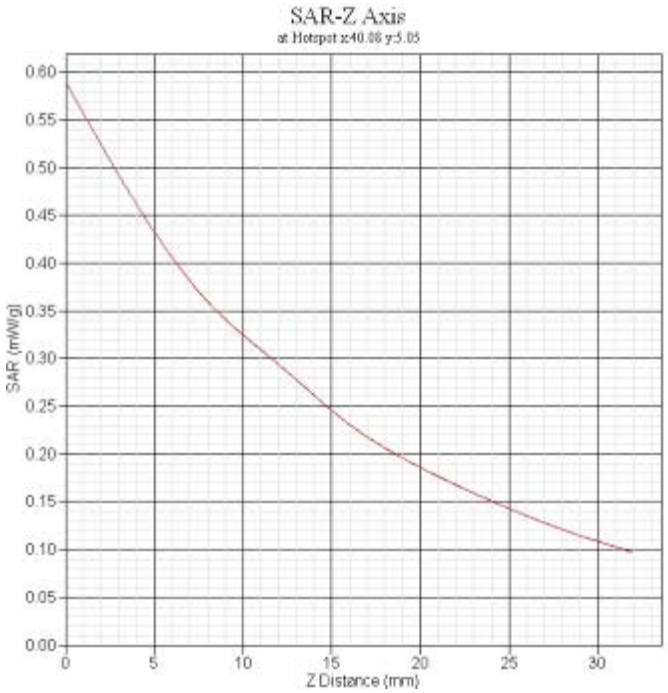
WCDMA Band Ⅱ Left cheek CH9538	
Frequency(MHz)	1907.6
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	-1.340
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.981
SAR 10g(W/Kg)	0.470

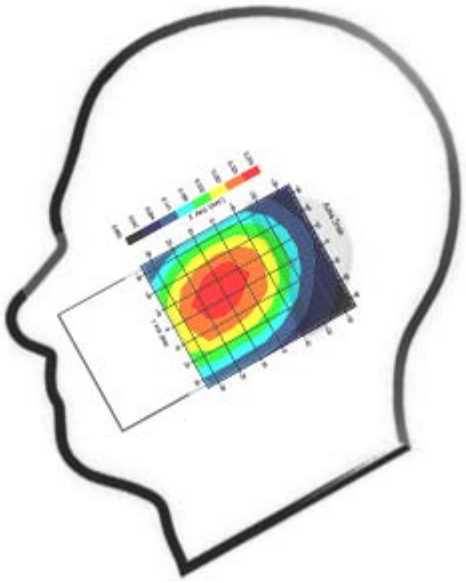
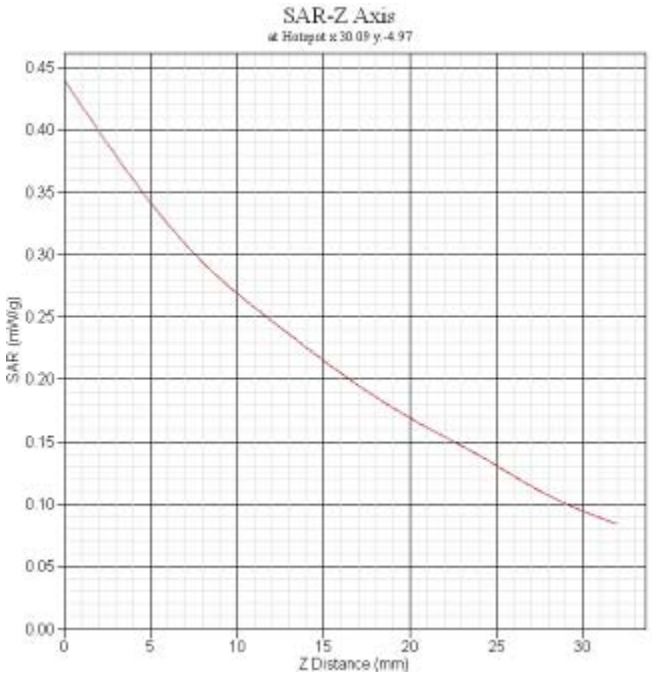
WCDMA Band Ⅱ Right cheek CH9262	
Frequency(MHz)	1852.4
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	-3.681
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	1.324
SAR 10g(W/Kg)	0.728

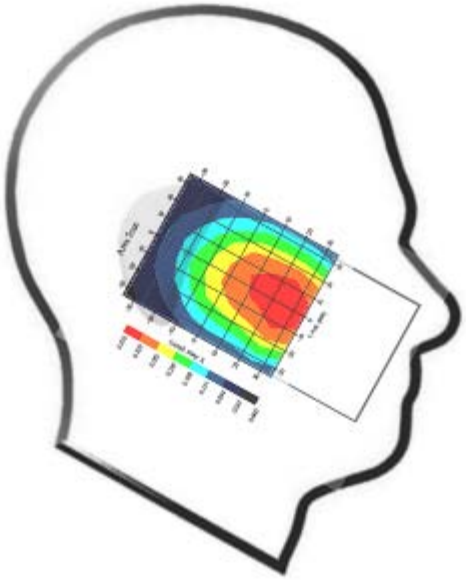
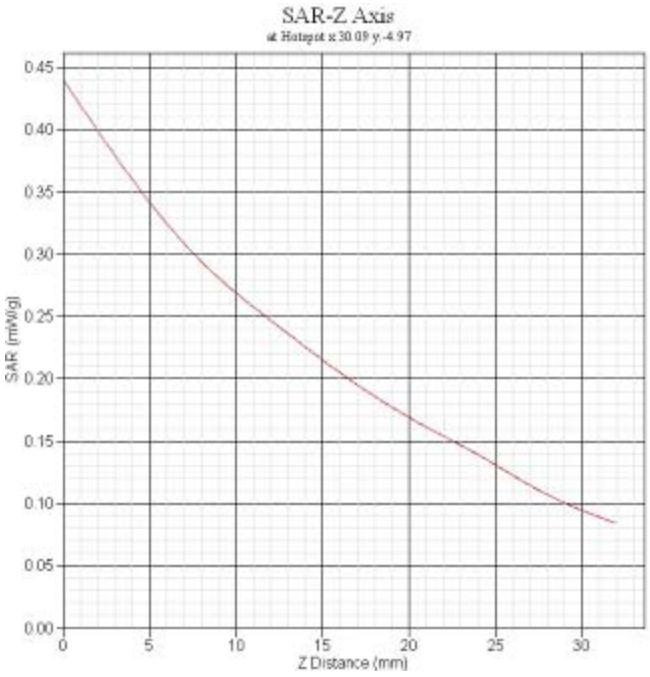
WCDMA Band Ⅱ Right cheek CH9538	
Frequency(MHz)	1907.6
Relative permittivity(real part)	41.55
Conductivity(S/m)	1.41
Variation(%)	0.925
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.7
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.804
SAR 10g(W/Kg)	0.428

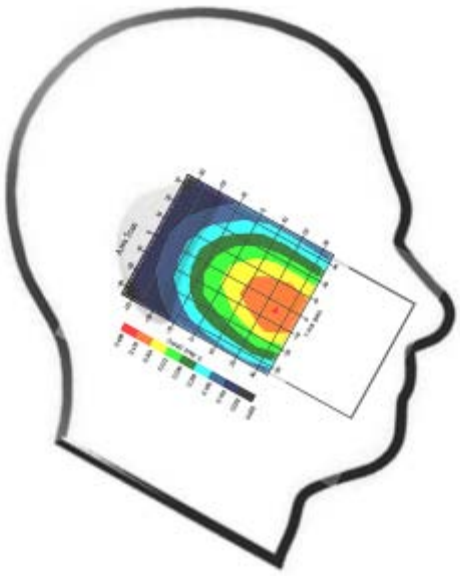
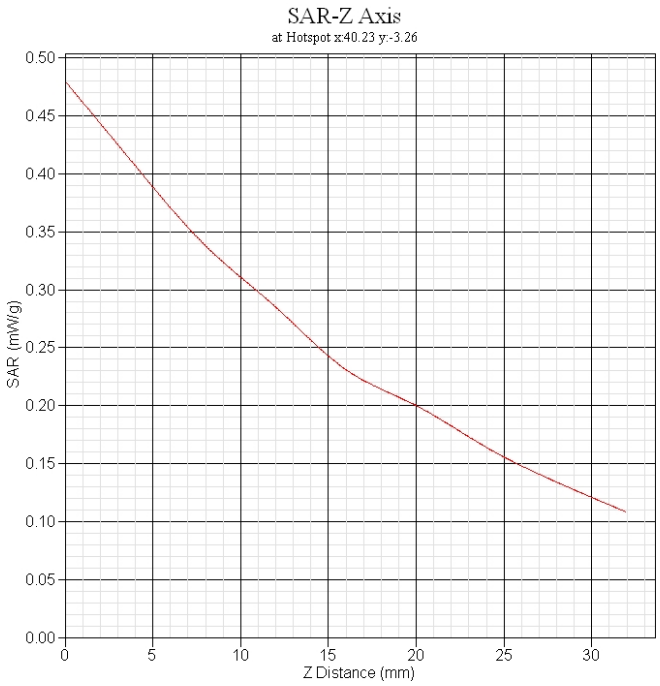
WCDMA Band Ⅴ Left cheek CH4183	
Frequency(MHz)	836.6
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	3.458
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.375
SAR 10g(W/Kg)	0.279

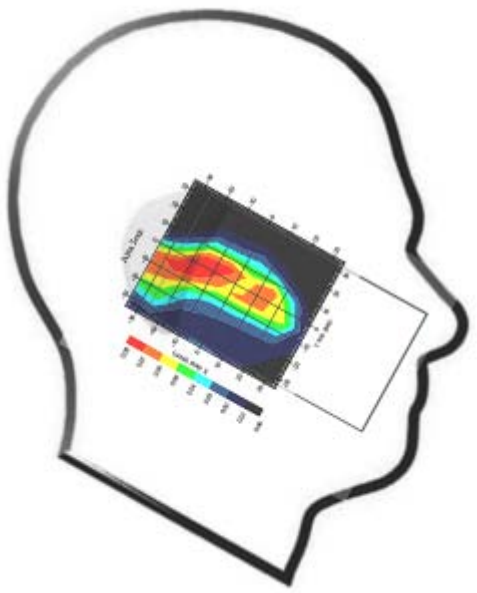
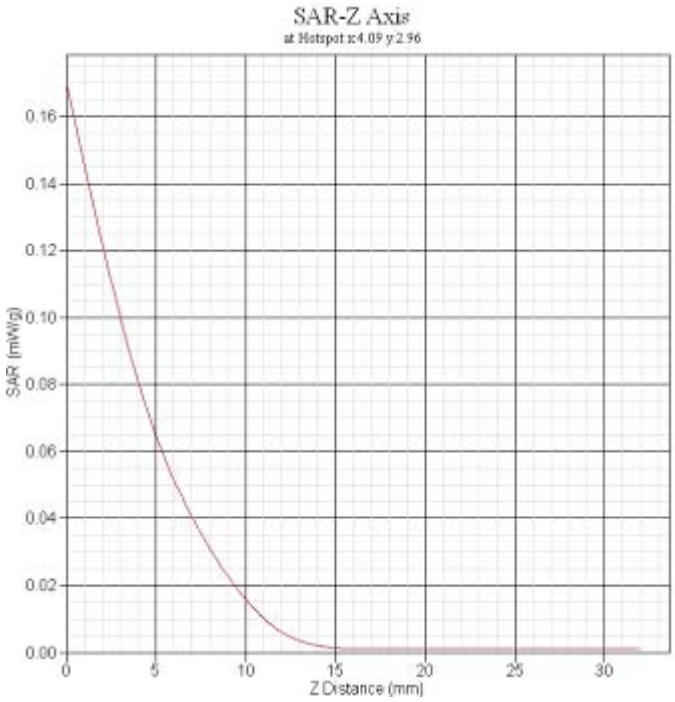
WCDMA Band Ⅴ Left tilt CH4183	
Frequency(MHz)	836.6
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	0.769
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.309
SAR 10g(W/Kg)	0.230

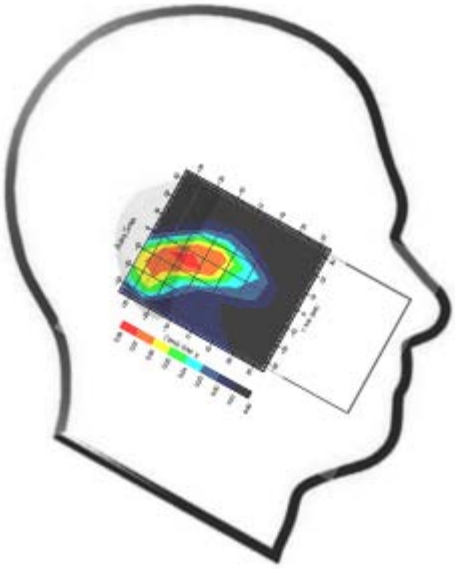
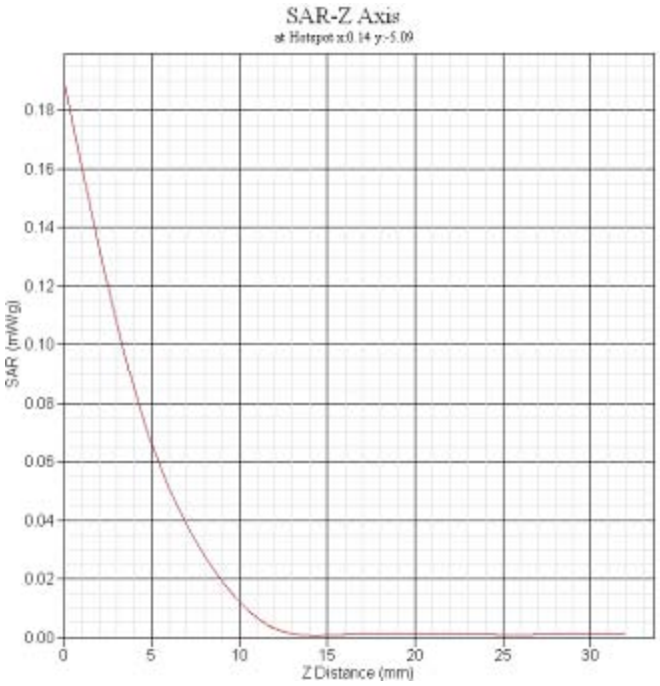
WCDMA Band Ⅴ Right cheek CH4183	
Frequency(MHz)	836.6
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	-1.452
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.327
SAR 10g(W/Kg)	0.150

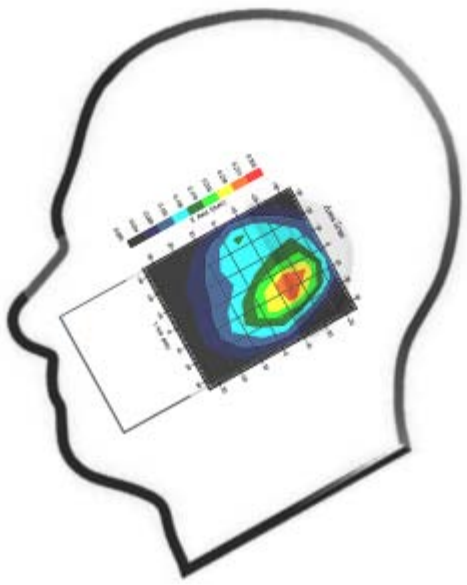
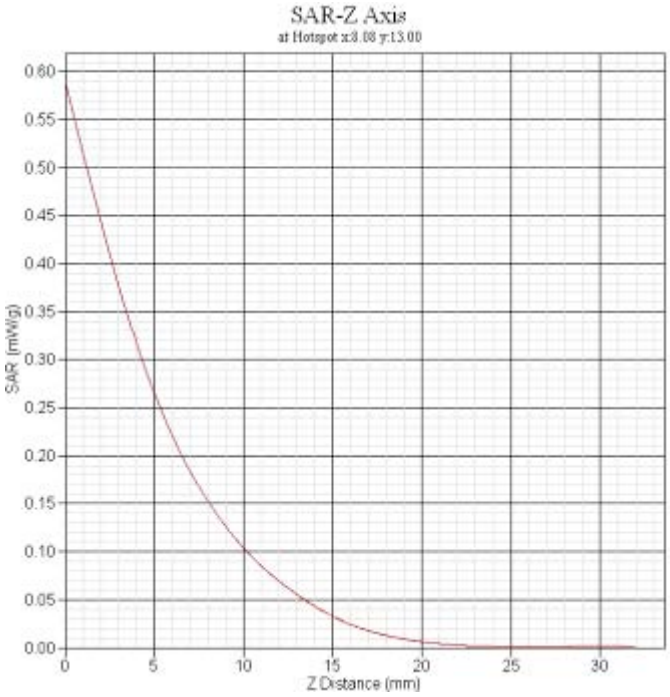
WCDMA Band Ⅴ	Right tilt CH4183
Frequency(MHz)	836.6
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	0.747
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.349
SAR 10g(W/Kg)	0.260

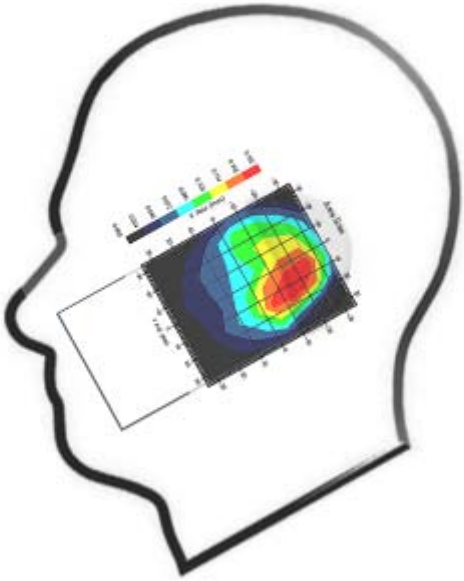
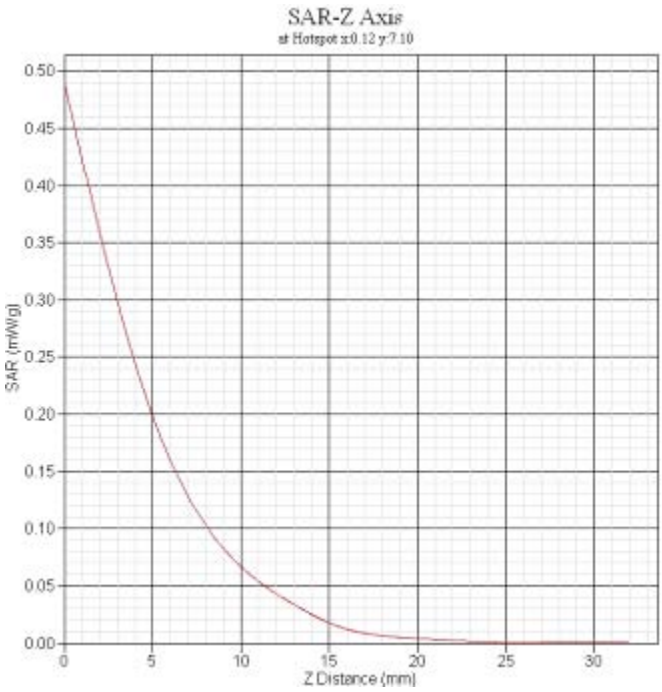
WCDMA Band Ⅴ Left cheek CH4132	
Frequency(MHz)	826.4
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	-3.498
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.313
SAR 10g(W/Kg)	0.253

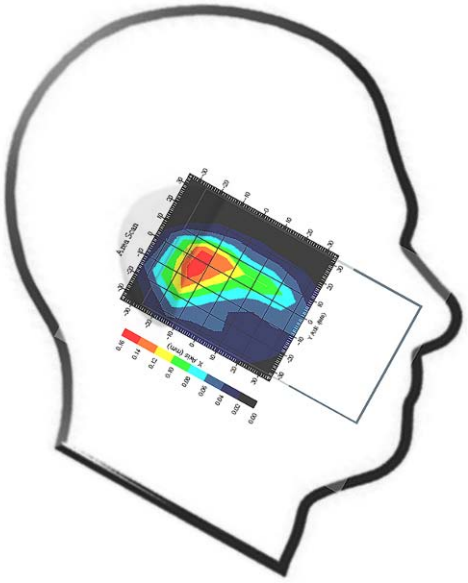
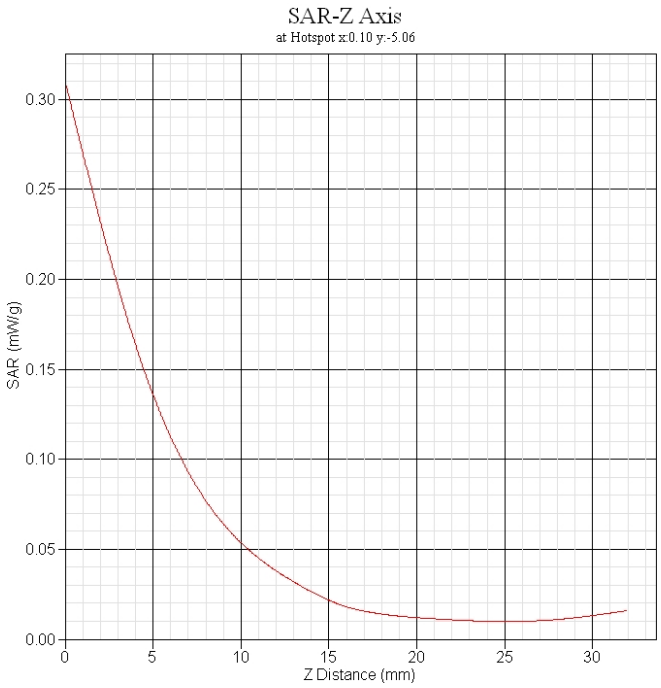
WCDMA Band Ⅴ Left cheek CH4233	
Frequency(MHz)	846.6
Relative permittivity(real part)	40.27
Conductivity(S/m)	0.92
Variation(%)	-2.242
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.5
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-10
	
SAR 1g(W/Kg)	0.382
SAR 10g(W/Kg)	0.264

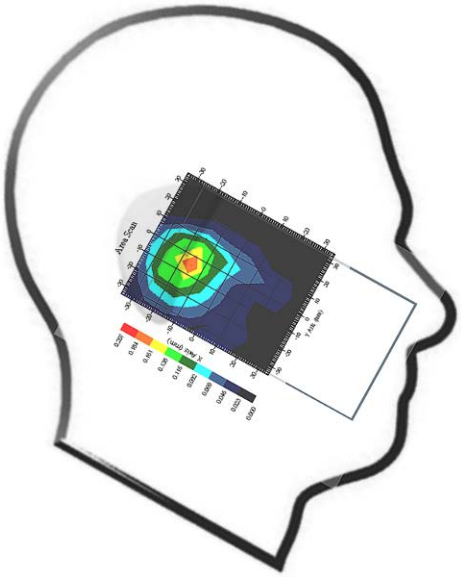
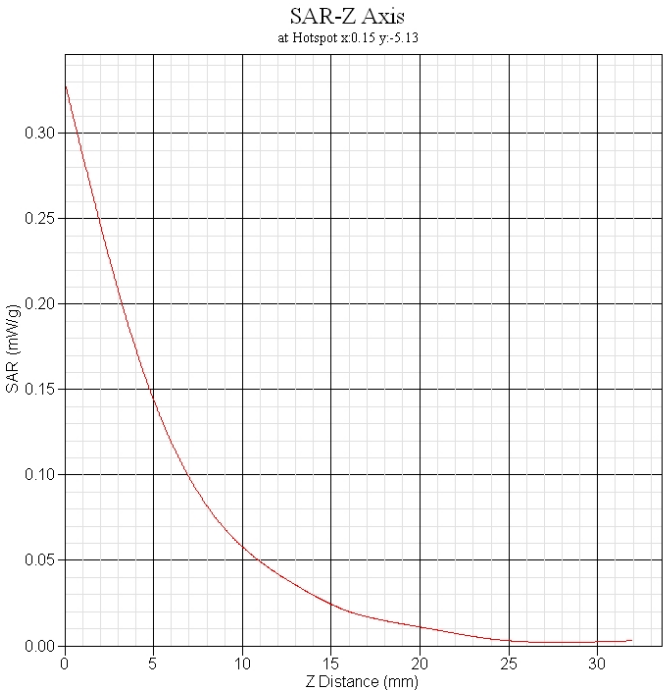
802.11b Left cheek CH11	
Frequency(MHz)	2472
Relative permittivity(real part)	40.24
Conductivity(S/m)	1.83
Variation(%)	-0.594
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.65
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.081
SAR 10g(W/Kg)	0.033

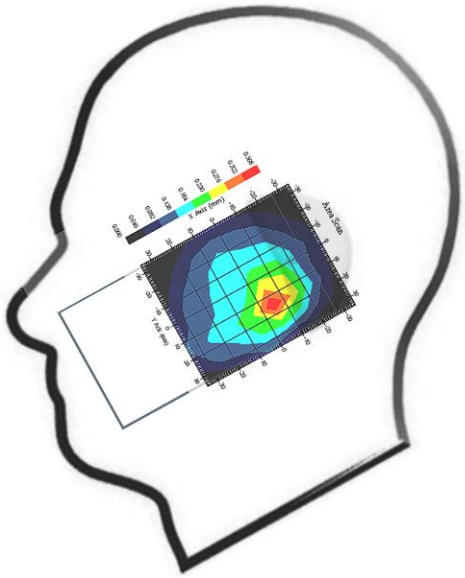
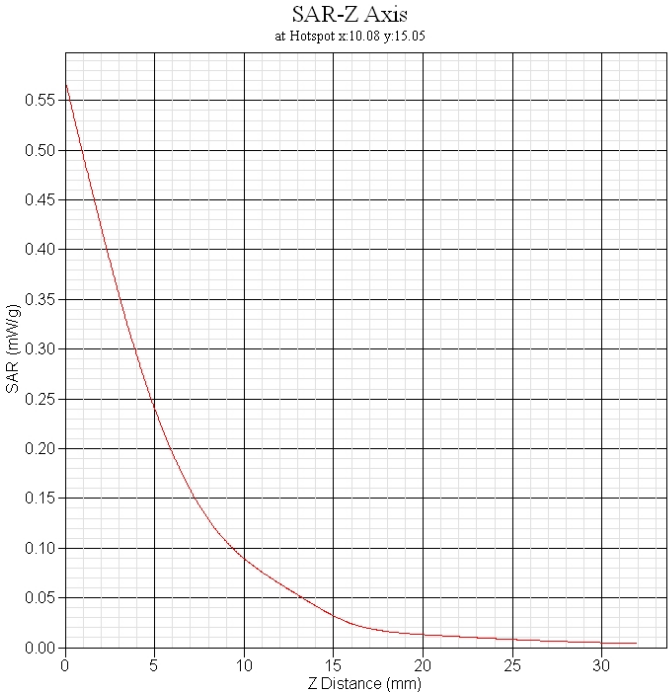
802.11b Left tilt CH11	
Frequency(MHz)	2472
Relative permittivity(real part)	40.24
Conductivity(S/m)	1.83
Variation(%)	-1.651
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.65
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.082
SAR 10g(W/Kg)	0.034

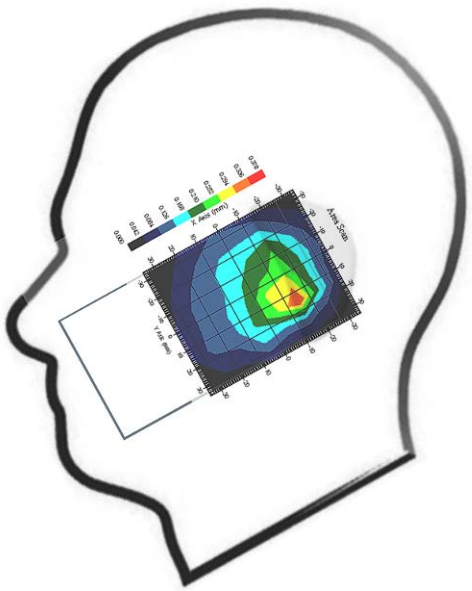
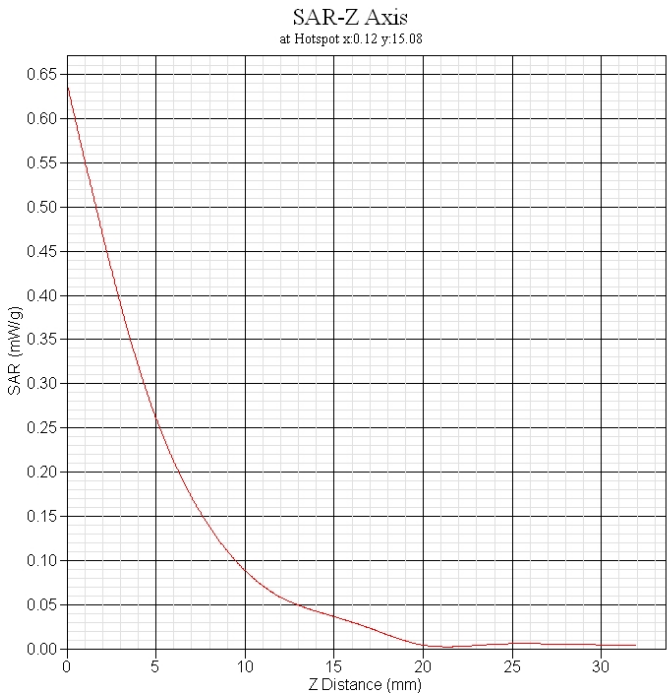
802.11b Right cheek CH11	
Frequency(MHz)	2472
Relative permittivity(real part)	40.24
Conductivity(S/m)	1.83
Variation(%)	1.918
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.65
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.251
SAR 10g(W/Kg)	0.123

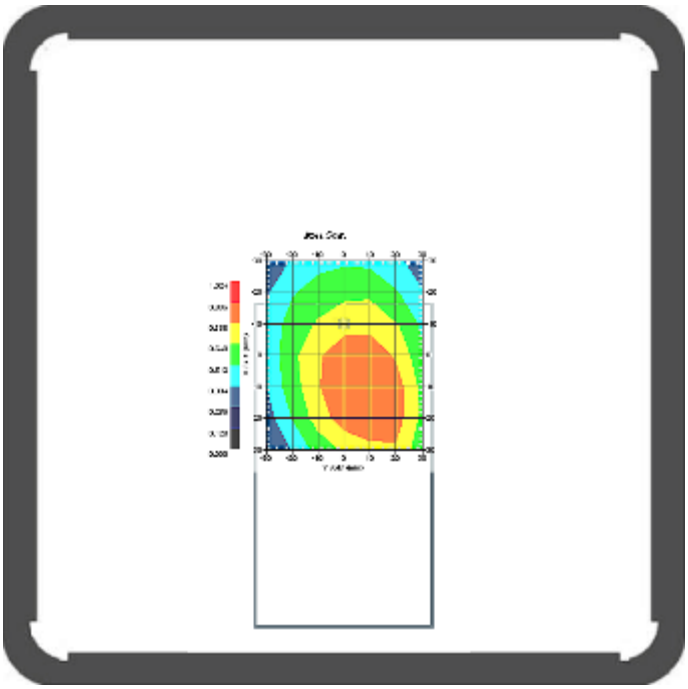
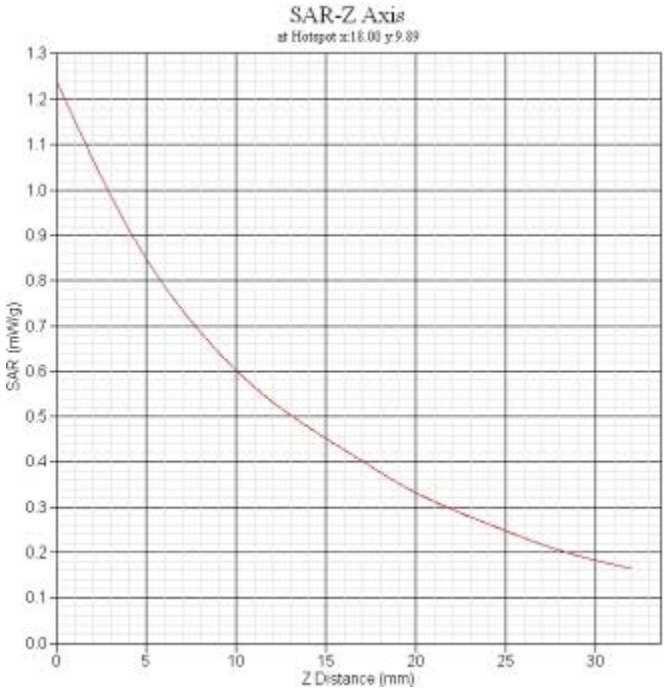
802.11b Right tilt CH11	
Frequency(MHz)	2472
Relative permittivity(real part)	40.24
Conductivity(S/m)	1.83
Variation(%)	4.809
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.65
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.225
SAR 10g(W/Kg)	0.096

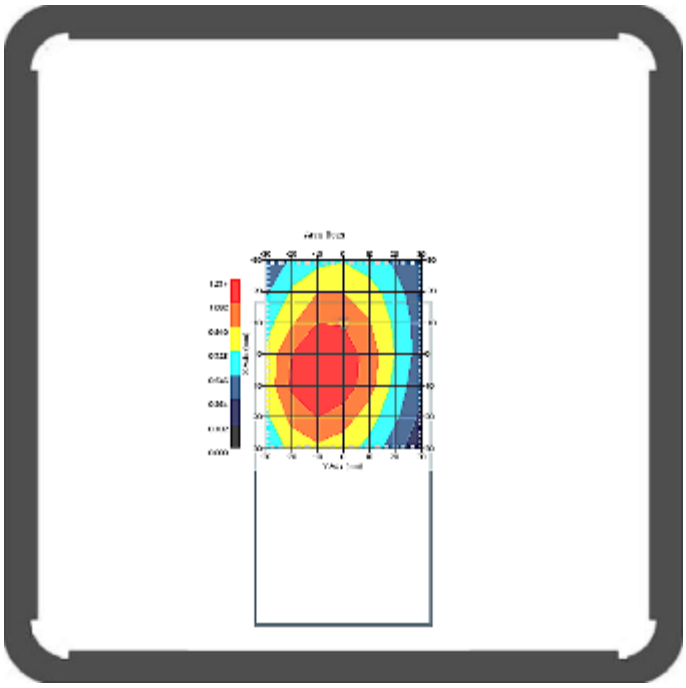
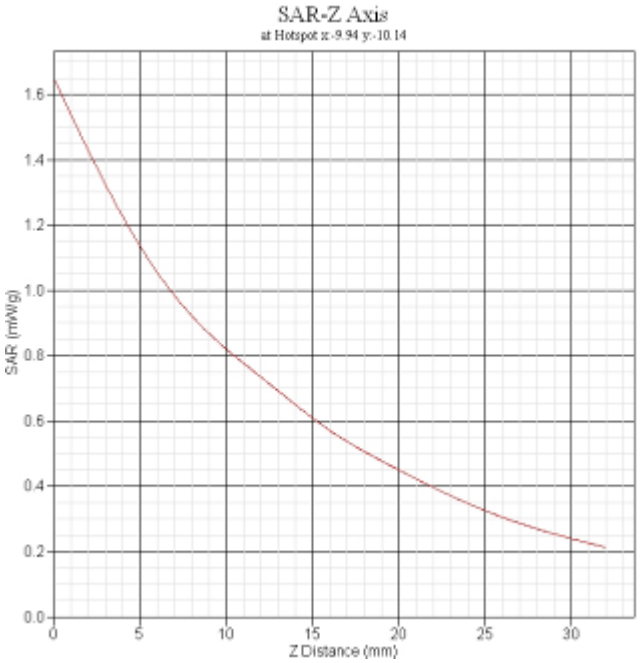
802.11g Left cheek CH11	
Frequency(MHz)	2472
Relative permittivity(real part)	40.24
Conductivity(S/m)	1.83
Variation(%)	1.453
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.65
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.149
SAR 10g(W/Kg)	0.068

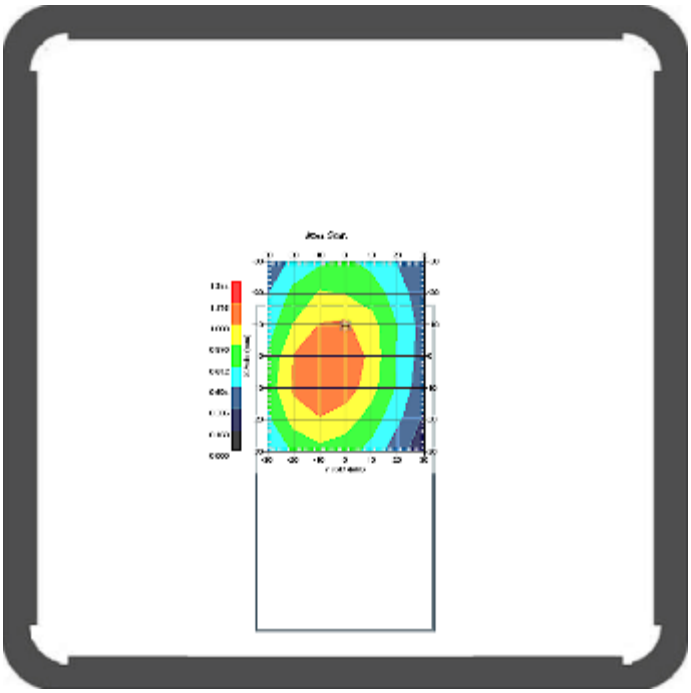
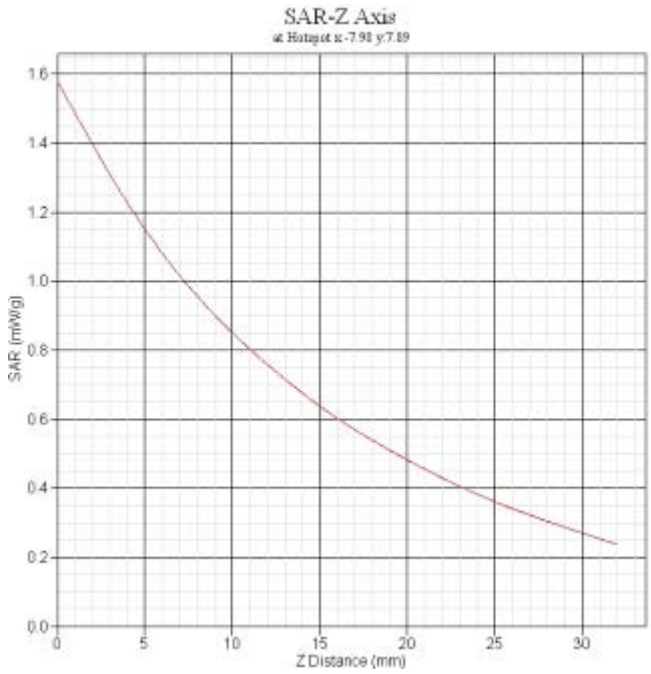
802.11g Left tilt CH11	
Frequency(MHz)	2472
Relative permittivity(real part)	40.24
Conductivity(S/m)	1.83
Variation(%)	2.426
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.65
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.158
SAR 10g(W/Kg)	0.072

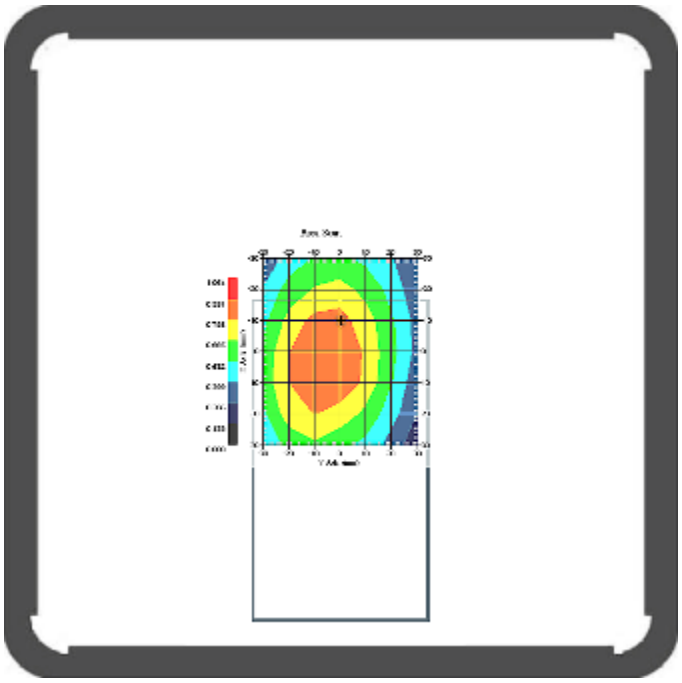
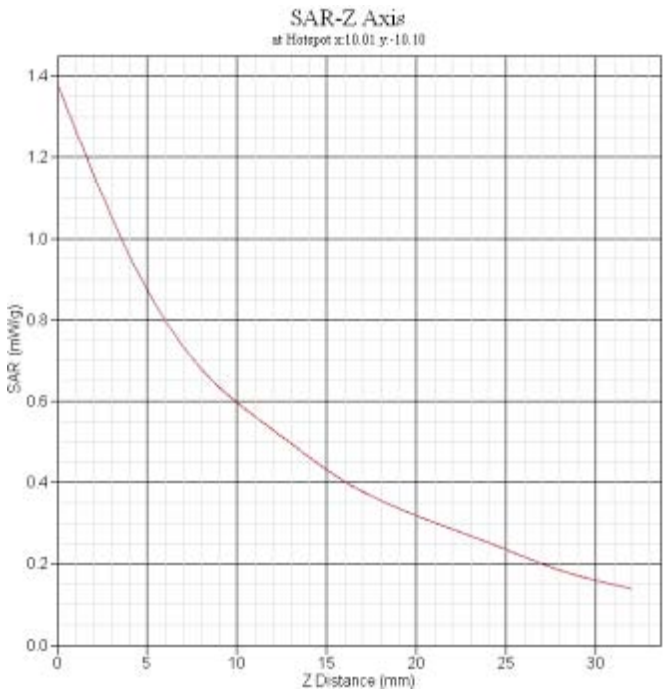
802.11g Right cheek CH11	
Frequency(MHz)	2472
Relative permittivity(real part)	40.24
Conductivity(S/m)	1.83
Variation(%)	-3.191
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.65
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.255
SAR 10g(W/Kg)	0.134

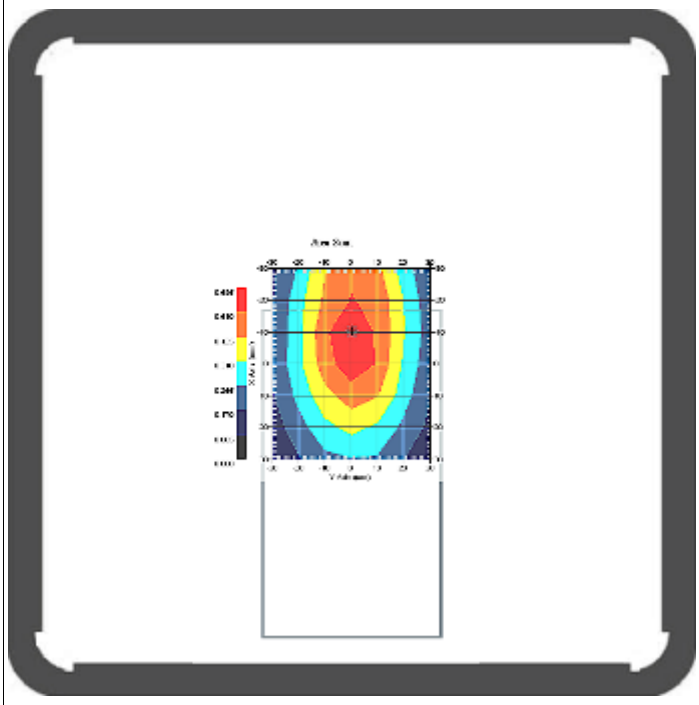
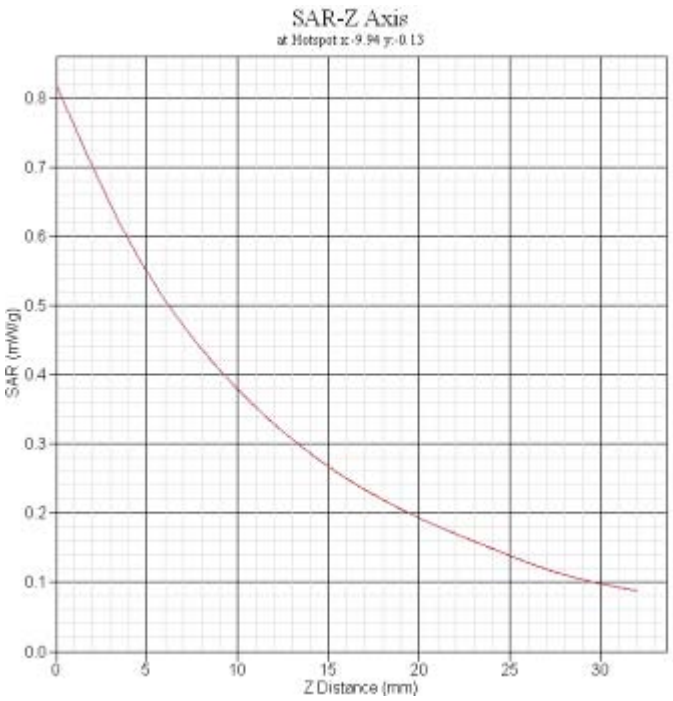
802.11g Right tilt CH11	
Frequency(MHz)	2472
Relative permittivity(real part)	40.24
Conductivity(S/m)	1.83
Variation(%)	1.746
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.65
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.246
SAR 10g(W/Kg)	0.119

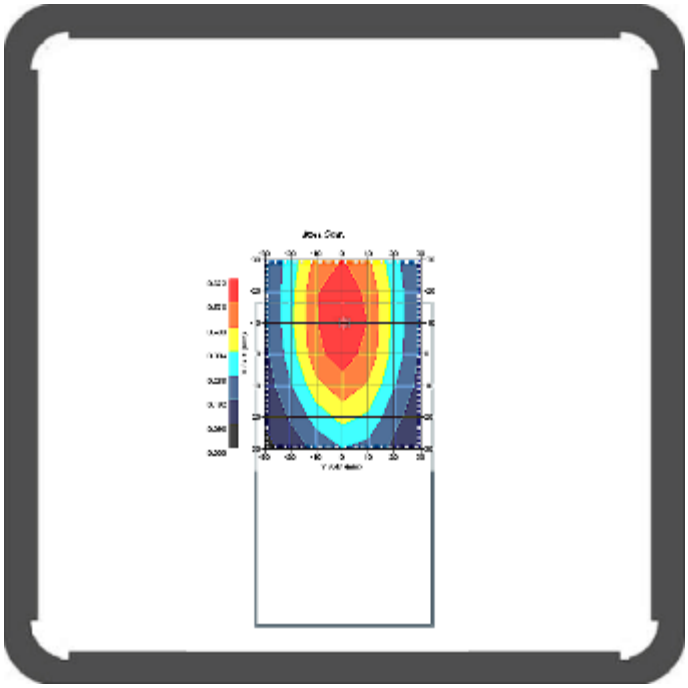
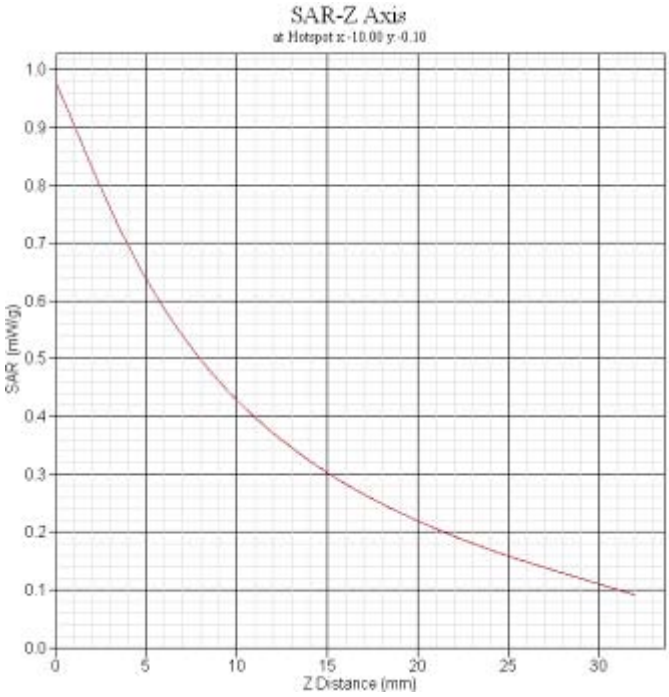
GPRS850 body Front CH190(Hotspot)	
Frequency(MHz)	836.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	-0.324
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.781
SAR 10g(W/Kg)	0.560

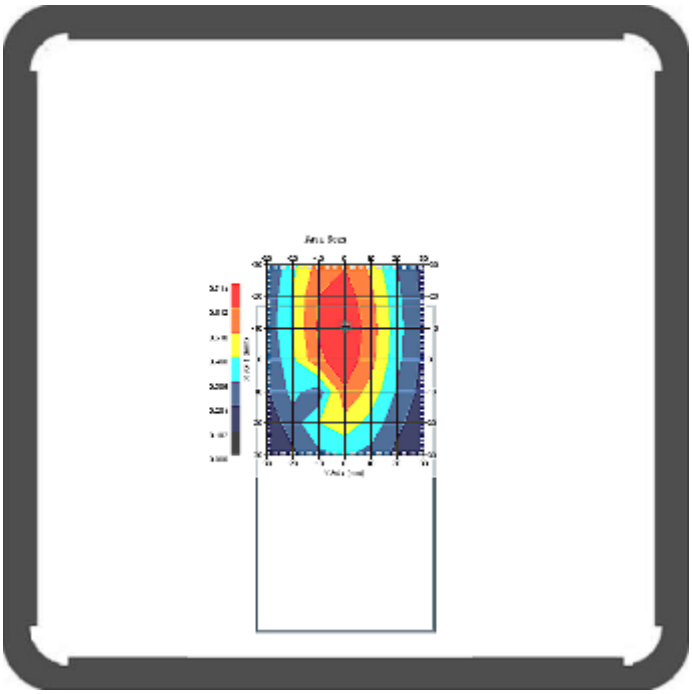
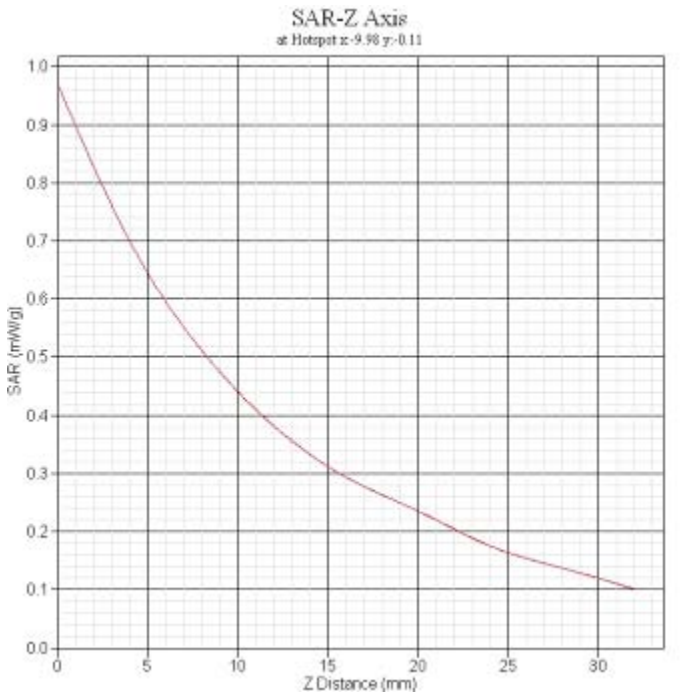
GPRS850 body Back CH128(Hotspot)	
Frequency(MHz)	824.2
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	0.001
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	1.221
SAR 10g(W/Kg)	0.821

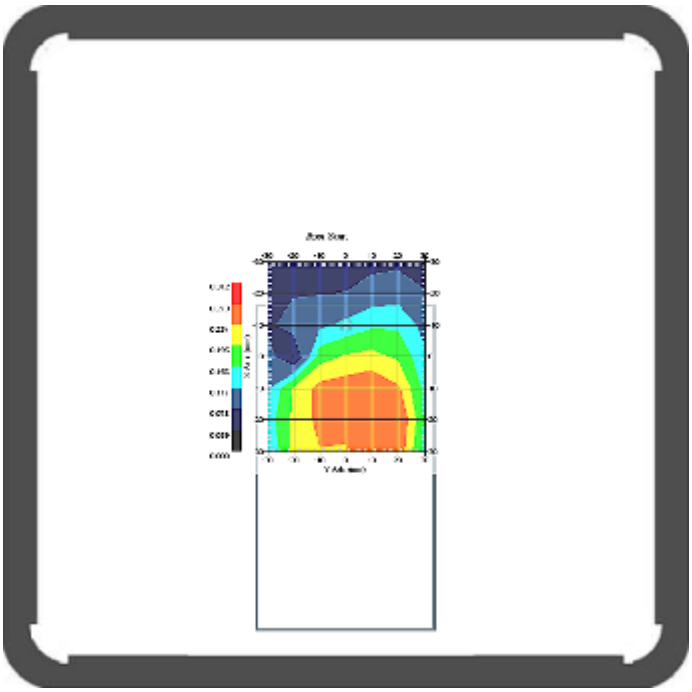
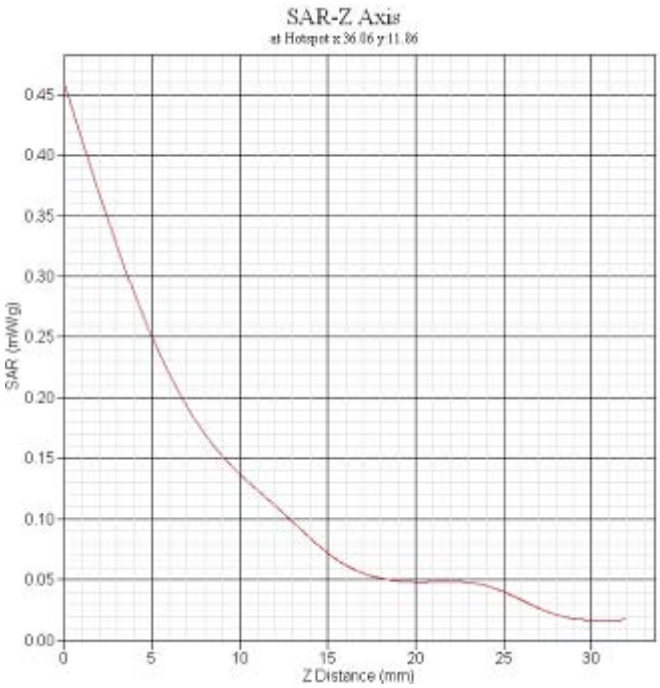
GPRS850 body Back CH190(Hotspot)	
Frequency(MHz)	836.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	-0.267
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	1.106
SAR 10g(W/Kg)	0.746

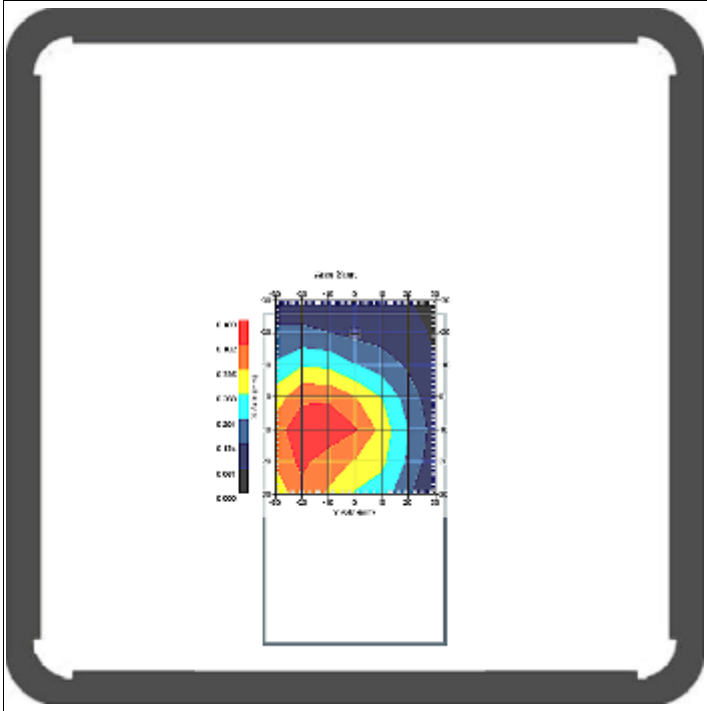
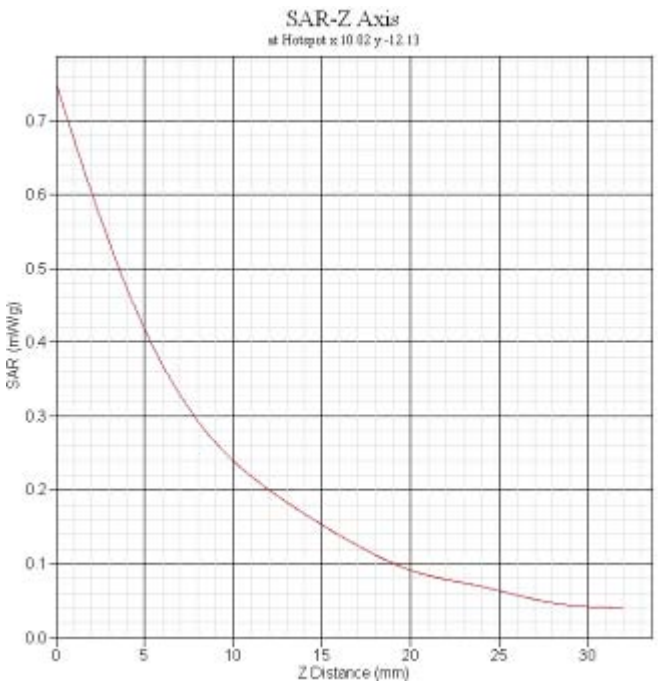
GPRS850 body Back CH251(Hotspot)	
Frequency(MHz)	848.8
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	-1.983
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.918
SAR 10g(W/Kg)	0.610

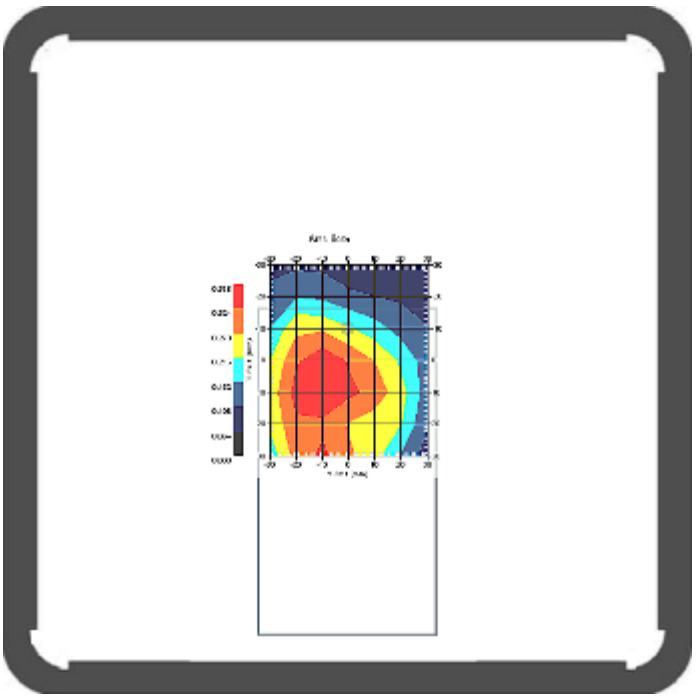
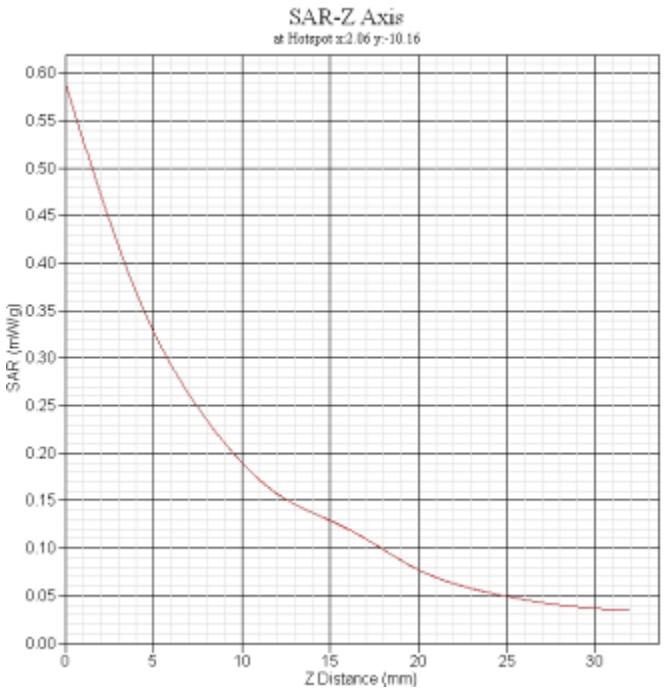
GPRS850 body left CH190(Hotspot)	
Frequency(MHz)	836.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	-1.058
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.551
SAR 10g(W/Kg)	0.366

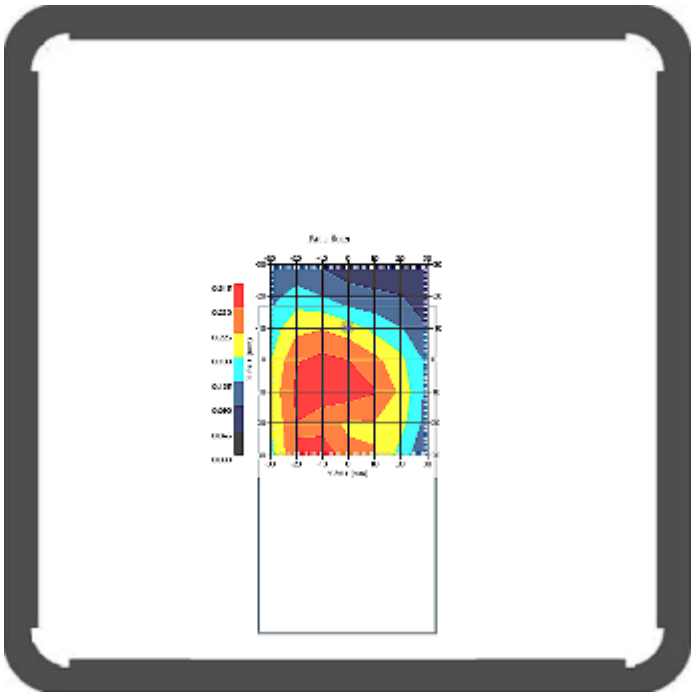
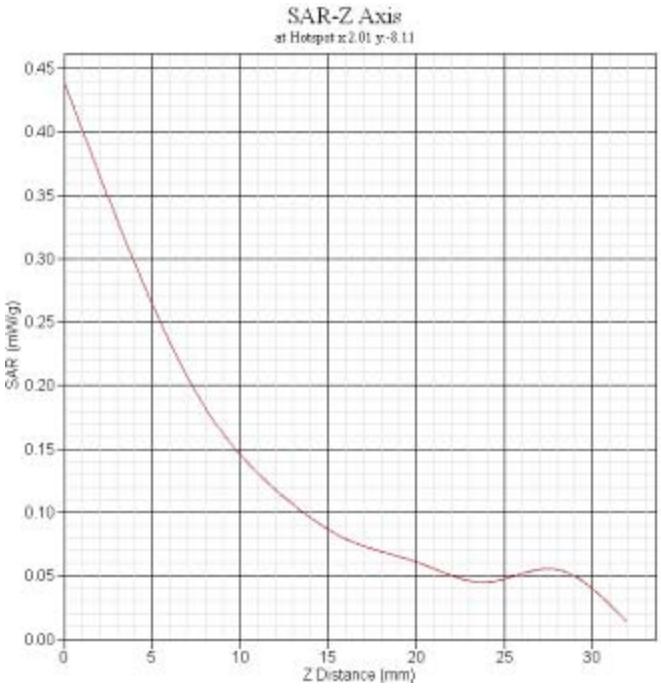
GPRS850 body Right CH190(Hotspot)	
Frequency(MHz)	836.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	0.814
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.715
SAR 10g(W/Kg)	0.401

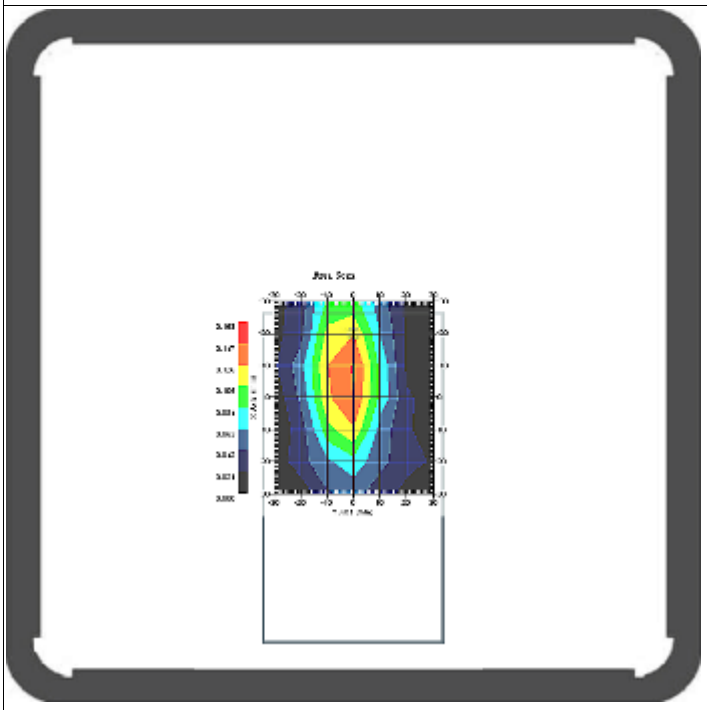
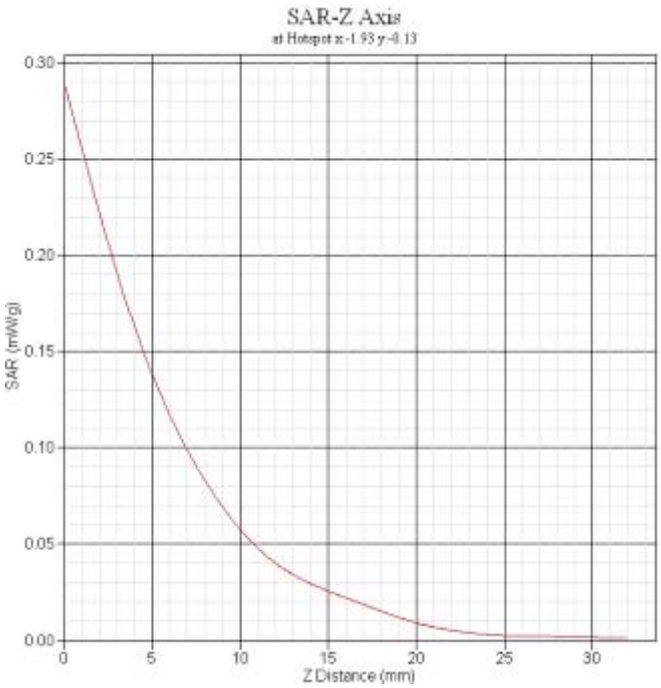
GPRS850 body bottom CH190(Hotspot)	
Frequency(MHz)	836.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	-0.893
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.660
SAR 10g(W/Kg)	0.428

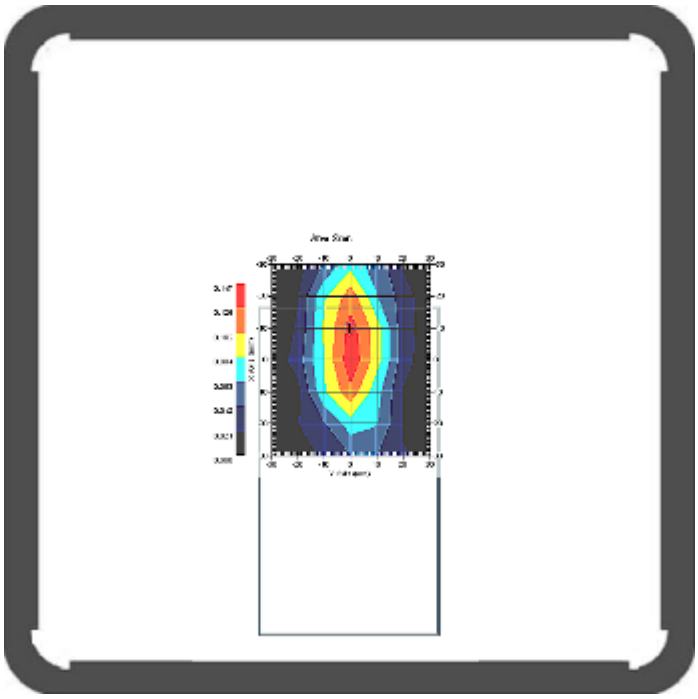
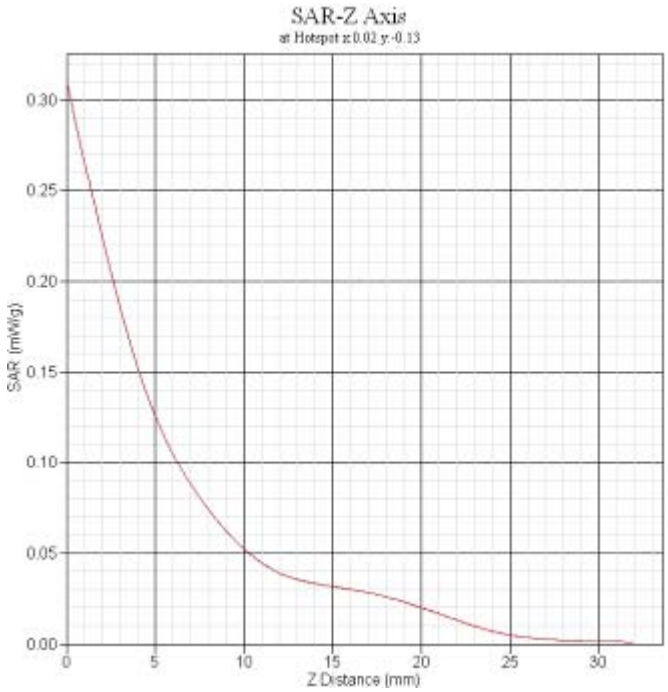
GPRS1900 body Front CH661(Hotspot)	
Frequency(MHz)	1880.0
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	0.741
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.282
SAR 10g(W/Kg)	0.164

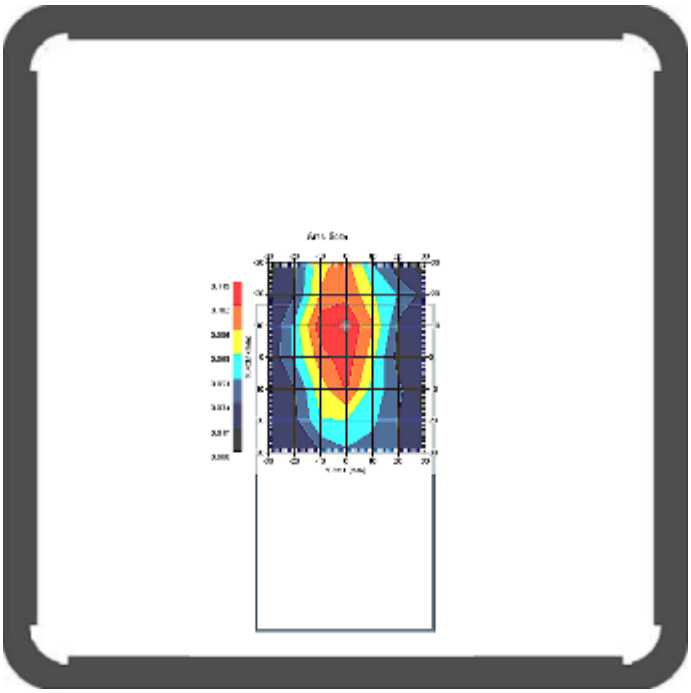
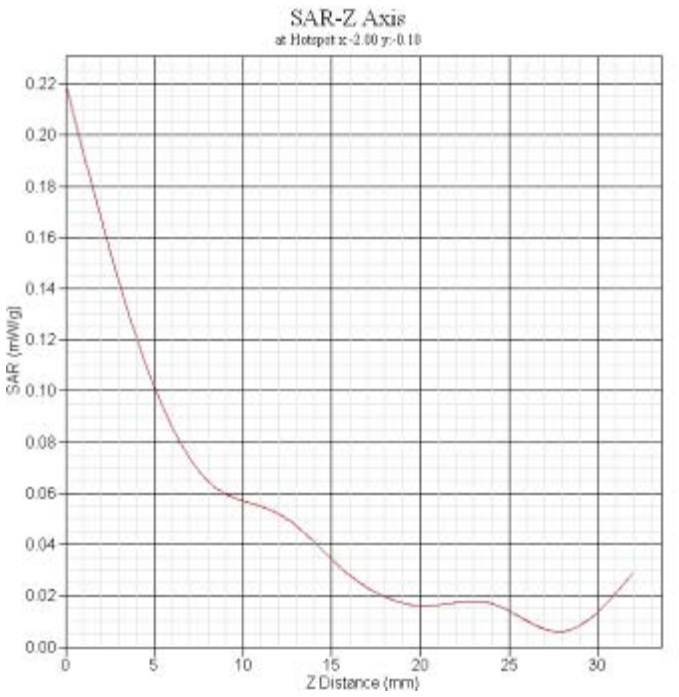
GPRS1900 body Back CH512(Hotspot)	
Frequency(MHz)	1850.2
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	1.260
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.412
SAR 10g(W/Kg)	0.241

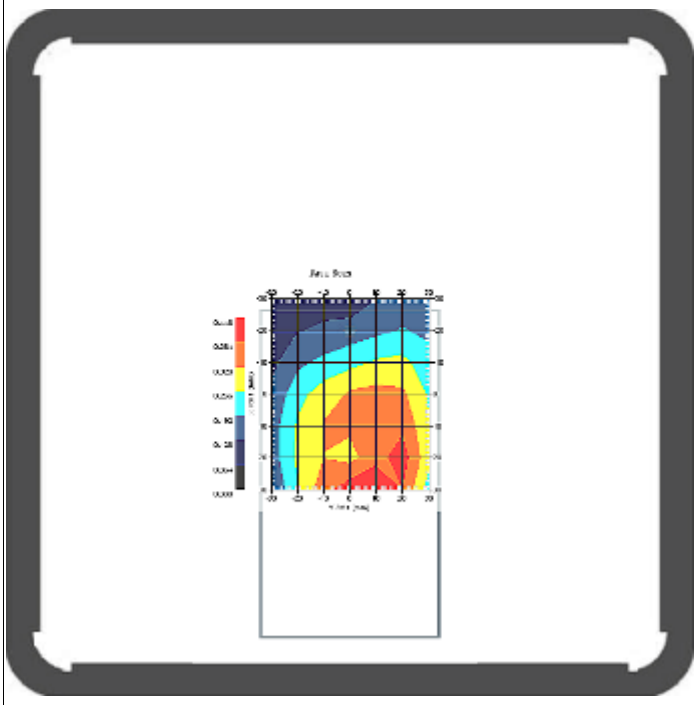
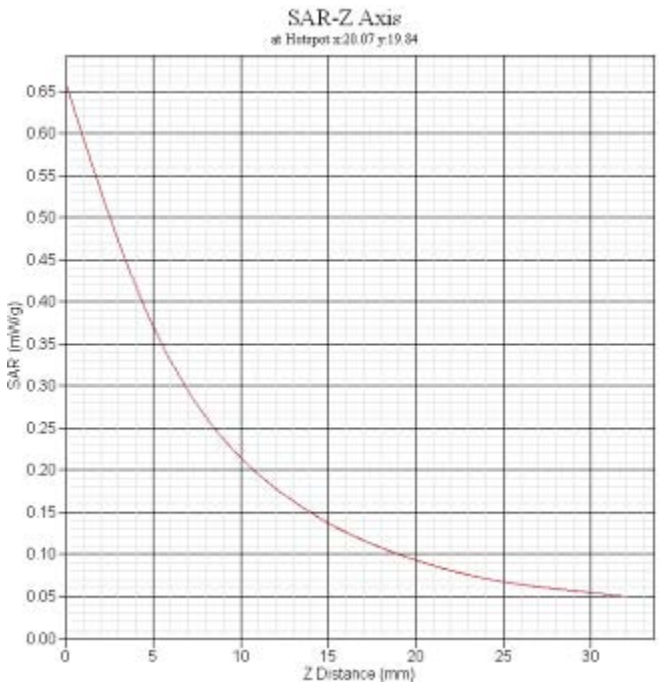
GPRS1900 body Back CH661(Hotspot)	
Frequency(MHz)	1880.0
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	4.979
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.348
SAR 10g(W/Kg)	0.202

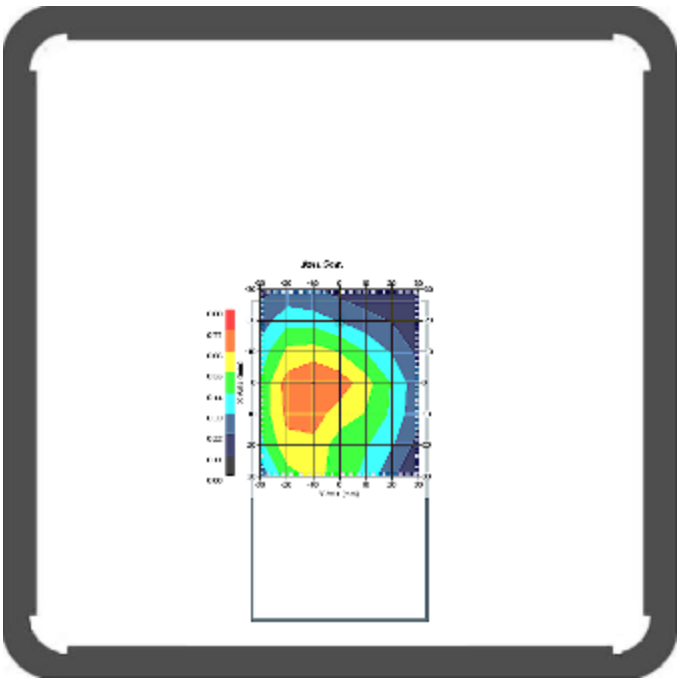
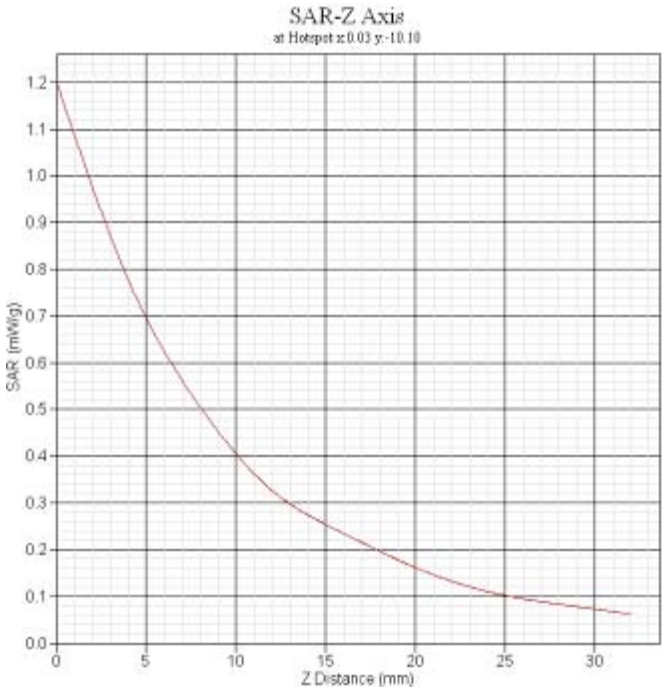
GPRS1900 body Back CH810(Hotspot)	
Frequency(MHz)	1909.8
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	-1.686
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.279
SAR 10g(W/Kg)	0.169

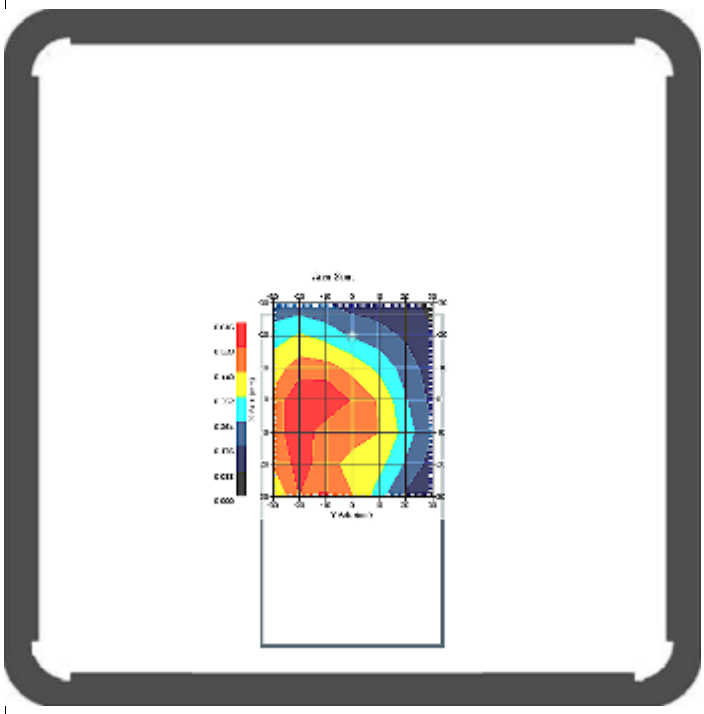
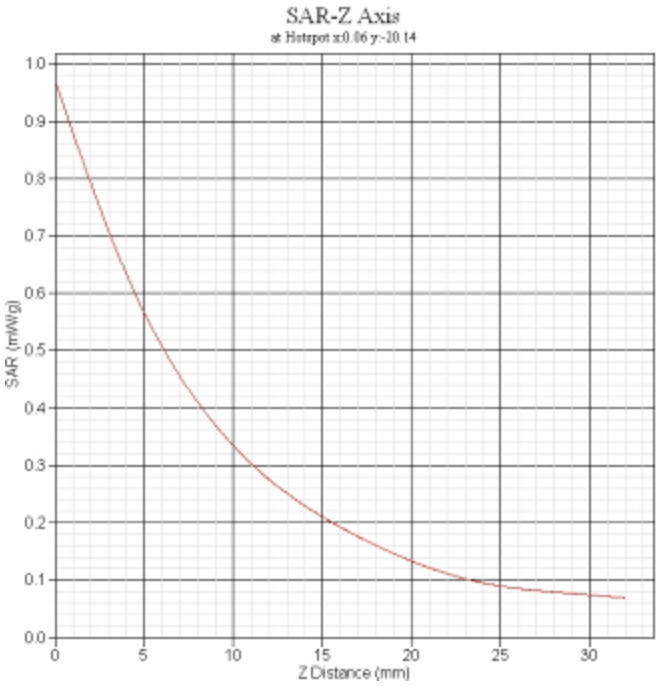
GPRS1900 body left CH661(Hotspot)	
Frequency(MHz)	1880.0
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	-3.895
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.143
SAR 10g(W/Kg)	0.069

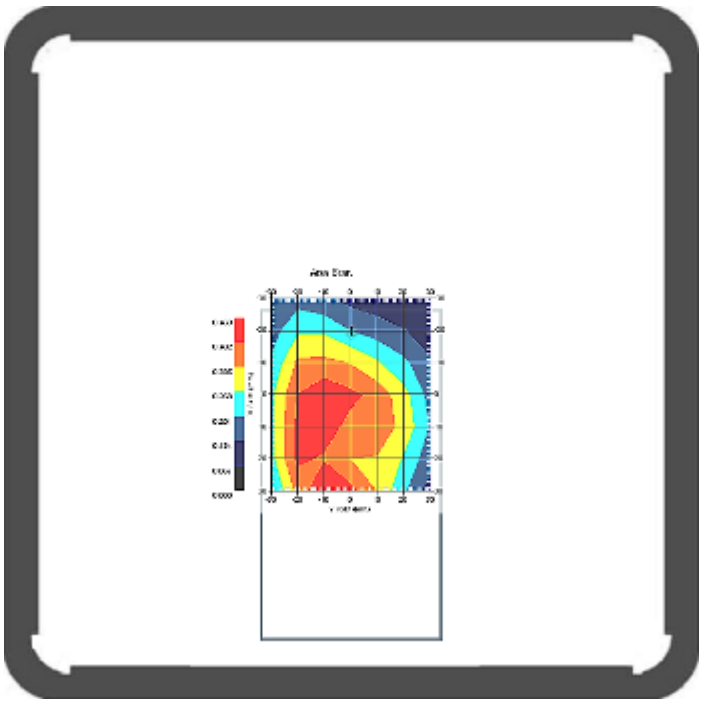
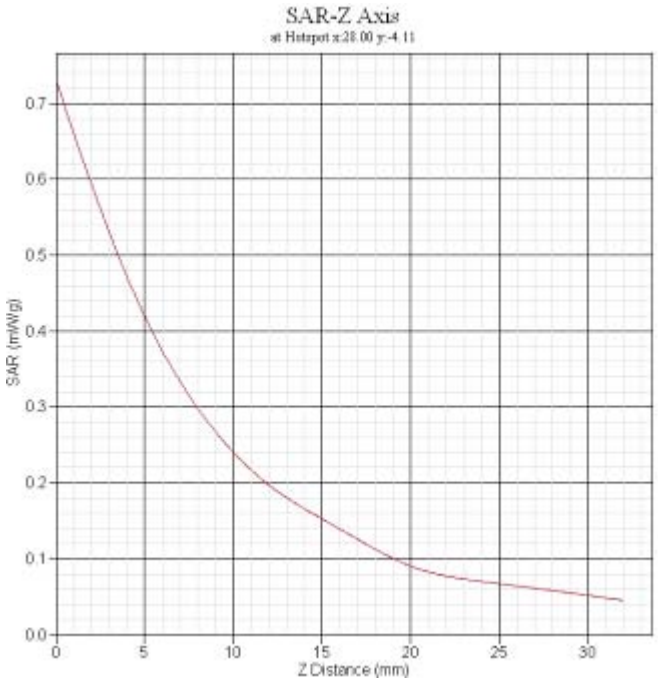
GPRS1900 body Right CH661(Hotspot)	
Frequency(MHz)	1880.0
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	1.559
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.138
SAR 10g(W/Kg)	0.063

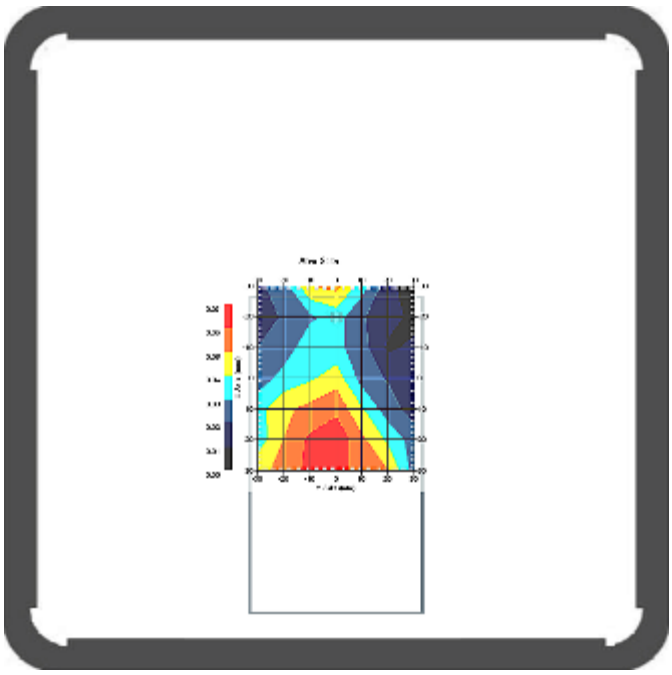
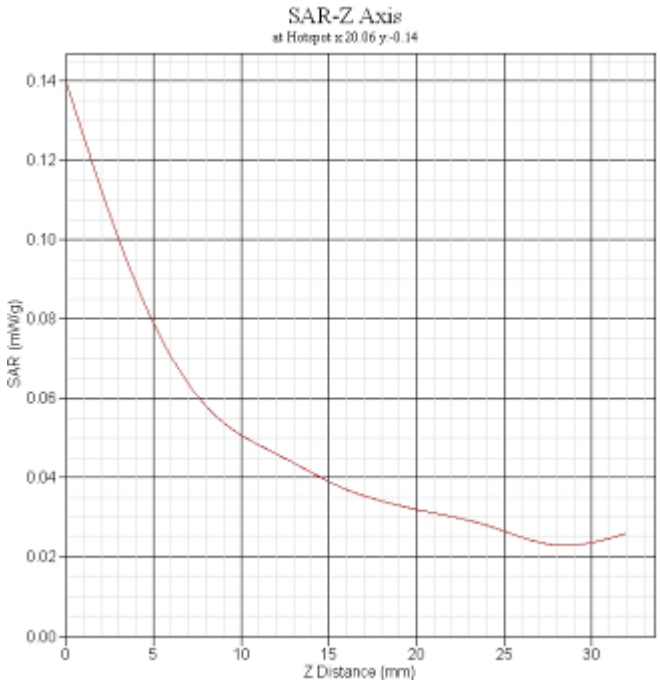
GPRS1900 body bottom CH661(Hotspot)	
Frequency(MHz)	1880.0
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	-1.619
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.093
SAR 10g(W/Kg)	0.048

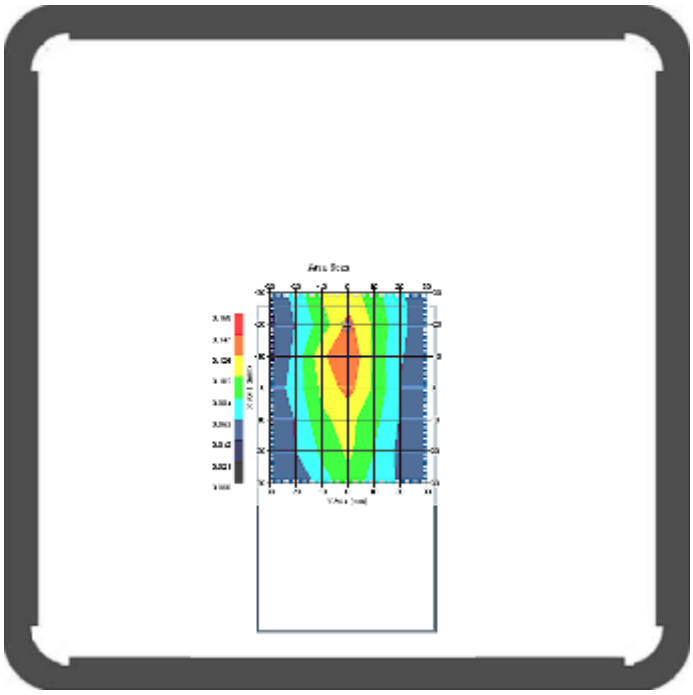
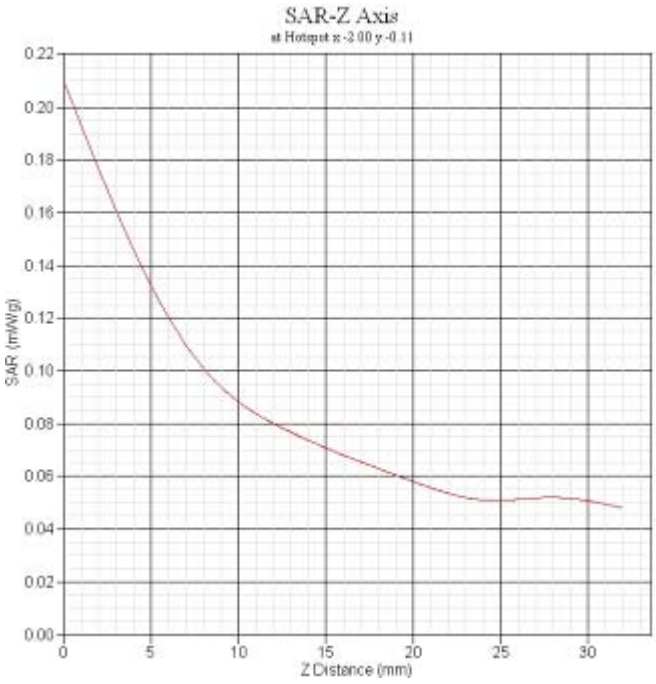
WCDMA Band Ⅱ body Front CH9400(Hotspot)	
Frequency(MHz)	1800.0
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	-0.504
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.394
SAR 10g(W/Kg)	0.230

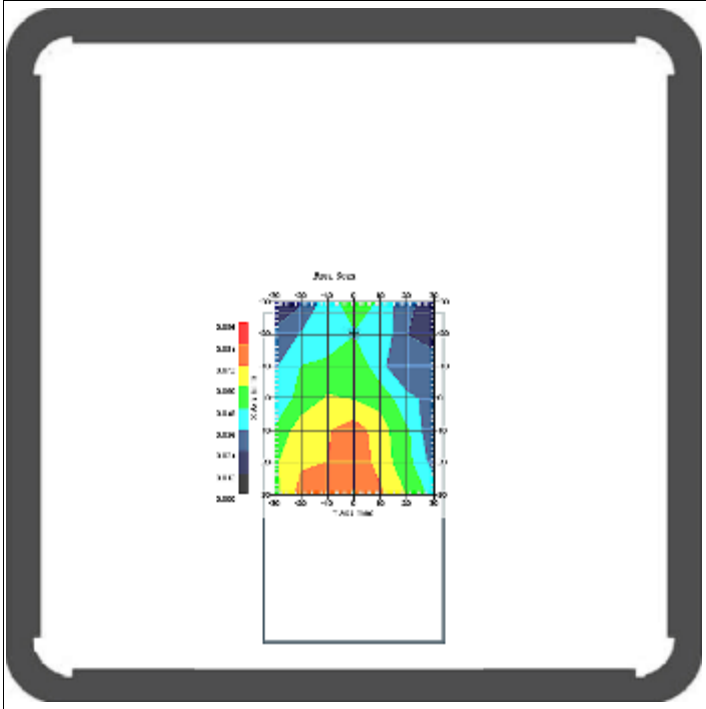
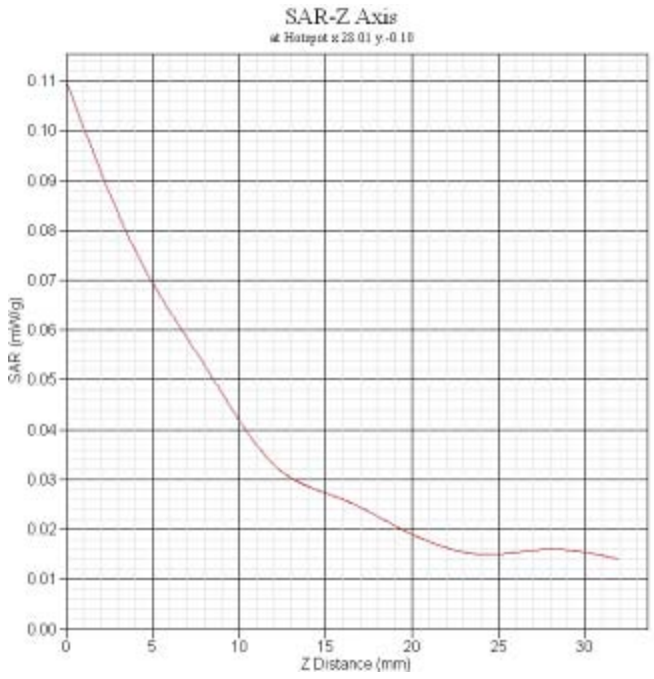
WCDMA Band Ⅱ body back CH9262(Hotspot)	
Frequency(MHz)	1852.4
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	-2.774
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.733
SAR 10g(W/Kg)	0.424

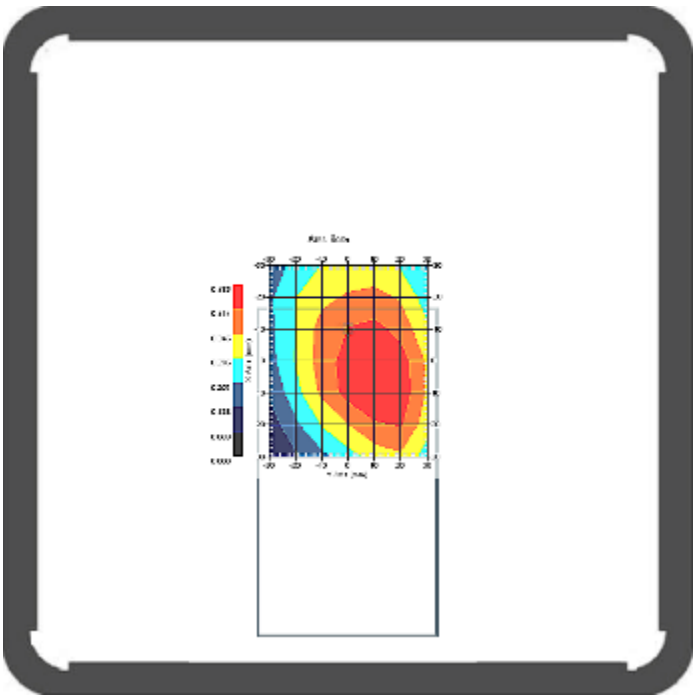
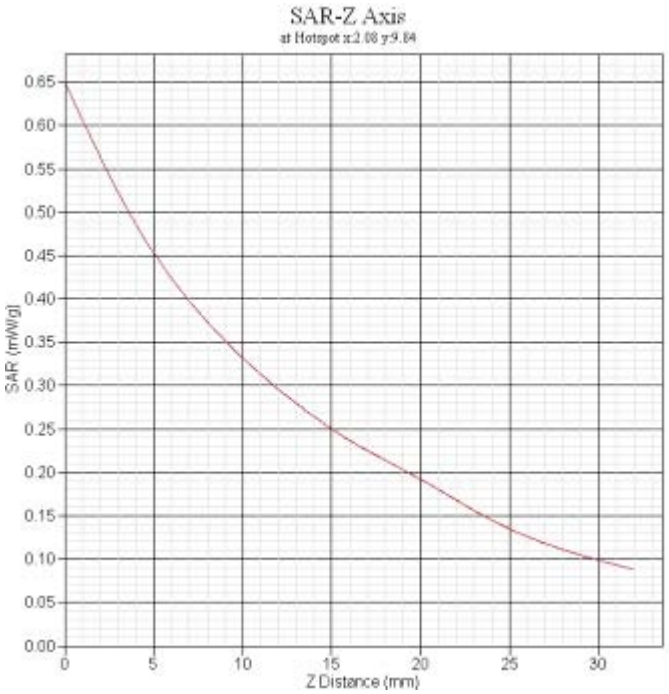
WCDMA Band Ⅱ body Back CH9400(Hotspot)	
Frequency(MHz)	1800.0
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	3.550
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.599
SAR 10g(W/Kg)	0.354

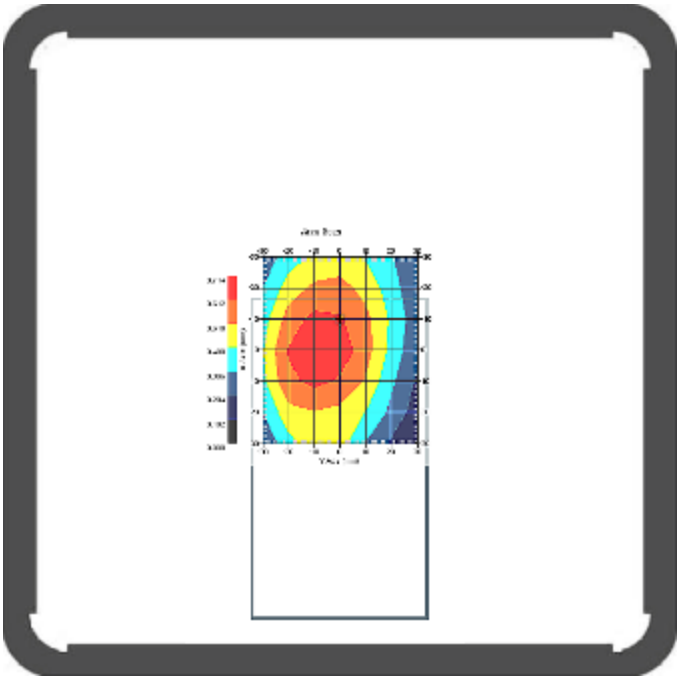
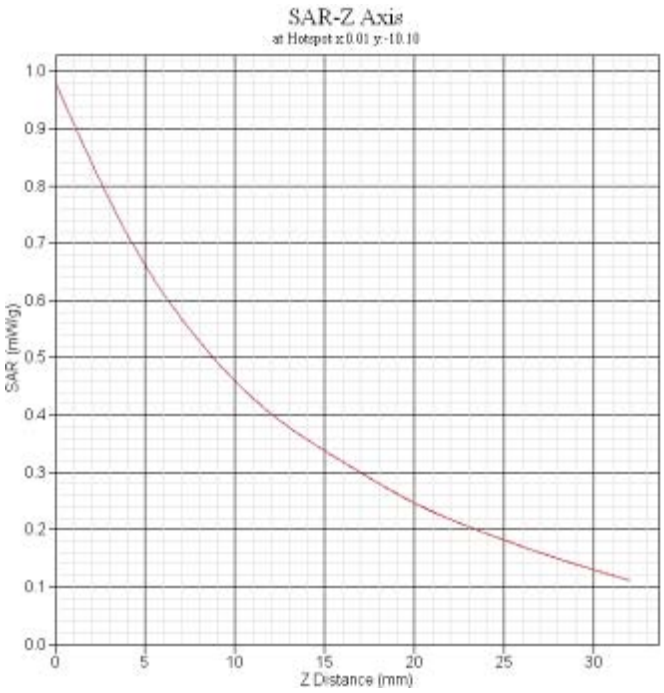
WCDMA Band Ⅱ body back CH9538(Hotspot)	
Frequency(MHz)	1907.6
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	-3.415
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.434
SAR 10g(W/Kg)	0.231

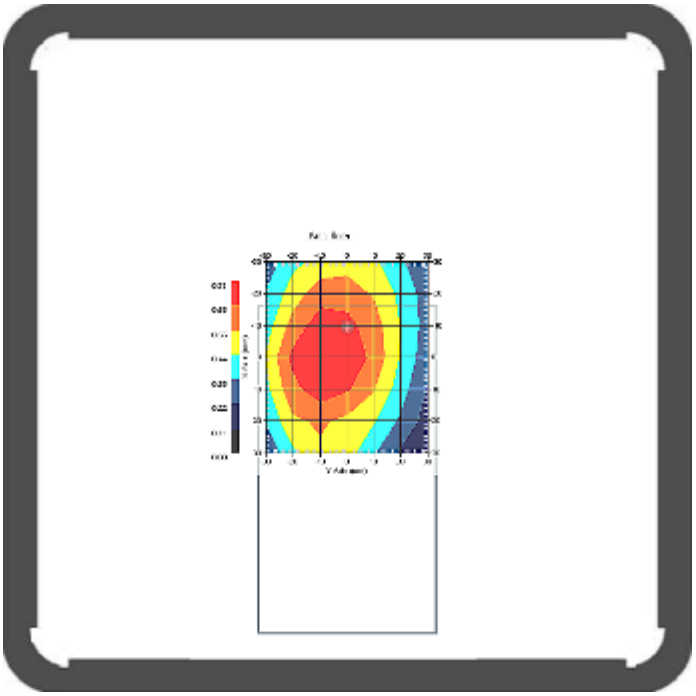
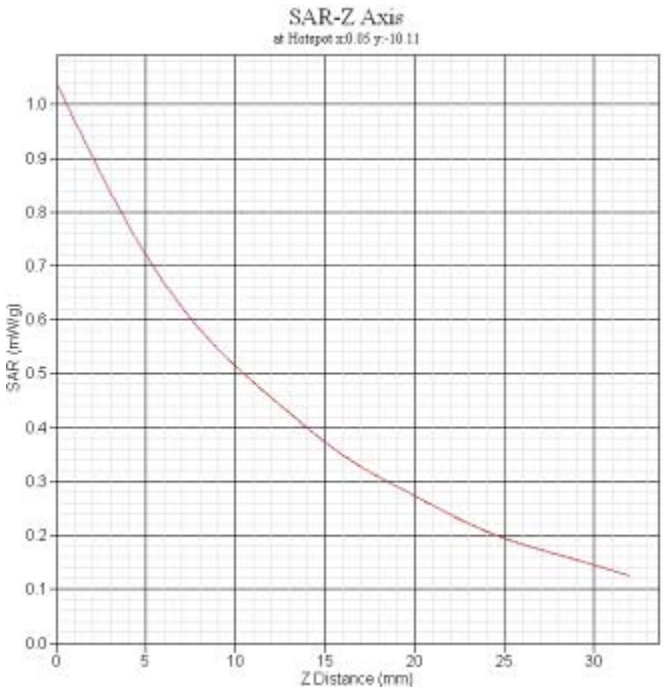
WCDMA Band Ⅱ body left CH9400(Hotspot)	
Frequency(MHz)	1800.0
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	2.949
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.084
SAR 10g(W/Kg)	0.054

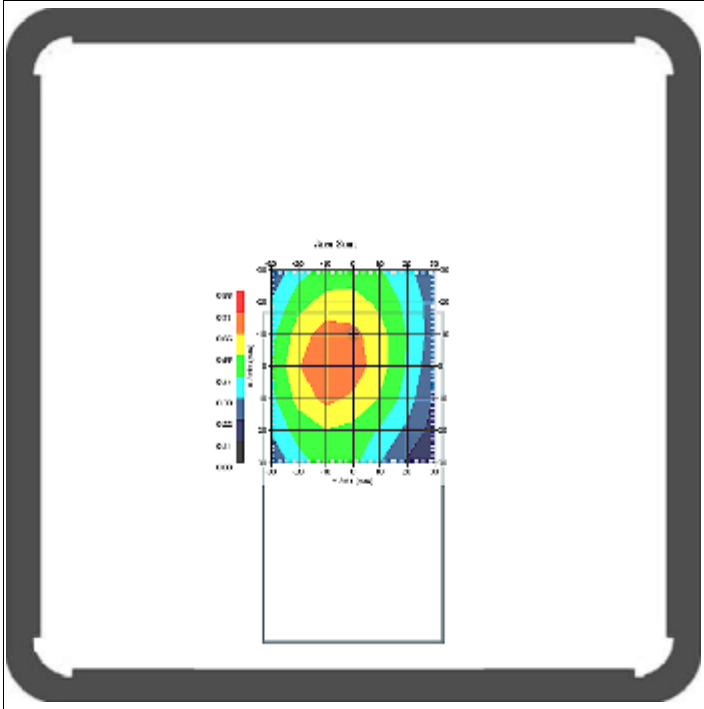
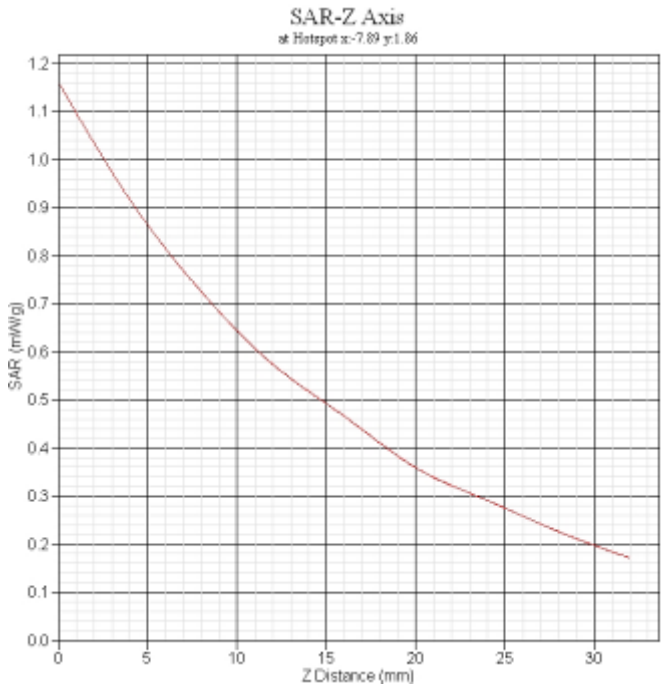
WCDMA Band Ⅱ body Right CH9400(Hotspot)	
Frequency(MHz)	1800.0
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	0.395
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.134
SAR 10g(W/Kg)	0.083

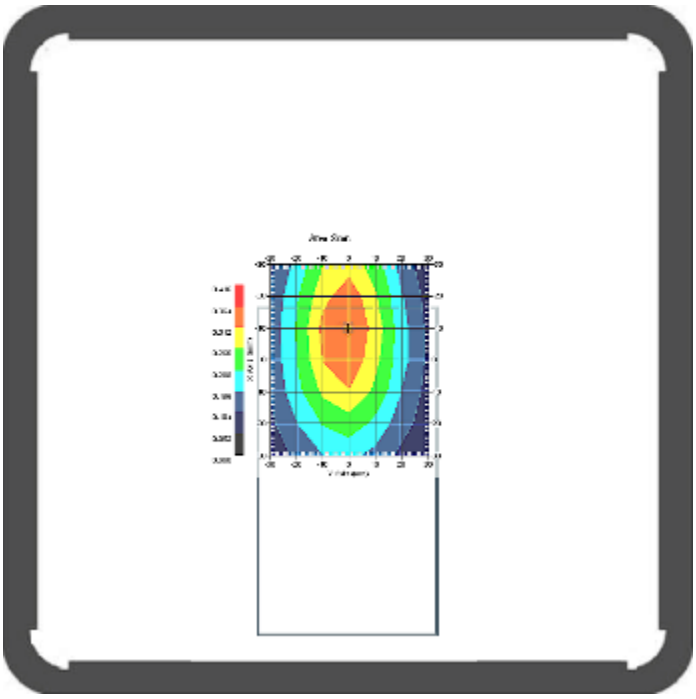
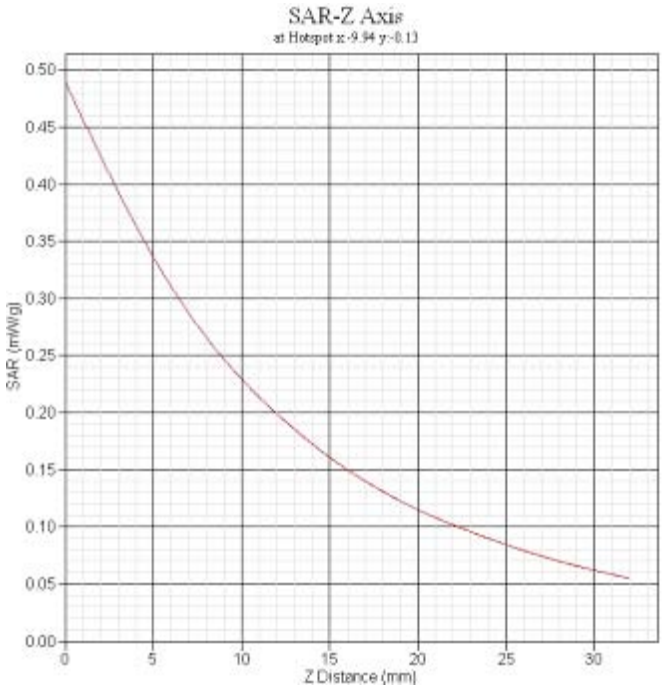
WCDMA Band Ⅱ body bottom CH9400(Hotspot)	
Frequency(MHz)	1800.0
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	4.837
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.071
SAR 10g(W/Kg)	0.043

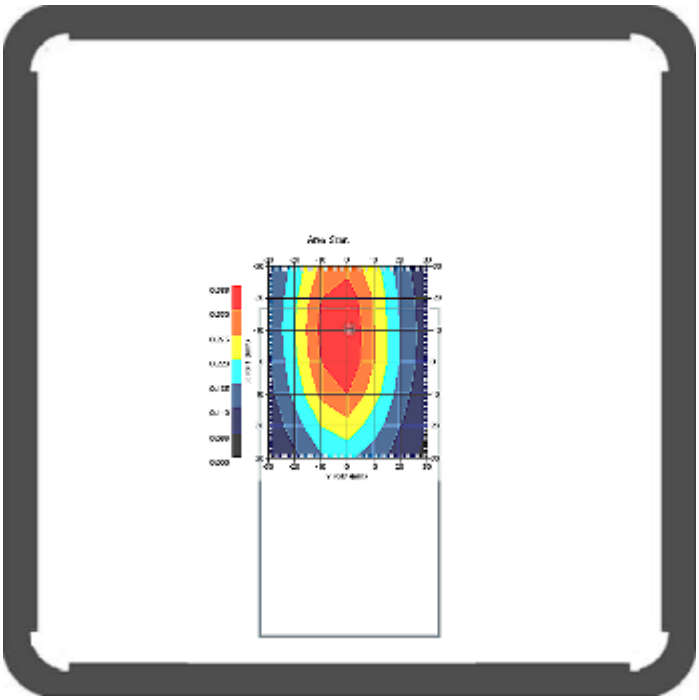
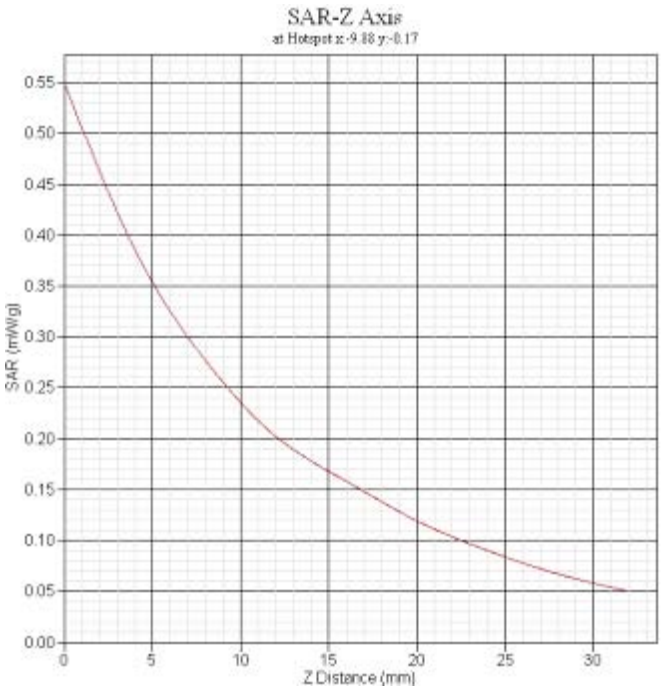
WCDMA Band Ⅴbody Front CH4183(Hotspot)	
Frequency(MHz)	836.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	-0.297
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.455
SAR 10g(W/Kg)	0.297

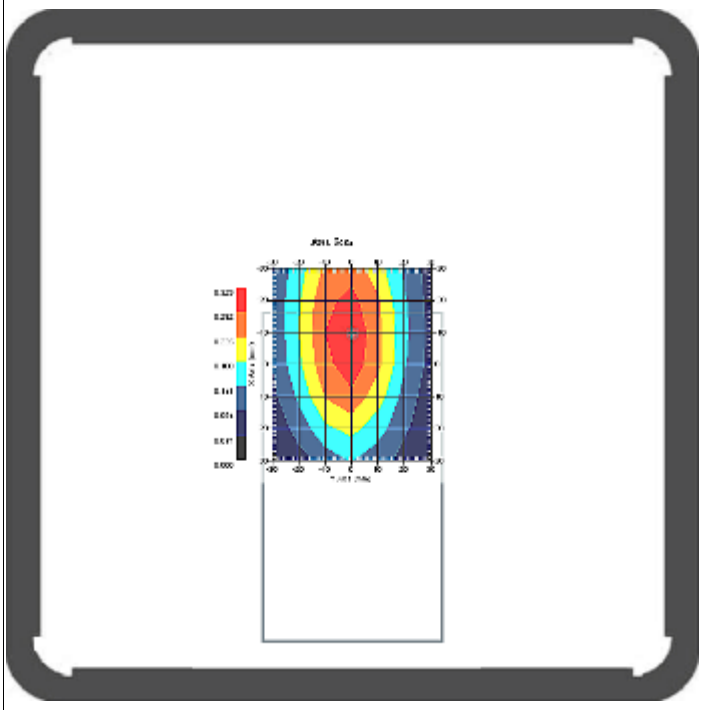
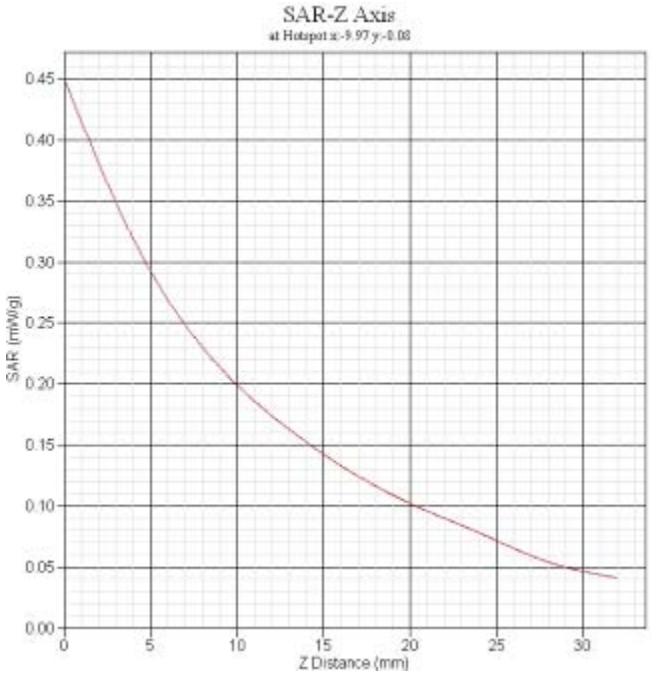
WCDMA Band Ⅴbody Back CH4132(Hotspot)	
Frequency(MHz)	826.4
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	0.575
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.680
SAR 10g(W/Kg)	0.457

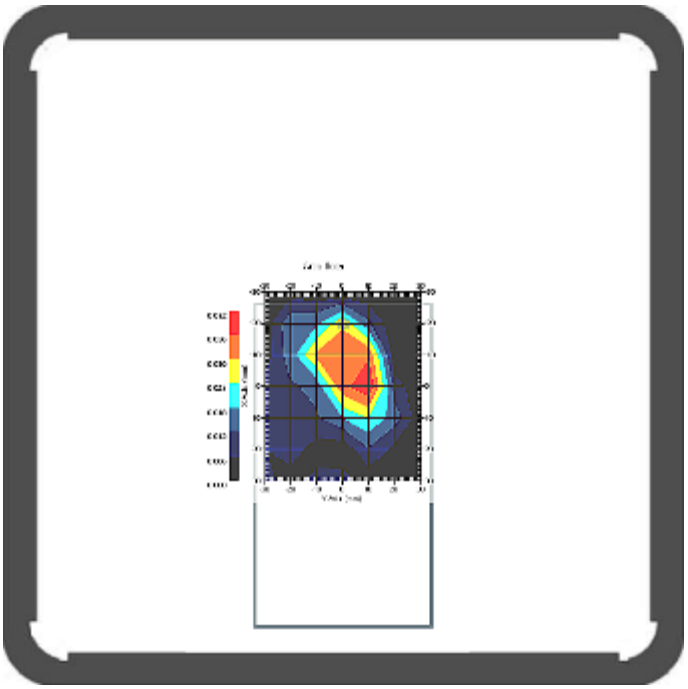
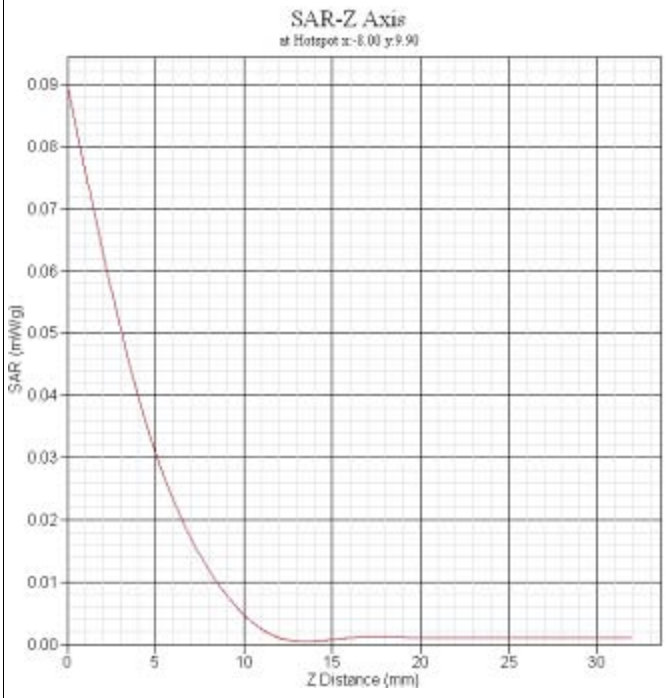
WCDMA Band Ⅴbody Back CH4183(Hotspot)	
Frequency(MHz)	836.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	2.253
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.710
SAR 10g(W/Kg)	0.460

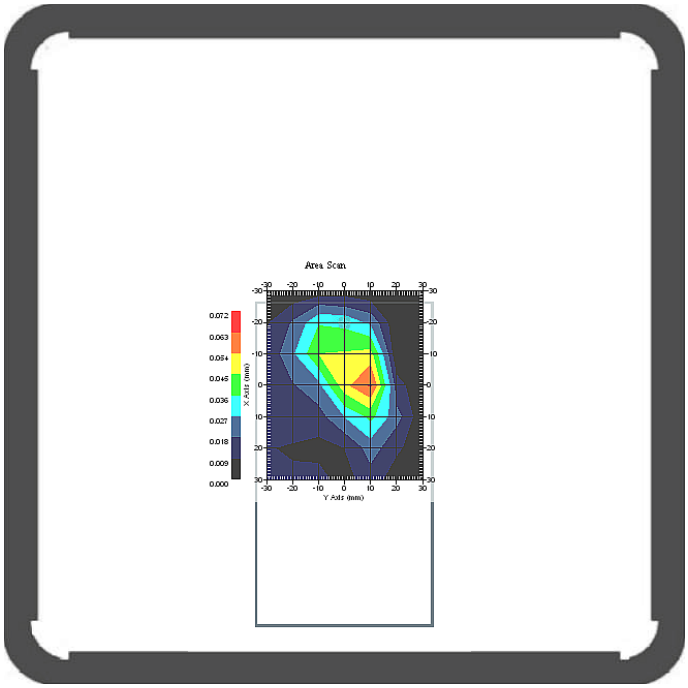
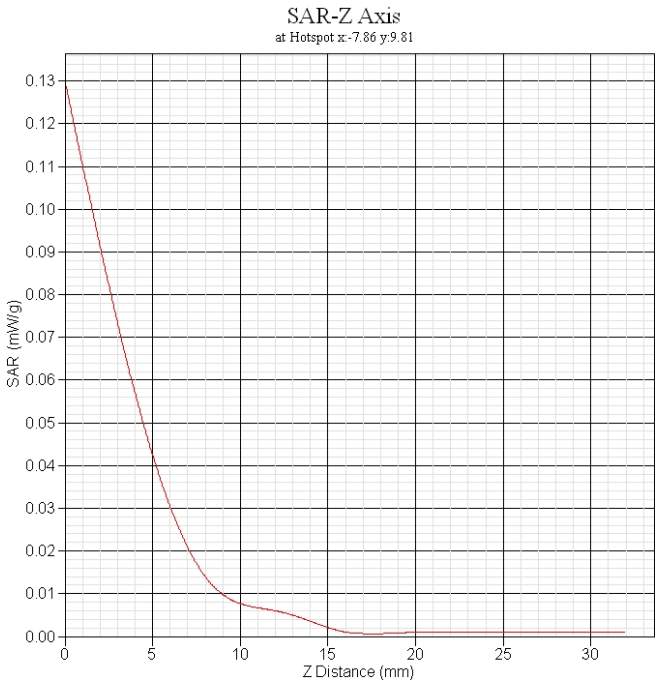
WCDMA Band Ⅴbody Back CH4233(Hotspot)	
Frequency(MHz)	846.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	-0.359
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.731
SAR 10g(W/Kg)	0.488

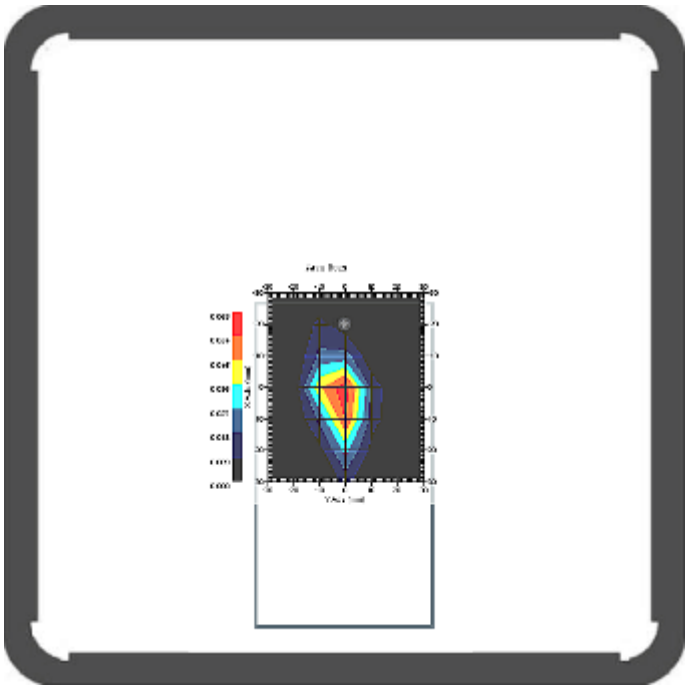
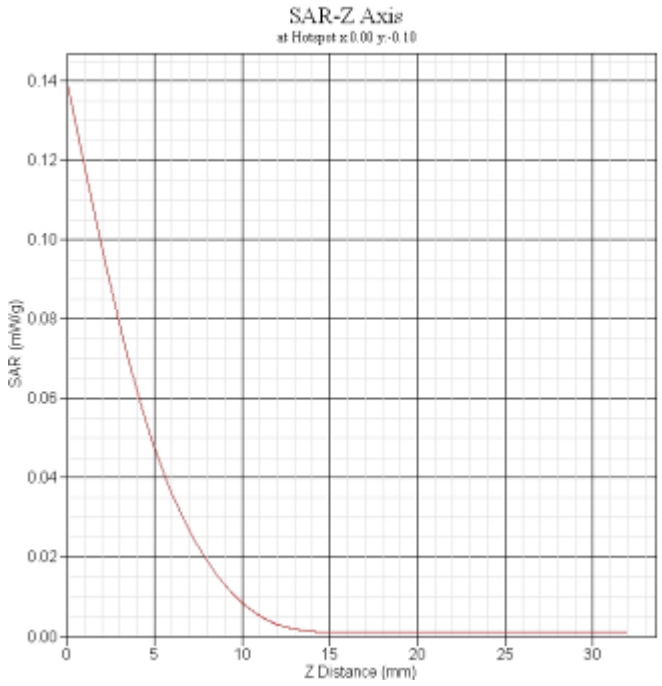
WCDMA Band Ⅴ body left CH4183 (Hotspot)	
Frequency(MHz)	836.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	-0.083
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.335
SAR 10g(W/Kg)	0.218

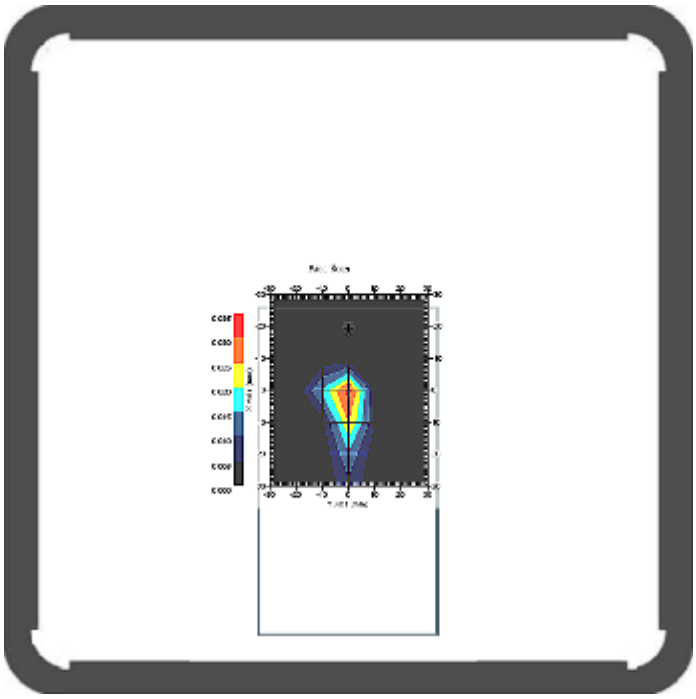
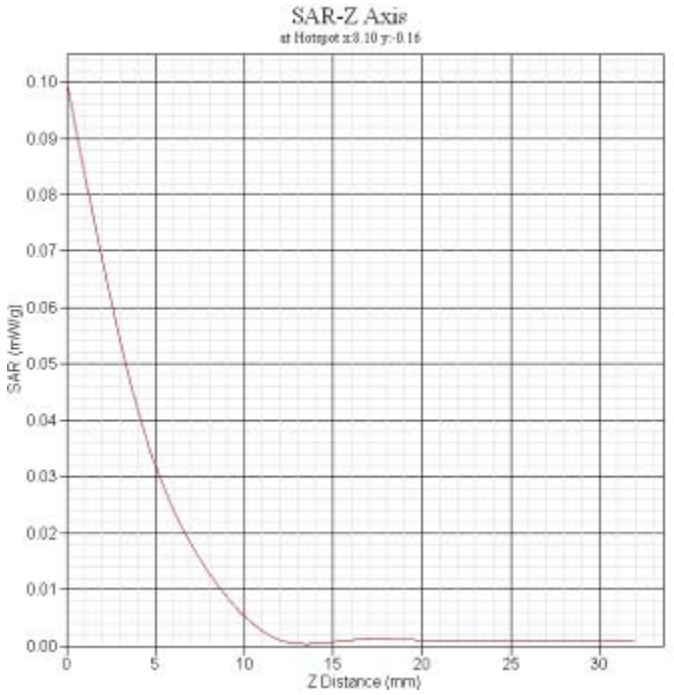
WCDMA Band Ⅴbody Right CH4183(Hotspot)	
Frequency(MHz)	836.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	0.145
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.361
SAR 10g(W/Kg)	0.229

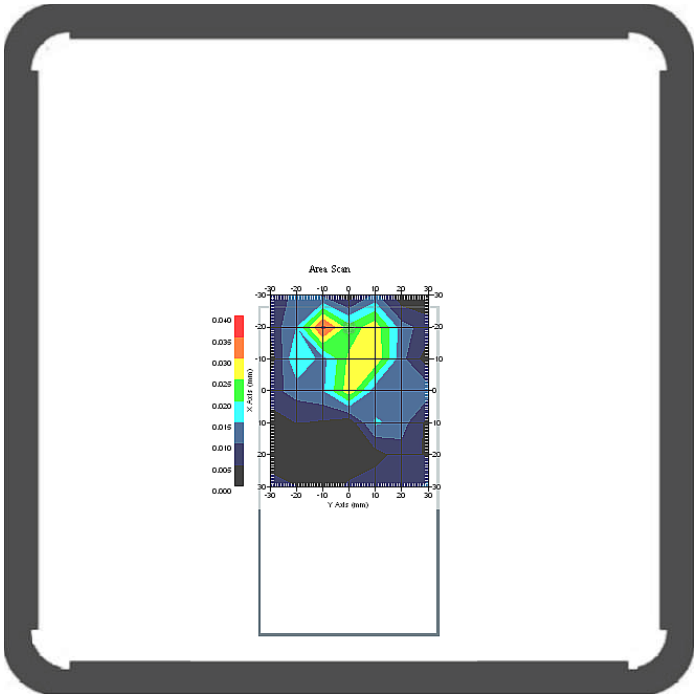
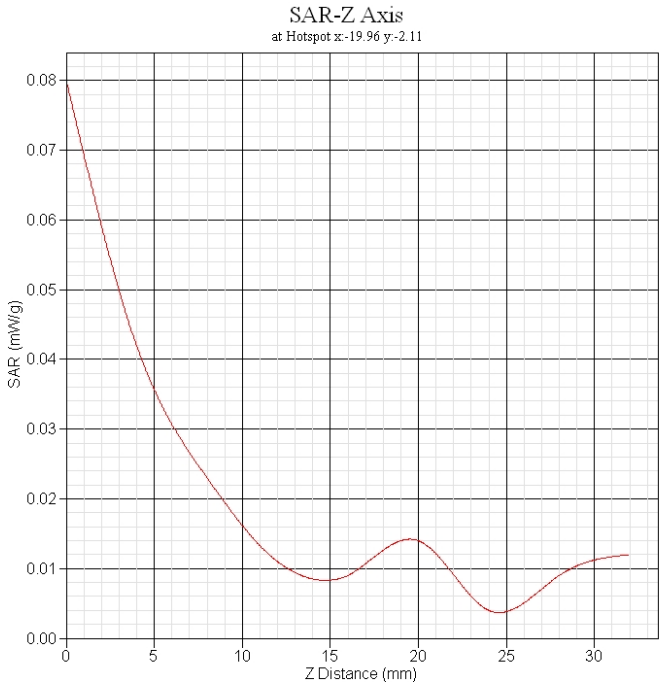
WCDMA Band Ⅴ body bottom CH4183(Hotspot)	
Frequency(MHz)	836.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	0.378
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.303
SAR 10g(W/Kg)	0.198

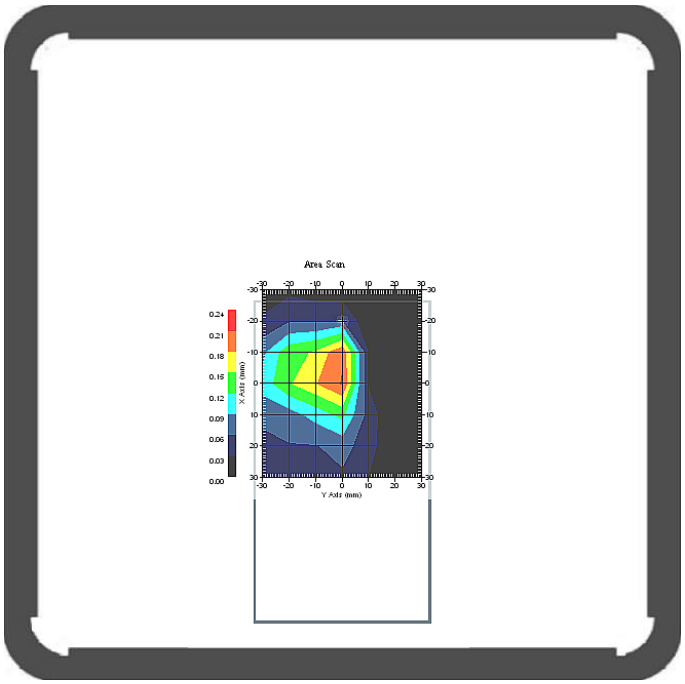
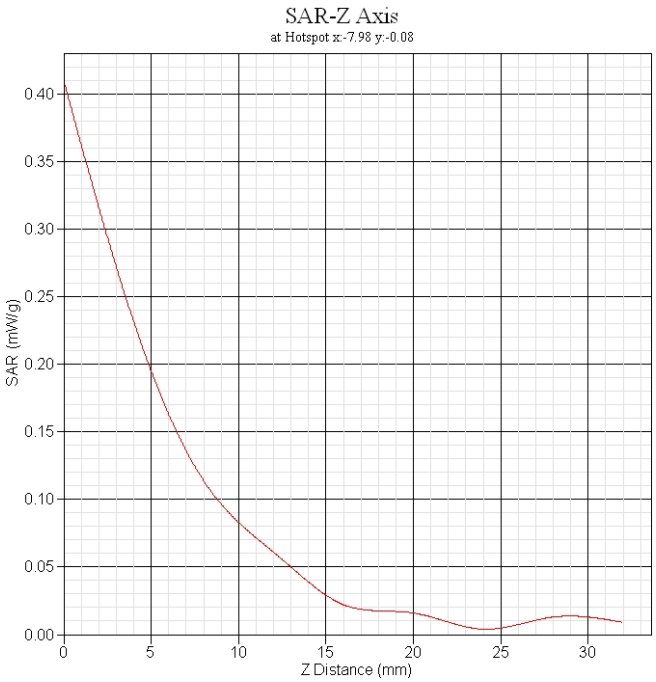
802.11b body Front CH11(Hotspot)	
Frequency(MHz)	2472
Relative permittivity(real part)	53.39
Conductivity(S/m)	1.91
Variation(%)	-1.297
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.032
SAR 10g(W/Kg)	0.012

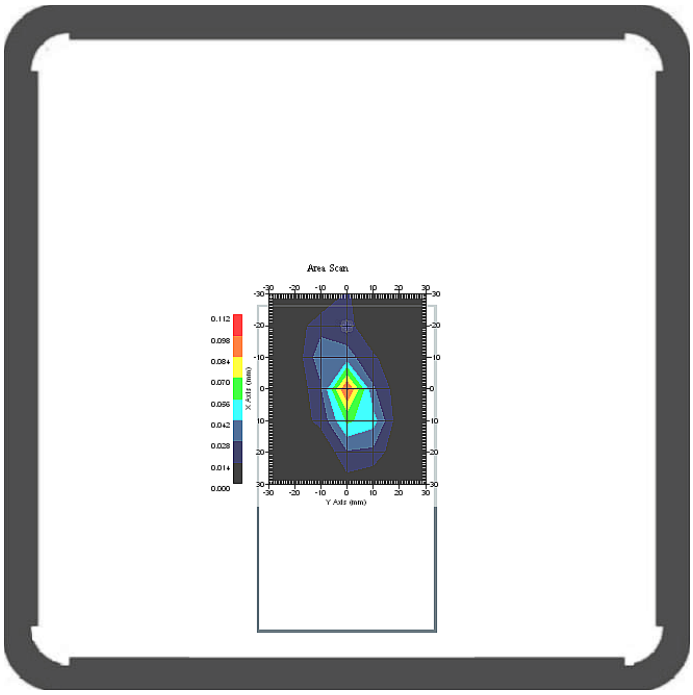
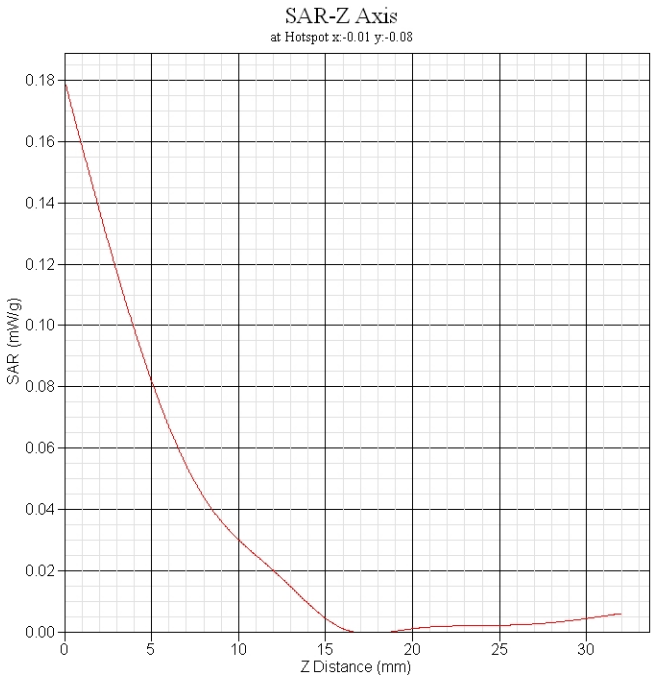
802.11b body Back CH11(Hotspot)	
Frequency(MHz)	2472
Relative permittivity(real part)	53.39
Conductivity(S/m)	1.91
Variation(%)	-1.050
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.050
SAR 10g(W/Kg)	0.019

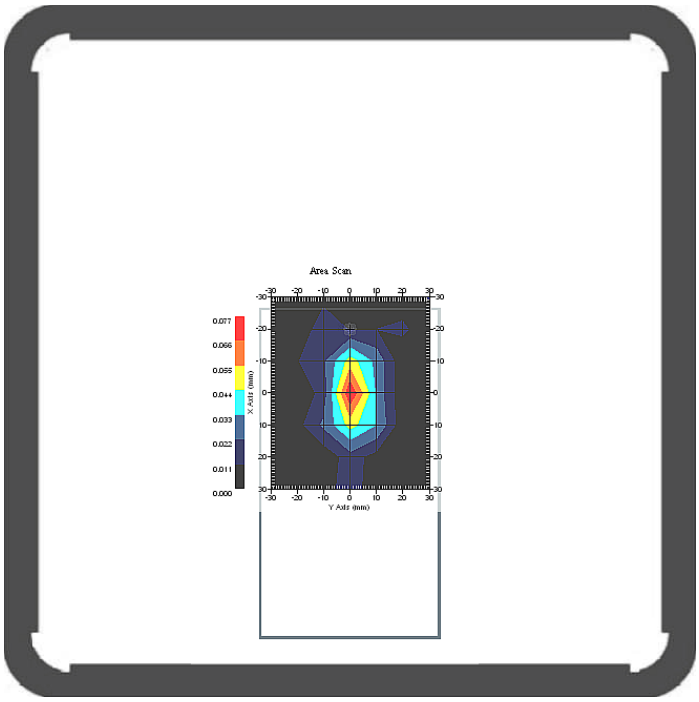
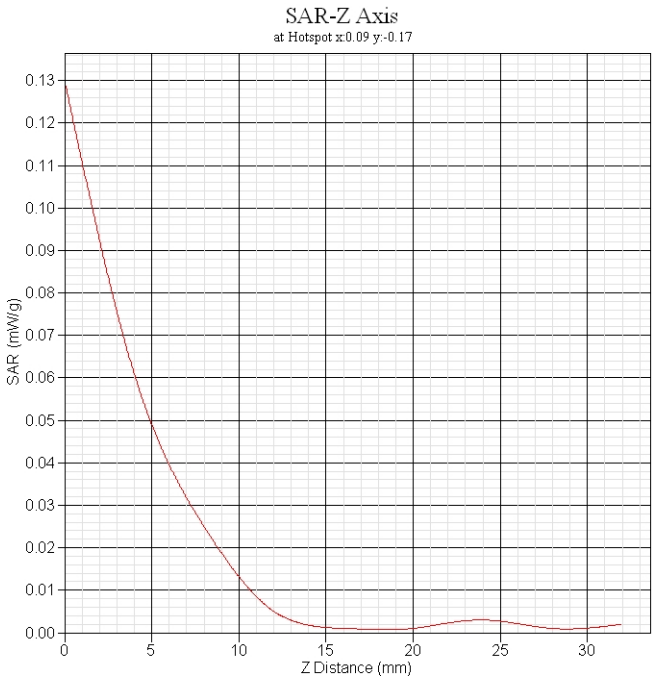
802.11b body Left CH11(Hotspot)	
Frequency(MHz)	2472
Relative permittivity(real part)	53.39
Conductivity(S/m)	1.91
Variation(%)	2.863
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.054
SAR 10g(W/Kg)	0.019

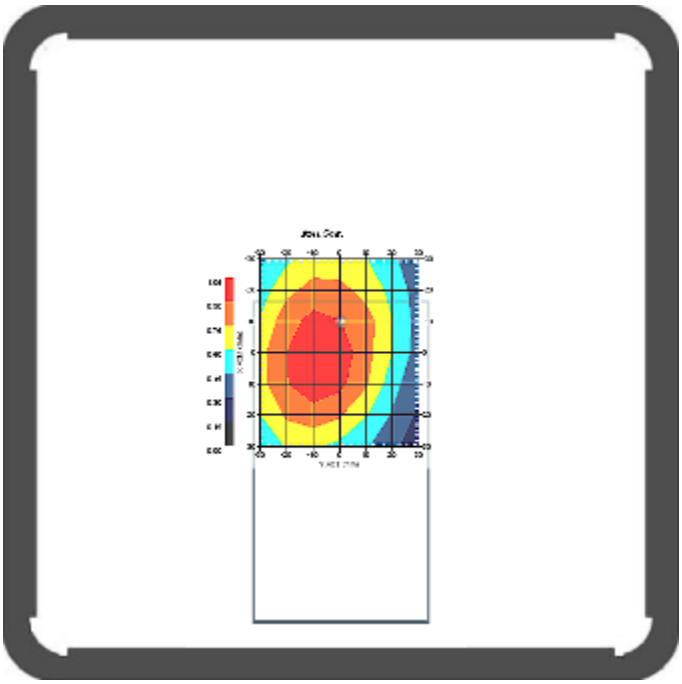
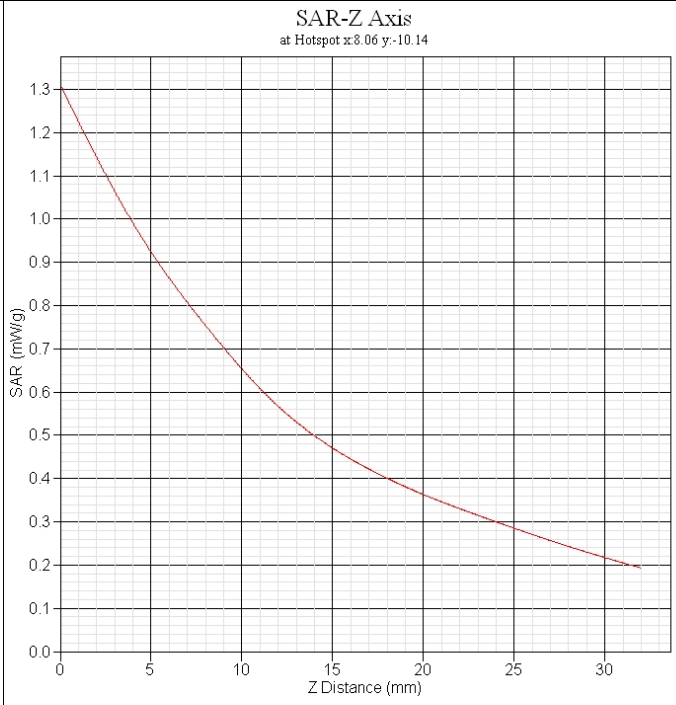
802.11b body Top ch11(Hotspot)	
Frequency(MHz)	2472
Relative permittivity(real part)	53.39
Conductivity(S/m)	1.91
Variation(%)	1.216
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.032
SAR 10g(W/Kg)	0.010

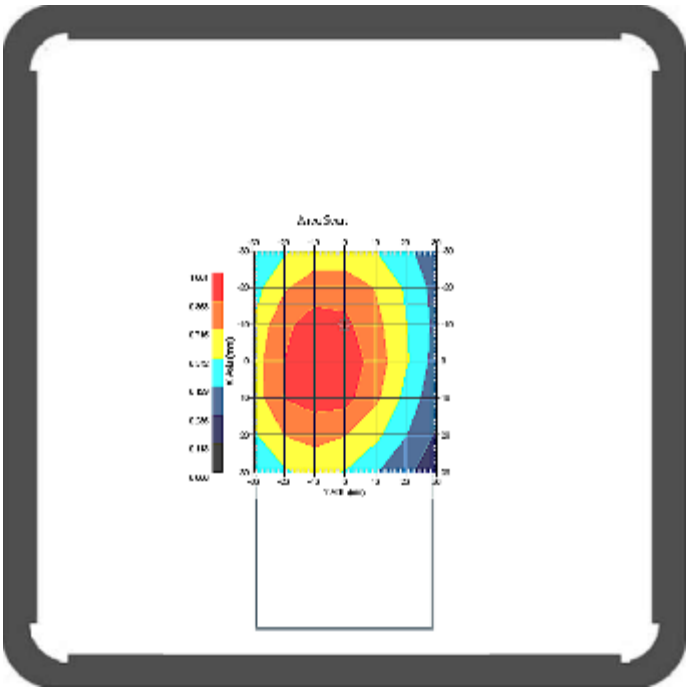
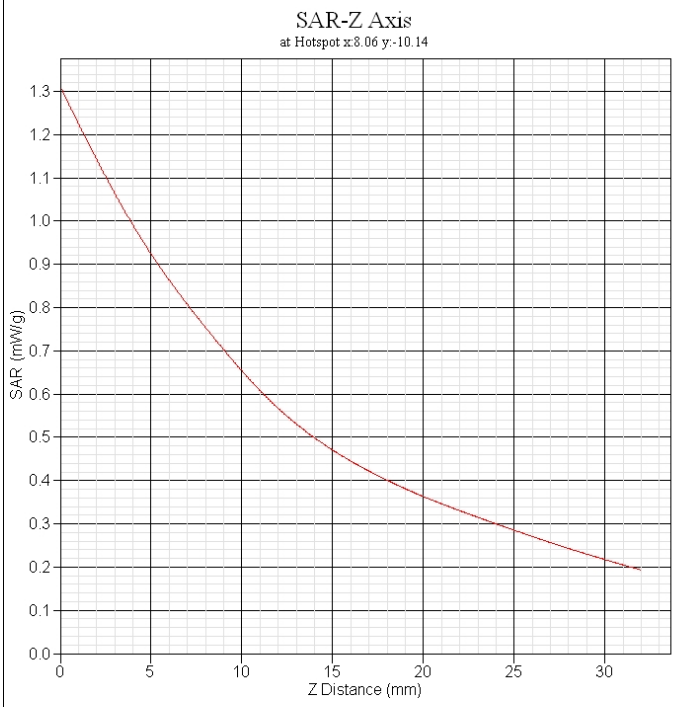
802.11g body Front CH11(Hotspot)	
Frequency(MHz)	2472
Relative permittivity(real part)	53.39
Conductivity(S/m)	1.91
Variation(%)	-3.519
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.032
SAR 10g(W/Kg)	0.014

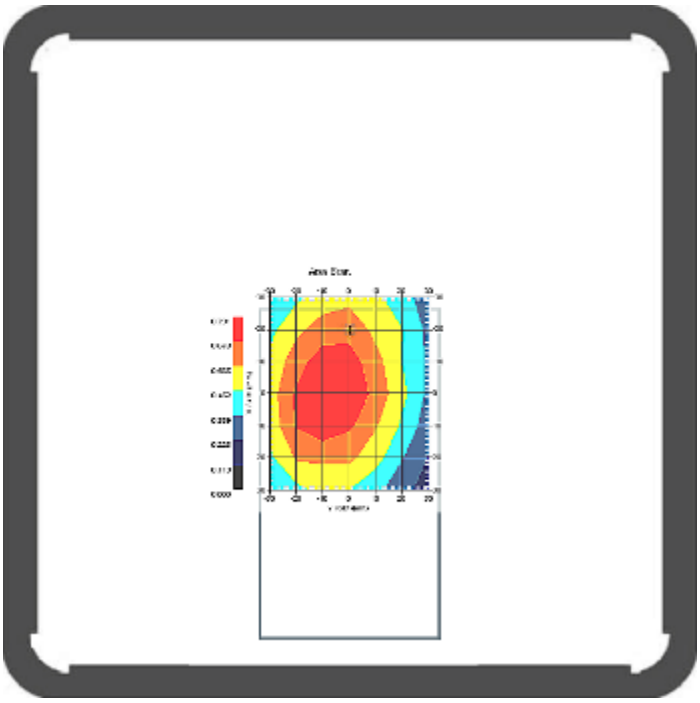
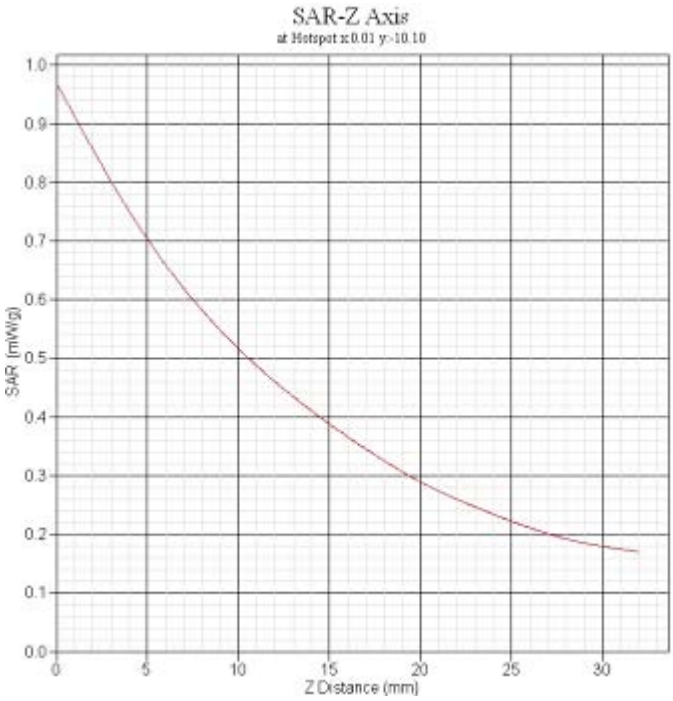
802.11g body Back CH11(Hotspot)	
Frequency(MHz)	2472
Relative permittivity(real part)	53.39
Conductivity(S/m)	1.91
Variation(%)	2.375
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.182
SAR 10g(W/Kg)	0.076

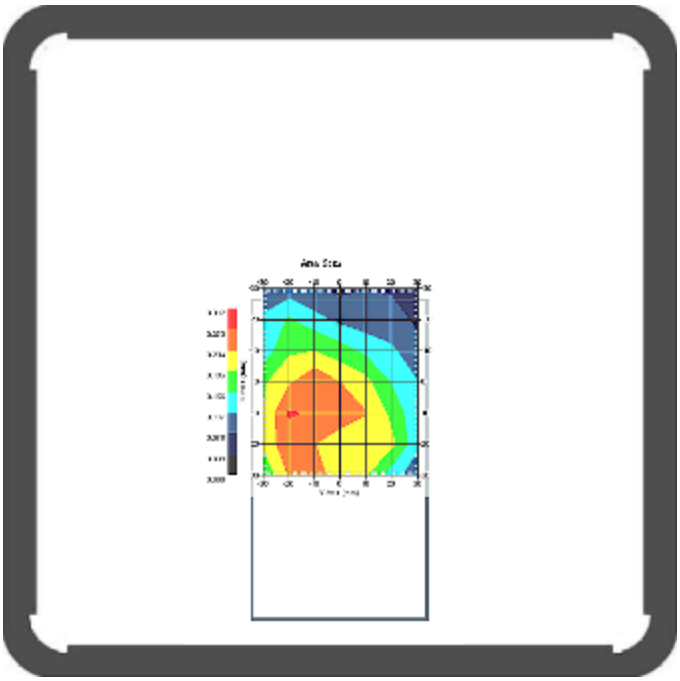
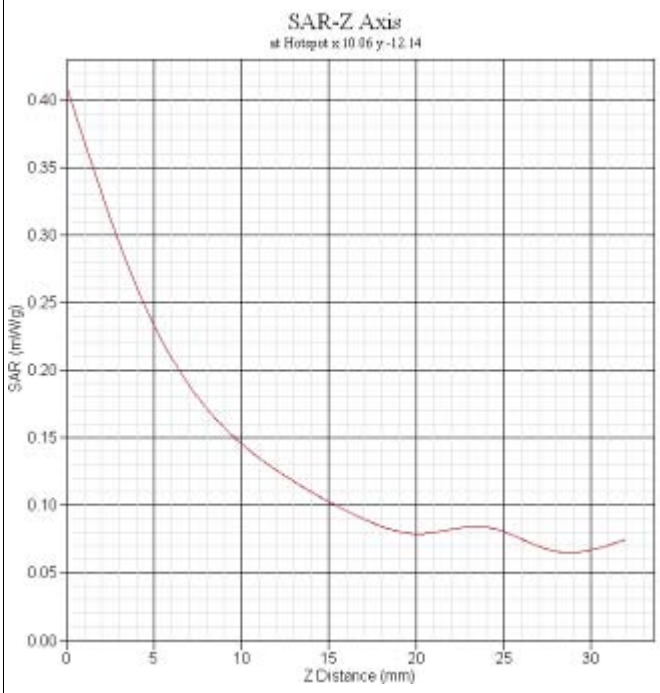
802.11g body Left CH11(Hotspot)	
Frequency(MHz)	2472
Relative permittivity(real part)	53.39
Conductivity(S/m)	1.91
Variation(%)	-2.252
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.073
SAR 10g(W/Kg)	0.027

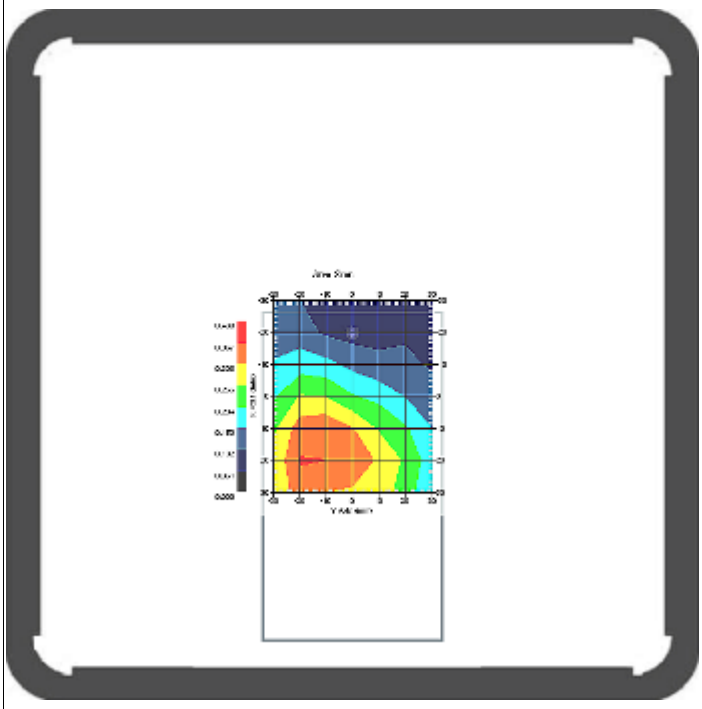
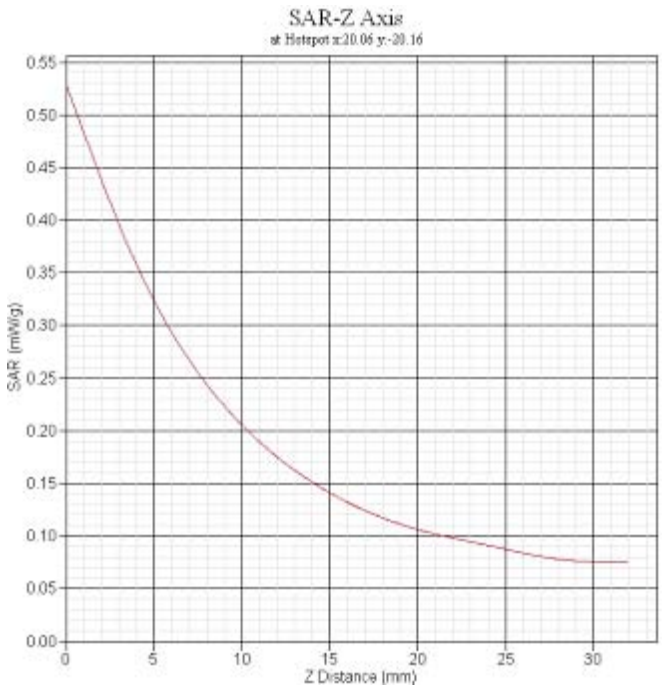
802.11g body Top ch11(Hotspot)	
Frequency(MHz)	2472
Relative permittivity(real part)	53.39
Conductivity(S/m)	1.91
Variation(%)	1.723
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.053
SAR 10g(W/Kg)	0.020

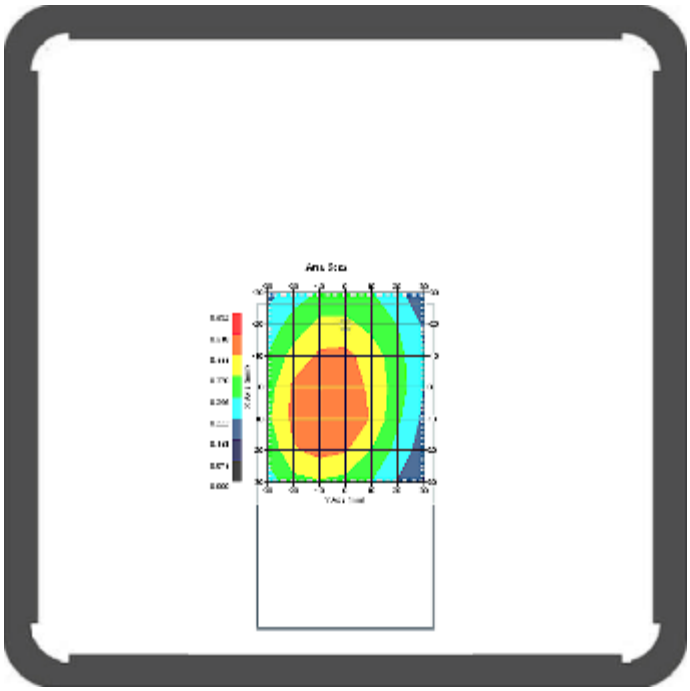
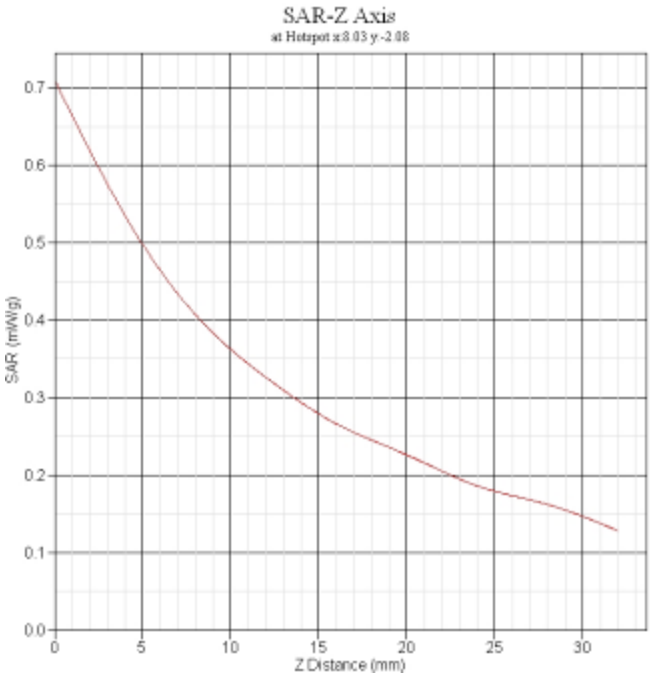
GPRS850 body Back CH128	
Frequency(MHz)	824.2
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	-2.791
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.892
SAR 10g(W/Kg)	0.625

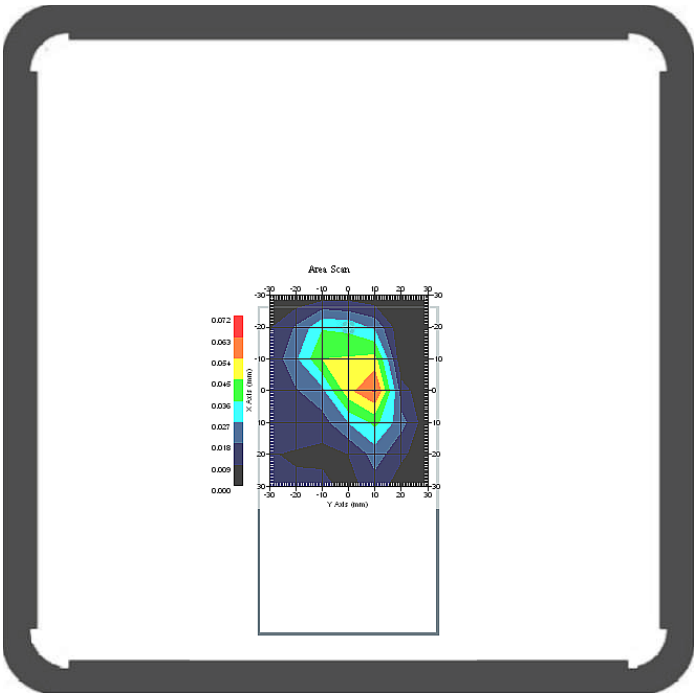
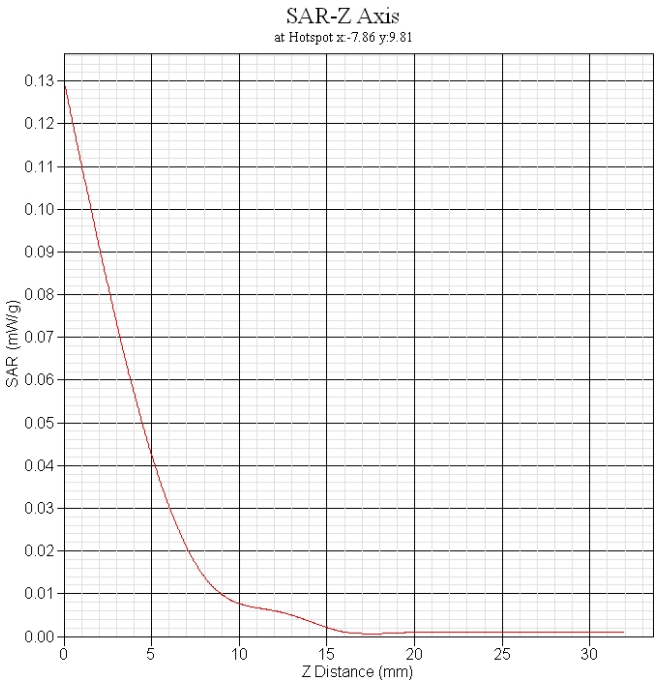
GPRS850 body Back CH190	
Frequency(MHz)	836.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	-3.574
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.909
SAR 10g(W/Kg)	0.617

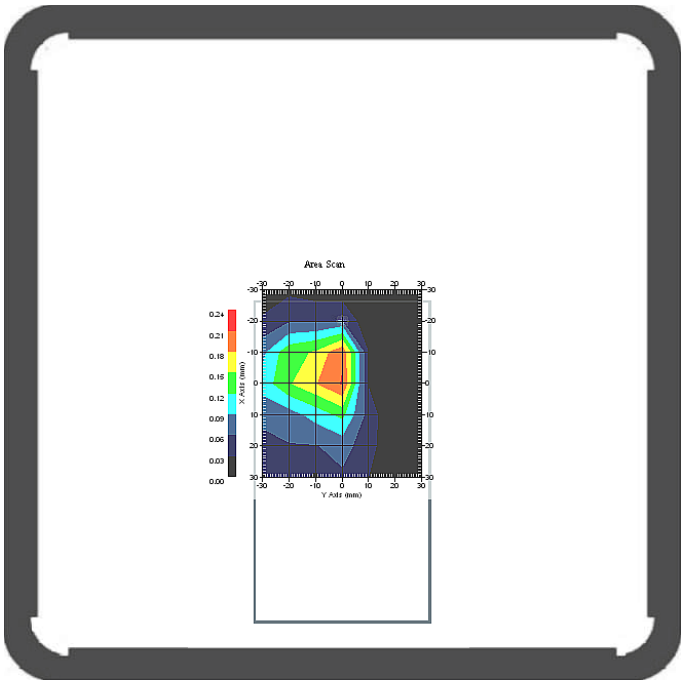
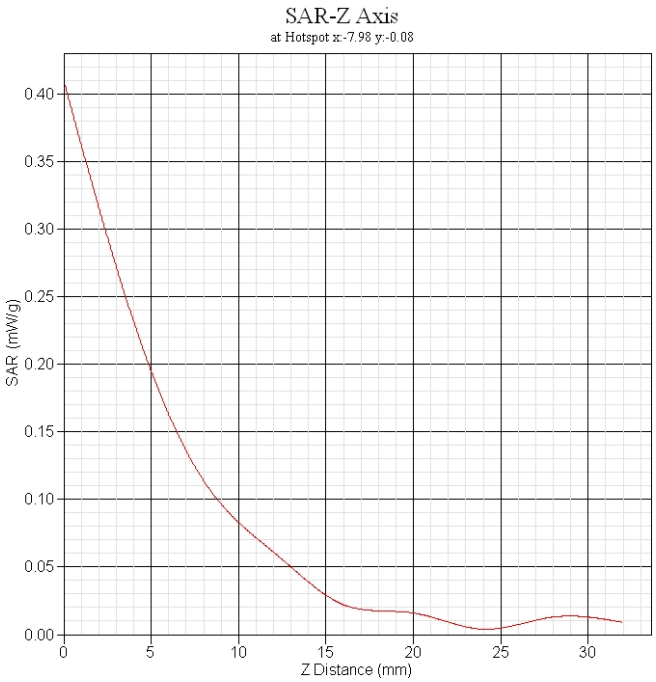
GPRS850 body Back CH251	
Frequency(MHz)	848.8
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	-4.485
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.663
SAR 10g(W/Kg)	0.447

GPRS1900 body Back CH661	
Frequency(MHz)	1880.0
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	-2.967
Duty Cycle Factor	2
Crest factor	2
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.280
SAR 10g(W/Kg)	0.167

WCDMA Band Ⅱ body Back CH9400	
Frequency(MHz)	1852.4
Relative permittivity(real part)	52.94
Conductivity(S/m)	1.55
Variation(%)	-3.779
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	5.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.364
SAR 10g(W/Kg)	0.220

WCDMA Band Ⅴ body Back CH4183	
Frequency(MHz)	836.6
Relative permittivity(real part)	53.32
Conductivity(S/m)	0.93
Variation(%)	-1.745
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	6.4
Probe Sensitivity	1.20 1.20 1.20 μV/(V/m)2
Data	2012-09-11
	
SAR 1g(W/Kg)	0.508
SAR 10g(W/Kg)	0.352

802.11b body Back ch11	
Frequency(MHz)	2472
Relative permittivity(real part)	53.39
Conductivity(S/m)	1.91
Variation(%)	0.786
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.042
SAR 10g(W/Kg)	0.016

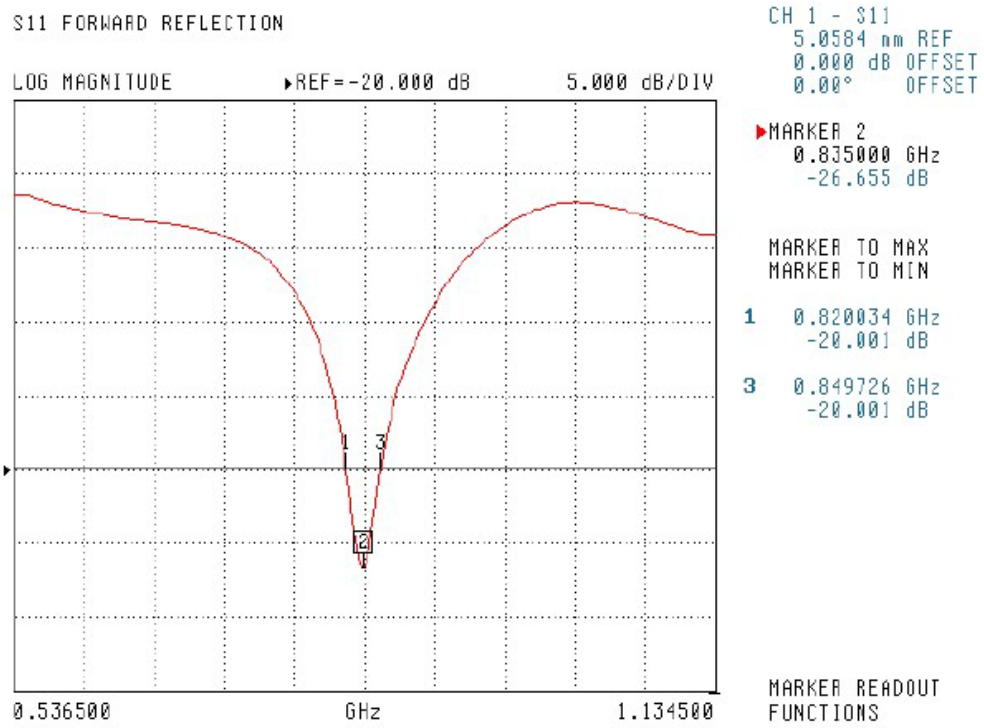
802.11g body Back CH11	
Frequency(MHz)	2472
Relative permittivity(real part)	53.39
Conductivity(S/m)	1.91
Variation(%)	1.457
Duty Cycle Factor	1
Crest factor	1
Conversion Fator	4.4
Probe Sensitivity	1.20 1.20 1.20 μ V/(V/m)2
Data	2012-09-12
	
SAR 1g(W/Kg)	0.174
SAR 10g(W/Kg)	0.069

ValidationDipole Calibration

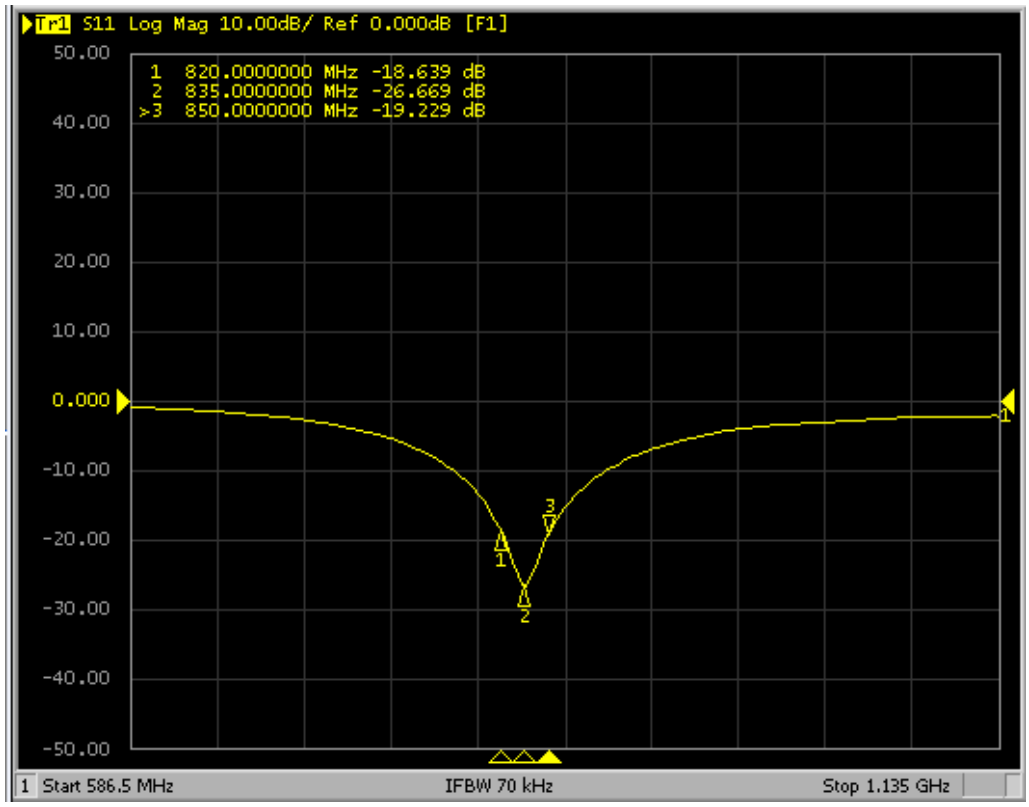
Electrical Specification 835MHz

Tissue Type	Return Loss(dB)	Impedance(ohm)
Head(2011)	-26.655	51.666
Head(2012 recent)	-26.669	52.536
Body(2011)	-22.106	57.482
Body(2012 recent)	-22.595	54.711

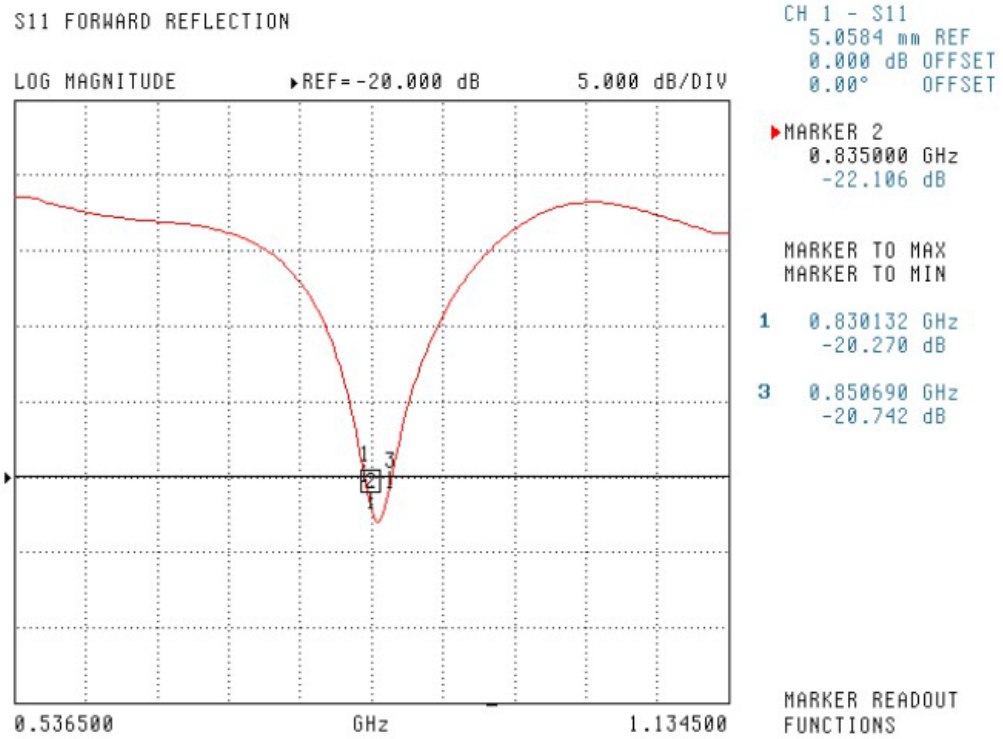
Head Tissue of Return Loss(2011)



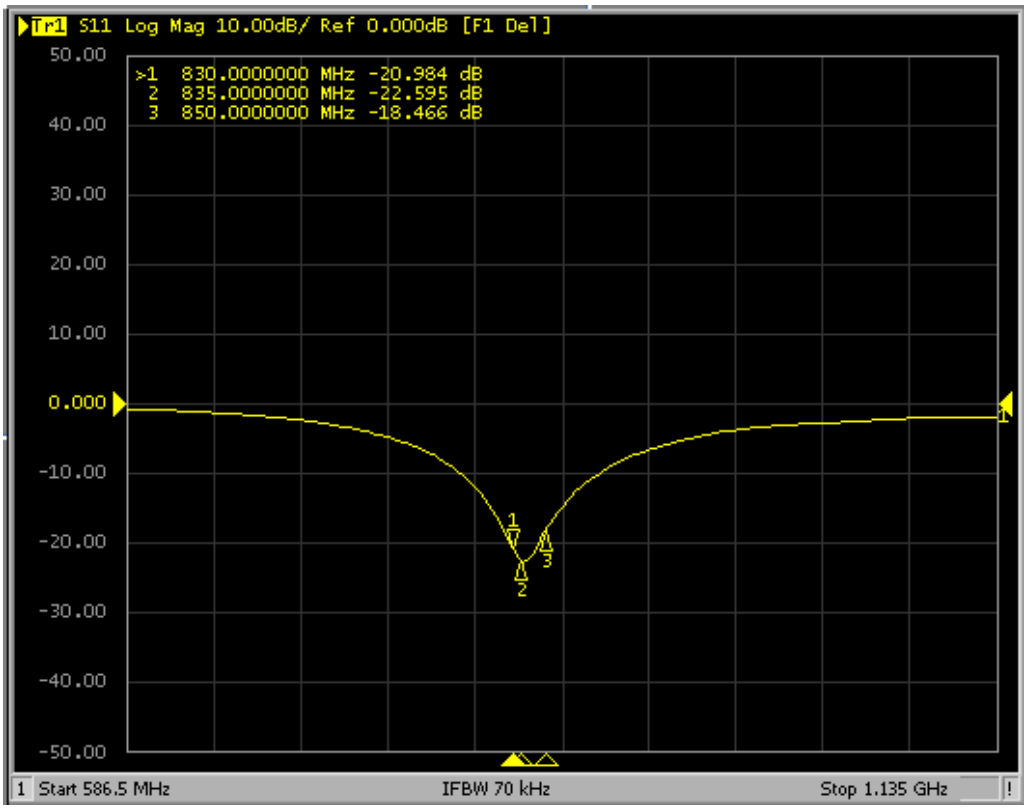
Head Tissue of Return Loss(2012 recent)



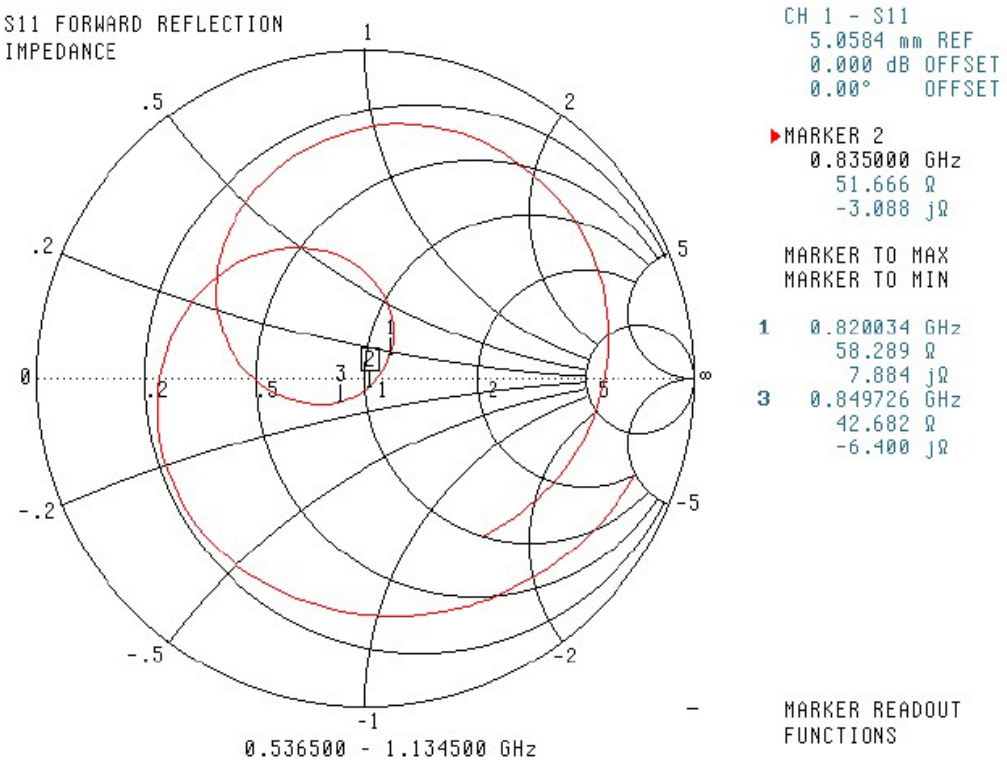
Body Tissue of Return Loss(2011)



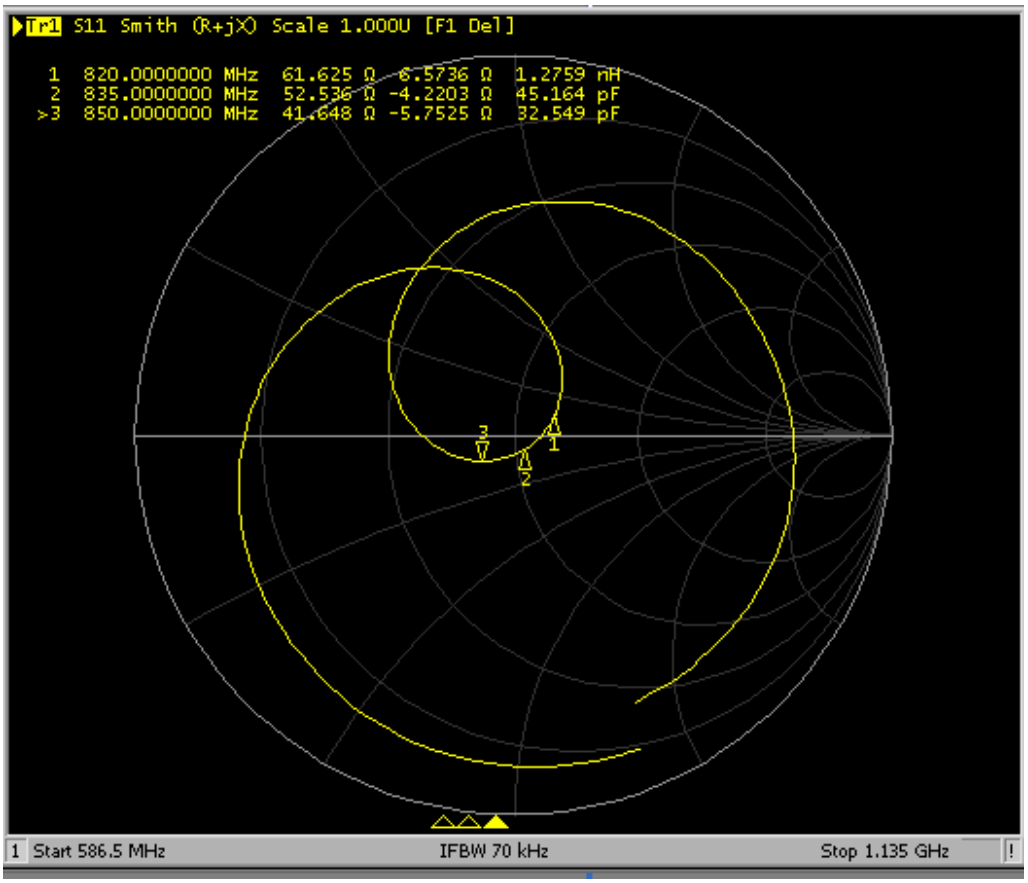
Body Tissue of Return Loss(2012 recent)



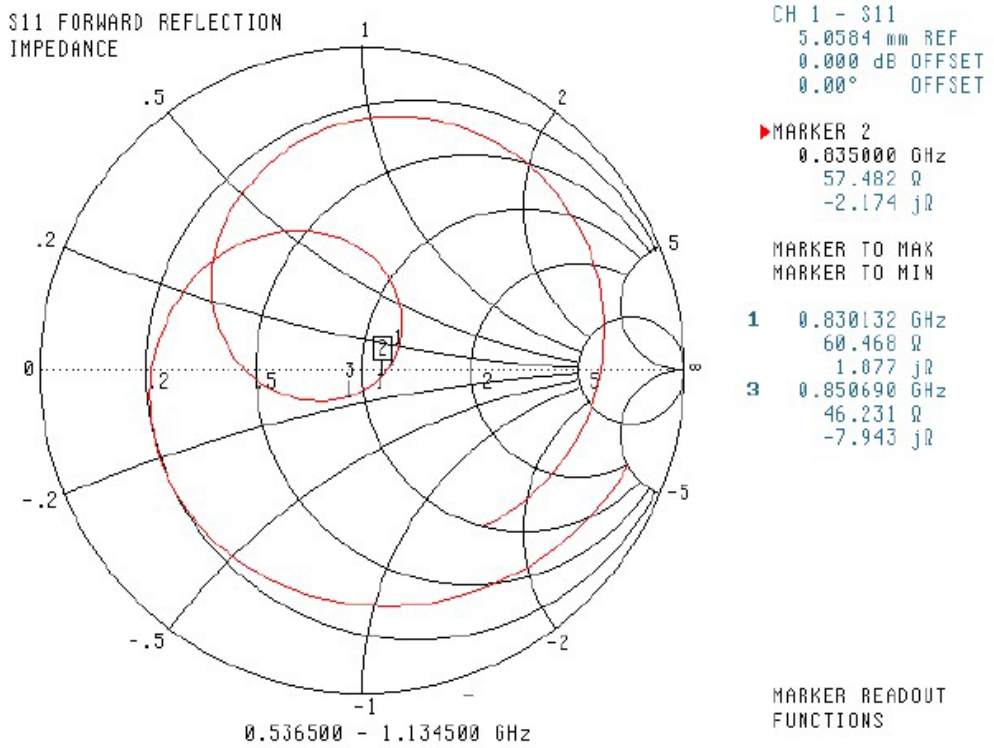
Head Tissue of Impedance(2011)



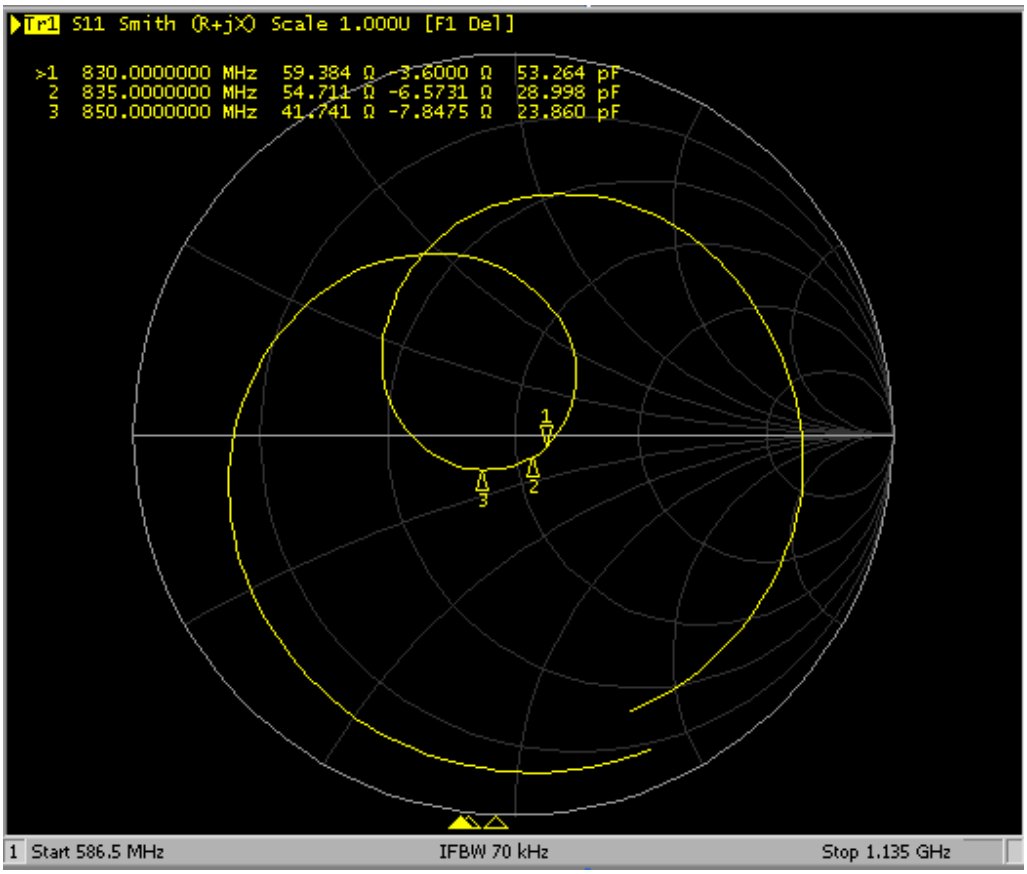
Head Tissue of Impedance(2012 recent)



Body Tissue of Impedance(2011)



Body Tissue of Impedance(2012 recent)

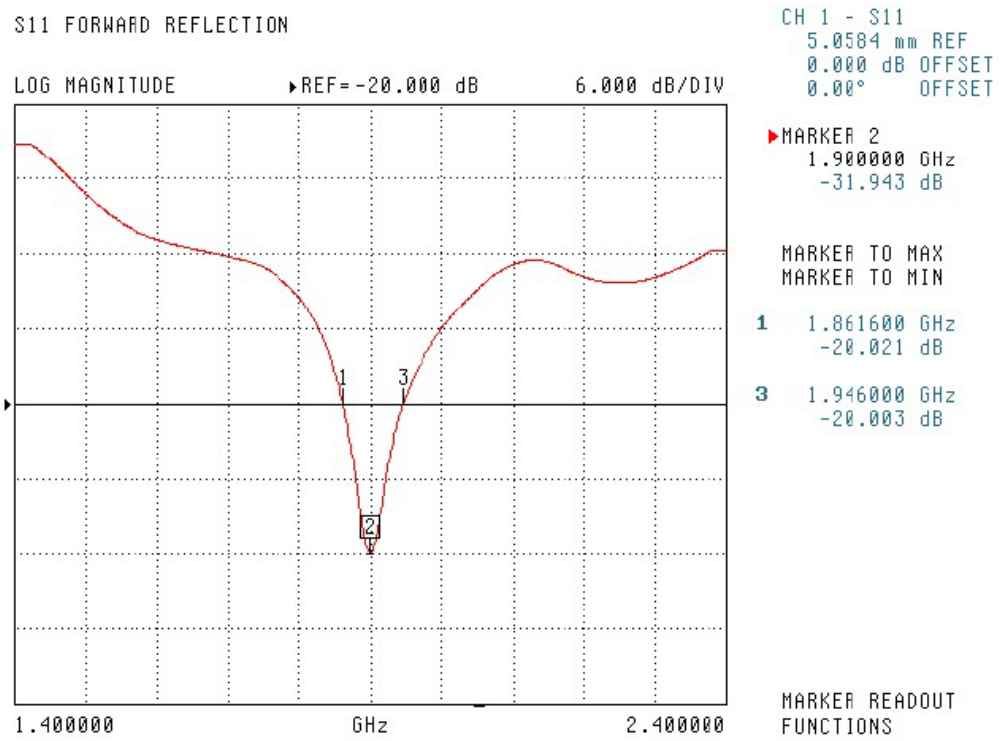


ValidationDipole Calibration

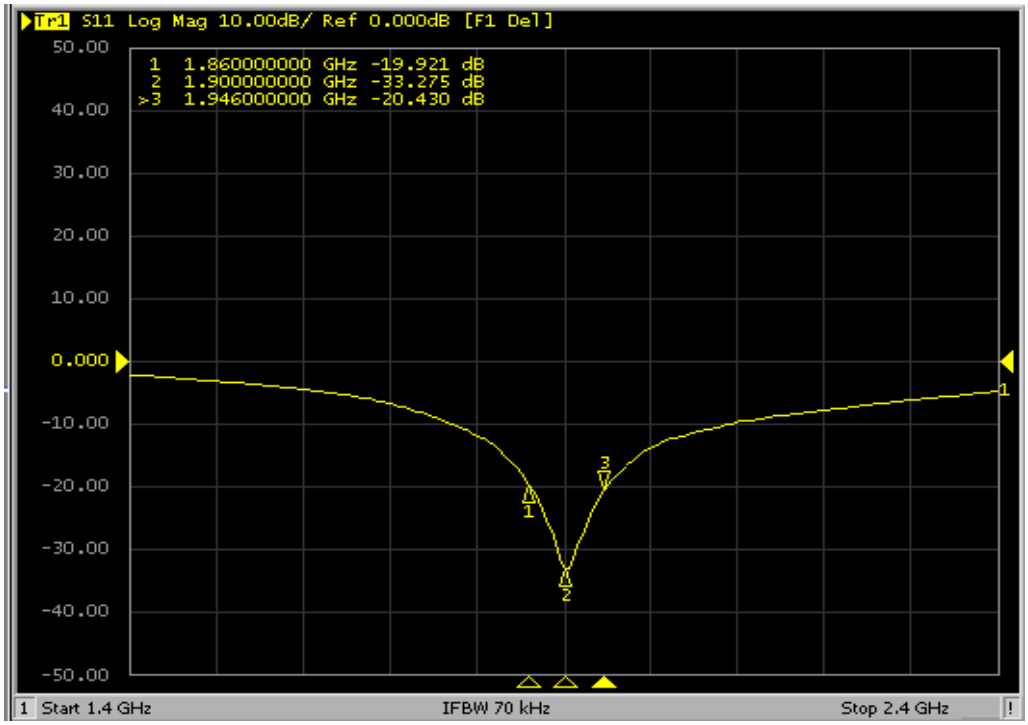
Electrical Specification 1900MHz

Tissue Type	Return Loss(dB)	Impedance(ohm)
Head(2011)	-31.943	51.262
Head(2012 recent)	-33.275	49.302
Body(2011)	-25.099	53.750
Body(2012 recent)	-25.606	50.197

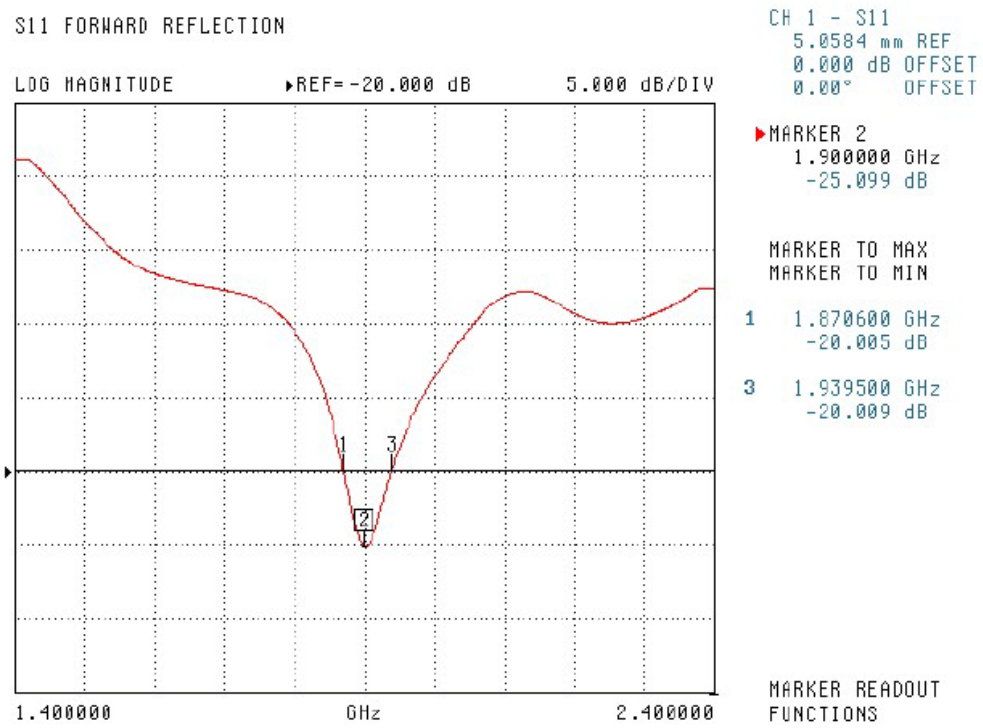
Head Tissue of Return Loss(2011)



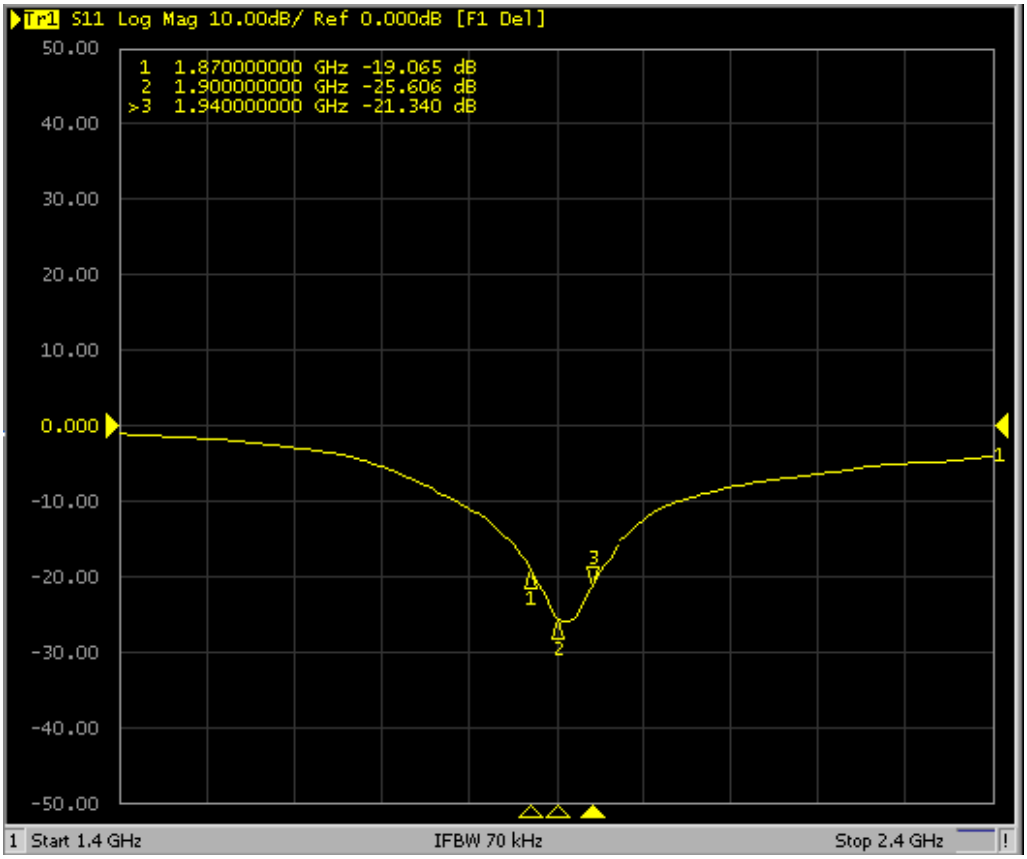
Head Tissue of Return Loss(2012 recent)



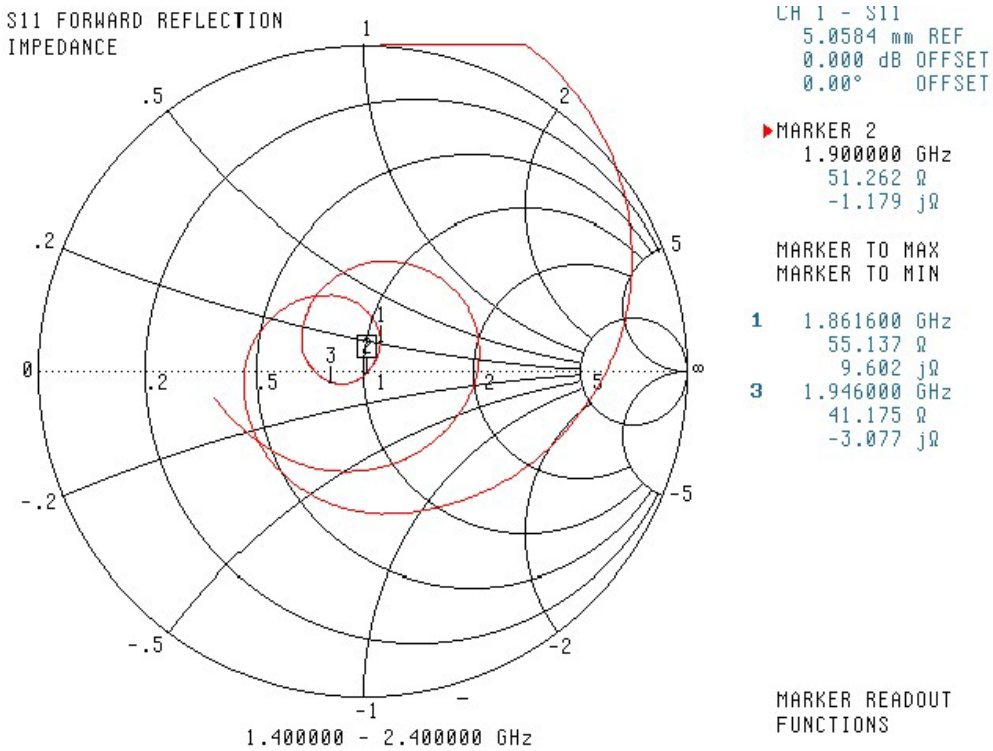
Body Tissue of Return Loss(2011)



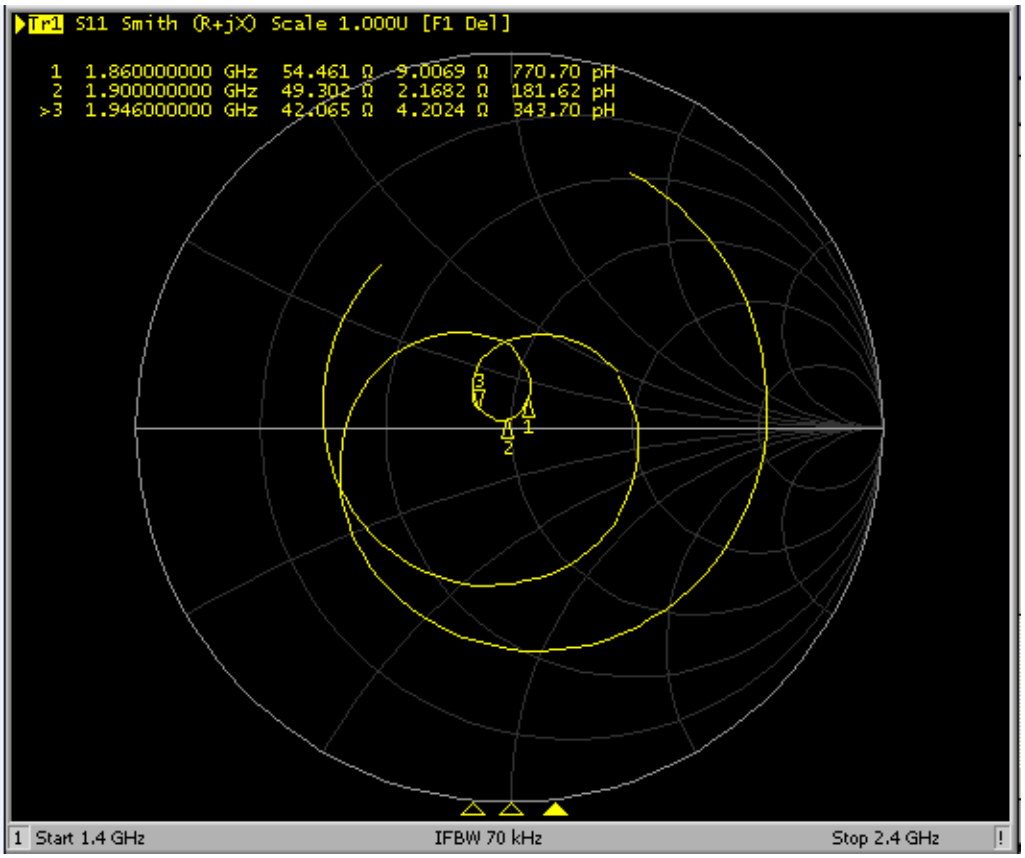
Body Tissue of Return Loss(2012 recent)



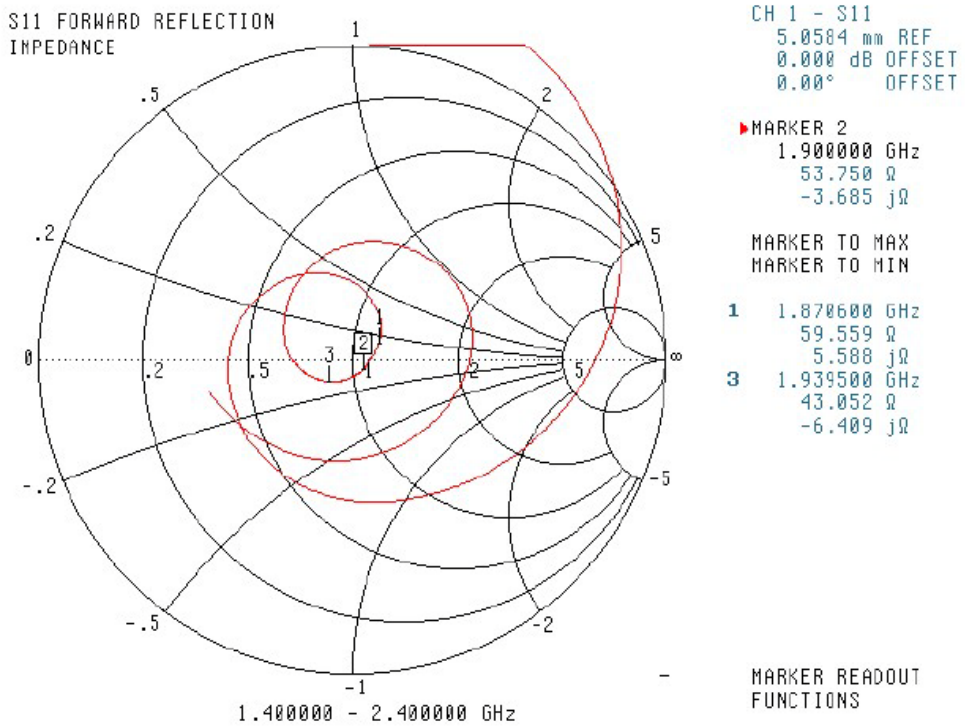
Head Tissue of Impedance(2011)



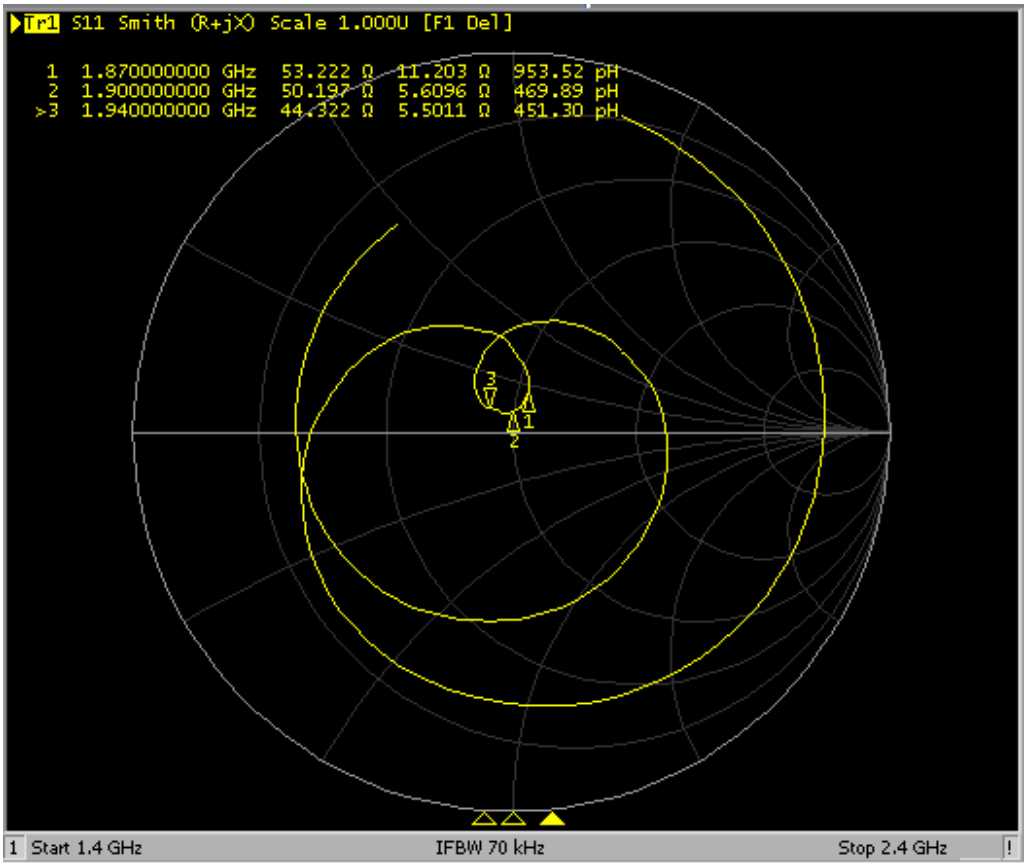
Head Tissue of Impedance(2012 recent)



Body Tissue of Impedance(2011)



Body Tissue of Impedance(2012 recent)


Tr1 S11 Smith (R+jX) Scale 1.000U [F1 Del]
1 1.870000000 GHz 53.222 Ω 11.203 Ω 953.52 pH
2 1.900000000 GHz 50.197 Ω 5.6096 Ω 469.89 pH
>3 1.940000000 GHz 44.322 Ω 5.5011 Ω 451.30 pH
1 Start 1.4 GHz
IFBW 70 kHz
Stop 2.4 GHz