

13. Appendix C. Plots of High SAR Measurement

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MEASUREMENT 1

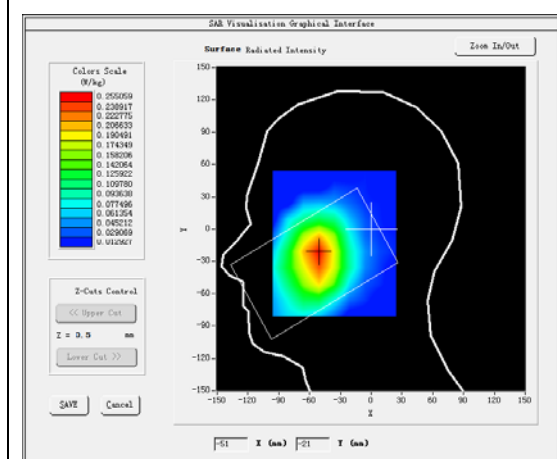
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>GSM850</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>TDMA (Crest factor: 2.0)</u>

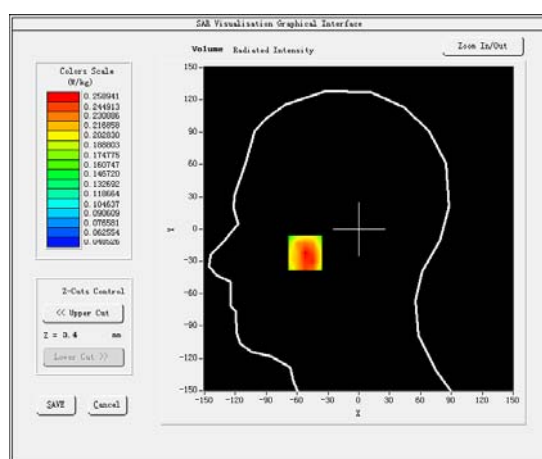
B. SAR Measurement Results

Frequency (MHz)	836.400000
Relative permittivity (real part)	41.240959
Relative permittivity (imaginary part)	19.791540
Conductivity (S/m)	0.919647
Variation (%)	0.370000

SURFACE SAR



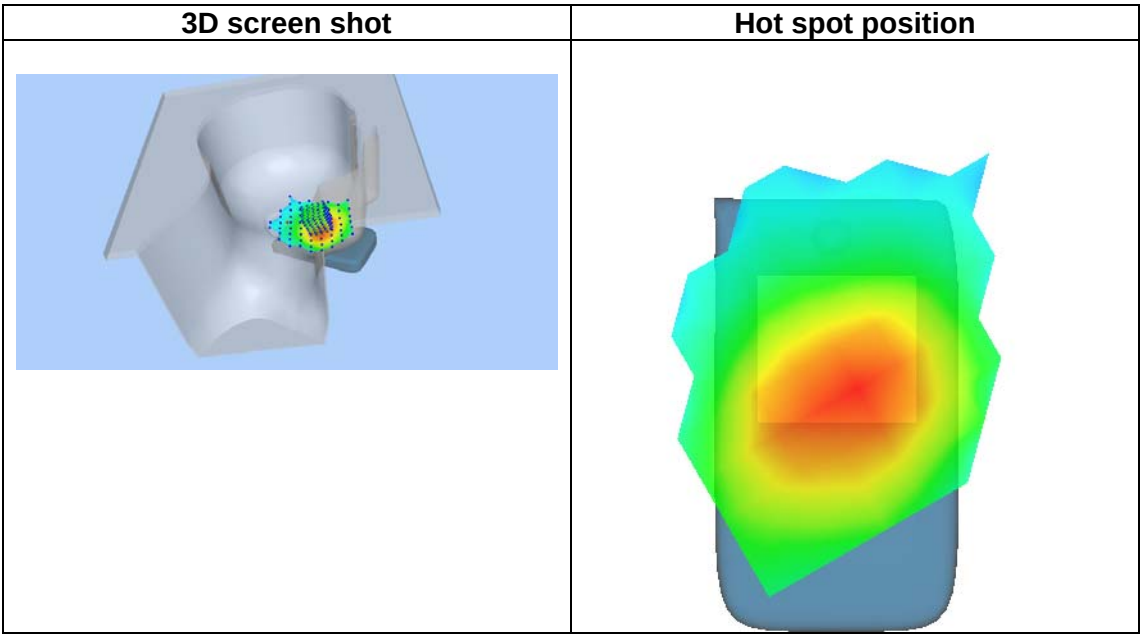
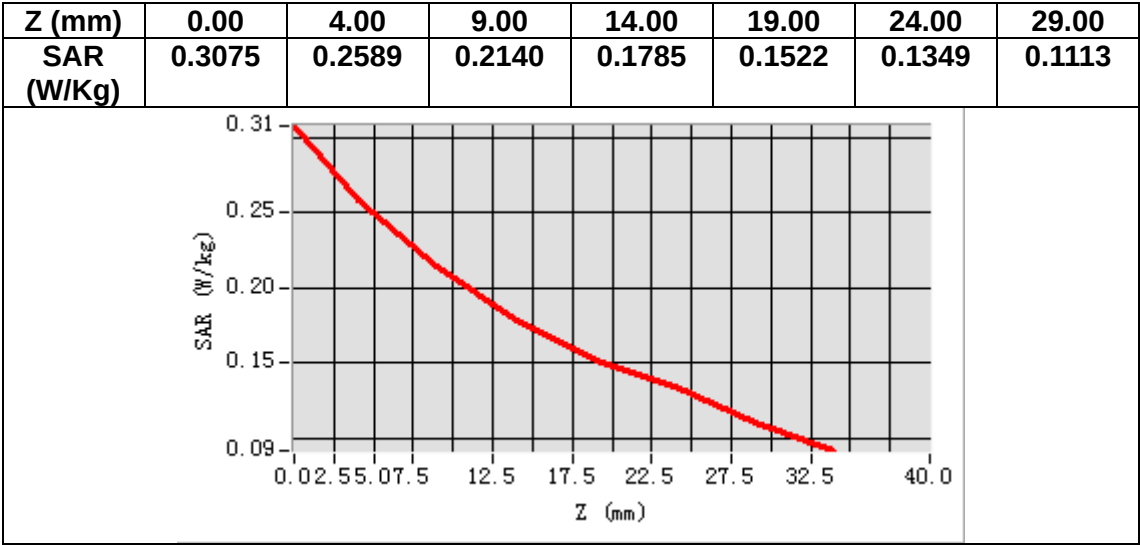
VOLUME SAR



Maximum location: X=-52.00, Y=-22.00

SAR Peak: 0.31 W/kg

SAR 10g (W/Kg)	0.196364
SAR 1g (W/Kg)	0.254539



MEASUREMENT 2

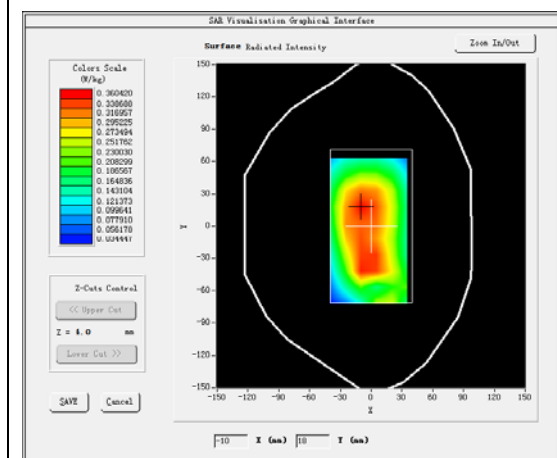
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7,dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>GSM850</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>TDMA (Crest factor: 2.0)</u>

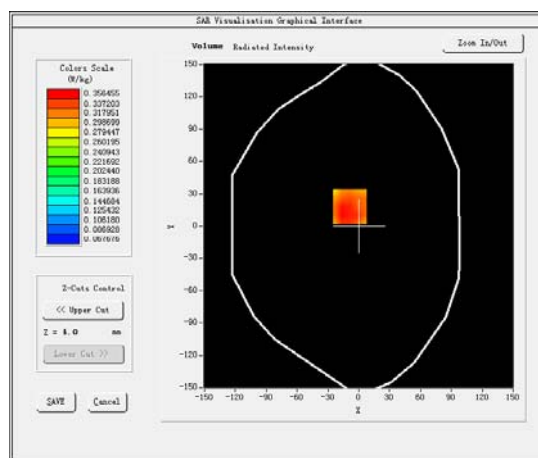
B. SAR Measurement Results

Frequency (MHz)	836.400000
Relative permittivity (real part)	54.779579
Relative permittivity (imaginary part)	21.622740
Conductivity (S/m)	1.004737
Variation (%)	-2.870000

SURFACE SAR



VOLUME SAR



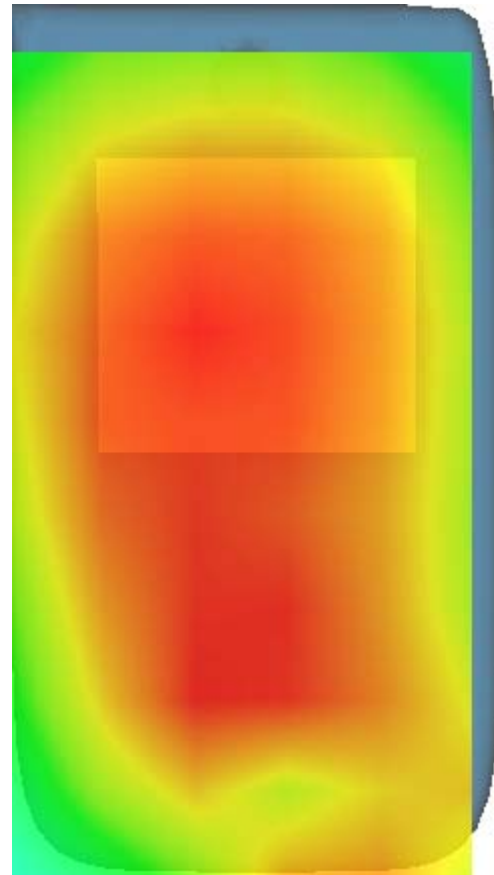
Maximum location: X=-9.00, Y=18.00

SAR Peak: 0.46 W/kg

SAR 10g (W/Kg)	0.267905
SAR 1g (W/Kg)	0.358401

Z (mm)	SAR (W/kg)
0.0	0.48
2.5	0.40
5.0	0.35
7.5	0.30
10.0	0.25
12.5	0.22
15.0	0.20
17.5	0.18
20.0	0.15
22.5	0.12
25.0	0.10
27.5	0.09
30.0	0.08
32.5	0.07
35.0	0.06

Hot spot position



MEASUREMENT 3

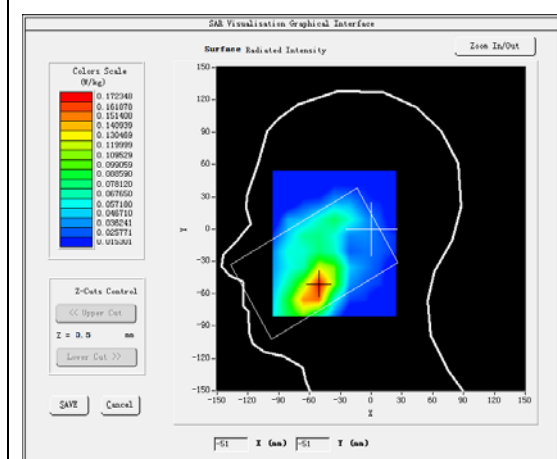
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>GSM1900</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>TDMA (Crest factor: 2.0)</u>

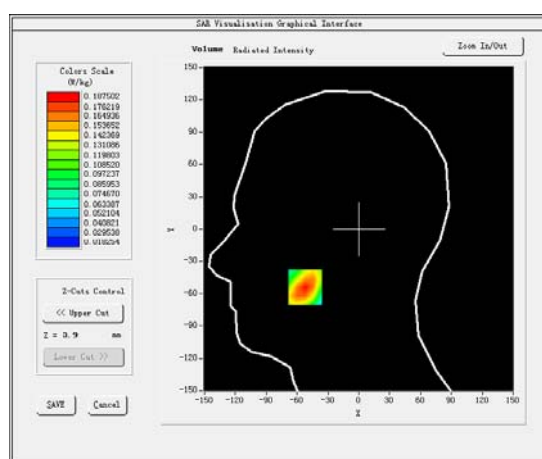
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	41.448200
Relative permittivity (imaginary part)	13.604300
Conductivity (S/m)	1.420894
Variation (%)	-0.970000

SURFACE SAR



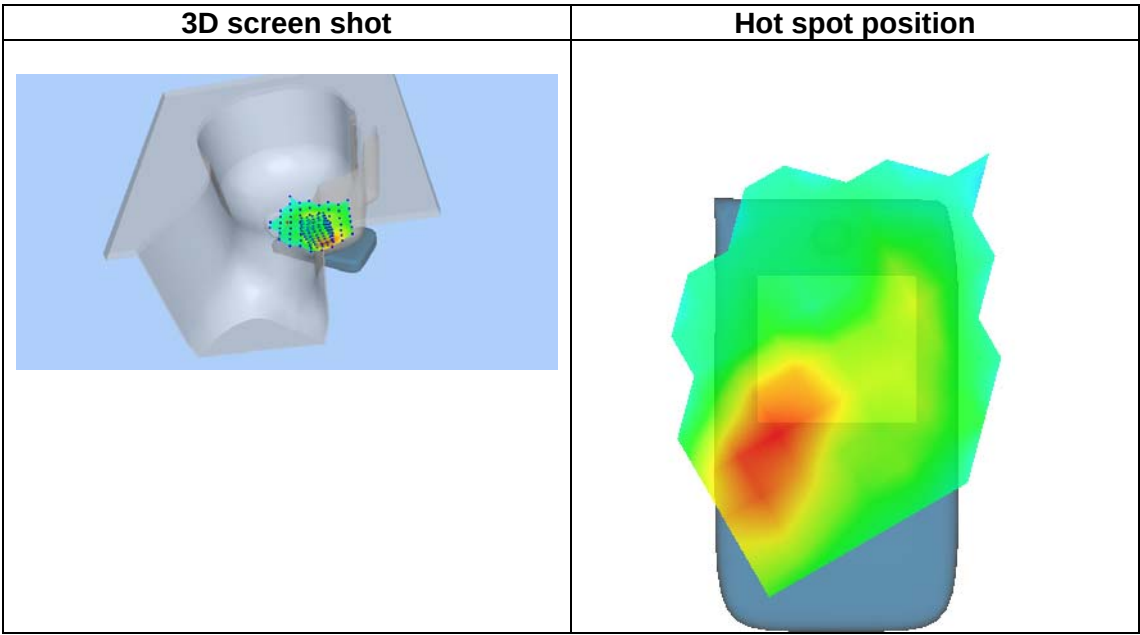
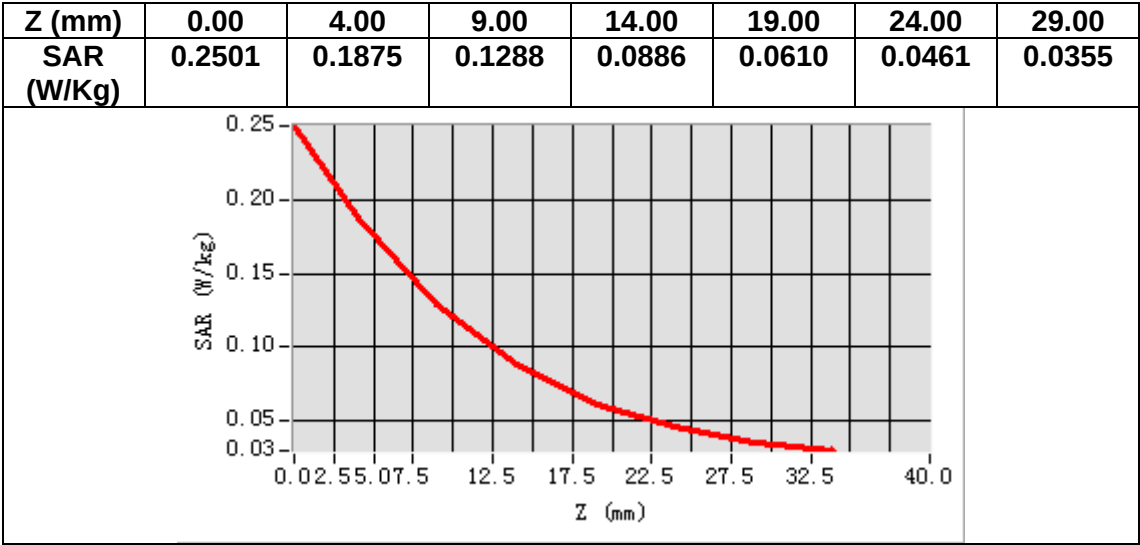
VOLUME SAR



Maximum location: X=-52.00, Y=-54.00

SAR Peak: 0.26 W/kg

SAR 10g (W/Kg)	0.111675
SAR 1g (W/Kg)	0.177392



MEASUREMENT 4

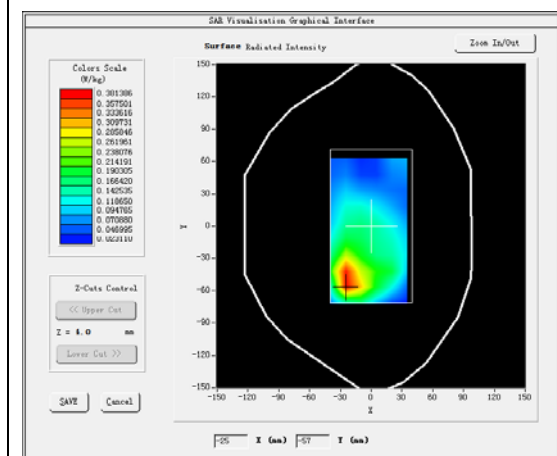
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7,dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>GSM1900</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>TDMA (Crest factor: 2.0)</u>

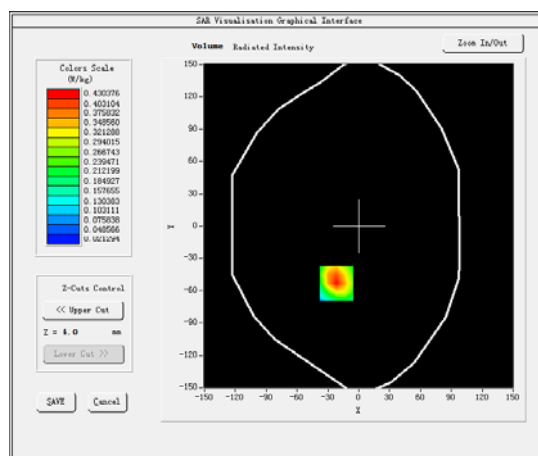
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	53.138901
Relative permittivity (imaginary part)	14.807700
Conductivity (S/m)	1.546582
Variation (%)	1.170000

SURFACE SAR



VOLUME SAR

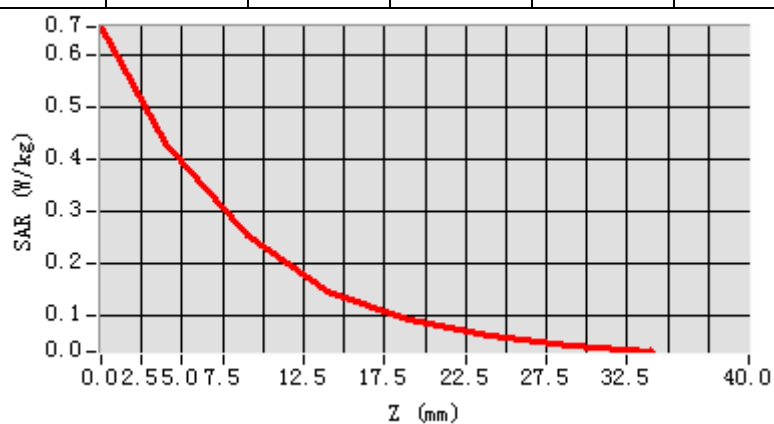


Maximum location: X=-22.00, Y=-53.00

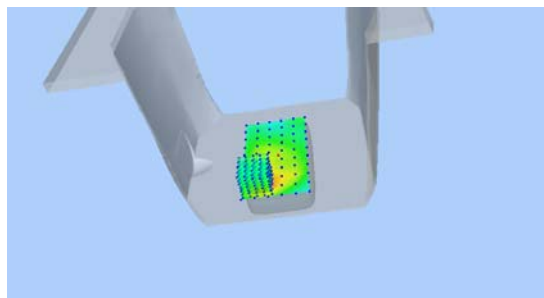
SAR Peak: 0.65 W/kg

SAR 10g (W/Kg)	0.228112
SAR 1g (W/Kg)	0.409619

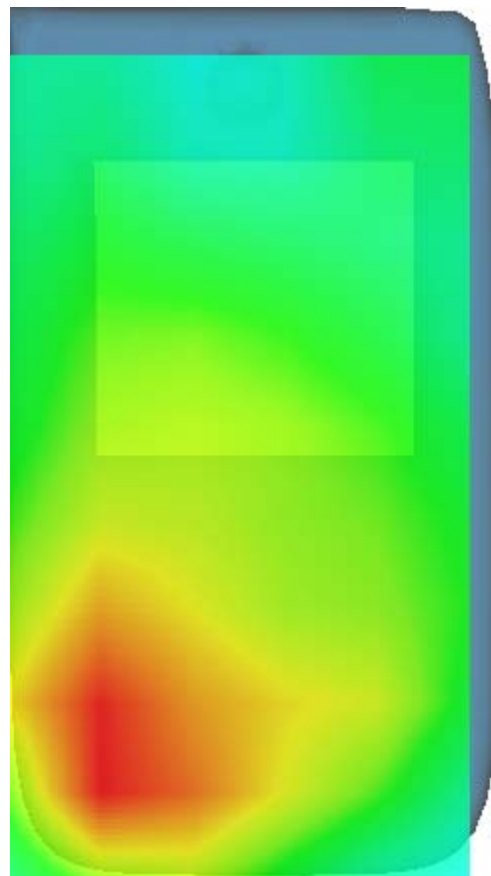
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.6529	0.4304	0.2524	0.1477	0.0929	0.0618	0.0426



3D screen shot



Hot spot position



MEASUREMENT 5

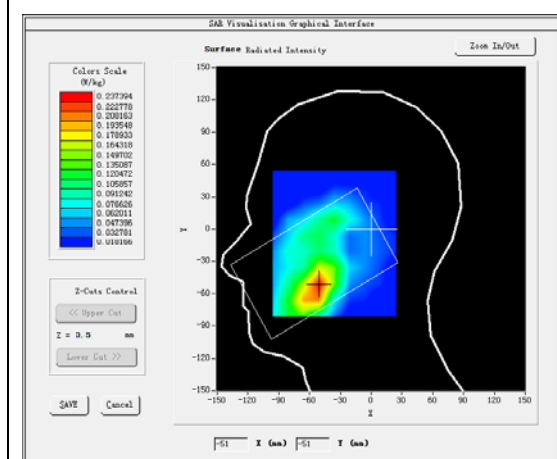
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>Band2 WCDMA1900</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>

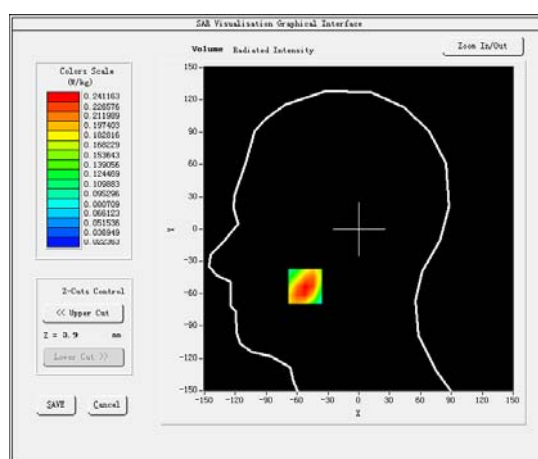
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	41.448200
Relative permittivity (imaginary part)	13.604300
Conductivity (S/m)	1.420894
Variation (%)	0.030000

SURFACE SAR



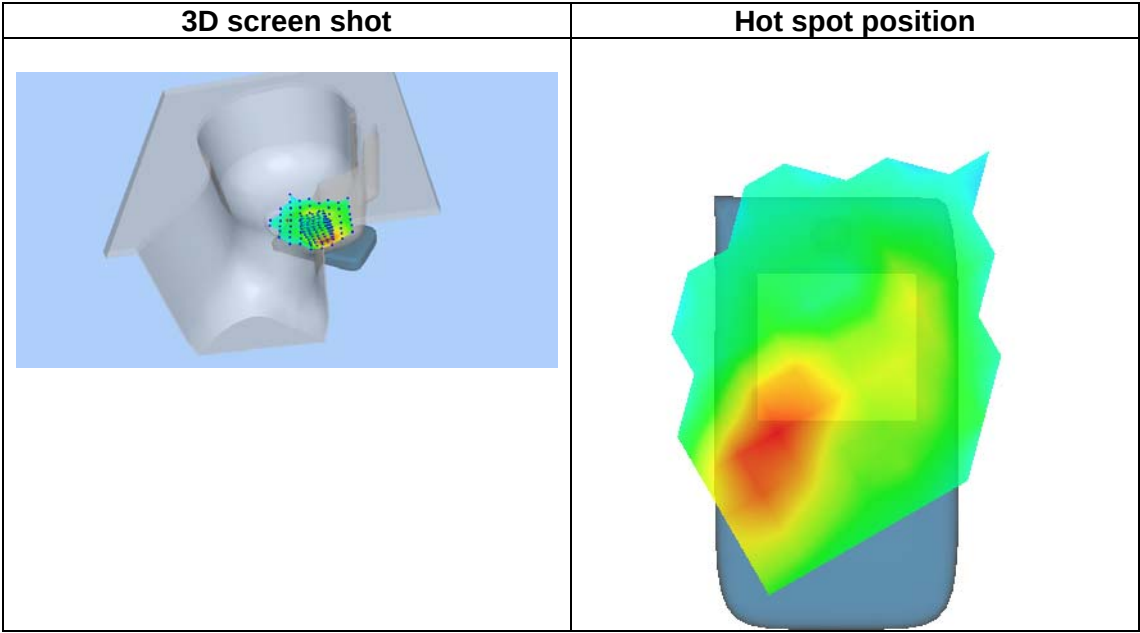
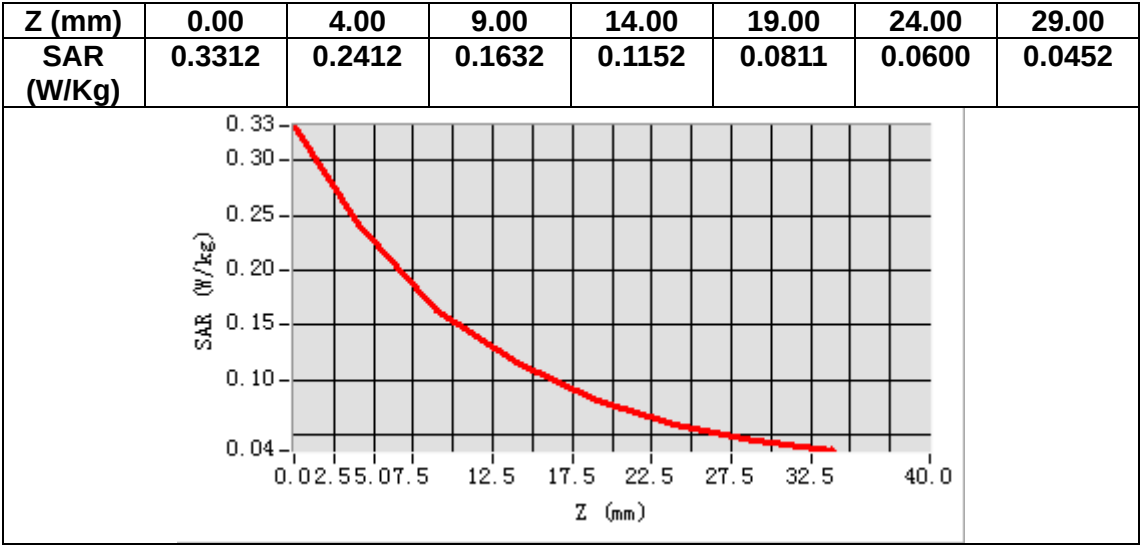
VOLUME SAR



Maximum location: X=-52.00, Y=-53.00

SAR Peak: 0.35 W/kg

SAR 10g (W/Kg)	0.146052
SAR 1g (W/Kg)	0.235358



MEASUREMENT 6

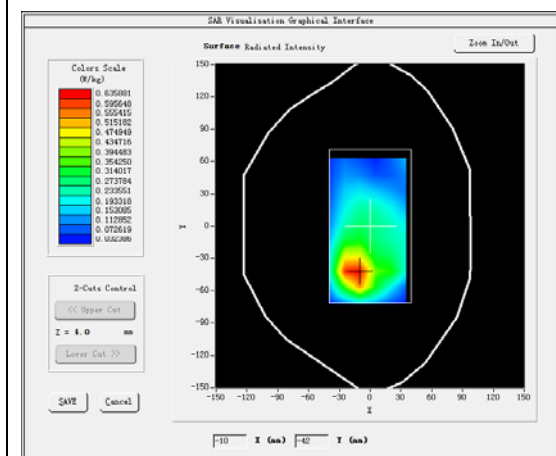
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>Band2 WCDMA1900</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>

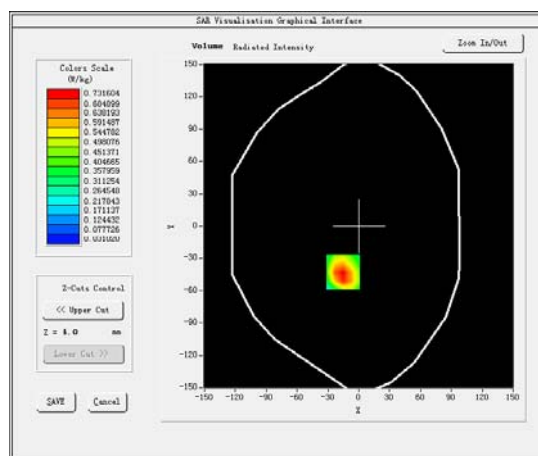
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	53.138901
Relative permittivity (imaginary part)	14.807700
Conductivity (S/m)	1.546582
Variation (%)	-4.910000

SURFACE SAR



VOLUME SAR



Maximum location: X=-15.00, Y=-43.00

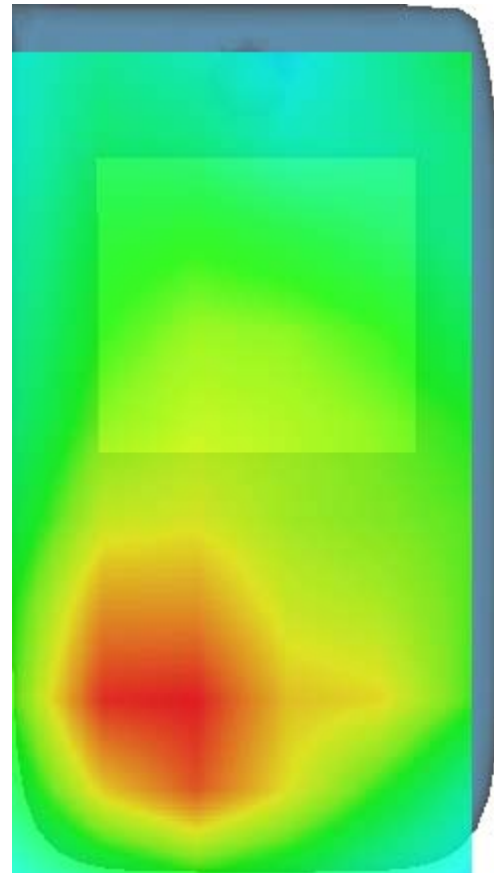
SAR Peak: 1.19 W/kg

SAR 10g (W/Kg)	0.388557
SAR 1g (W/Kg)	0.722917

The graph shows the SAR distribution along the Z-axis for a 100 W CW horn antenna. The SAR starts at approximately 1.1 W/kg at Z=0 and decreases rapidly, reaching near zero at Z=35 mm. The curve is smooth and monotonically decreasing.

Z (mm)	SAR (W/kg)
0.0	1.10
2.5	0.90
5.0	0.75
7.5	0.60
10.0	0.45
12.5	0.35
15.0	0.25
17.5	0.18
20.0	0.12
22.5	0.08
25.0	0.05
27.5	0.03
30.0	0.02
32.5	0.01
35.0	0.00

Hot spot position



MEASUREMENT 7

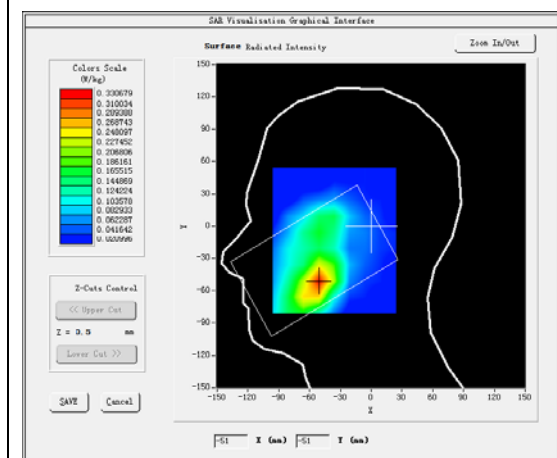
A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Left head</u>
Device Position	<u>Cheek</u>
Band	<u>Band4 WCDMA1700</u>
Channels	<u>Middle</u>
Signal	<u>WCDMA (Crest factor: 1.0)</u>

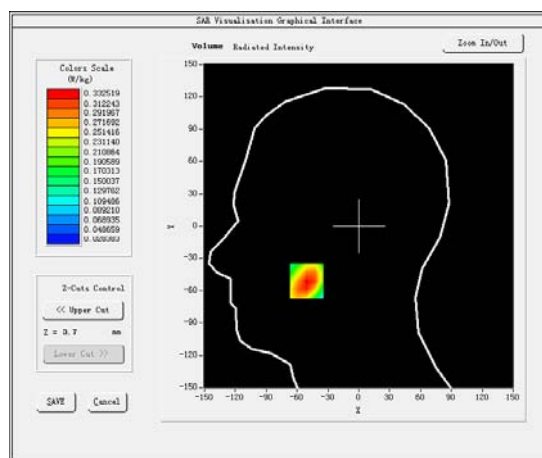
B. SAR Measurement Results

Frequency (MHz)	1732.600000
Relative permittivity (real part)	39.977390
Relative permittivity (imaginary part)	13.955742
Conductivity (S/m)	1.342853
Variation (%)	0.040000

SURFACE SAR



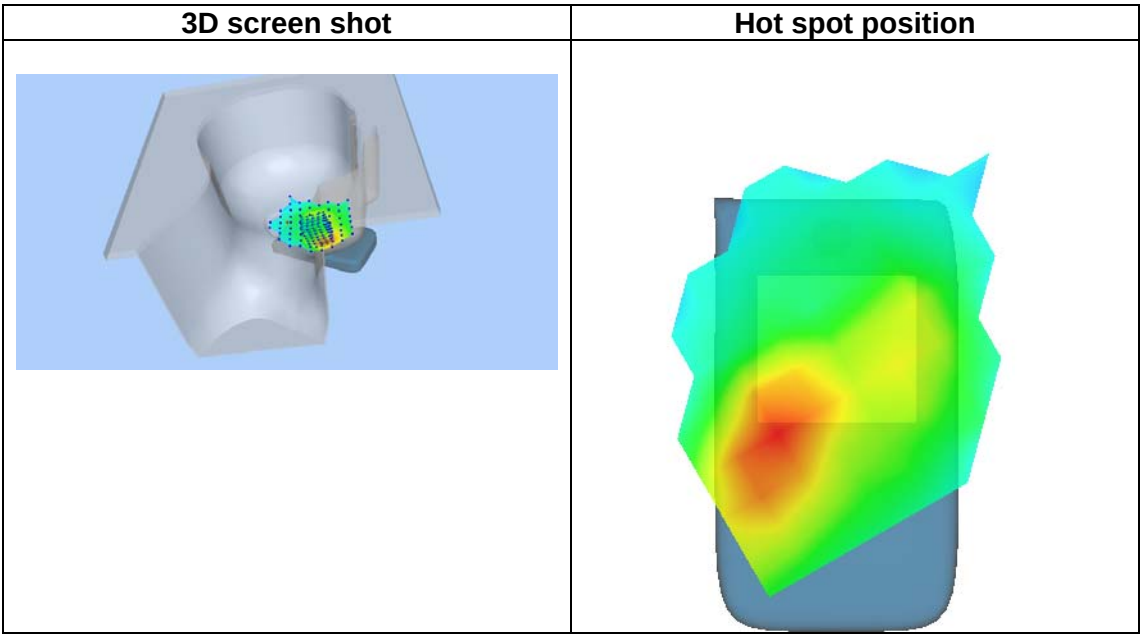
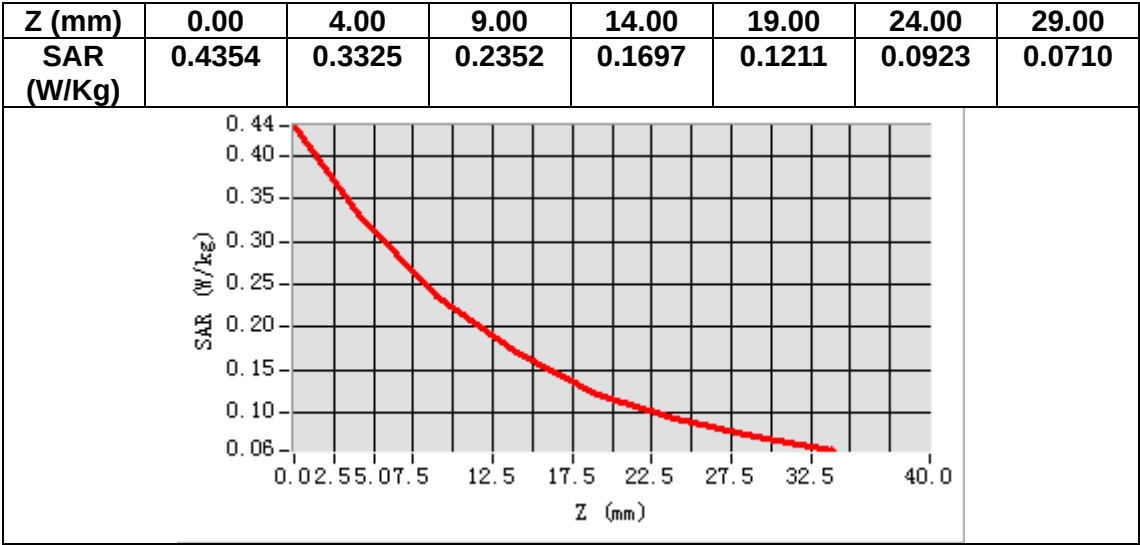
VOLUME SAR



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

SAR Peak: 0.47 W/kg

SAR 10g (W/Kg)	0.206048
SAR 1g (W/Kg)	0.322240



MEASUREMENT 8

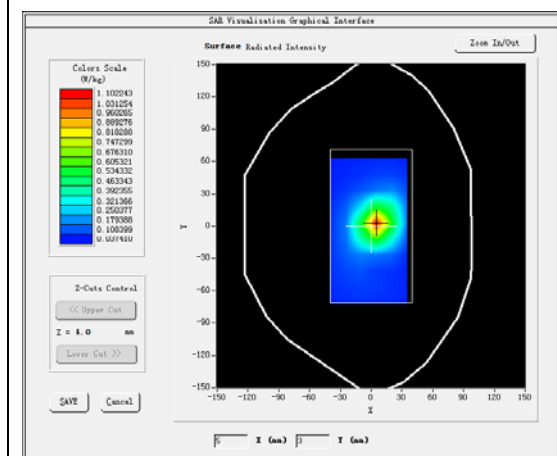
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7,dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>Band4 WCDMA1700</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>

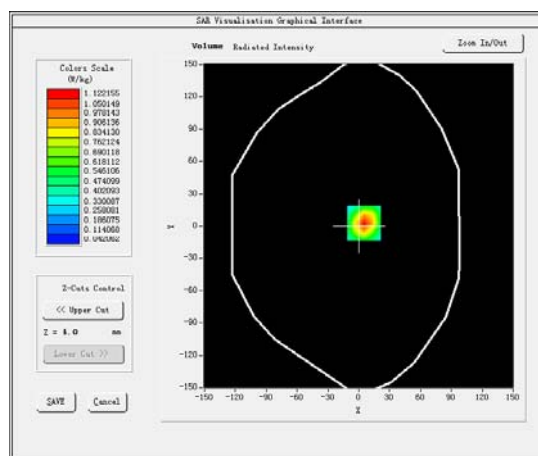
B. SAR Measurement Results

Frequency (MHz)	1732.600000
Relative permittivity (real part)	54.116165
Relative permittivity (imaginary part)	15.391370
Conductivity (S/m)	1.480992
Variation (%)	-0.900000

SURFACE SAR



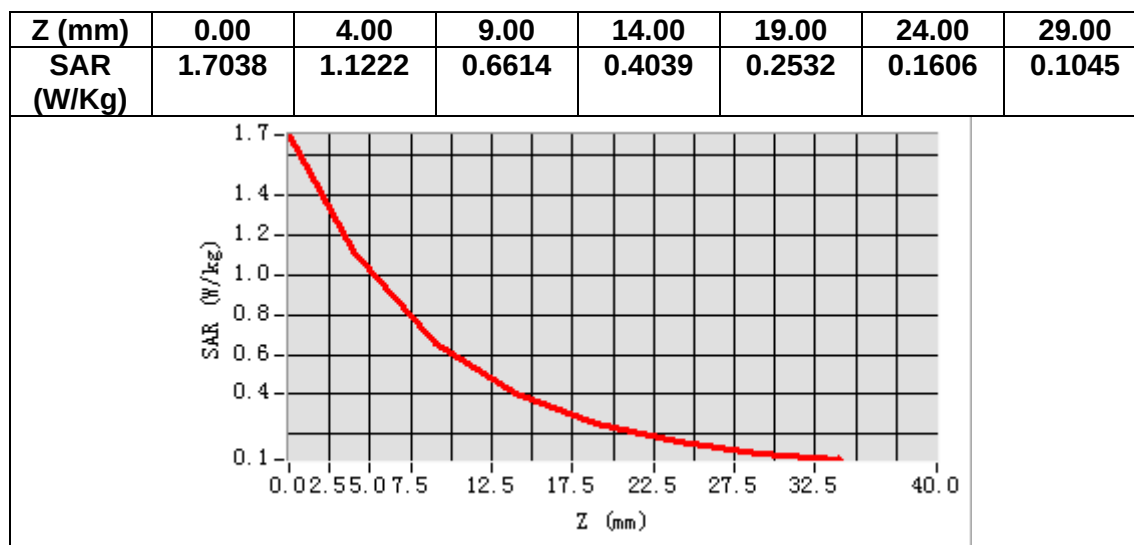
VOLUME SAR



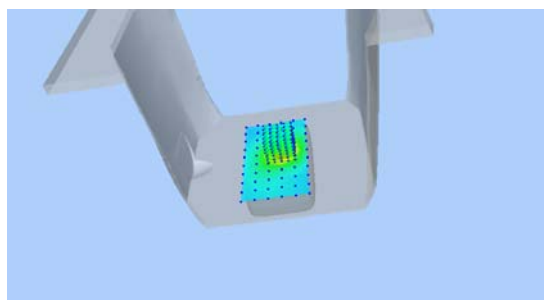
Maximum location: X=5.00, Y=3.00

SAR Peak: 1.70 W/kg

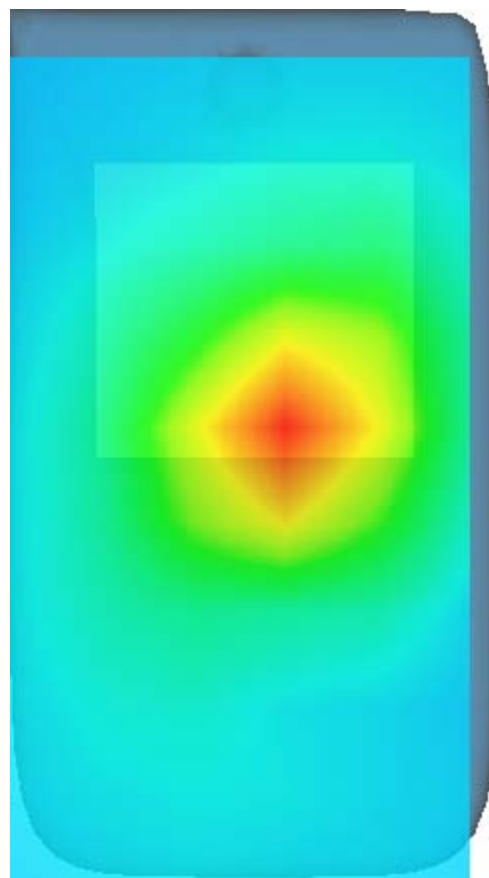
SAR 10g (W/Kg)	0.560150
SAR 1g (W/Kg)	1.045674



3D screen shot



Hot spot position



MEASUREMENT 9

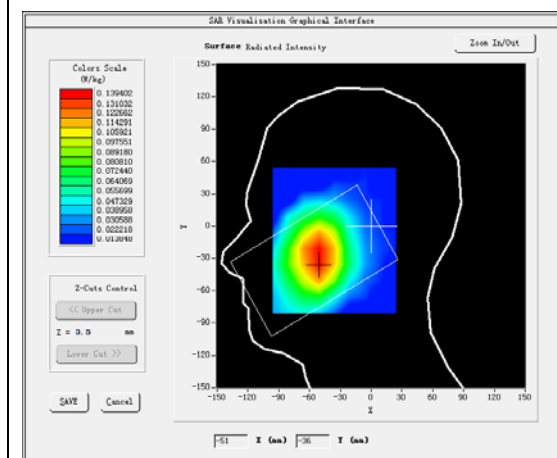
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>Band5 WCDMA850</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>

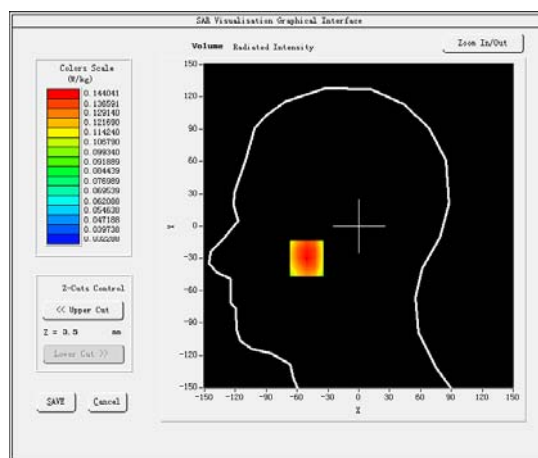
B. SAR Measurement Results

Frequency (MHz)	836.400000
Relative permittivity (real part)	41.240959
Relative permittivity (imaginary part)	19.791540
Conductivity (S/m)	0.919647
Variation (%)	1.090000

SURFACE SAR



VOLUME SAR



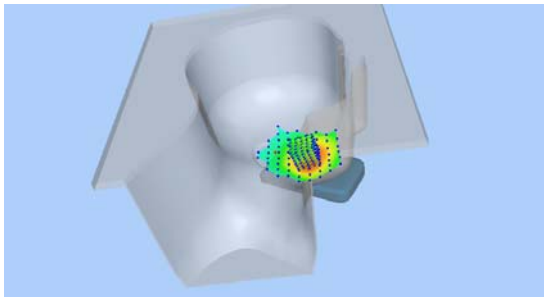
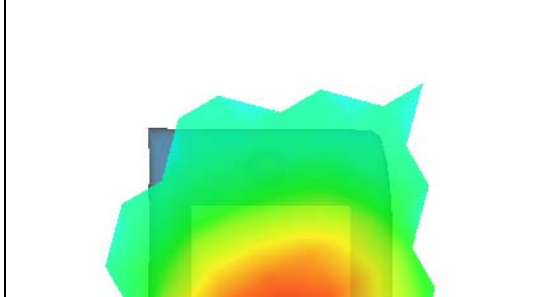
Maximum location: X=-51.00, Y=-30.00

SAR Peak: 0.17 W/kg

SAR 10g (W/Kg)	0.115395
SAR 1g (W/Kg)	0.143376

The graph plots SAR (W/kg) on the y-axis against Z (mm) on the x-axis. The y-axis ranges from 0.06 to 0.17 with major ticks every 0.02. The x-axis ranges from 0.0 to 40.0 with major ticks every 5.0. A red curve shows a decreasing trend.

Z (mm)	SAR (W/kg)
0.0	0.170
2.5	0.155
5.0	0.145
7.5	0.135
10.0	0.125
12.5	0.118
15.0	0.112
17.5	0.105
20.0	0.098
22.5	0.092
25.0	0.085
27.5	0.080
30.0	0.075
32.5	0.070
35.0	0.065

3D screen shot	Hot spot position
 A 3D visualization of a head model (grey) with a hot spot visualization (colorful, multi-colored) overlaid on the head, indicating the location of the hot spot. The hot spot is a small, multi-colored area on the side of the head, with a color gradient from blue to red.	 A 3D visualization of the hot spot position, showing a large, irregular, multi-colored area (yellow, orange, red, green, blue) overlaid on the head model, indicating the location of the hot spot. The hot spot is a large, irregular area on the side of the head, with a color gradient from blue to red.

MEASUREMENT 10

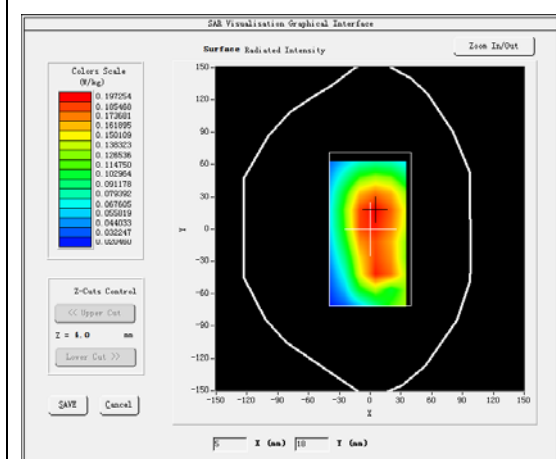
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>Band5 WCDMA850</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>

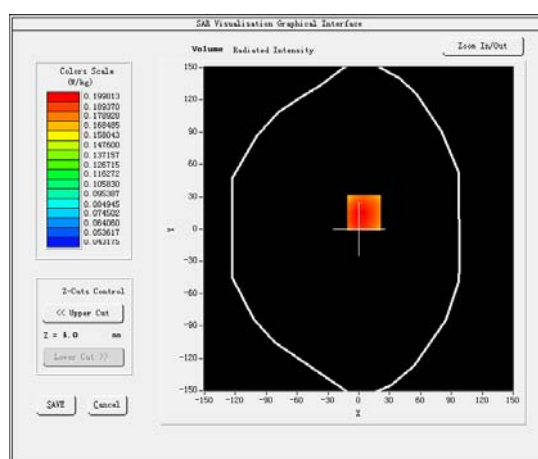
B. SAR Measurement Results

Frequency (MHz)	836.400000
Relative permittivity (real part)	54.779579
Relative permittivity (imaginary part)	21.622740
Conductivity (S/m)	1.004737
Variation (%)	0.340000

SURFACE SAR



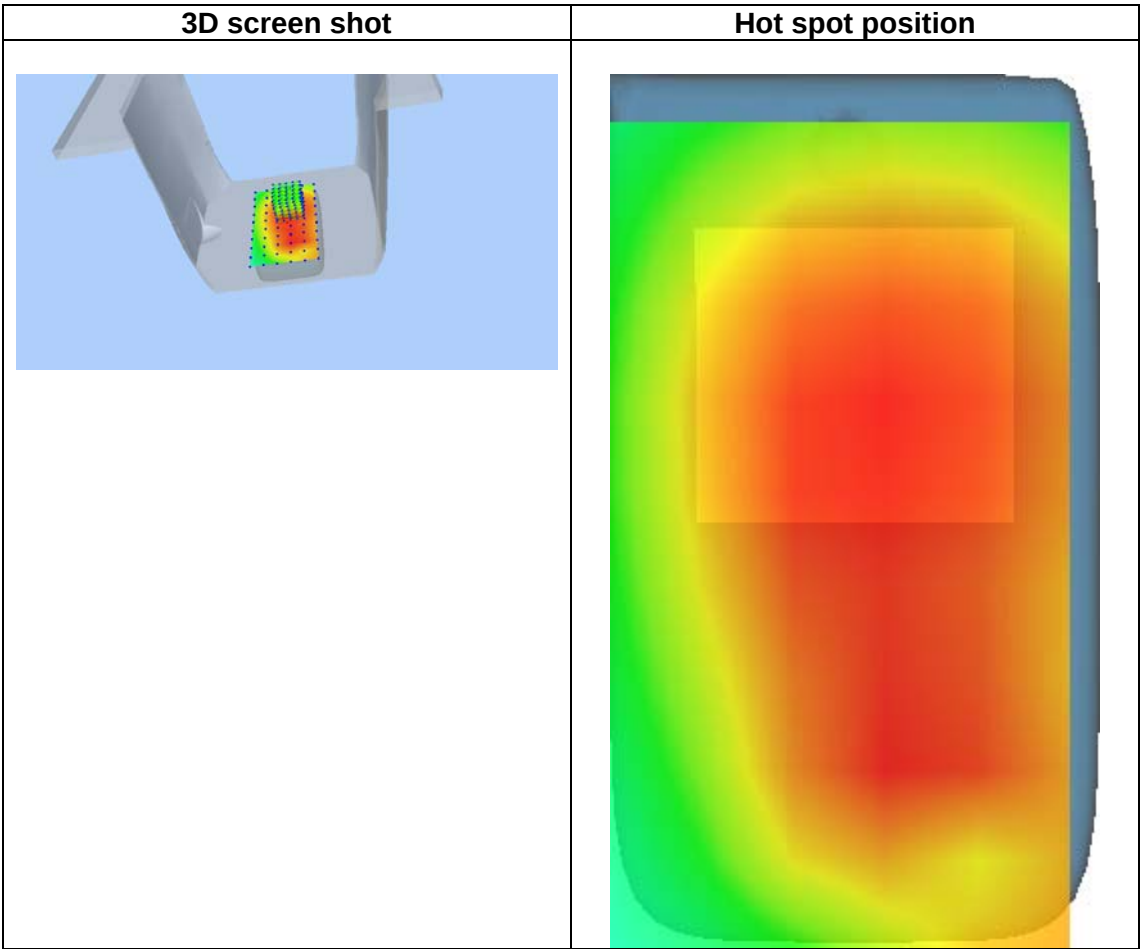
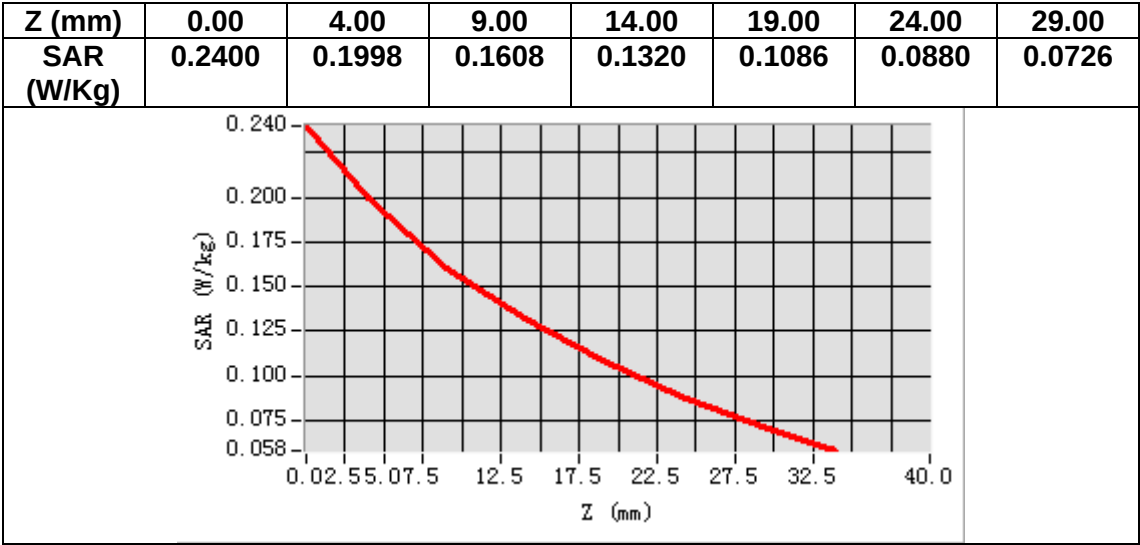
VOLUME SAR



Maximum location: X=5.00, Y=15.00

SAR Peak: 0.24 W/kg

SAR 10g (W/Kg)	0.154704
SAR 1g (W/Kg)	0.200816



MEASUREMENT 11

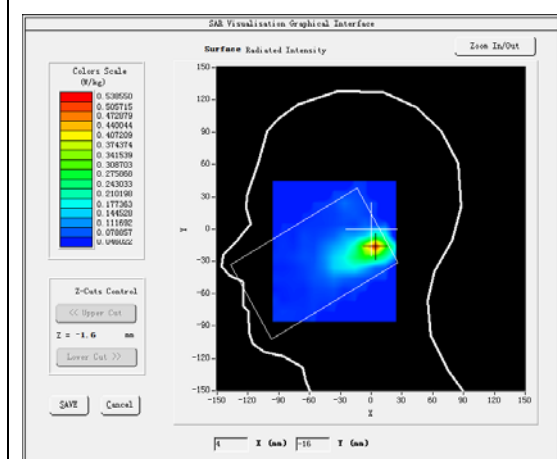
A. Experimental conditions.

Area Scan	<u>dx=10mm dy=10mm, h= 2.00 mm</u>
ZoomScan	<u>7x7x12,dx=4mm dy=4mm dz=2mm</u>
Phantom	<u>Right head</u>
Device Position	<u>Cheek</u>
Band	<u>IEEE 802.11a U-NII</u>
Channels	<u>Middle</u>
Signal	<u>IEEE802.11a (Crest factor: 1.0)</u>

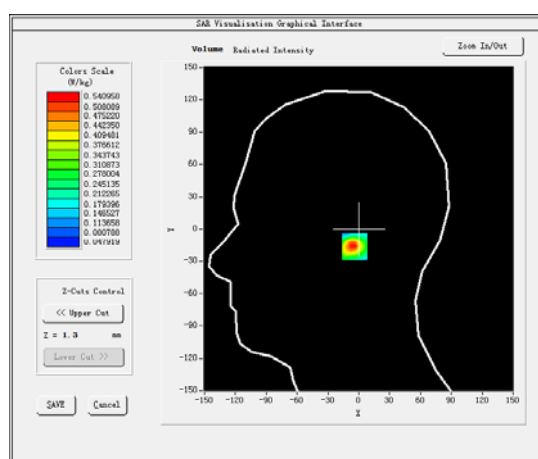
B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative permittivity (real part)	35.852982
Relative permittivity (imaginary part)	16.101620
Conductivity (S/m)	4.651579
Variation (%)	-2.400000

SURFACE SAR



VOLUME SAR

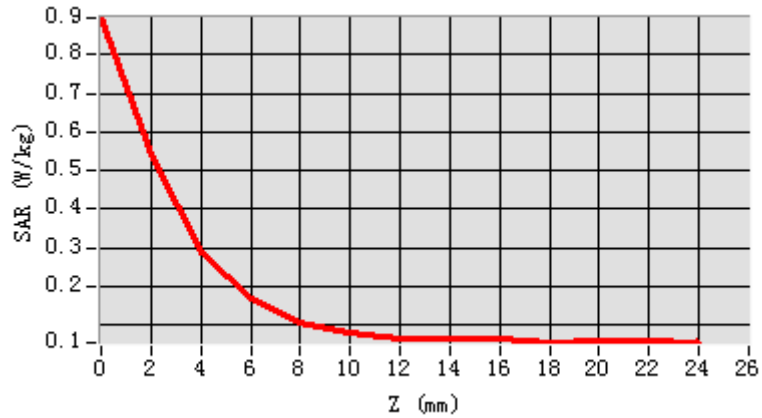


Maximum location: X=5.00, Y=-16.00

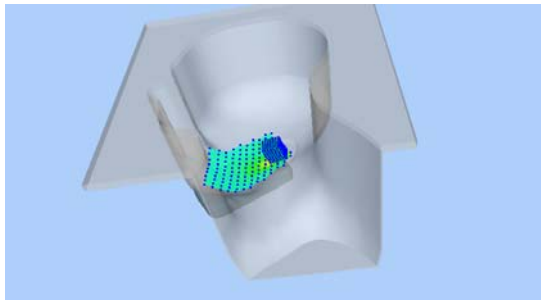
SAR Peak: 1.44 W/kg

SAR 10g (W/Kg)	0.209081
SAR 1g (W/Kg)	0.524571

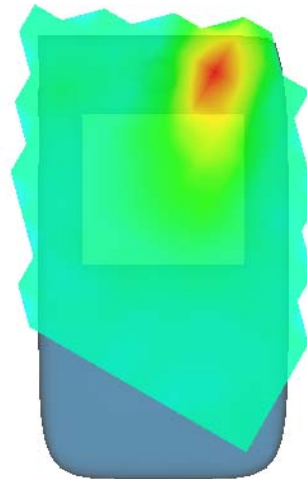
Z (m m)	0.00	2.00	4.00	6.00	8.00	10.0	12.0	14.0	16.0	18.0	20.0	22.0
SAR (W/ Kg)	0.89 62	0.54 10	0.28 98	0.16 64	0.10 61	0.07 93	0.06 46	0.06 16	0.06 30	0.05 43	0.05 73	0.05 68



3D screen shot



Hot spot position



MEASUREMENT 12

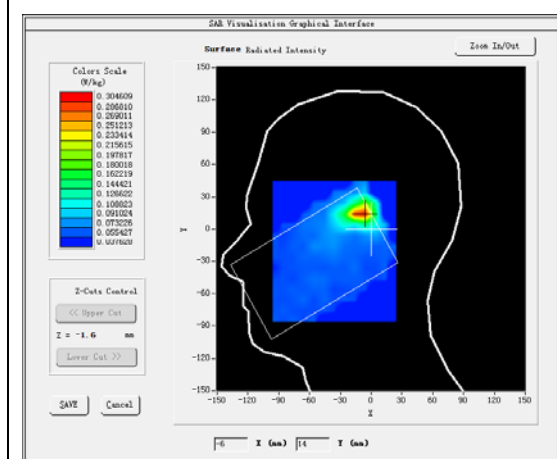
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=10mm dy=10mm, h= 2.00 mm</u>
<u>ZoomScan</u>	<u>7x7x12,dx=4mm dy=4mm dz=2mm</u>
<u>Phantom</u>	<u>Right head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>IEEE 802.11a U-NII</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>IEEE802.11a (Crest factor: 1.0)</u>

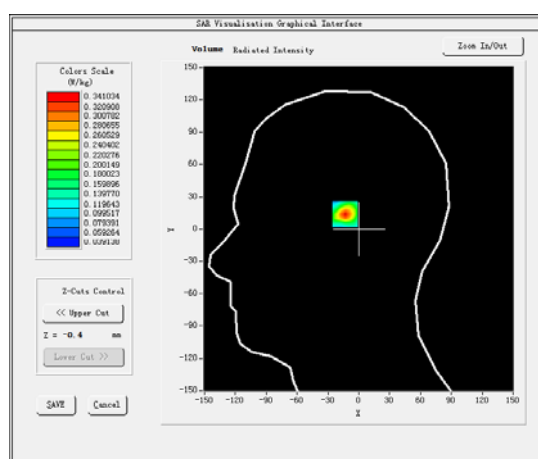
B. SAR Measurement Results

Frequency (MHz)	5785.000000
Relative permittivity (real part)	34.754787
Relative permittivity (imaginary part)	16.125265
Conductivity (S/m)	5.182481
Variation (%)	0.770000

SURFACE SAR



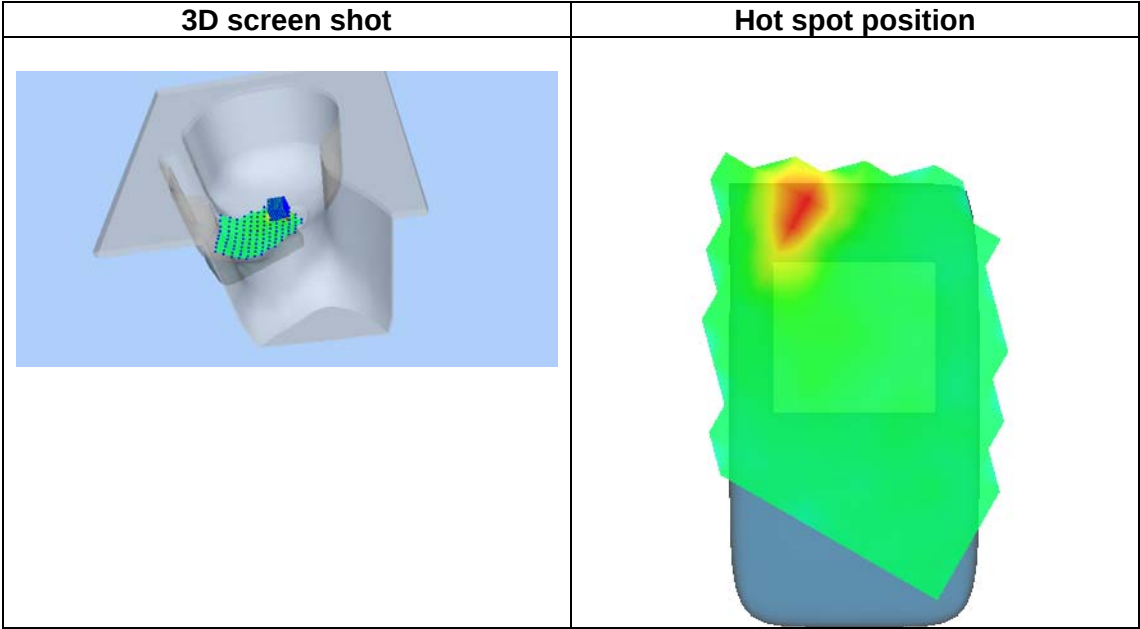
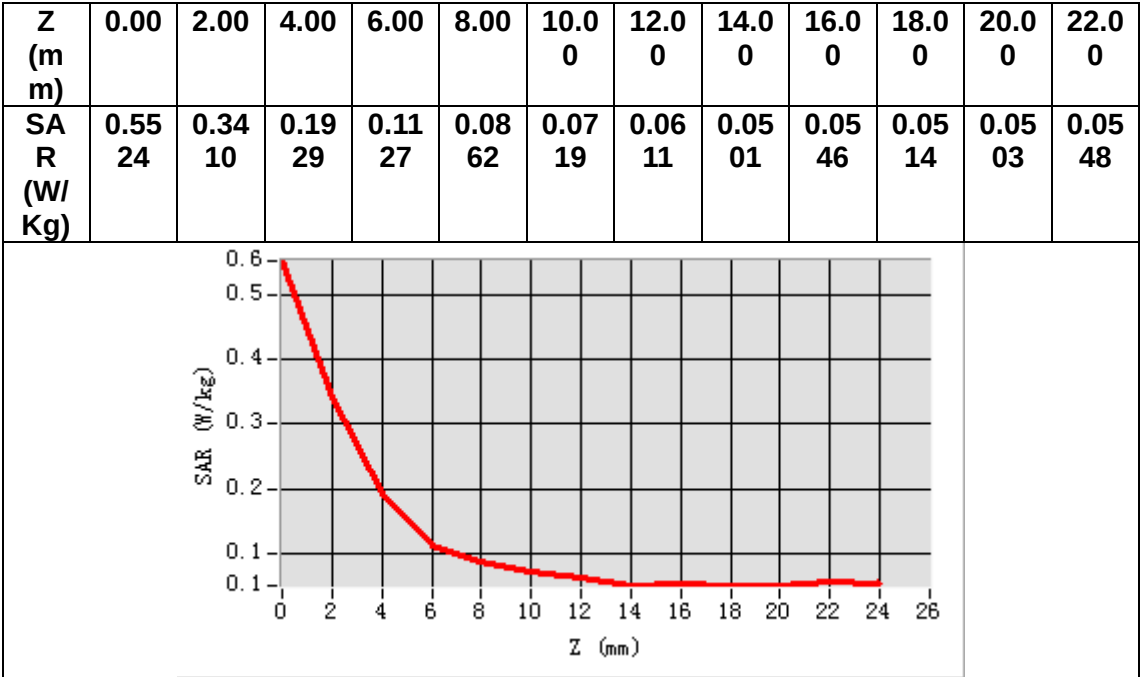
VOLUME SAR



Maximum location: X=-10.00, Y=15.00

SAR Peak: 0.86 W/kg

SAR 10g (W/Kg)	0.135438
SAR 1g (W/Kg)	0.326837



MEASUREMENT 13

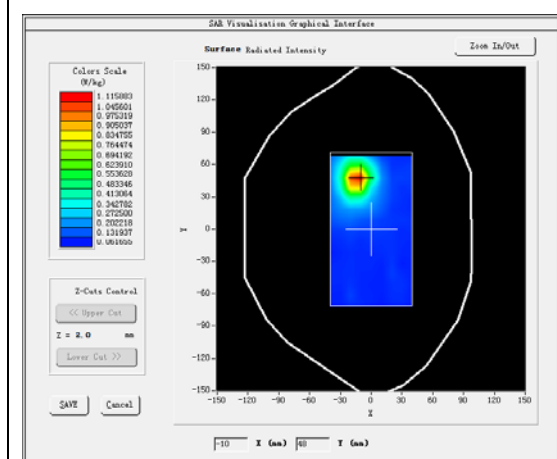
A. Experimental conditions.

Area Scan	<u>dx=10mm dy=10mm, h= 2.00 mm</u>
ZoomScan	<u>7x7x12,dx=4mm dy=4mm dz=2mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>IEEE 802.11a U-NII</u>
Channels	<u>Middle</u>
Signal	<u>IEEE802.11a (Crest factor: 1.0)</u>

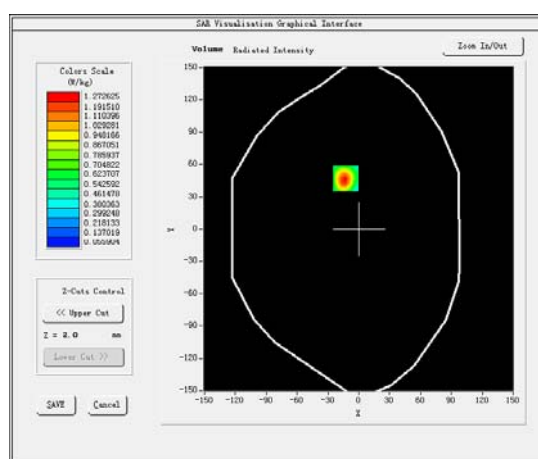
B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative permittivity (real part)	49.809536
Relative permittivity (imaginary part)	18.305510
Conductivity (S/m)	5.288258
Variation (%)	-3.810000

SURFACE SAR



VOLUME SAR

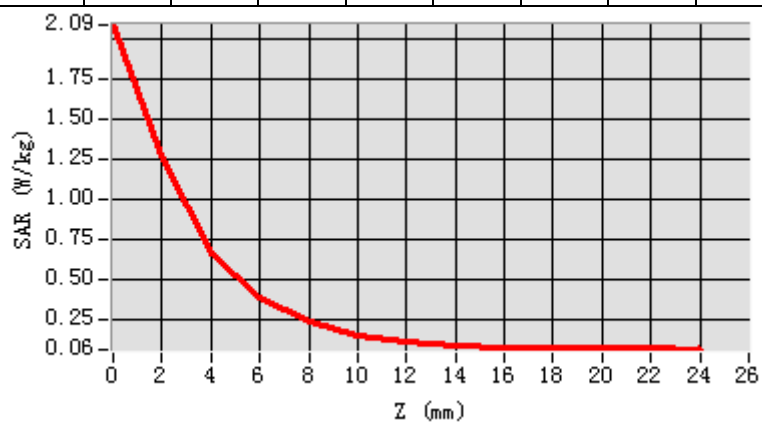


Maximum location: X=-13.00, Y=47.00

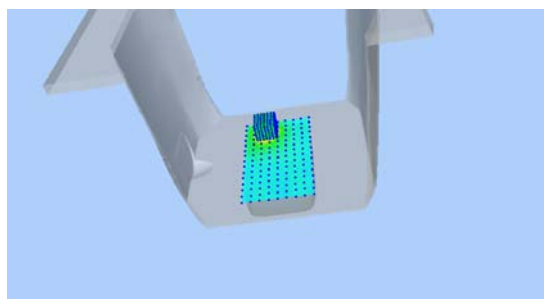
SAR Peak: 2.21 W/kg

SAR 10g (W/Kg)	0.312153
SAR 1g (W/Kg)	0.745784

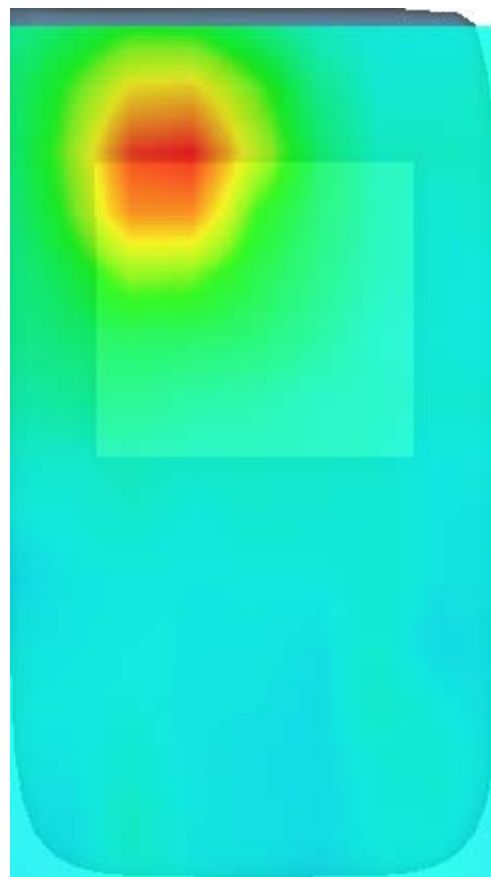
Z (m m)	0.00	2.00	4.00	6.00	8.00	10.0 0	12.0 0	14.0 0	16.0 0	18.0 0	20.0 0	22.0 0
SA R (W/ Kg)	2.09 05	1.27 26	0.65 89	0.38 03	0.23 80	0.15 05	0.10 65	0.08 46	0.07 42	0.07 28	0.06 73	0.06 86



3D screen shot



Hot spot position



MEASUREMENT 14

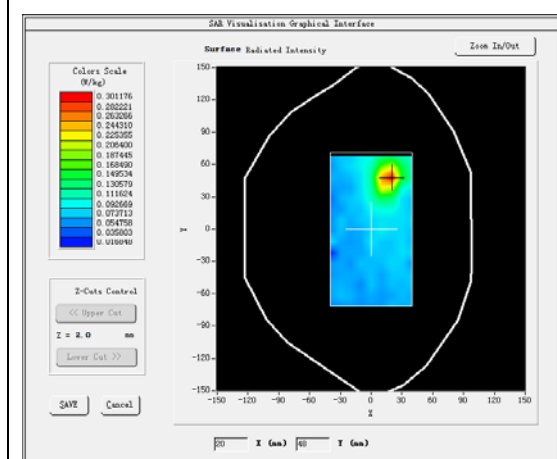
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=10mm dy=10mm, h= 2.00 mm</u>
<u>ZoomScan</u>	<u>7x7x12,dx=4mm dy=4mm dz=2mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>IEEE 802.11a U-NII</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>IEEE802.11a (Crest factor: 1.0)</u>

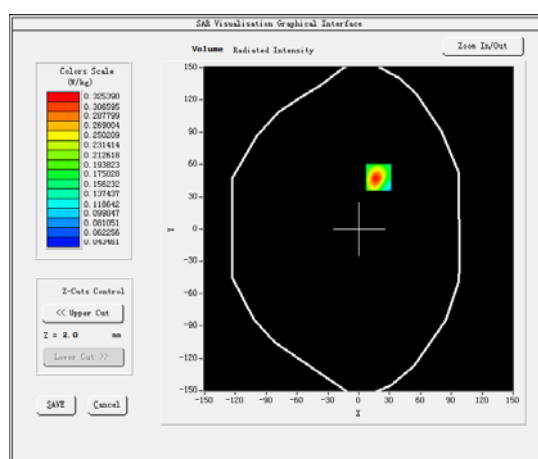
B. SAR Measurement Results

Frequency (MHz)	5785.000000
Relative permittivity (real part)	48.618702
Relative permittivity (imaginary part)	18.656767
Conductivity (S/m)	5.996077
Variation (%)	2.790000

SURFACE SAR



VOLUME SAR

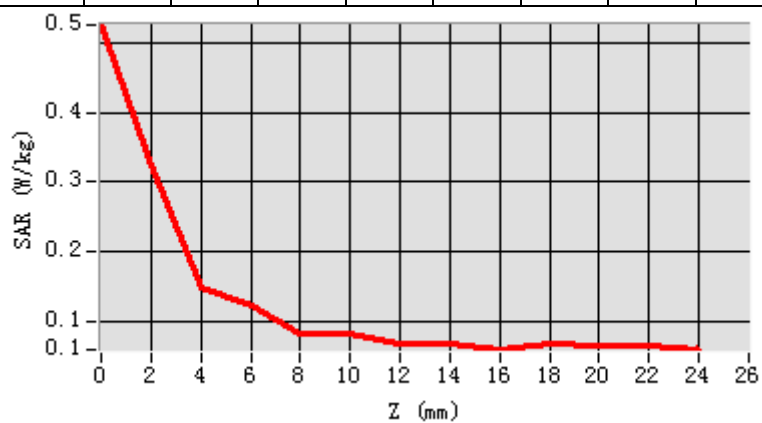


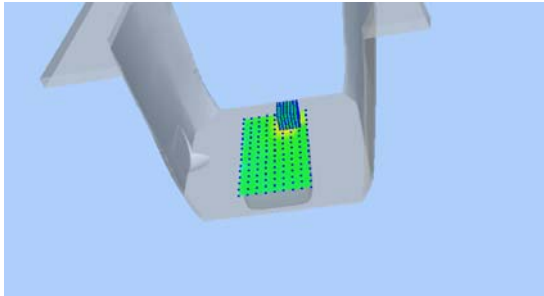
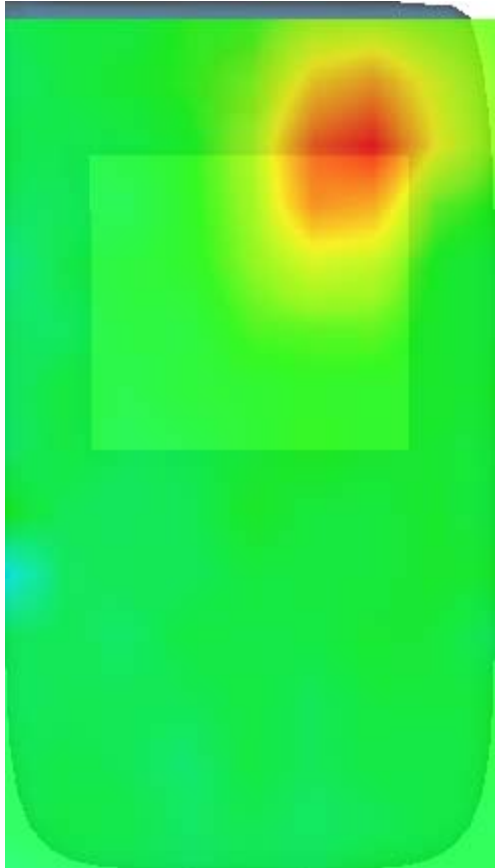
Maximum location: X=19.00, Y=48.00

SAR Peak: 0.56 W/kg

SAR 10g (W/Kg)	0.114329
SAR 1g (W/Kg)	0.208765

Z (m m)	0.00	2.00	4.00	6.00	8.00	10.0 0	12.0 0	14.0 0	16.0 0	18.0 0	20.0 0	22.0 0
SA R (W/ Kg)	0.52 55	0.32 54	0.14 90	0.12 27	0.08 34	0.08 14	0.06 72	0.06 86	0.05 98	0.06 80	0.06 49	0.06 60



3D screen shot	Hot spot position
	

MEASUREMENT 15

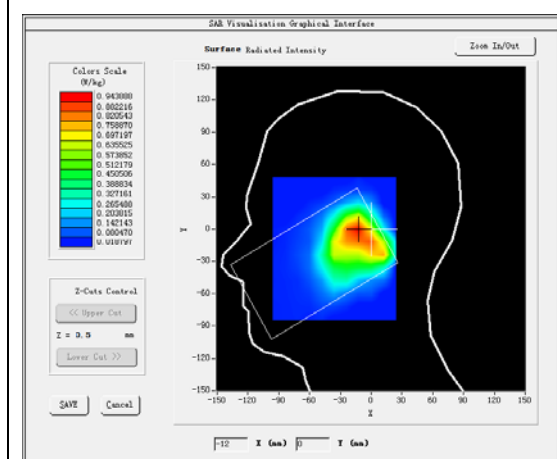
A. Experimental conditions.

Area Scan	<u>dx=12mm dy=12mm, h= 5.00 mm</u>
ZoomScan	<u>7x7x7,dx=5mm dy=5mm dz=5mm</u>
Phantom	<u>Right head</u>
Device Position	<u>Cheek</u>
Band	<u>IEEE 802.11b ISM</u>
Channels	<u>Middle</u>
Signal	<u>IEEE802.11b (Crest factor: 1.0)</u>

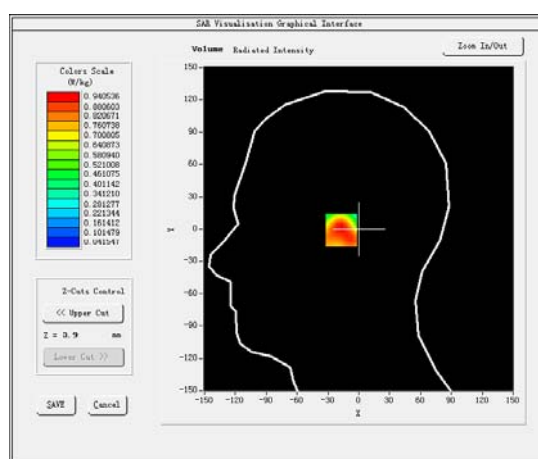
B. SAR Measurement Results

Frequency (MHz)	2437.000000
Relative permittivity (real part)	39.721001
Relative permittivity (imaginary part)	13.410300
Conductivity (S/m)	1.815606
Variation (%)	-0.310000

SURFACE SAR



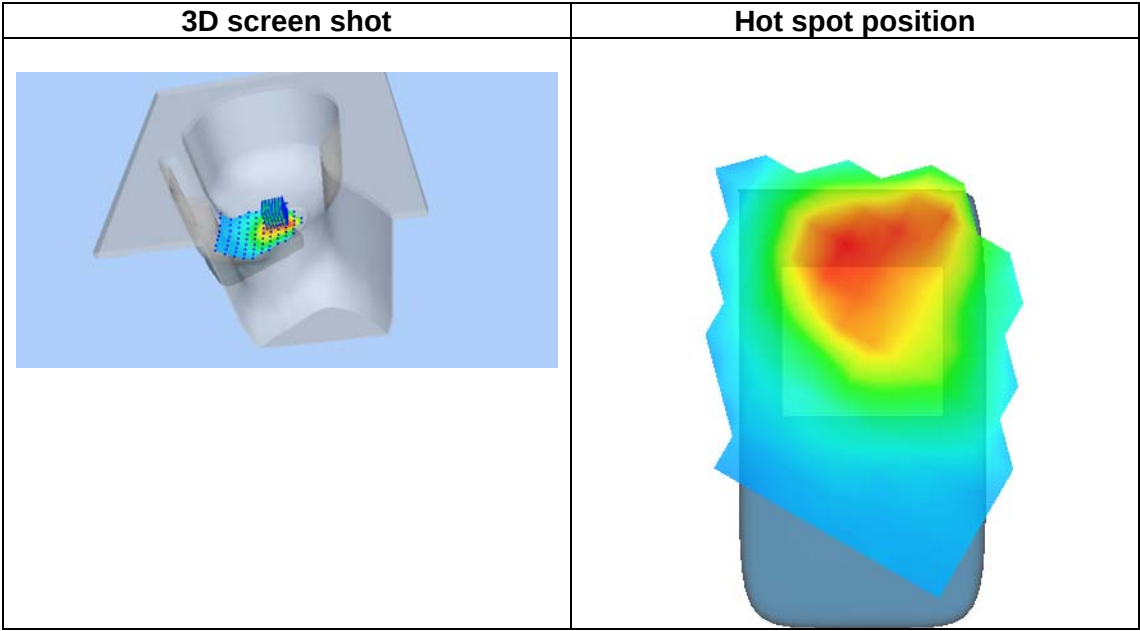
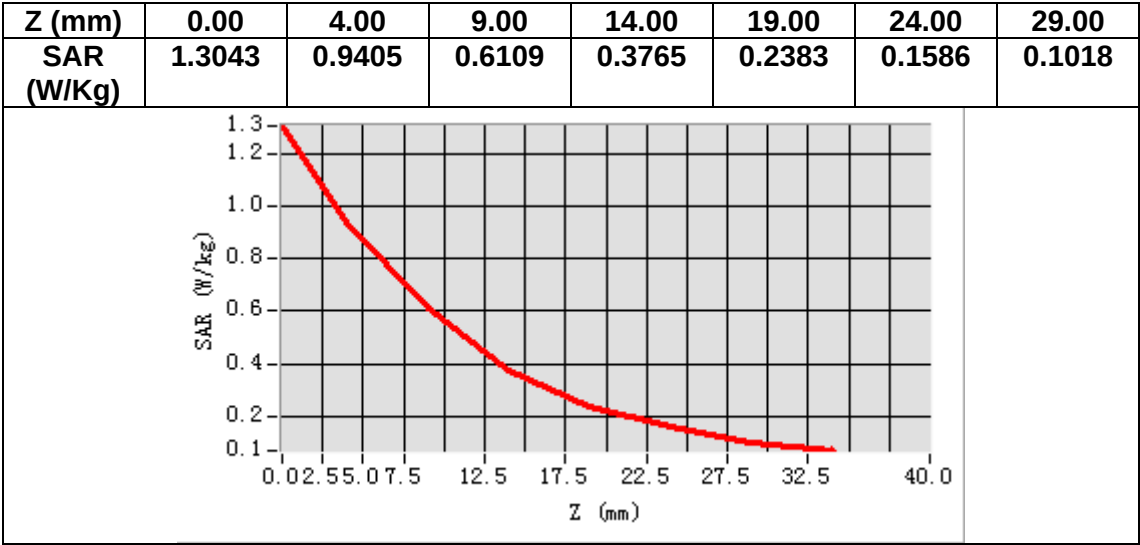
VOLUME SAR



Maximum location: X=-14.00, Y=-1.00

SAR Peak: 1.38 W/kg

SAR 10g (W/Kg)	0.547393
SAR 1g (W/Kg)	0.712428



MEASUREMENT 16

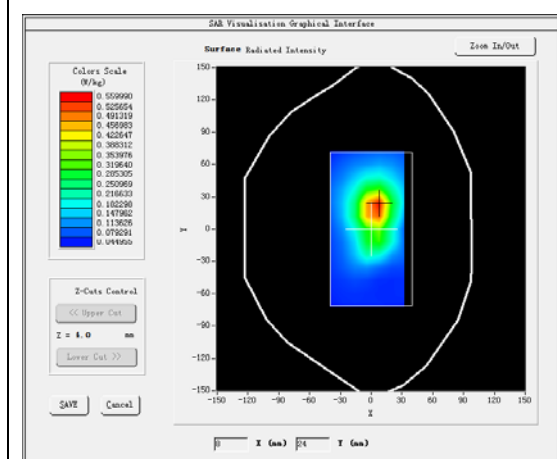
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=12mm dy=12mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>7x7x7,dx=5mm dy=5mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>IEEE 802.11b ISM</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>IEEE802.11b (Crest factor: 1.0)</u>

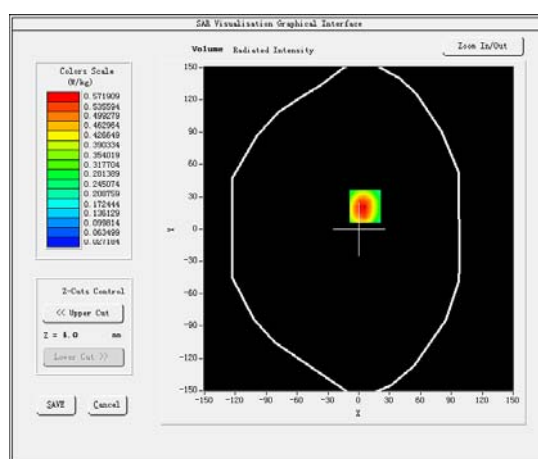
B. SAR Measurement Results

Frequency (MHz)	2437.000000
Relative permittivity (real part)	52.621601
Relative permittivity (imaginary part)	14.595620
Conductivity (S/m)	1.976085
Variation (%)	-0.910000

SURFACE SAR

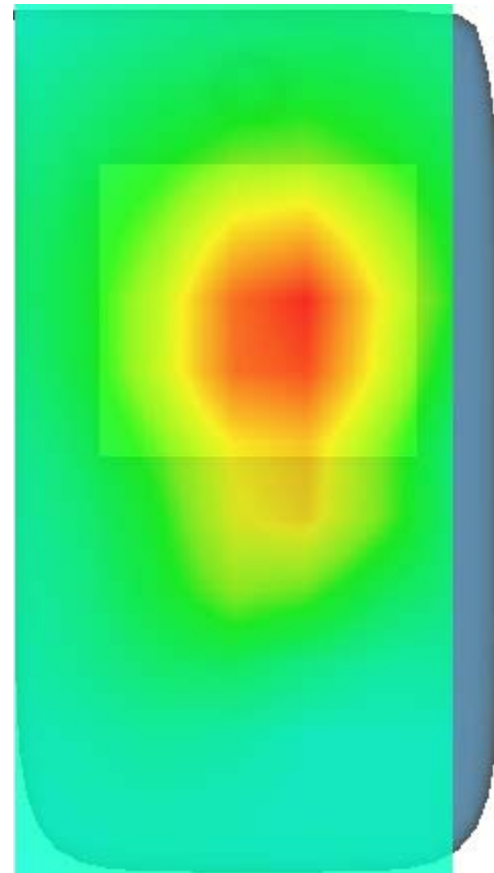


VOLUME SAR



Z (mm)	SAR (W/kg)
0.25	0.80
2.5	0.65
5.0	0.55
7.5	0.45
10.0	0.38
12.5	0.30
15.0	0.22
17.5	0.18
20.0	0.15
22.5	0.13
25.0	0.11
27.5	0.10
30.0	0.09
32.5	0.08
35.0	0.07

Hot spot position



MEASUREMENT 17

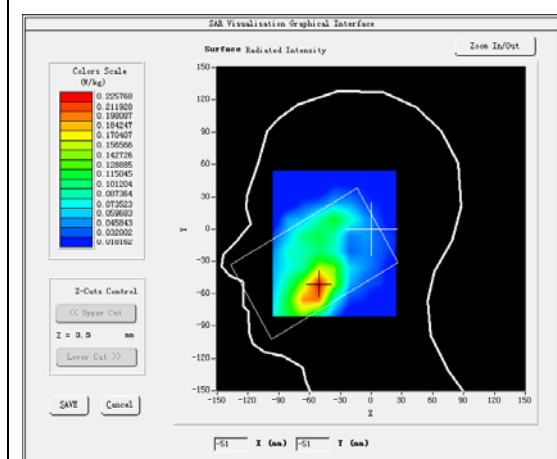
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7,dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>LTE band 2</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

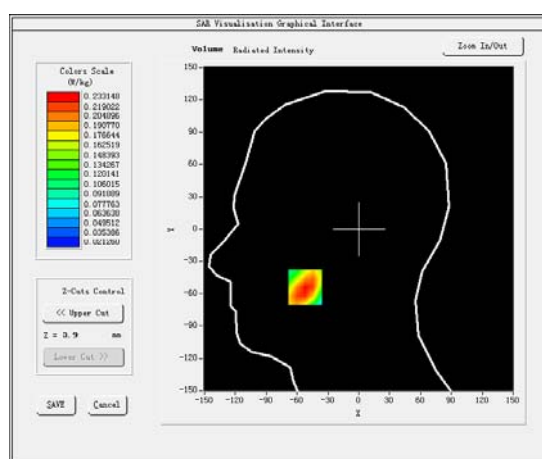
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	41.493801
Relative permittivity (imaginary part)	13.598100
Conductivity (S/m)	1.419868
Variation (%)	1.910000

SURFACE SAR



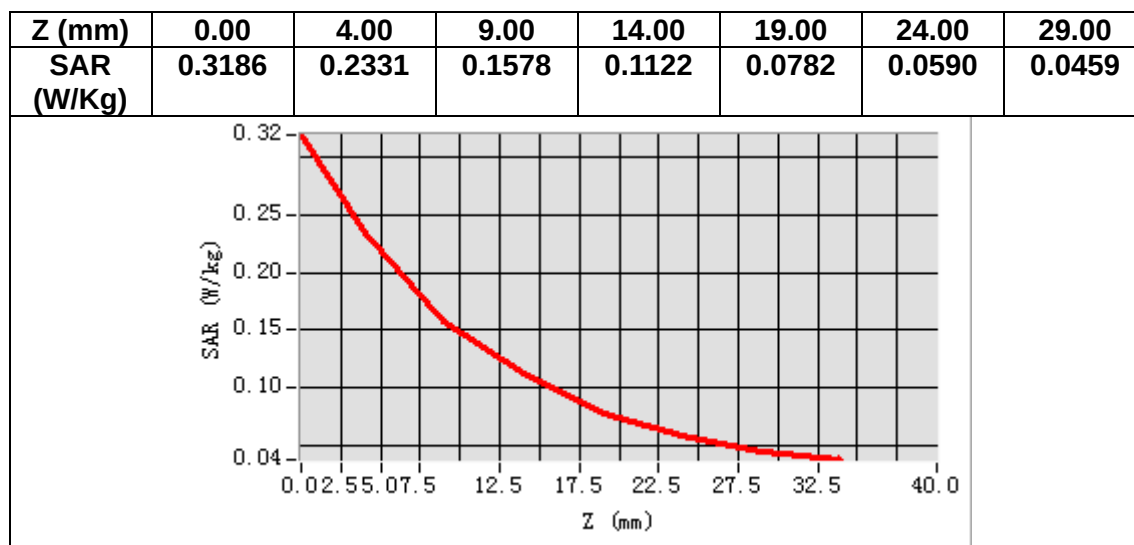
VOLUME SAR

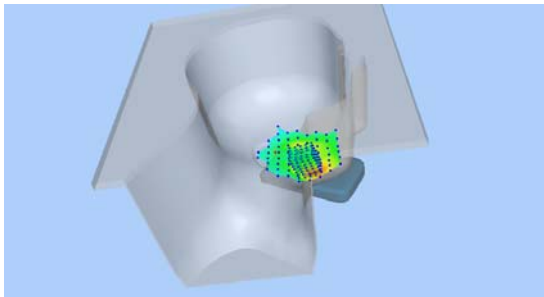
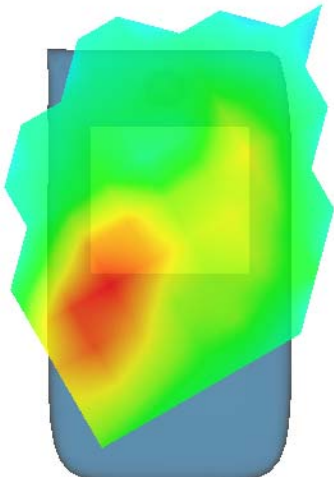


Maximum location: X=-52.00, Y=-54.00

SAR Peak: 0.34 W/kg

SAR 10g (W/Kg)	0.141754
SAR 1g (W/Kg)	0.226934



3D screen shot	Hot spot position
 A 3D perspective view of a knee joint model. A grid of small, multi-colored dots (red, yellow, green, blue) is overlaid on the joint, representing the positions of sensors or measurement points. The model is set against a light blue background.	 A visualization of the hot spot position. It shows a 3D model of the knee joint with a semi-transparent, irregularly shaped volume overlaid. This volume is color-coded, with a red/orange core indicating the highest intensity, transitioning through yellow and green to a blue outer edge. The volume appears to be centered over the joint area.

MEASUREMENT 18

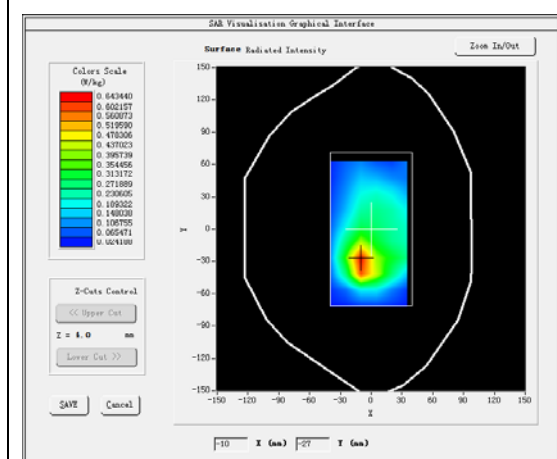
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 2</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

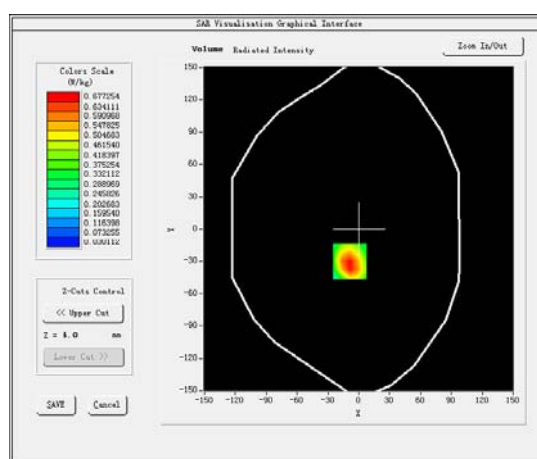
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	53.145950
Relative permittivity (imaginary part)	14.816150
Conductivity (S/m)	1.547053
Variation (%)	-0.130000

SURFACE SAR



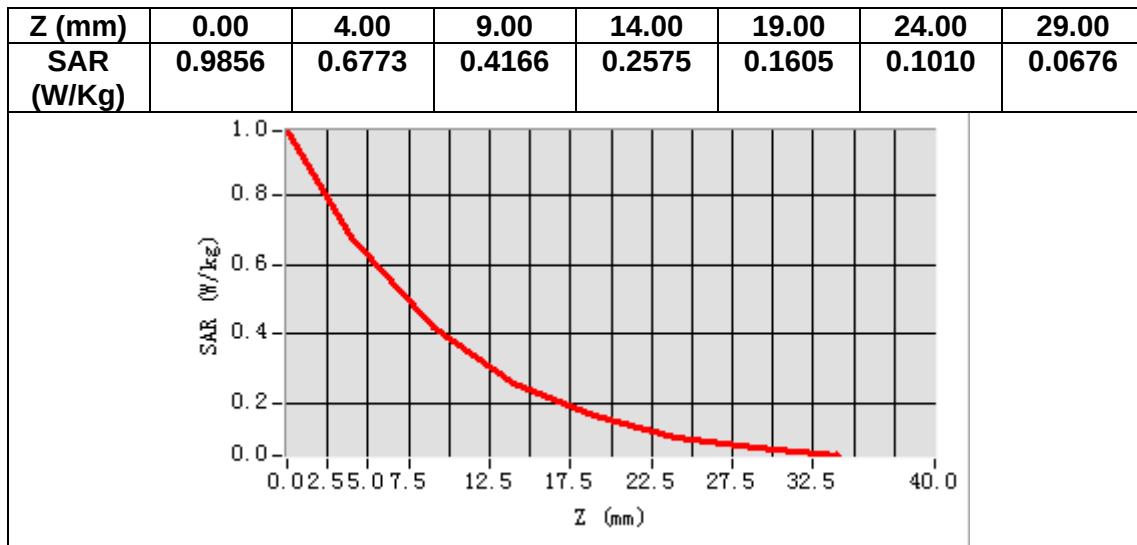
VOLUME SAR



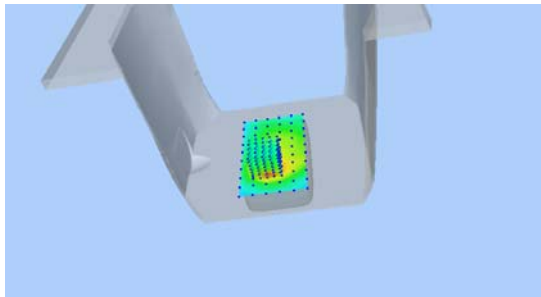
Maximum location: X=-9.00, Y=-30.00

SAR Peak: 1.05 W/kg

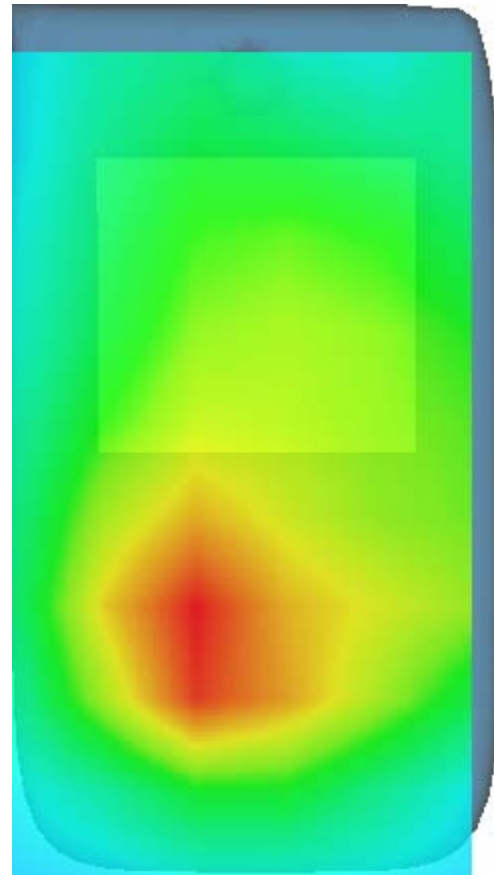
SAR 10g (W/Kg)	0.369606
SAR 1g (W/Kg)	0.665849



3D screen shot



Hot spot position



MEASUREMENT 19

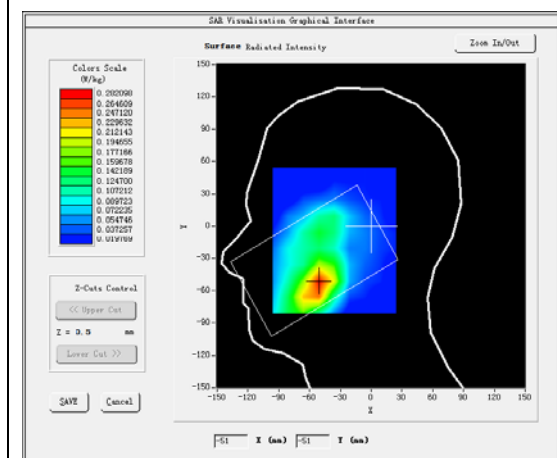
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>LTE band 4</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

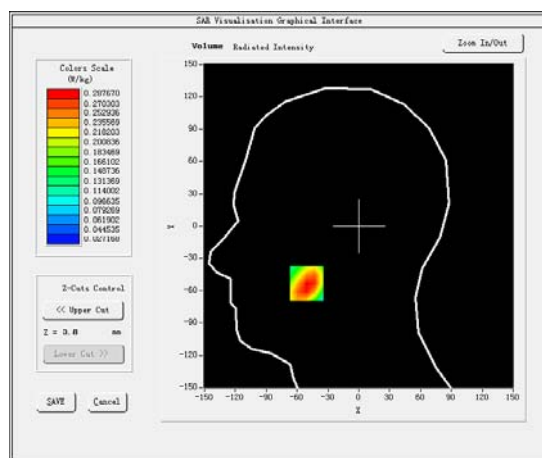
B. SAR Measurement Results

Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.985291
Relative permittivity (imaginary part)	13.940592
Conductivity (S/m)	1.341782
Variation (%)	1.360000

SURFACE SAR



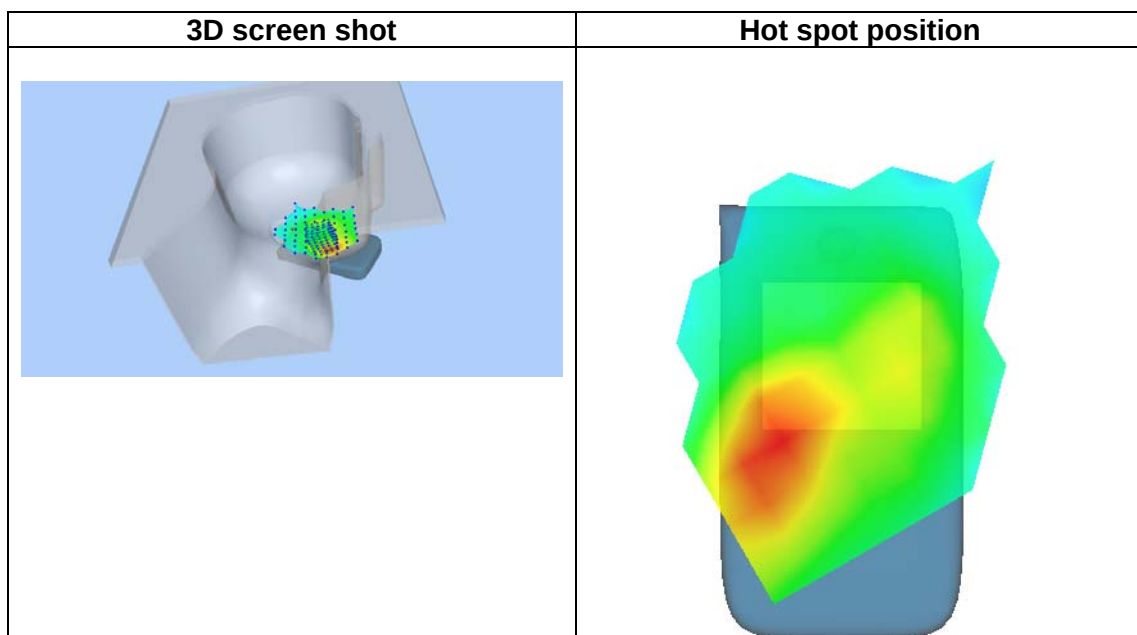
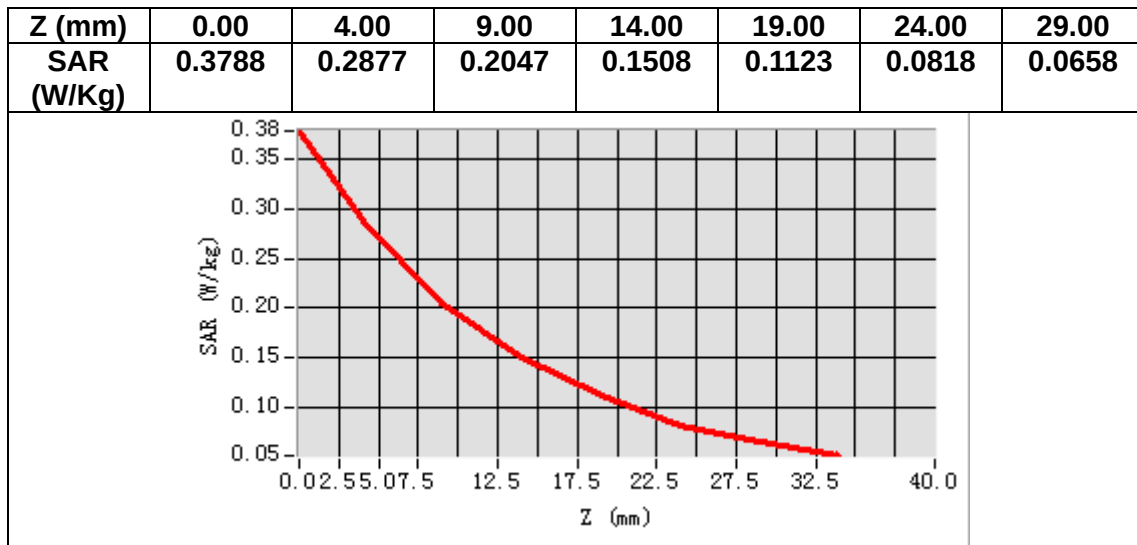
VOLUME SAR



Maximum location: X=-51.00, Y=-53.00

SAR Peak: 0.41 W/kg

SAR 10g (W/Kg)	0.180608
SAR 1g (W/Kg)	0.283171



MEASUREMENT 20

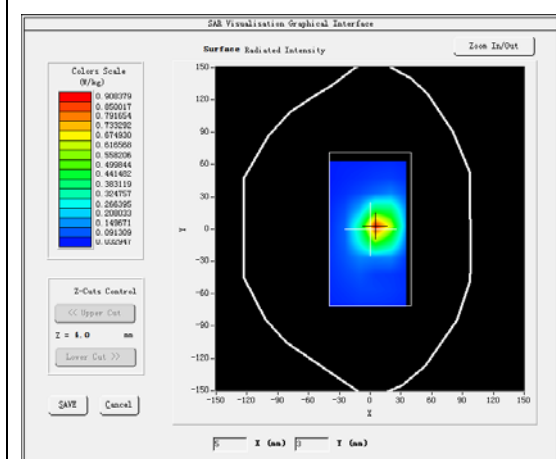
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 4</u>
<u>Channels</u>	<u>Low</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

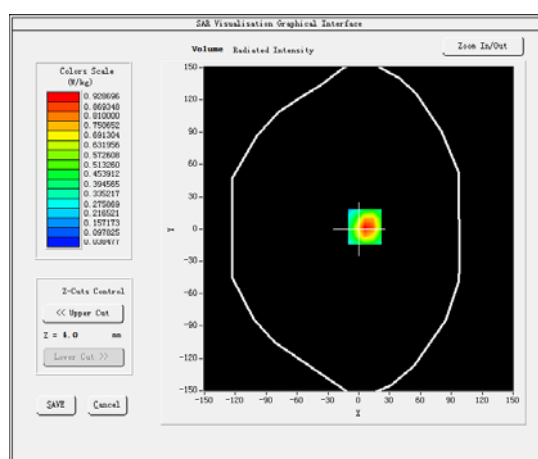
B. SAR Measurement Results

Frequency (MHz)	1720.000000
Relative permittivity (real part)	54.216667
Relative permittivity (imaginary part)	15.367870
Conductivity (S/m)	1.468058
Variation (%)	-0.910000

SURFACE SAR



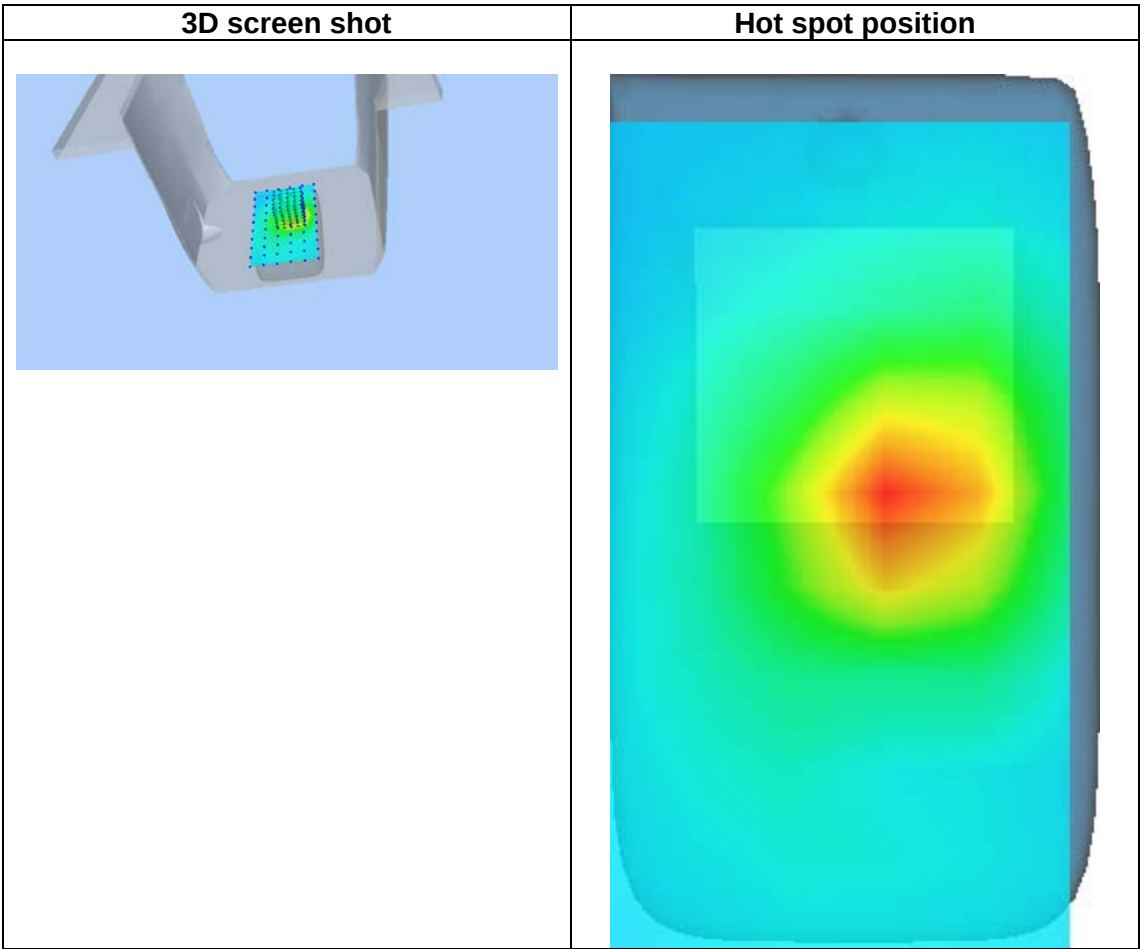
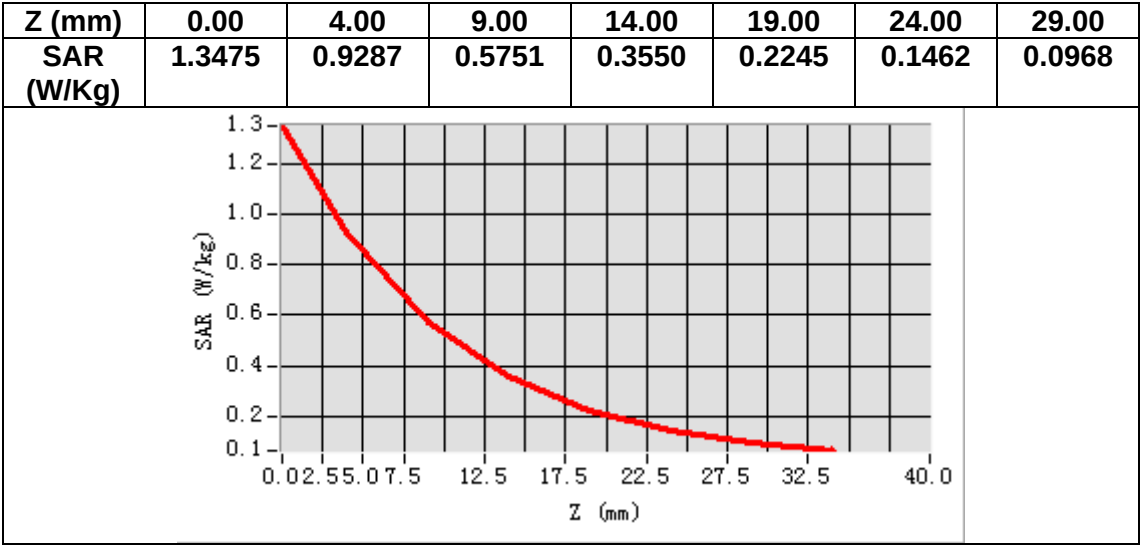
VOLUME SAR



Maximum location: X=6.00, Y=2.00

SAR Peak: 1.40 W/kg

SAR 10g (W/Kg)	0.482855
SAR 1g (W/Kg)	0.881666



MEASUREMENT 21

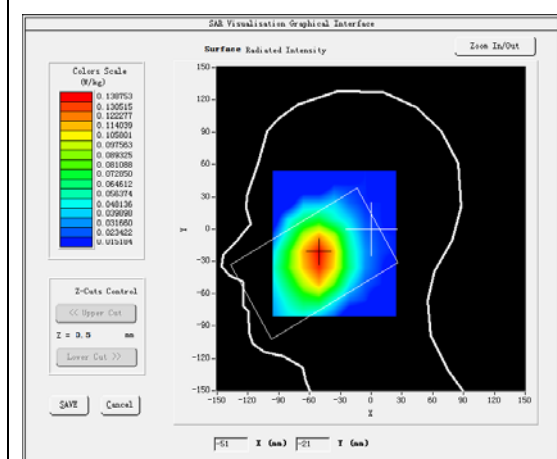
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7,dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>LTE band 5</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

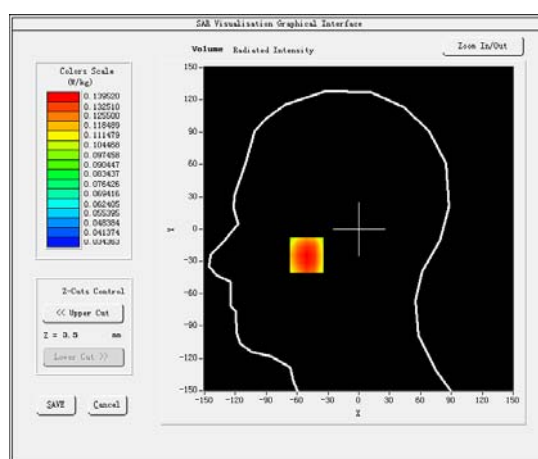
B. SAR Measurement Results

Frequency (MHz)	836.500000
Relative permittivity (real part)	41.243549
Relative permittivity (imaginary part)	19.790199
Conductivity (S/m)	0.919695
Variation (%)	3.870000

SURFACE SAR



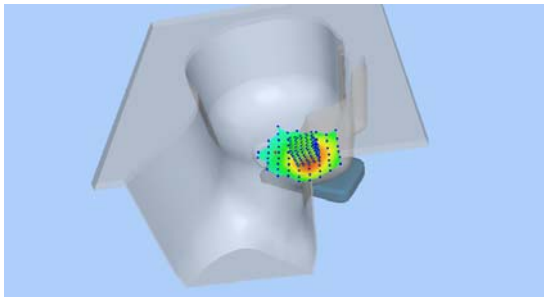
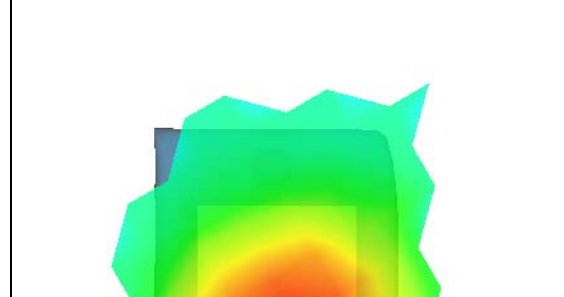
VOLUME SAR



Maximum location: X=-51.00, Y=-24.00

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.112950
SAR 1g (W/Kg)	0.139002

3D screen shot	Hot spot position
 A 3D visualization of a knee joint model. A small, localized area on the femur is highlighted with a color gradient from blue to red, indicating a hot spot. The model is set against a light blue background.	 A 3D visualization of a knee joint model showing the hot spot position. The hot spot is represented by a large, irregularly shaped region with a color gradient from blue to red, indicating the intensity of the hot spot. The model is set against a light blue background.

MEASUREMENT 22

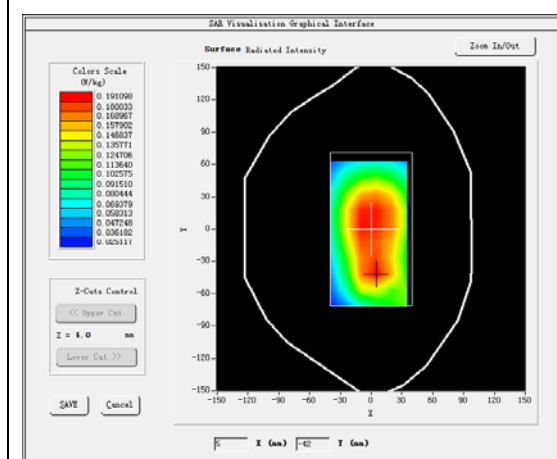
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 5</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

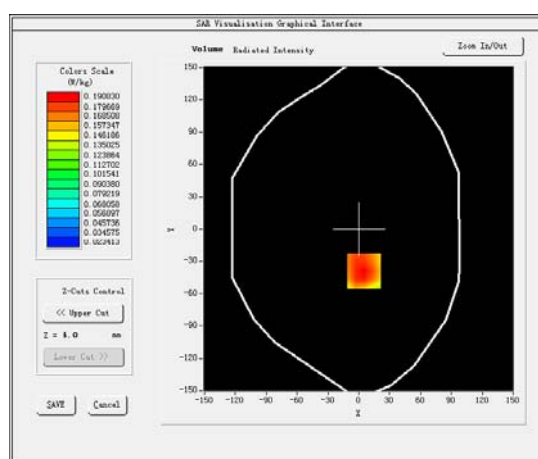
B. SAR Measurement Results

Frequency (MHz)	836.500000
Relative permittivity (real part)	54.783501
Relative permittivity (imaginary part)	21.617001
Conductivity (S/m)	1.004590
Variation (%)	0.140000

SURFACE SAR



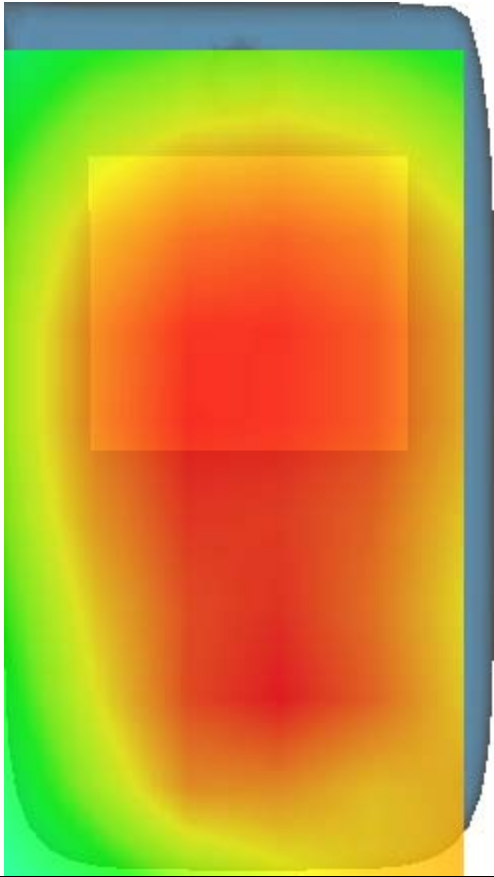
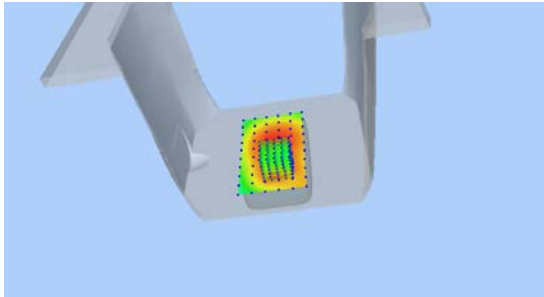
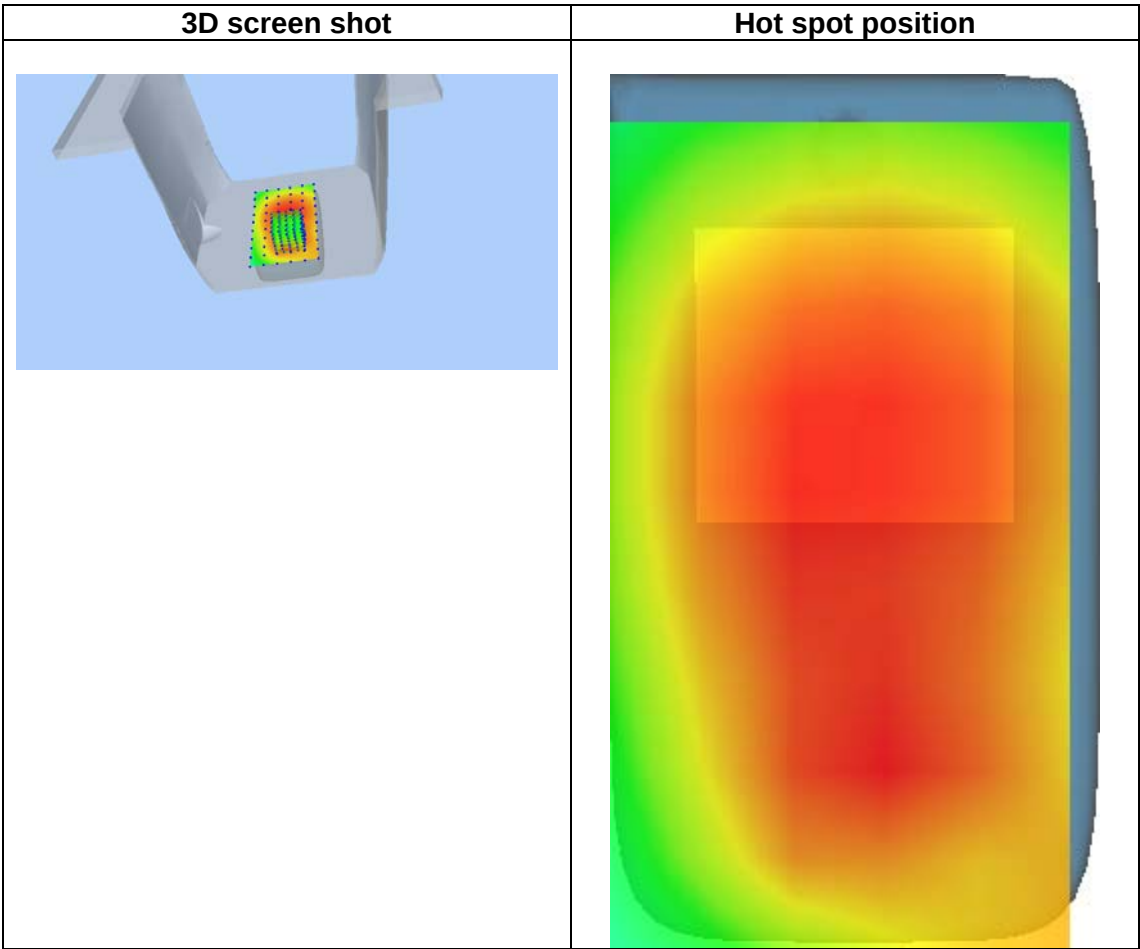
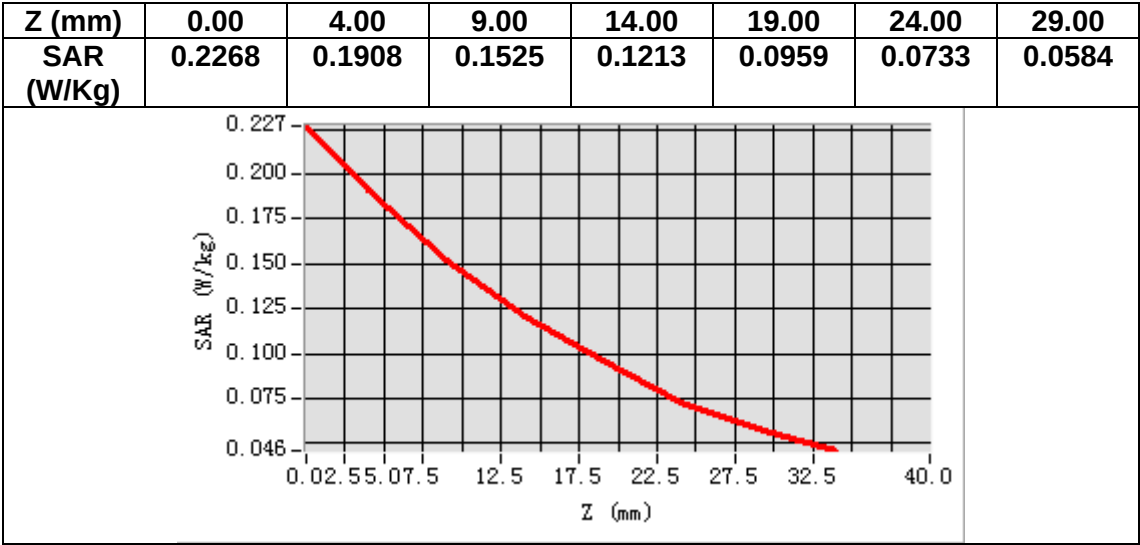
VOLUME SAR



Maximum location: X=5.00, Y=-39.00

SAR Peak: 0.24 W/kg

SAR 10g (W/Kg)	0.143936
SAR 1g (W/Kg)	0.192311



MEASUREMENT 23

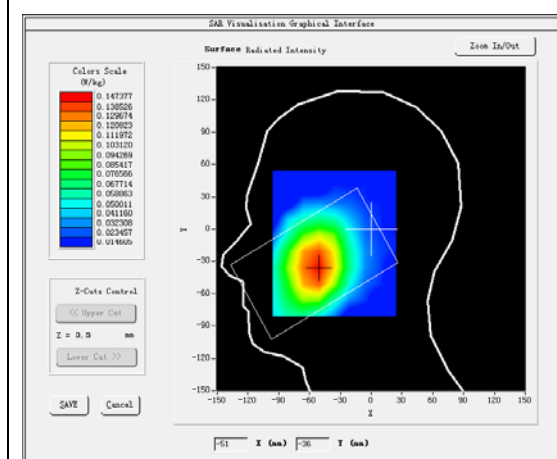
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7,dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>LTE band 12</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

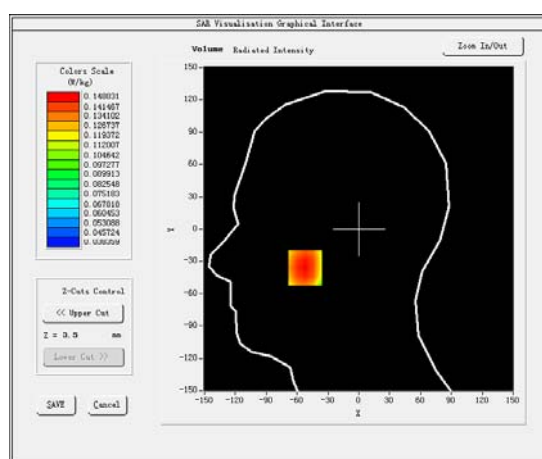
B. SAR Measurement Results

Frequency (MHz)	707.500000
Relative permittivity (real part)	41.927959
Relative permittivity (imaginary part)	21.741301
Conductivity (S/m)	0.854554
Variation (%)	0.660000

SURFACE SAR



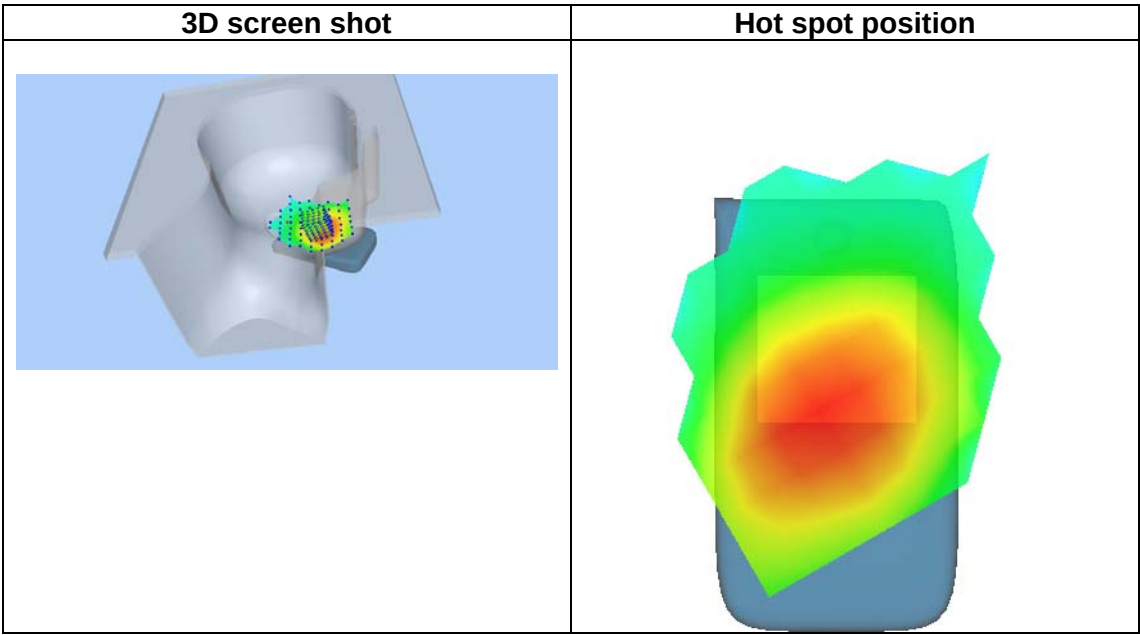
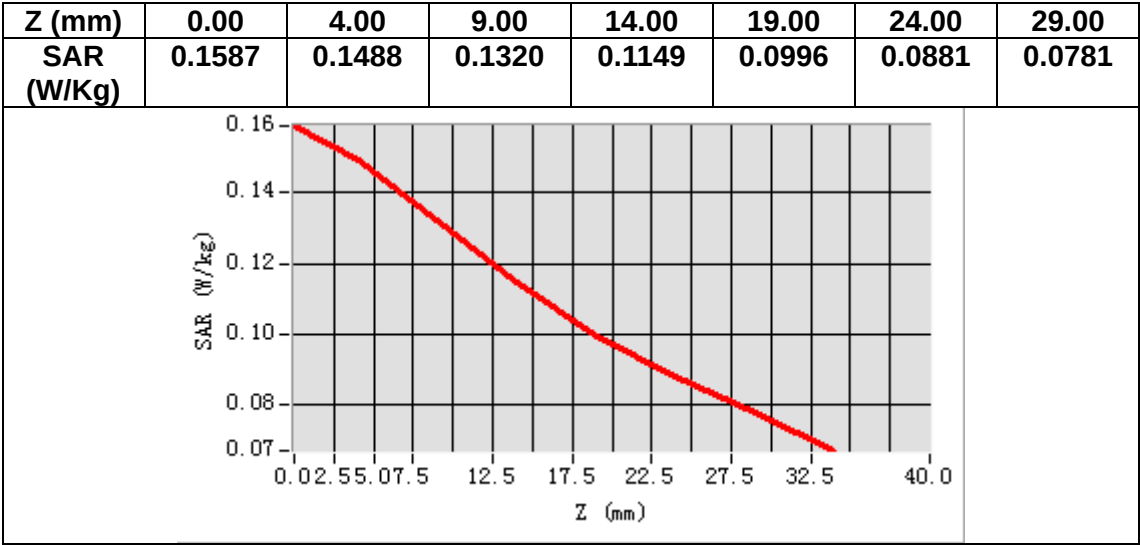
VOLUME SAR



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

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.122216
SAR 1g (W/Kg)	0.144714



MEASUREMENT 24

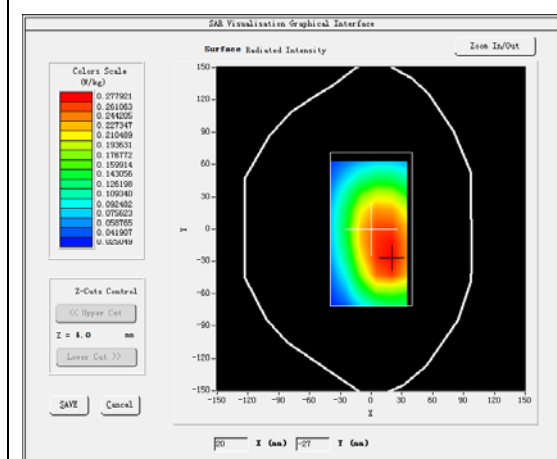
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 12</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

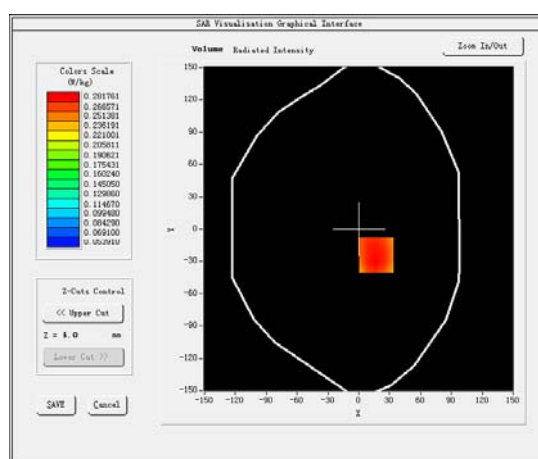
B. SAR Measurement Results

Frequency (MHz)	707.500000
Relative permittivity (real part)	55.837959
Relative permittivity (imaginary part)	23.651300
Conductivity (S/m)	0.929627
Variation (%)	0.380000

SURFACE SAR



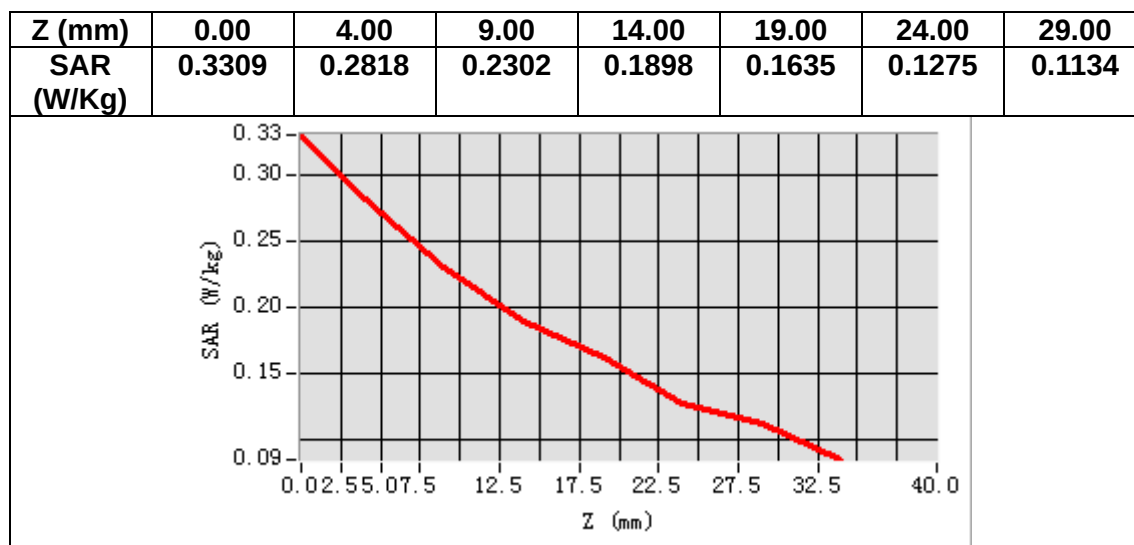
VOLUME SAR



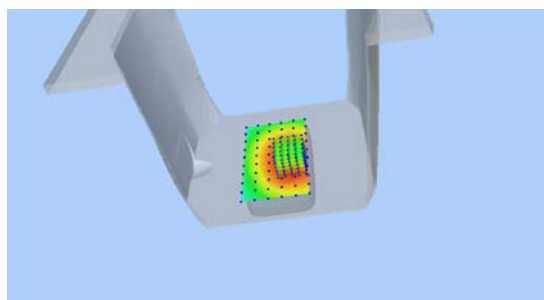
Maximum location: X=17.00, Y=-24.00

SAR Peak: 0.33 W/kg

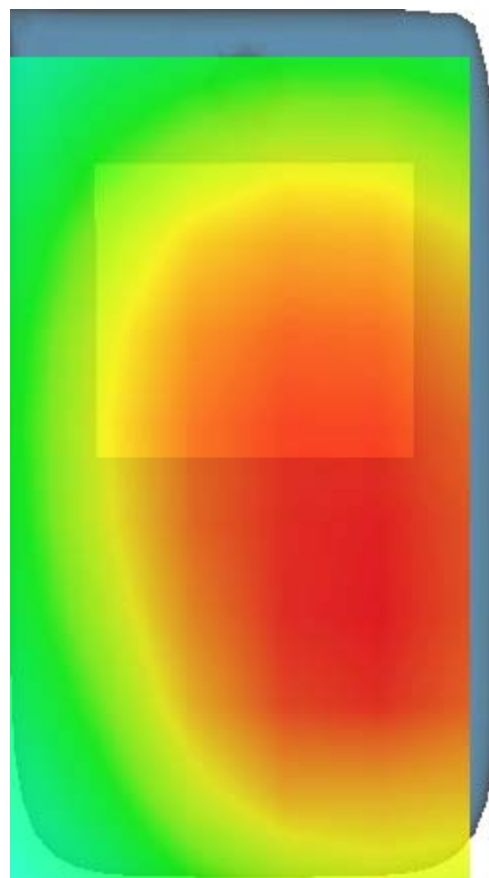
SAR 10g (W/Kg)	0.220387
SAR 1g (W/Kg)	0.275718



3D screen shot



Hot spot position



MEASUREMENT 25

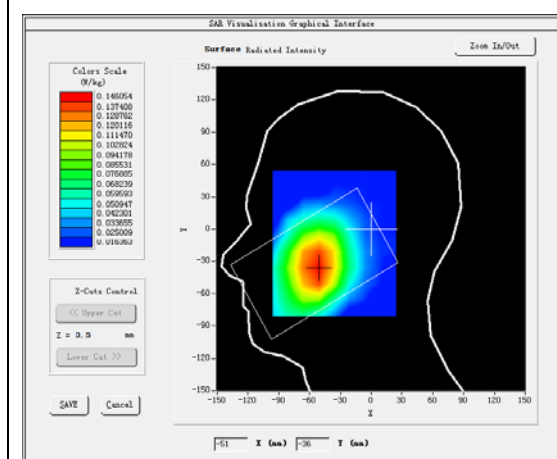
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7,dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>LTE band 17</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

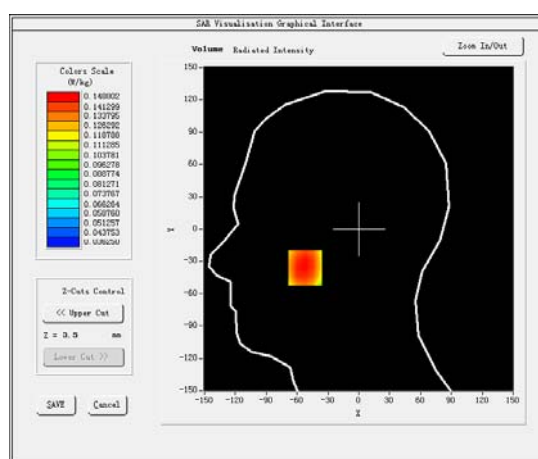
B. SAR Measurement Results

Frequency (MHz)	710.000000
Relative permittivity (real part)	41.906712
Relative permittivity (imaginary part)	21.760500
Conductivity (S/m)	0.858331
Variation (%)	2.250000

SURFACE SAR



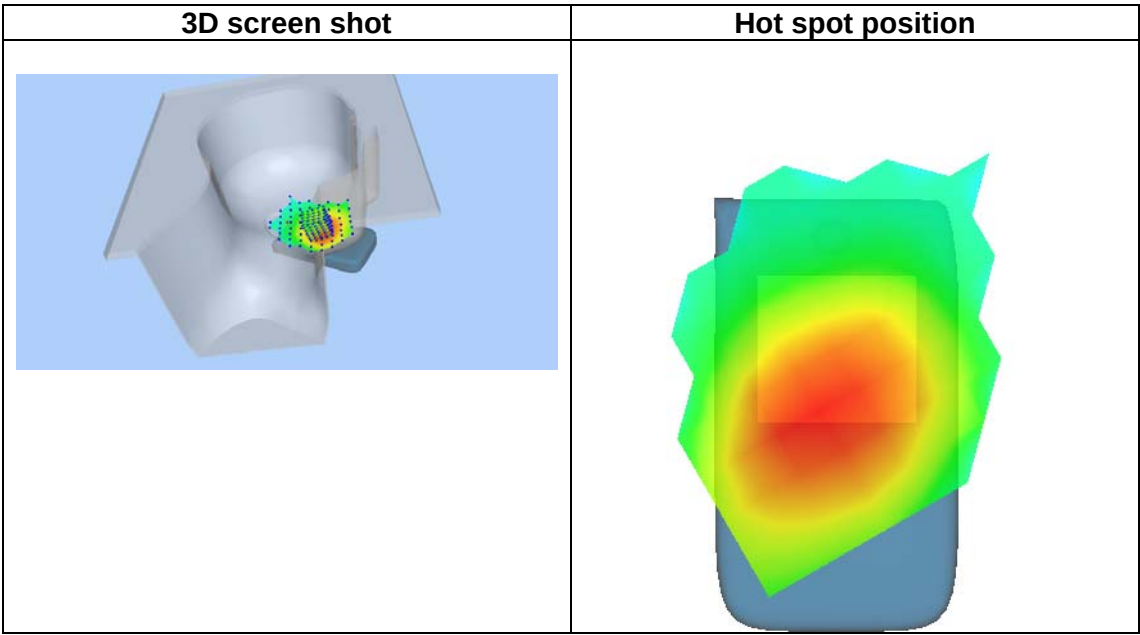
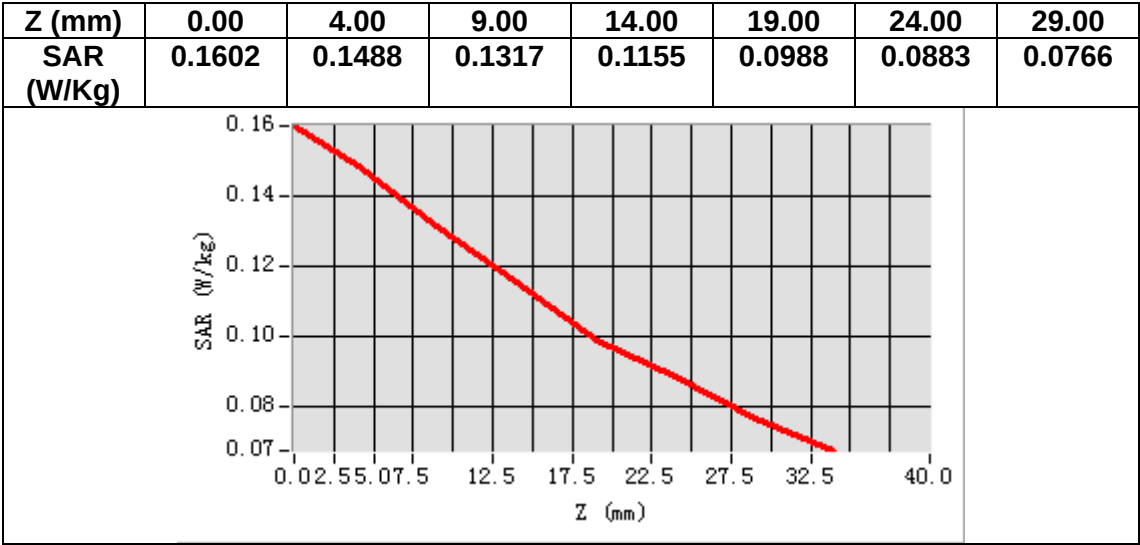
VOLUME SAR



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

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.122390
SAR 1g (W/Kg)	0.145033



MEASUREMENT 26

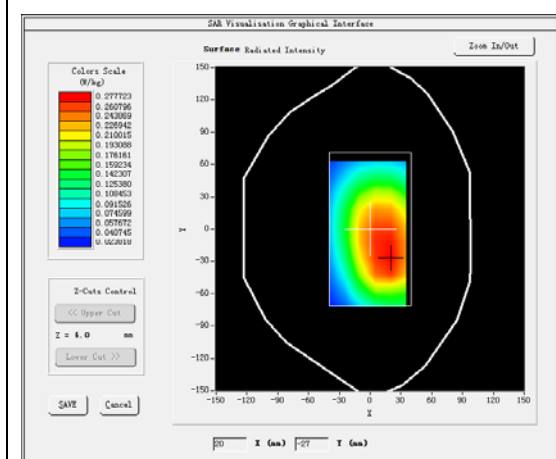
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 17</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

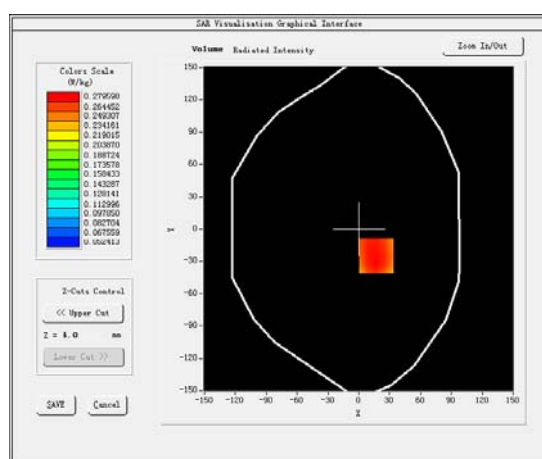
B. SAR Measurement Results

Frequency (MHz)	710.000000
Relative permittivity (real part)	55.816711
Relative permittivity (imaginary part)	23.670500
Conductivity (S/m)	0.933670
Variation (%)	0.070000

SURFACE SAR



VOLUME SAR



Maximum location: X=17.00, Y=-25.00

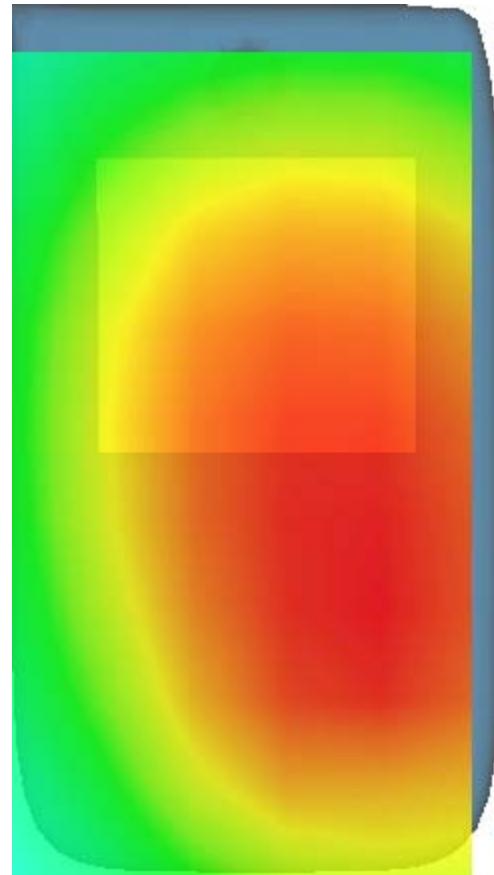
SAR Peak: 0.33 W/kg

SAR 10g (W/Kg)	0.219257
SAR 1g (W/Kg)	0.273657

The graph plots SAR (W/kg) on the y-axis against Z (mm) on the x-axis. The y-axis has major ticks at 0.08, 0.15, 0.20, 0.25, and 0.32. The x-axis has major ticks at 0.0, 2.5, 5.0, 7.5, 12.5, 17.5, 22.5, 27.5, 32.5, and 40.0. A red line shows the SAR profile, which starts at approximately 0.31 W/kg at Z=0 and decreases to 0.08 W/kg at Z=35 mm.

Z (mm)	SAR (W/kg)
0.0	0.31
2.5	0.28
5.0	0.25
7.5	0.22
10.0	0.20
12.5	0.18
15.0	0.17
17.5	0.16
20.0	0.15
22.5	0.13
25.0	0.12
27.5	0.11
30.0	0.10
32.5	0.09
35.0	0.08

Hot spot position



MEASUREMENT 27

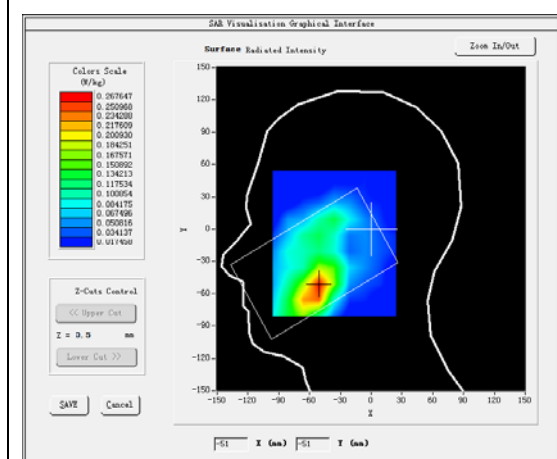
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>LTE band 25</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

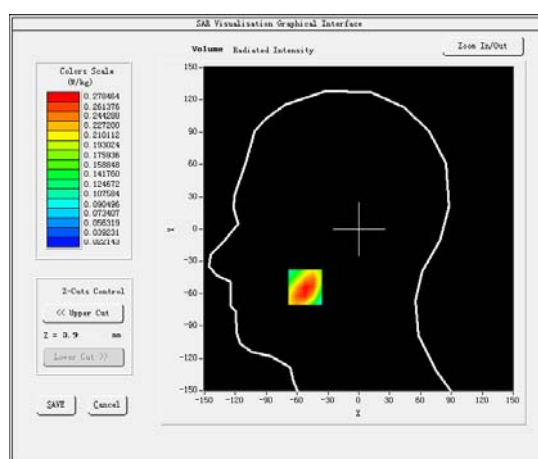
B. SAR Measurement Results

Frequency (MHz)	1882.500000
Relative permittivity (real part)	41.498501
Relative permittivity (imaginary part)	13.629700
Conductivity (S/m)	1.425061
Variation (%)	-2.370000

SURFACE SAR



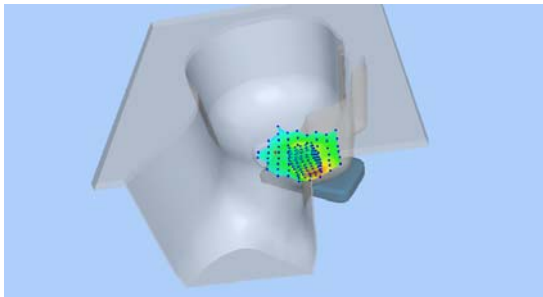
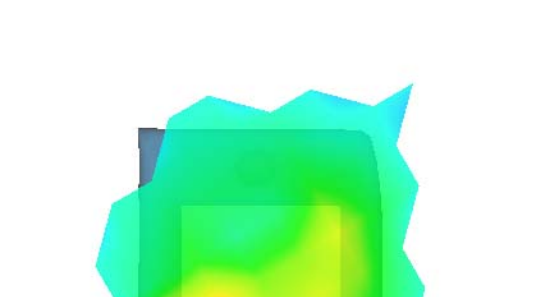
VOLUME SAR



Maximum location: X=-52.00, Y=-54.00

SAR Peak: 0.41 W/kg

SAR 10g (W/Kg)	0.168250
SAR 1g (W/Kg)	0.273151

3D screen shot	Hot spot position
 A 3D perspective view of a dental model, likely a maxillary arch, rendered in a light gray color. A small, rectangular area on the right side of the model (corresponding to the upper right quadrant) is highlighted with a dense grid of small, multi-colored dots. The dots are colored in a gradient from blue to red, indicating varying intensity or temperature. The background is a solid light blue.	 A 3D visualization of the hot spot position. It shows a semi-transparent, multi-colored surface that appears to be a map or heatmap overlaid on a 3D model of the dental arch. The colors range from blue (low intensity) to red (high intensity), with a prominent red and orange area in the center-right region, indicating the location of the highest intensity or 'hot spot'. The background is white.

MEASUREMENT 28

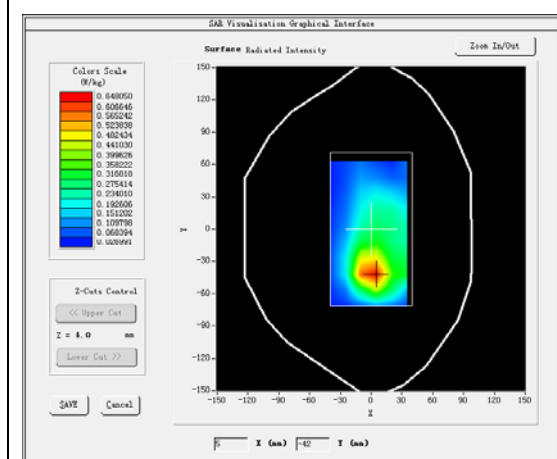
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 25</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

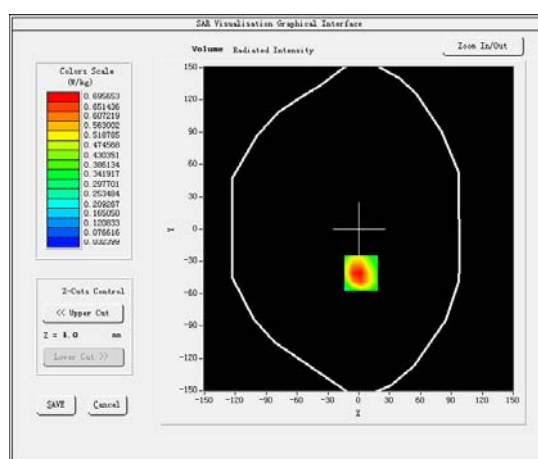
B. SAR Measurement Results

Frequency (MHz)	1882.500000
Relative permittivity (real part)	53.099098
Relative permittivity (imaginary part)	14.788800
Conductivity (S/m)	1.546251
Variation (%)	-0.030000

SURFACE SAR



VOLUME SAR



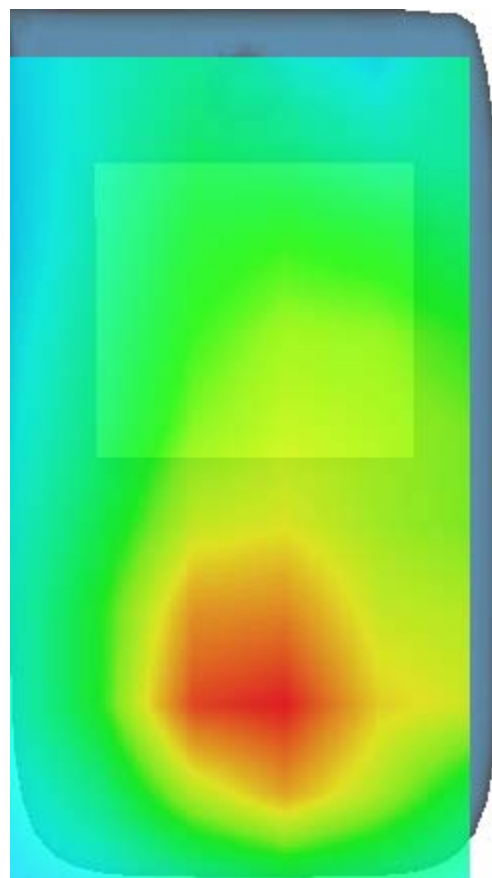
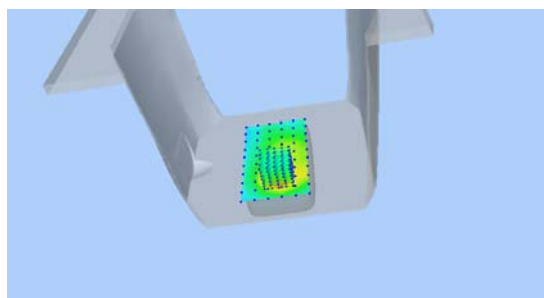
Maximum location: X=2.00, Y=-41.00

SAR Peak: 1.09 W/kg

SAR 10g (W/Kg)	0.382785
SAR 1g (W/Kg)	0.690639

Graph of SAR (W/kg) vs Z (mm) for the 100 MHz case. The SAR starts at 1.0 W/kg at Z=0 and decreases to 0.0 W/kg at Z=32.5 mm.

Hot spot position



14. Appendix D. Calibration Certificate

Table of contents
E Field Probe - SN 08/16 EPGO287
750 MHz Dipole - SN 03/15 DIP 0G750-355
835 MHz Dipole - SN 03/15 DIP 0G835-347
1800 MHz Dipole - SN 03/15 DIP 1G800-349
1900 MHz Dipole - SN 03/15 DIP 1G900-350
2450 MHz Dipole - SN 03/15 DIP 2G450-352
5000-6000 MHz Dipole - SN 13/14 WGA 33



COMOSAR E-Field Probe Calibration Report

Ref : ACR.260.1.18.SATU.A

**SHENZHEN NTEK TESTING TECHNOLOGY
CO., LTD.**

**BUILDING E, FENDA SCIENCE PARK, SANWEI
COMMUNITY, XIXIANG STREET,
BAO'AN DISTRICT, SHENZHEN GUANGDONG, CHINA
MVG COMOSAR DOSIMETRIC E-FIELD PROBE
SERIAL NO.: SN 08/16 EPGO287**

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144



Calibration Date: 09/17/2018

Summary:

This document presents the method and results from an accredited COMOSAR Dosimetric E-Field Probe calibration performed in MVG USA using the CALISAR / CALIBAIR test bench, for use with a COMOSAR system only. All calibration results are traceable to national metrology institutions.



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.260.1.18.SATU.A

	<i>Name</i>	<i>Function</i>	<i>Date</i>	<i>Signature</i>
<i>Prepared by :</i>	Jérôme LUC	Product Manager	9/17/2018	
<i>Checked by :</i>	Jérôme LUC	Product Manager	9/17/2018	
<i>Approved by :</i>	Kim RUTKOWSKI	Quality Manager	9/17/2018	

	<i>Customer Name</i>
<i>Distribution :</i>	SHENZHEN NTEK TESTING TECHNOLOGY CO., LTD.

<i>Issue</i>	<i>Date</i>	<i>Modifications</i>
A	9/17/2018	Initial release



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.260.1.18.SATU.A

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.260.1.18.SATU.A

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	SN 08/16 EPGO287
Product Condition (new / used)	Used
Frequency Range of Probe	0.15 GHz-6GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.209 MΩ Dipole 2: R2=0.196 MΩ Dipole 3: R3=0.197 MΩ

A yearly calibration interval is recommended.

2 PRODUCT DESCRIPTION

2.1 GENERAL INFORMATION

MVG's COMOSAR E field Probes are built in accordance to the IEEE 1528, OET 65 Bulletin C and CEI/IEC 62209 standards.



Figure 1 – MVG COMOSAR Dosimetric E field Dipole

Probe Length	330 mm
Length of Individual Dipoles	2 mm
Maximum external diameter	8 mm
Probe Tip External Diameter	2.5 mm
Distance between dipoles / probe extremity	1 mm

3 MEASUREMENT METHOD

The IEEE 1528, OET 65 Bulletin C, CENELEC EN50361 and CEI/IEC 62209 standards provide recommended practices for the probe calibrations, including the performance characteristics of interest and methods by which to assess their affect. All calibrations / measurements performed meet the fore mentioned standards.

3.1 LINEARITY

The evaluation of the linearity was done in free space using the waveguide, performing a power sweep to cover the SAR range 0.01W/kg to 100W/kg.



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.260.1.18.SATU.A

3.2 SENSITIVITY

The sensitivity factors of the three dipoles were determined using a two step calibration method (air and tissue simulating liquid) using waveguides as outlined in the standards.

3.3 LOWER DETECTION LIMIT

The lower detection limit was assessed using the same measurement set up as used for the linearity measurement. The required lower detection limit is 10 mW/kg.

3.4 ISOTROPY

The axial isotropy was evaluated by exposing the probe to a reference wave from a standard dipole with the dipole mounted under the flat phantom in the test configuration suggested for system validations and checks. The probe was rotated along its main axis from 0 - 360 degrees in 15 degree steps. The hemispherical isotropy is determined by inserting the probe in a thin plastic box filled with tissue-equivalent liquid, with the plastic box illuminated with the fields from a half wave dipole. The dipole is rotated about its axis (0°–180°) in 15° increments. At each step the probe is rotated about its axis (0°–360°).

3.5 BOUNDARY EFFECT

The boundary effect is defined as the deviation between the SAR measured data and the expected exponential decay in the liquid when the probe is oriented normal to the interface. To evaluate this effect, the liquid filled flat phantom is exposed to fields from either a reference dipole or waveguide. With the probe normal to the phantom surface, the peak spatial average SAR is measured and compared to the analytical value at the surface.

4 MEASUREMENT UNCERTAINTY

The guidelines outlined in the IEEE 1528, OET 65 Bulletin C, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty associated with an E-field probe calibration using the waveguide technique. All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

Uncertainty analysis of the probe calibration in waveguide					
ERROR SOURCES	Uncertainty value (%)	Probability Distribution	Divisor	ci	Standard Uncertainty (%)
Incident or forward power	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Reflected power	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Liquid conductivity	5.00%	Rectangular	$\sqrt{3}$	1	2.887%
Liquid permittivity	4.00%	Rectangular	$\sqrt{3}$	1	2.309%
Field homogeneity	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Field probe positioning	5.00%	Rectangular	$\sqrt{3}$	1	2.887%
Field probe linearity	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Combined standard uncertainty					5.831%
Expanded uncertainty 95 % confidence level k = 2					12.0%

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.260.1.18.SATU.A

5 CALIBRATION MEASUREMENT RESULTS

Calibration Parameters	
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

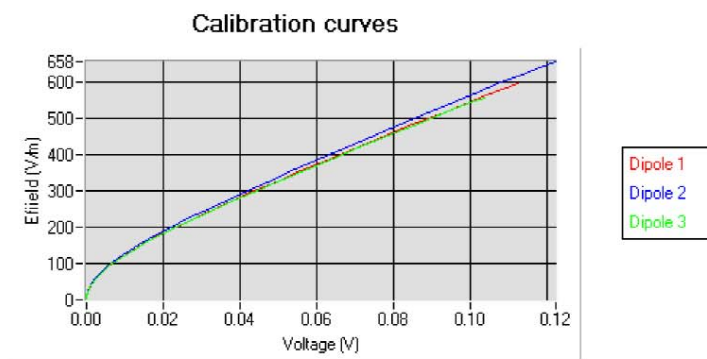
5.1 SENSITIVITY IN AIR

Normx dipole 1 ($\mu\text{V}/(\text{V}/\text{m})^2$)	Normy dipole 2 ($\mu\text{V}/(\text{V}/\text{m})^2$)	Normz dipole 3 ($\mu\text{V}/(\text{V}/\text{m})^2$)
0.66	0.75	0.58

DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
93	93	98

Calibration curves $e_i=f(V)$ ($i=1,2,3$) allow to obtain H-field value using the formula:

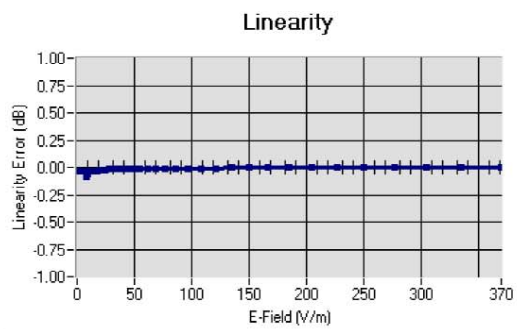
$$E = \sqrt{E_1^2 + E_2^2 + E_3^2}$$





COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.260.1.18.SATU.A

5.2 LINEARITYLinearity: $\pm 1.89\%$ ($\pm 0.08\text{dB}$)5.3 SENSITIVITY IN LIQUID

Liquid	Frequency (MHz $\pm$ 100MHz)	Permittivity	Epsilon (S/m)	ConvF
HL750	750	40.03	0.93	1.45
BL750	750	56.83	1.00	1.49
HL850	835	42.19	0.90	1.50
BL850	835	54.67	1.01	1.56
HL900	900	42.08	1.01	1.51
HL1800	1800	41.68	1.46	1.71
BL1800	1800	53.86	1.46	1.77
HL1900	1900	38.45	1.45	2.03
BL1900	1900	53.32	1.56	2.07
HL2000	2000	38.26	1.38	1.76
HL2450	2450	37.50	1.80	2.00
BL2450	2450	53.22	1.89	2.08
HL2600	2600	39.80	1.99	2.12
BL2600	2600	52.52	2.23	2.19
HL5200	5200	35.64	4.67	2.55
BL5200	5200	48.64	5.51	2.62
HL5400	5400	36.44	4.87	2.53
BL5400	5400	46.52	5.77	2.59
HL5600	5600	36.66	5.17	2.64
BL5600	5600	46.79	5.77	2.73
HL5800	5800	35.31	5.31	2.72
BL5800	5800	47.04	6.10	2.81

LOWER DETECTION LIMIT: 7mW/kg

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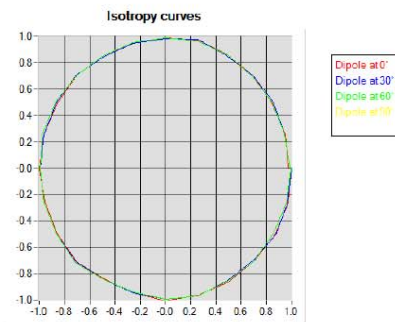
COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.260.1.18.SATU.A

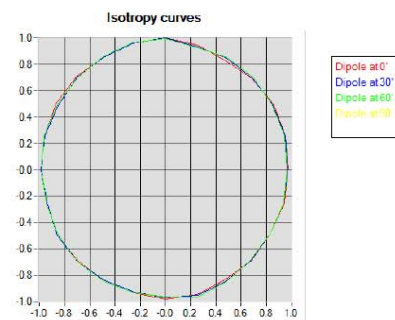
5.4 ISOTROPY

HL900 MHz

- Axial isotropy: 0.04 dB
- Hemispherical isotropy: 0.07 dB

**HL1800 MHz**

- Axial isotropy: 0.06 dB
- Hemispherical isotropy: 0.08 dB



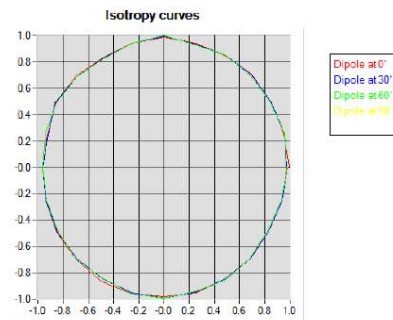


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HL5600 MHz

- Axial isotropy: 0.06 dB
- Hemispherical isotropy: 0.08 dB





COMOSAR E-FIELD PROBE CALIBRATION REPORT

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6 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	Manufacturer / Model	Identification No.	Current Calibration Date	Next Calibration Date
Flat Phantom	MVG	SN-20/09-SAM71	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rhode & Schwarz ZVA	SN100132	02/2016	02/2019
Reference Probe	MVG	EP 94 SN 37/08	10/2017	10/2018
Multimeter	Keithley 2000	1188656	01/2017	01/2020
Signal Generator	Agilent E4438C	MY49070581	01/2017	01/2020
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	01/2017	01/2020
Power Sensor	HP ECP-E26A	US37181460	01/2017	01/2020
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Waveguide	Mega Industries	069Y7-158-13-712	Validated. No cal required.	Validated. No cal required.
Waveguide Transition	Mega Industries	069Y7-158-13-701	Validated. No cal required.	Validated. No cal required.
Waveguide Termination	Mega Industries	069Y7-158-13-701	Validated. No cal required.	Validated. No cal required.
Temperature / Humidity Sensor	Control Company	150798832	11/2017	11/2020