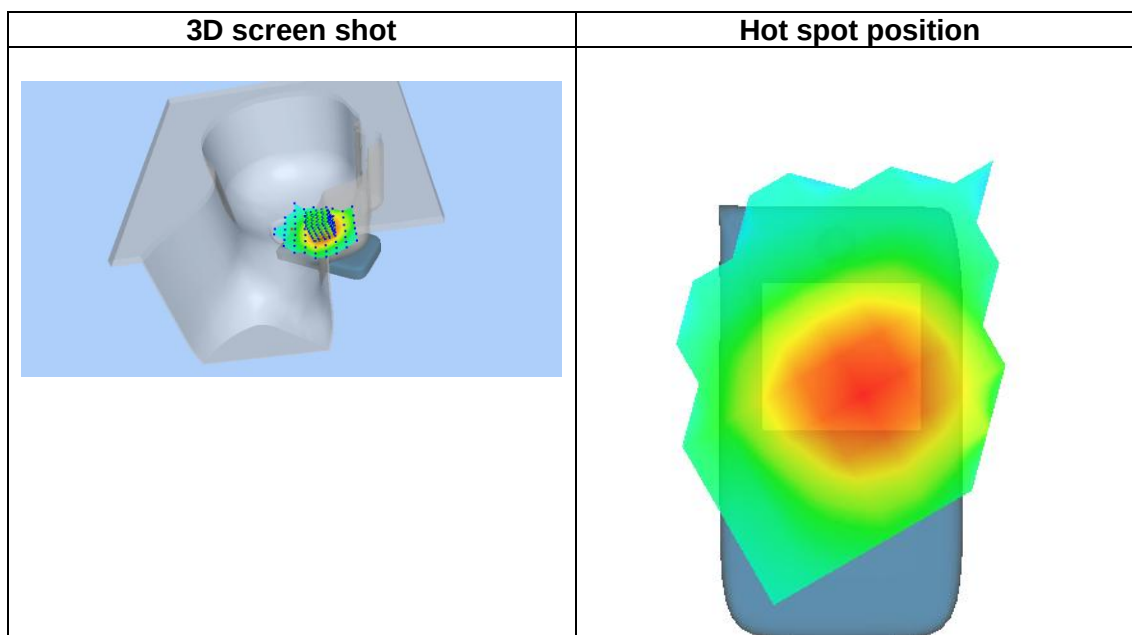
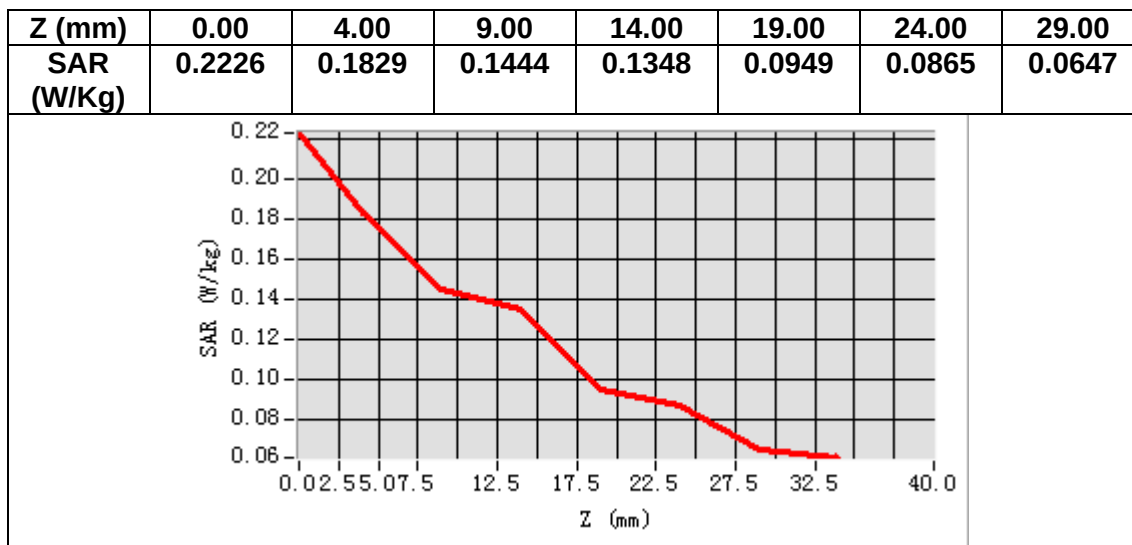




MEASUREMENT 2

Date of measurement: 1/3/2024

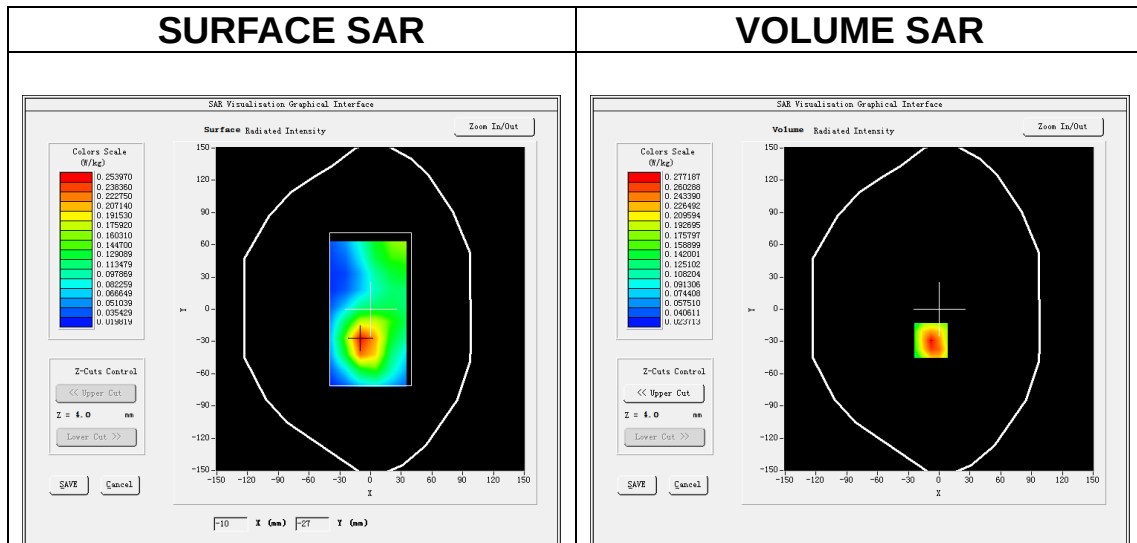
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.32</u>

B. SAR Measurement Results

Frequency (MHz)	836.400000
Relative permittivity (real part)	41.301842
Relative permittivity (imaginary part)	19.317196
Conductivity (S/m)	0.897606
Variation (%)	-0.660000

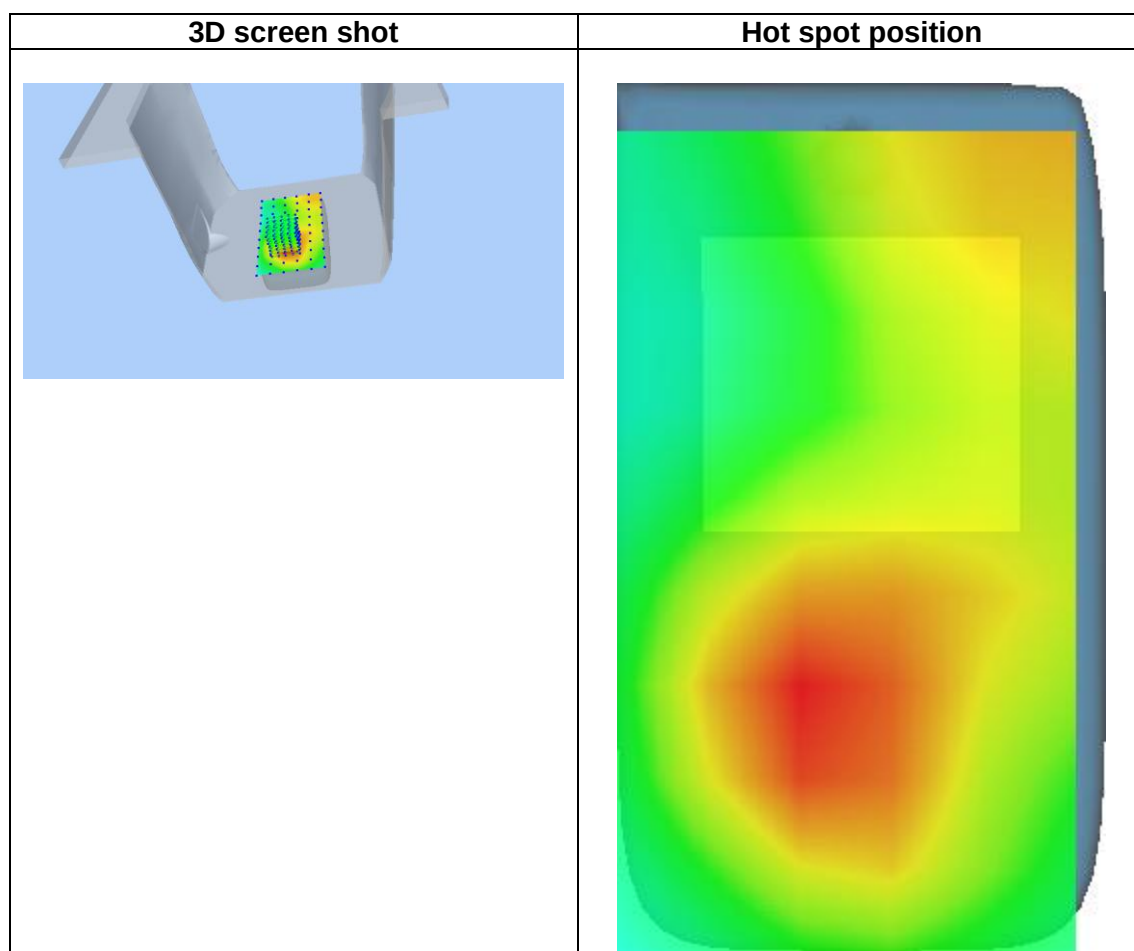
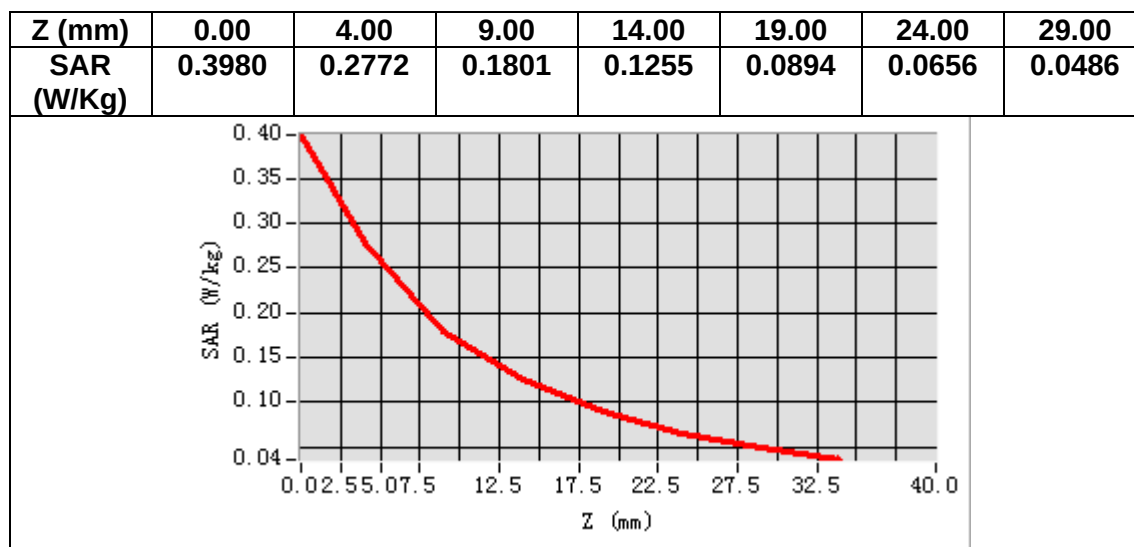
SURFACE SAR



Maximum location: X=-8.00, Y=-29.00

SAR Peak: 0.40 W/kg

SAR 10g (W/Kg)	0.164994
SAR 1g (W/Kg)	0.262973



MEASUREMENT 3

Date of measurement: 2/3/2024

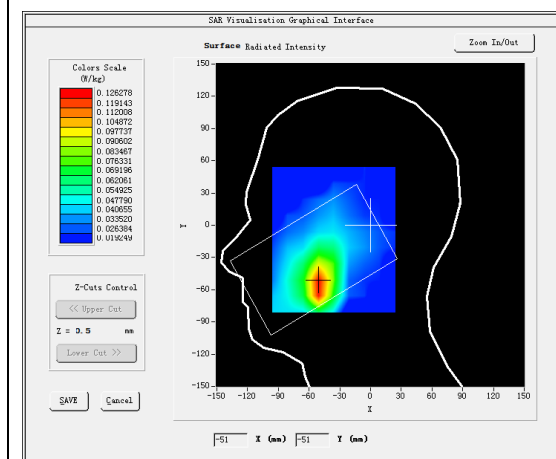
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.63</u>

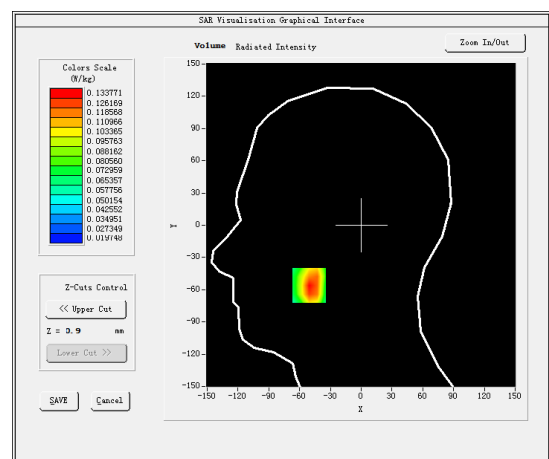
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.975822
Relative permittivity (imaginary part)	13.747208
Conductivity (S/m)	1.435820
Variation (%)	1.180000

SURFACE SAR



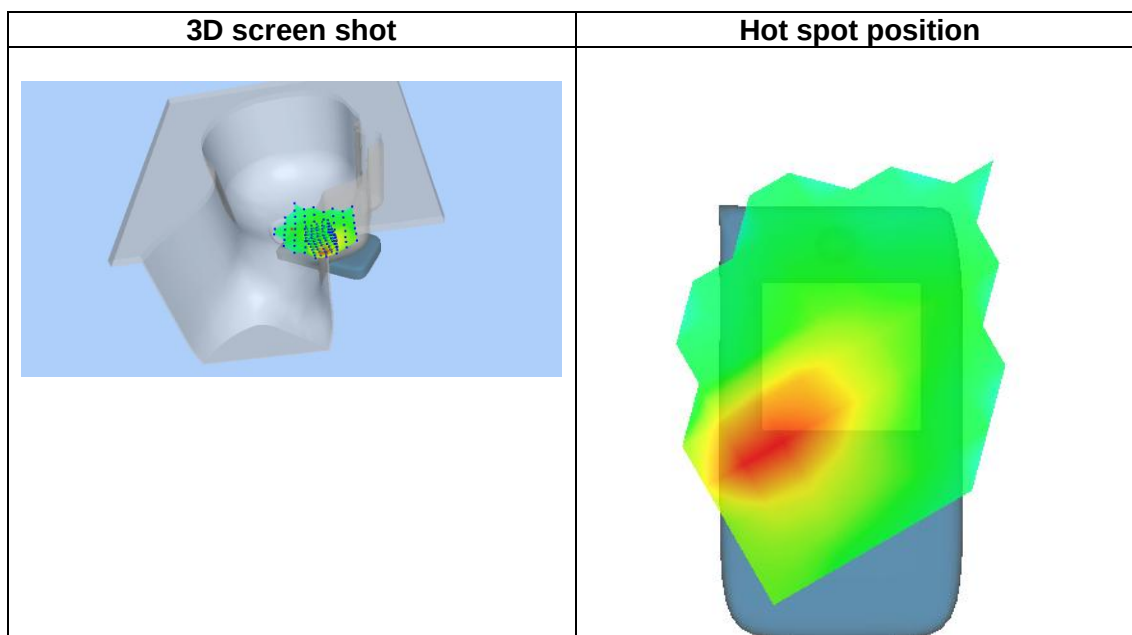
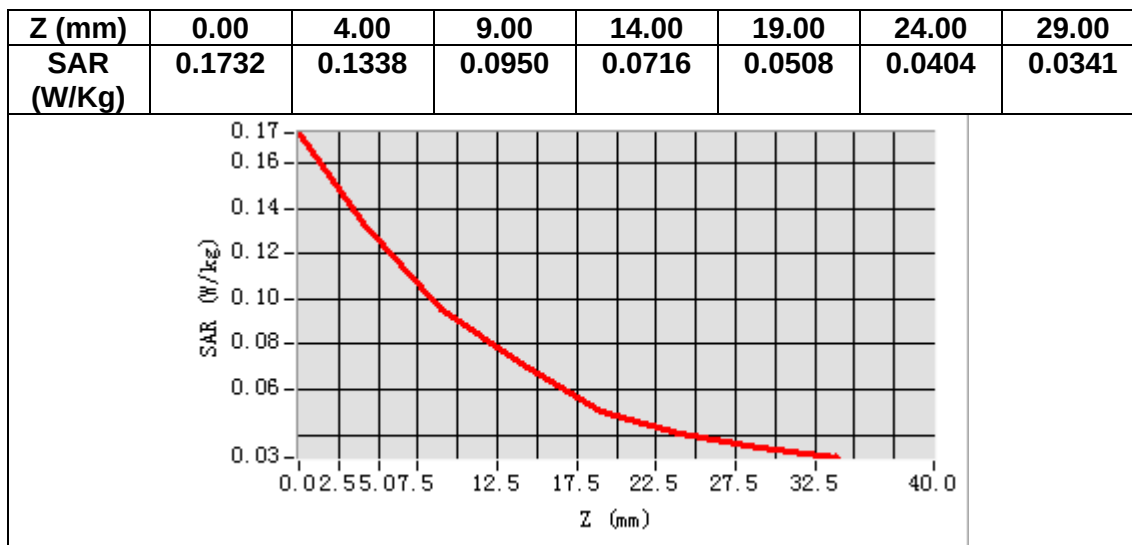
VOLUME SAR



Maximum location: X=-51.00, Y=-56.00

SAR Peak: 0.19 W/kg

SAR 10g (W/Kg)	0.083919
SAR 1g (W/Kg)	0.131511



MEASUREMENT 4

Date of measurement: 2/3/2024

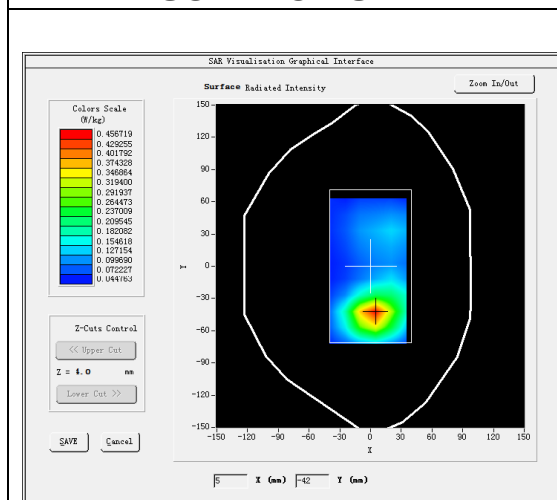
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.63</u>

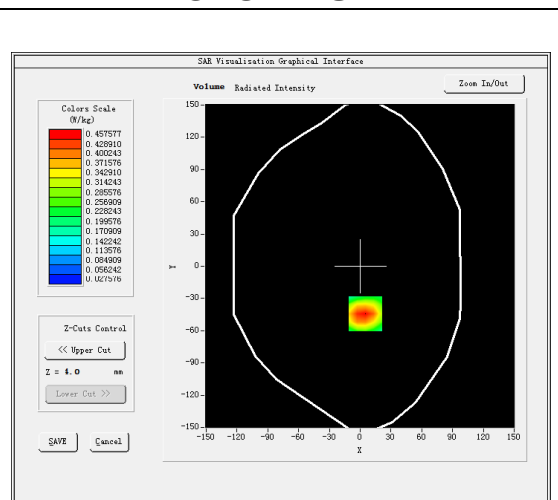
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.975822
Relative permittivity (imaginary part)	13.747208
Conductivity (S/m)	1.435820
Variation (%)	-2.000000

SURFACE SAR



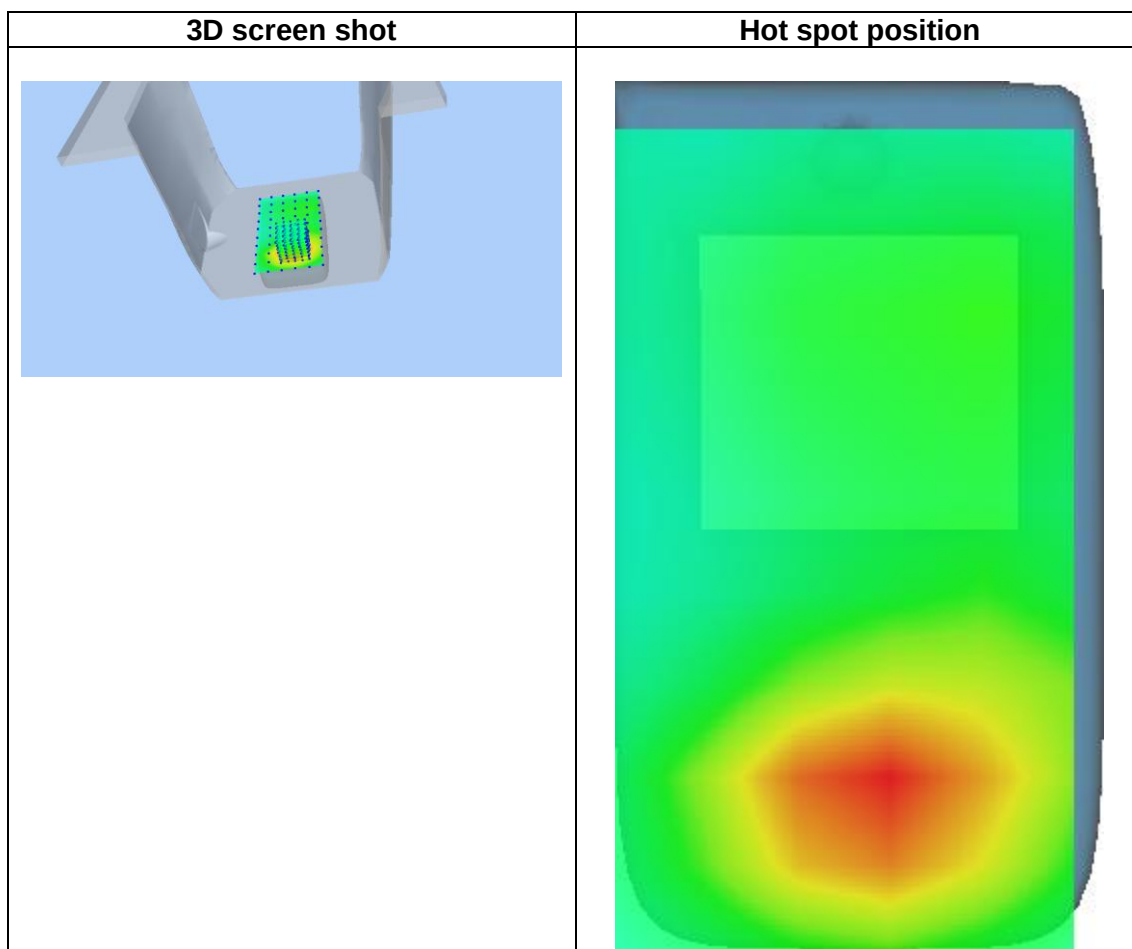
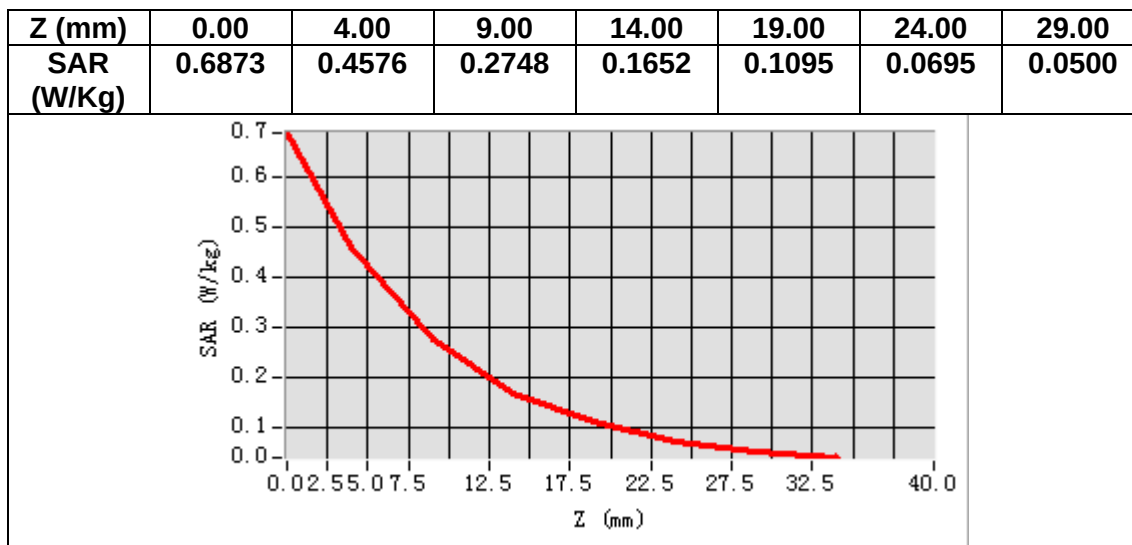
VOLUME SAR



Maximum location: X=5.00, Y=-44.00

SAR Peak: 0.68 W/kg

SAR 10g (W/Kg)	0.253510
SAR 1g (W/Kg)	0.444409



MEASUREMENT 5

Date of measurement: 2/3/2024

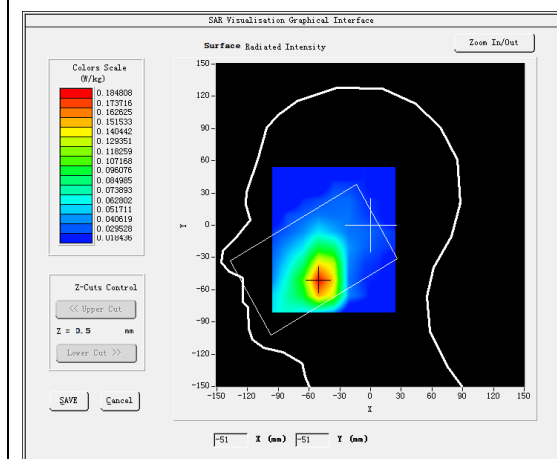
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.63</u>

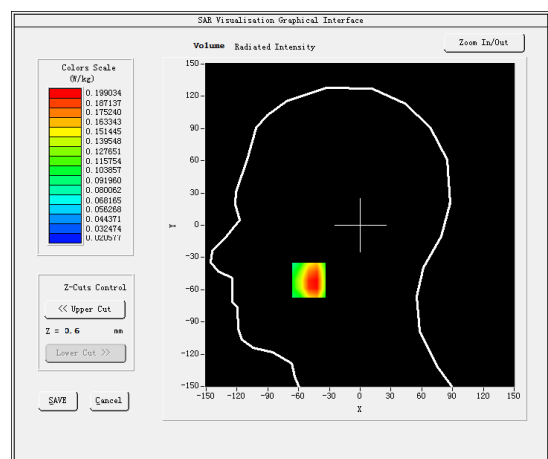
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.975822
Relative permittivity (imaginary part)	13.747208
Conductivity (S/m)	1.435820
Variation (%)	1.730000

SURFACE SAR



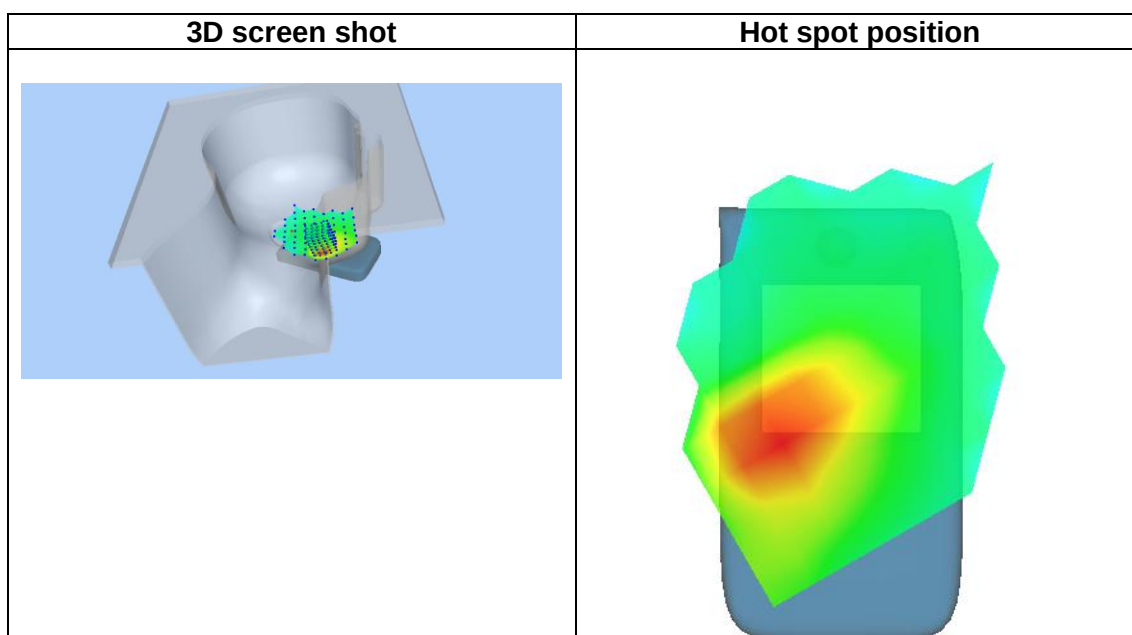
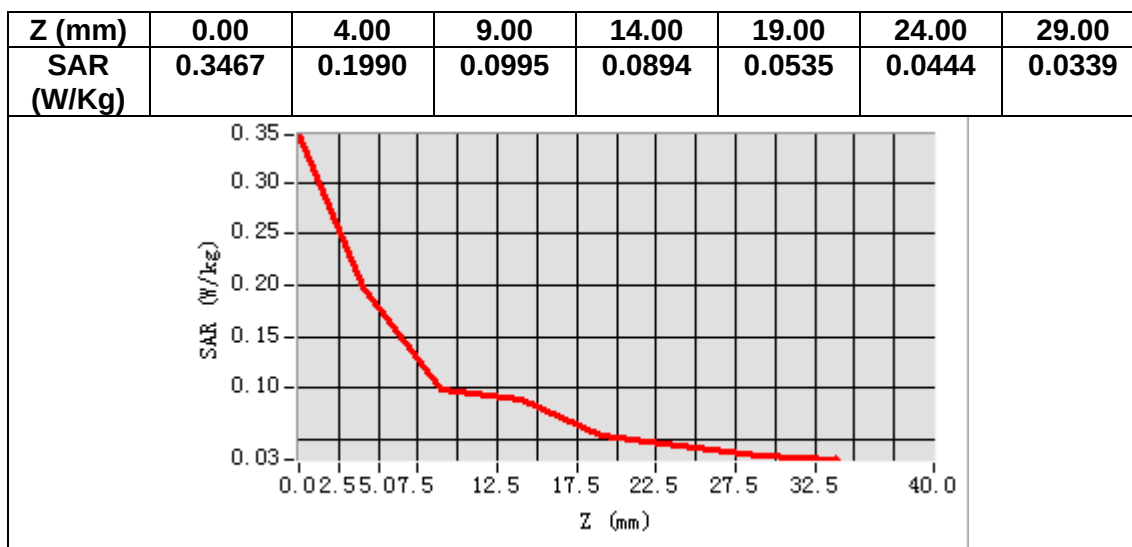
VOLUME SAR



Maximum location: X=-50.00, Y=-51.00

SAR Peak: 0.30 W/kg

SAR 10g (W/Kg)	0.122501
SAR 1g (W/Kg)	0.202956



MEASUREMENT 6

Date of measurement: 2/3/2024

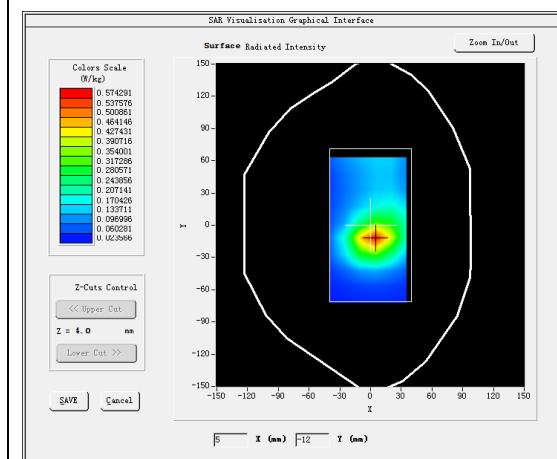
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.63</u>

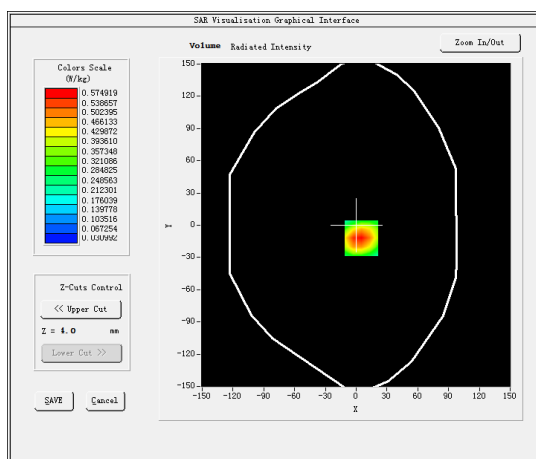
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.975822
Relative permittivity (imaginary part)	13.747208
Conductivity (S/m)	1.435820
Variation (%)	-0.580000

SURFACE SAR



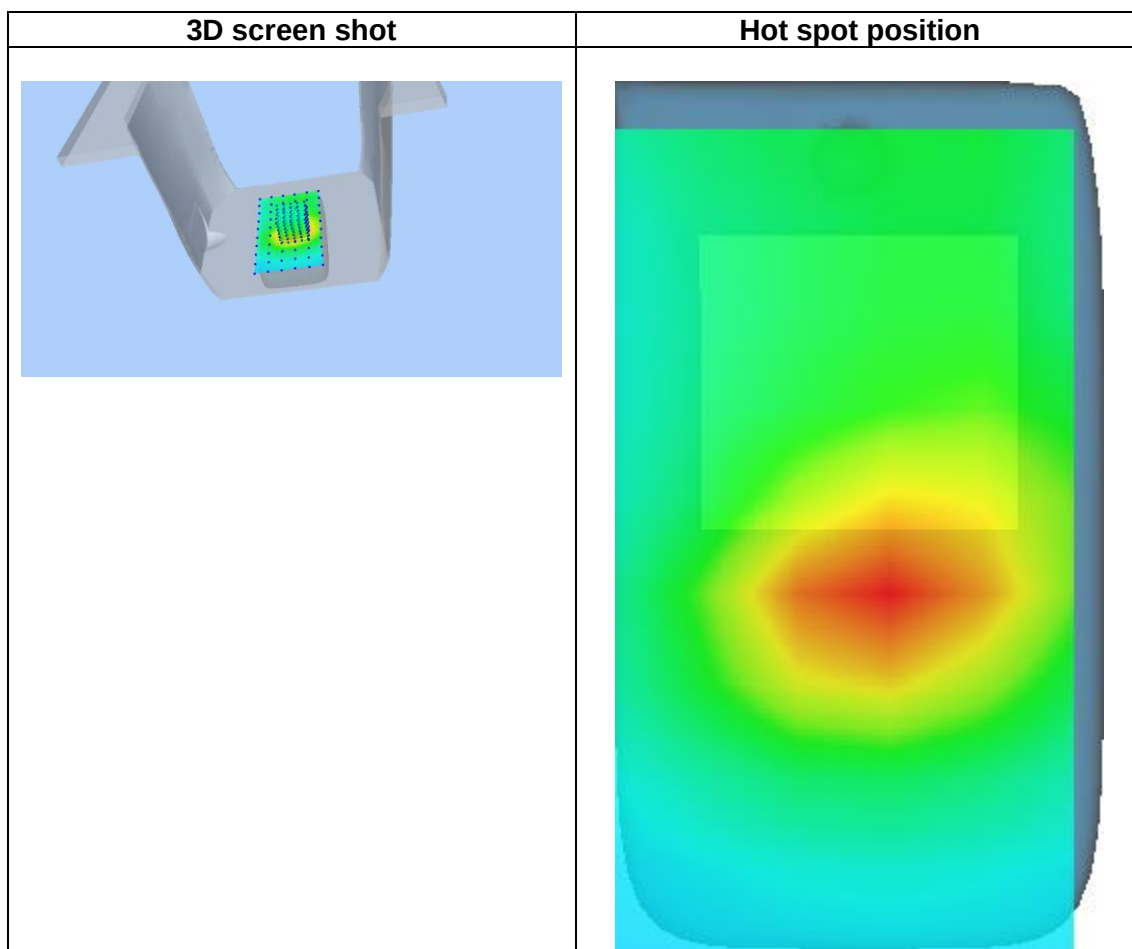
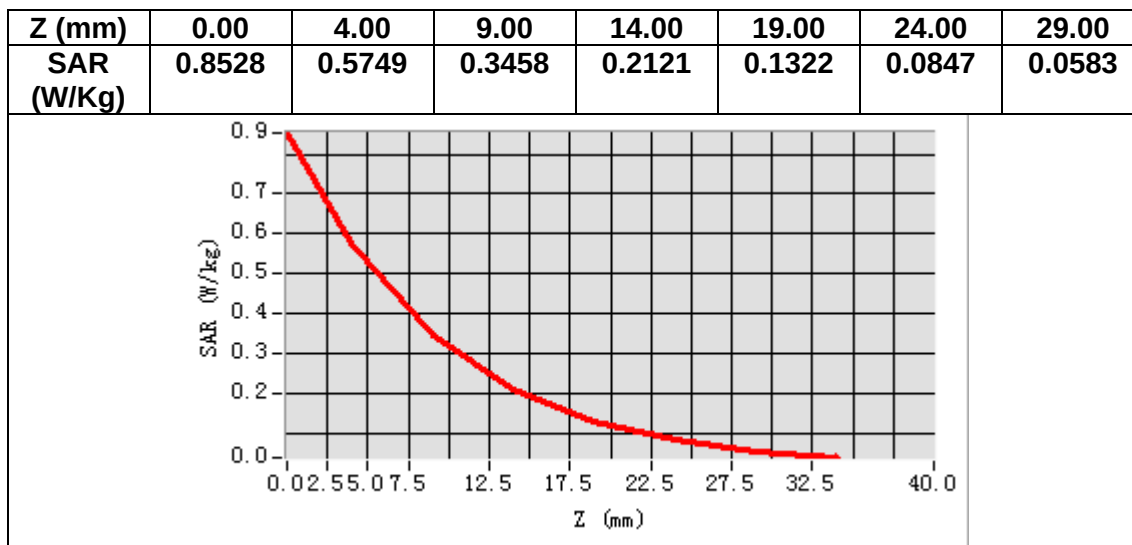
VOLUME SAR



Maximum location: X=5.00, Y=-12.00

SAR Peak: 0.86 W/kg

SAR 10g (W/Kg)	0.314458
SAR 1g (W/Kg)	0.558276



MEASUREMENT 7

Date of measurement: 29/2/2024

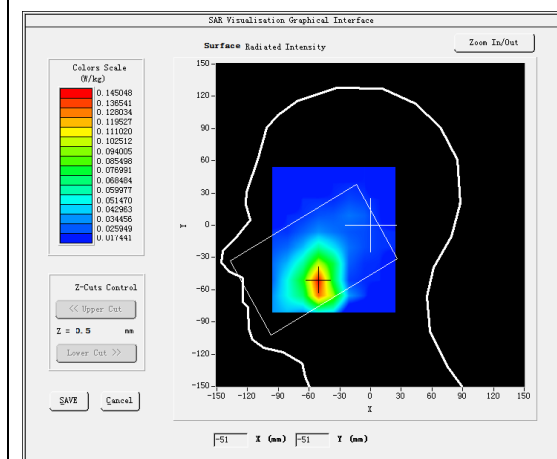
A. Experimental conditions.

<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>Band4 WCDMA1700</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.45</u>

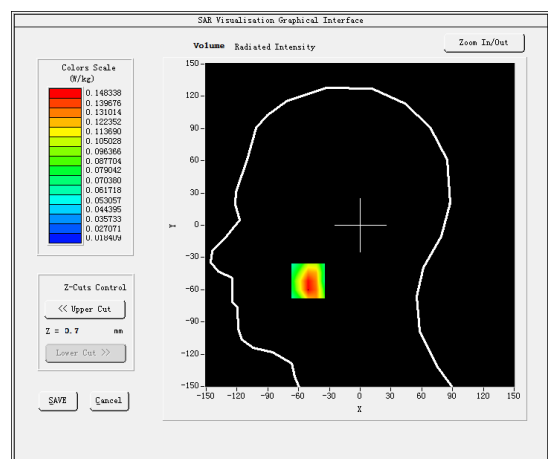
B. SAR Measurement Results

Frequency (MHz)	1732.600000
Relative permittivity (real part)	39.656105
Relative permittivity (imaginary part)	13.871263
Conductivity (S/m)	1.334724
Variation (%)	-0.930000

SURFACE SAR



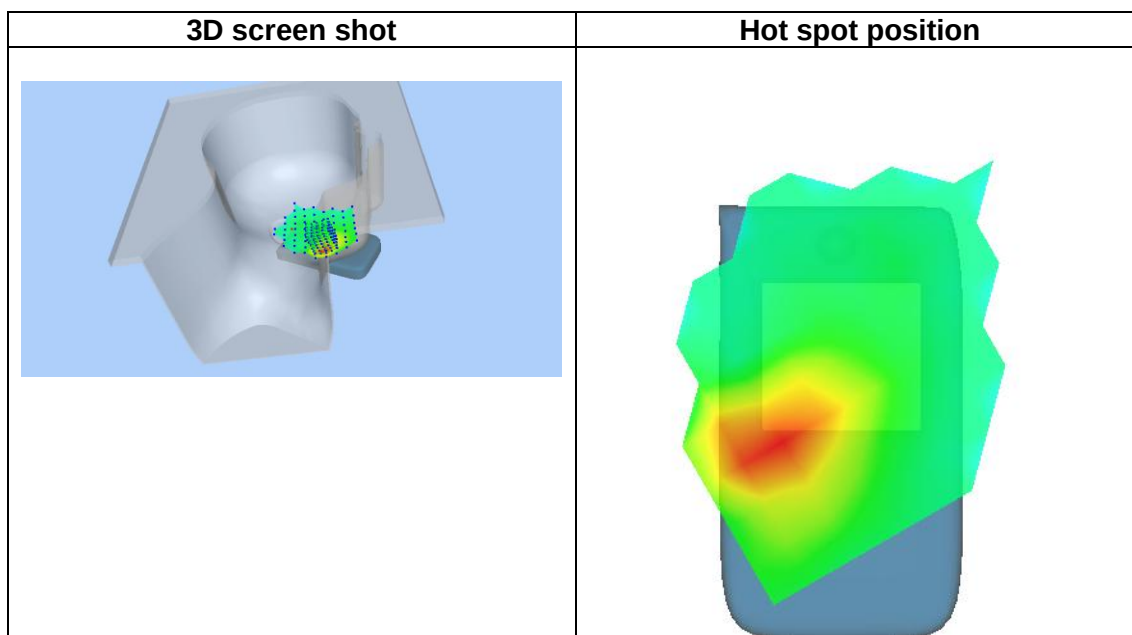
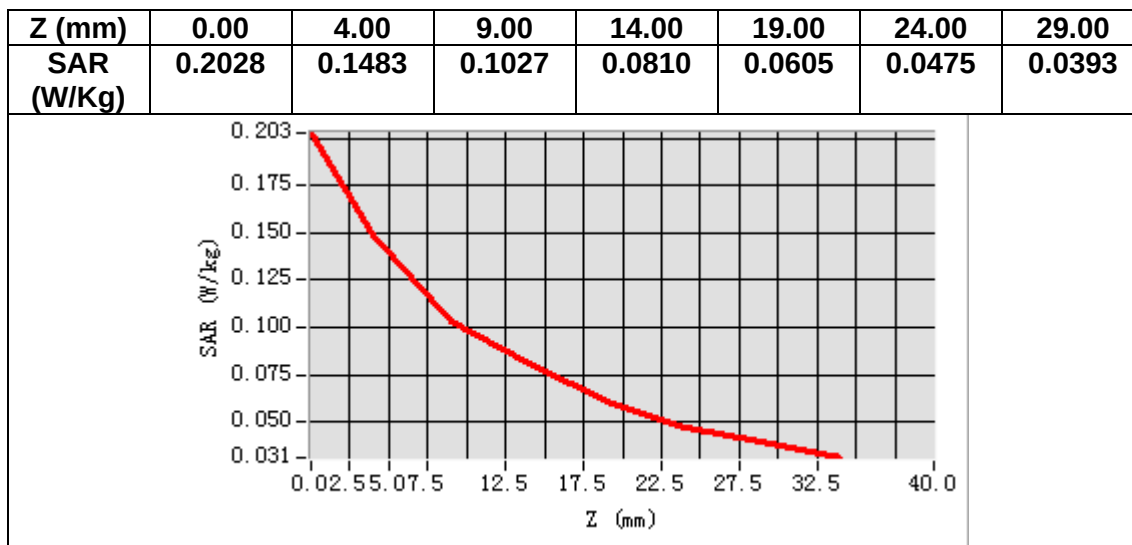
VOLUME SAR



Maximum location: X=-51.00, Y=-52.00

SAR Peak: 0.21 W/kg

SAR 10g (W/Kg)	0.093976
SAR 1g (W/Kg)	0.144498



MEASUREMENT 8

Date of measurement: 29/2/2024

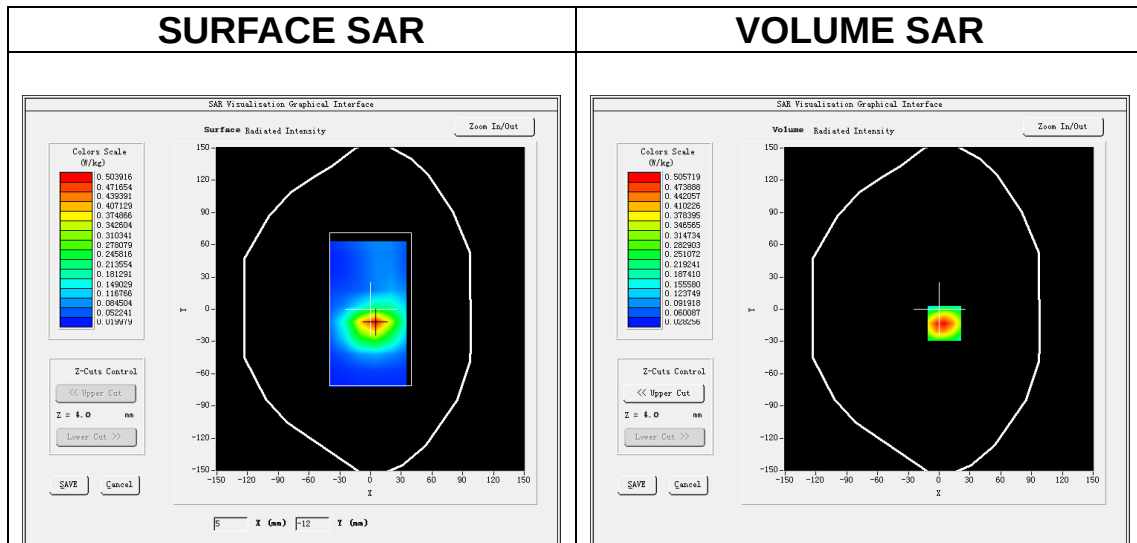
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.45</u>

B. SAR Measurement Results

Frequency (MHz)	1732.600000
Relative permittivity (real part)	39.656105
Relative permittivity (imaginary part)	13.871263
Conductivity (S/m)	1.334724
Variation (%)	0.400000

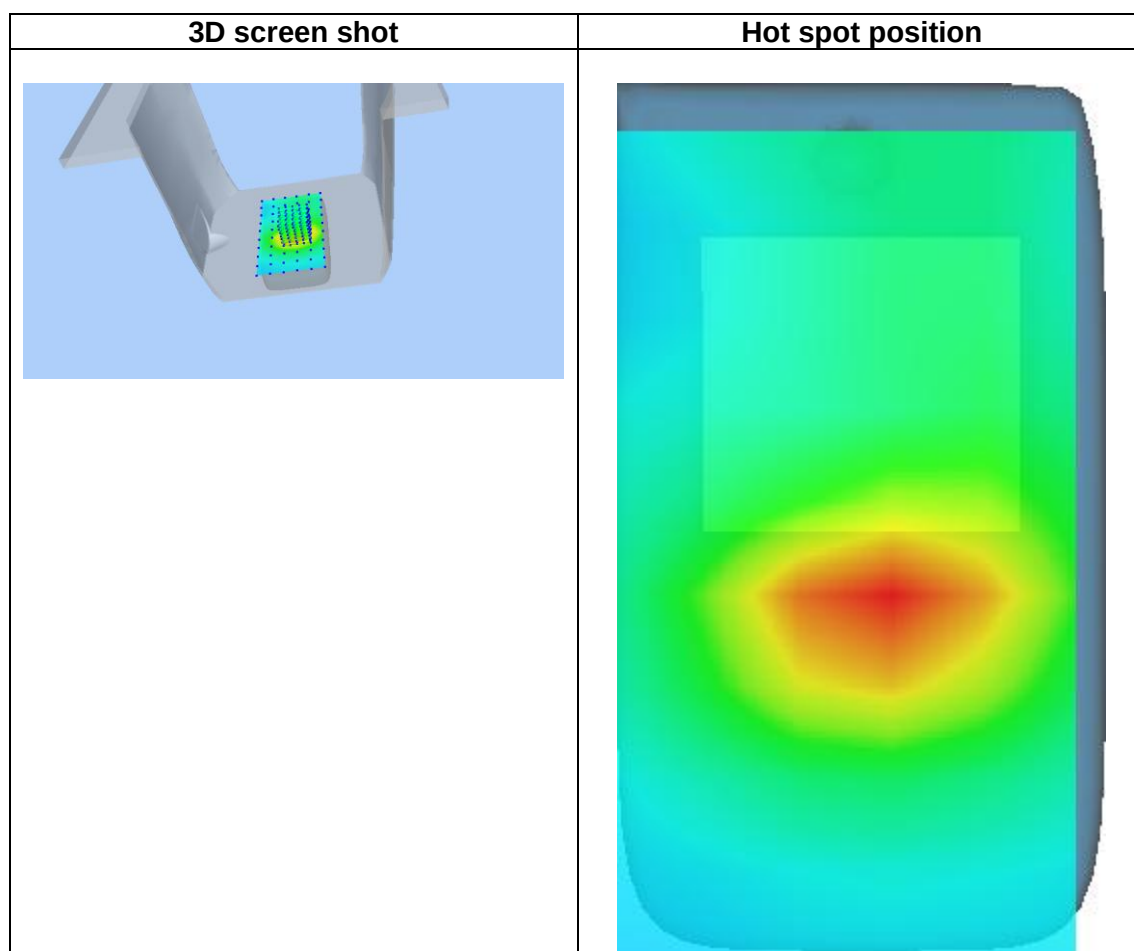
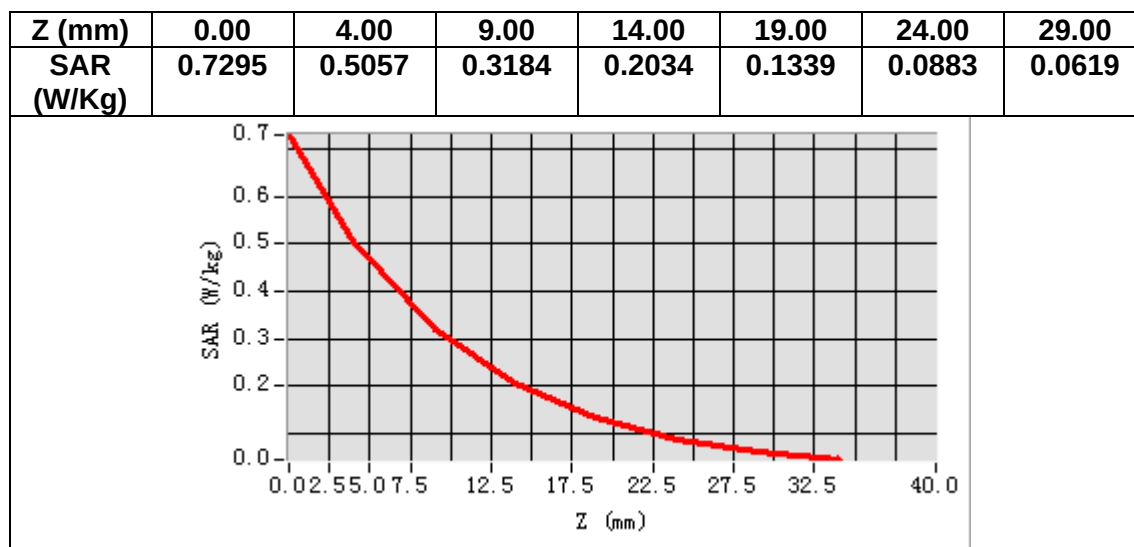
SURFACE SAR



Maximum location: X=5.00, Y=-13.00

SAR Peak: 0.73 W/kg

SAR 10g (W/Kg)	0.279022
SAR 1g (W/Kg)	0.480871



MEASUREMENT 9

Date of measurement: 1/3/2024

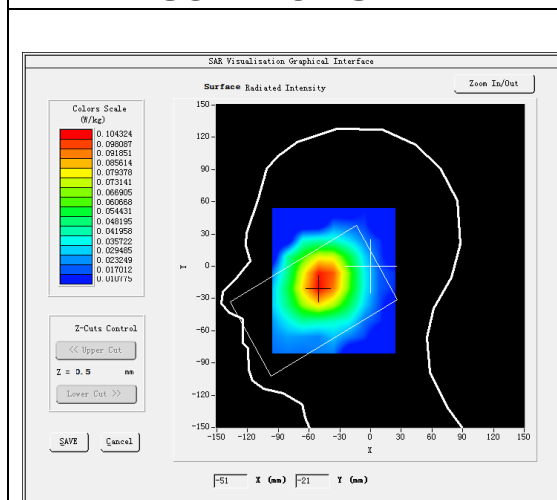
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.32</u>

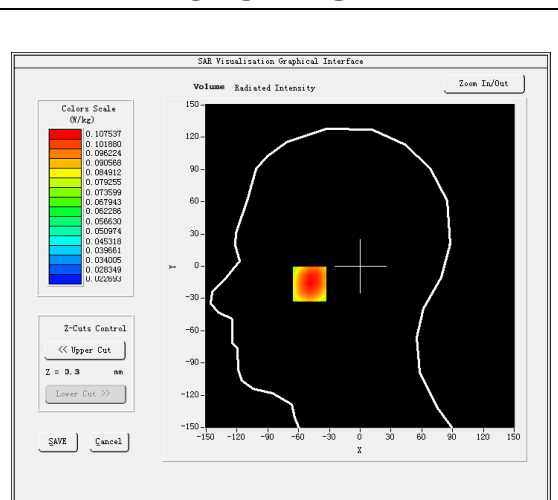
B. SAR Measurement Results

Frequency (MHz)	836.400000
Relative permittivity (real part)	41.301842
Relative permittivity (imaginary part)	19.317196
Conductivity (S/m)	0.897606
Variation (%)	0.020000

SURFACE SAR



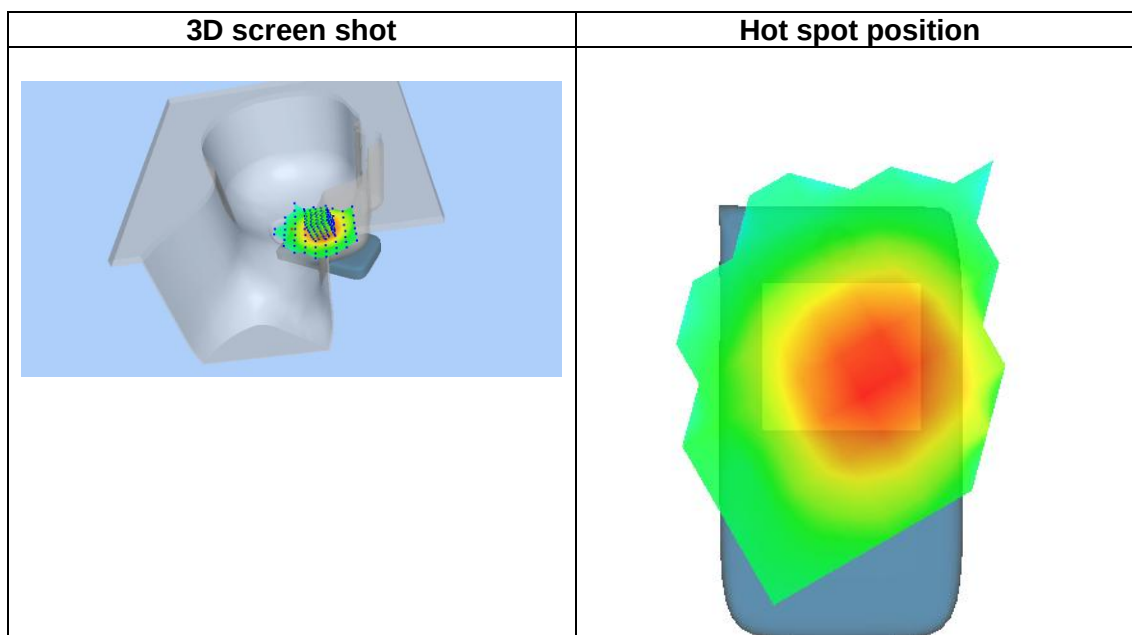
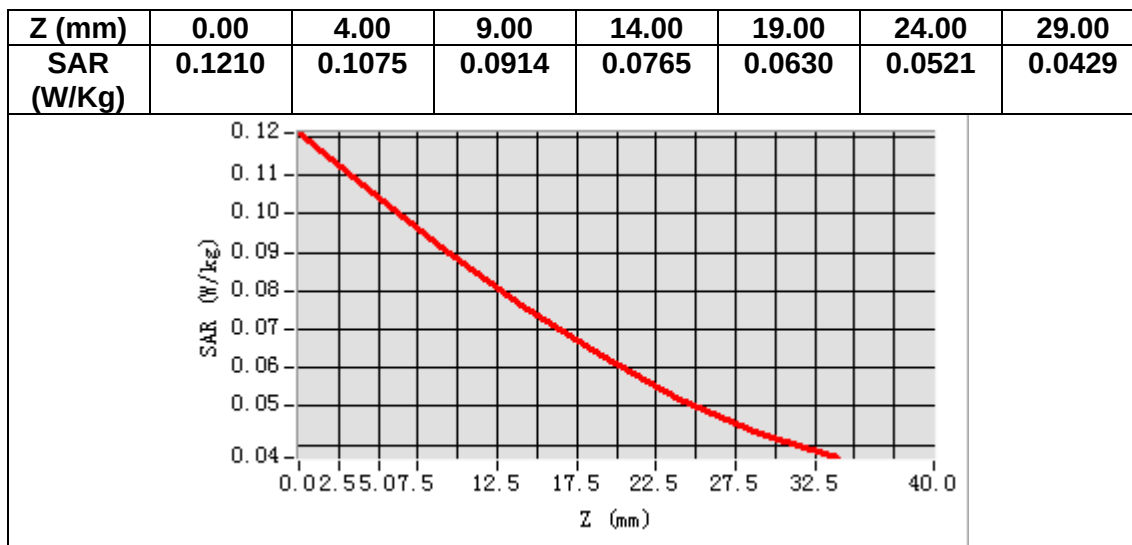
VOLUME SAR



Maximum location: X=-49.00, Y=-16.00

SAR Peak: 0.12 W/kg

SAR 10g (W/Kg)	0.082627
SAR 1g (W/Kg)	0.104526



MEASUREMENT 10

Date of measurement: 1/3/2024

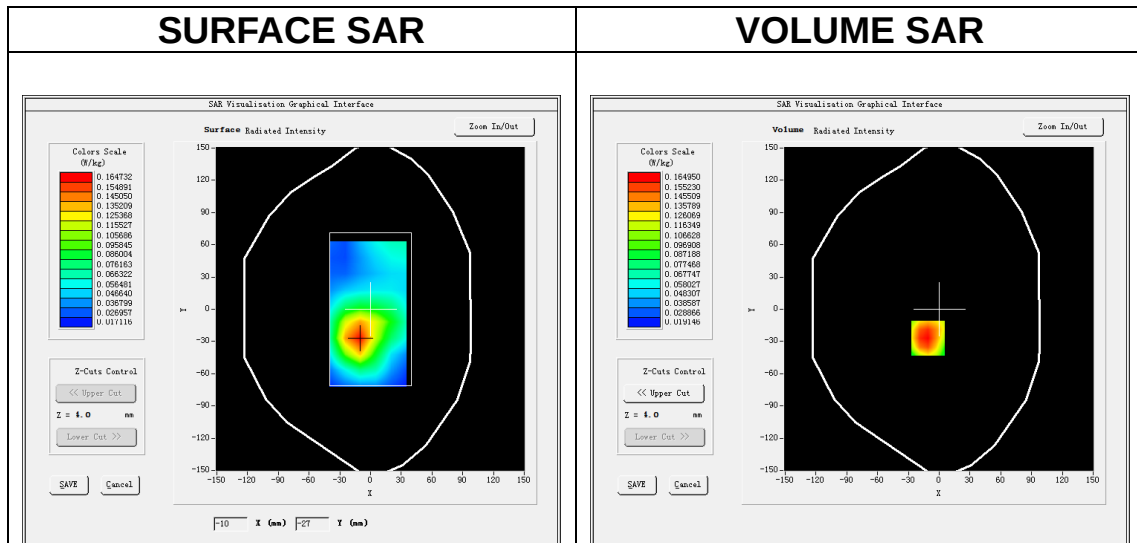
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.32</u>

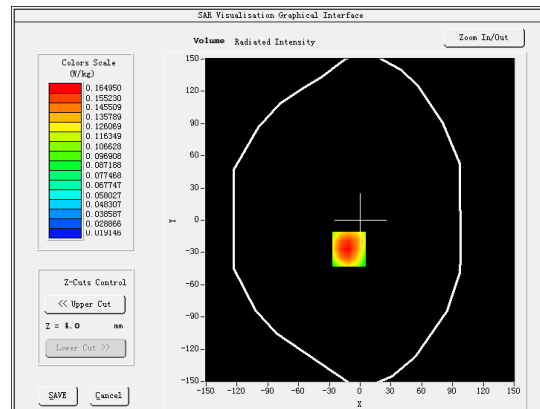
B. SAR Measurement Results

Frequency (MHz)	836.400000
Relative permittivity (real part)	41.301842
Relative permittivity (imaginary part)	19.317196
Conductivity (S/m)	0.897606
Variation (%)	-2.830000

SURFACE SAR



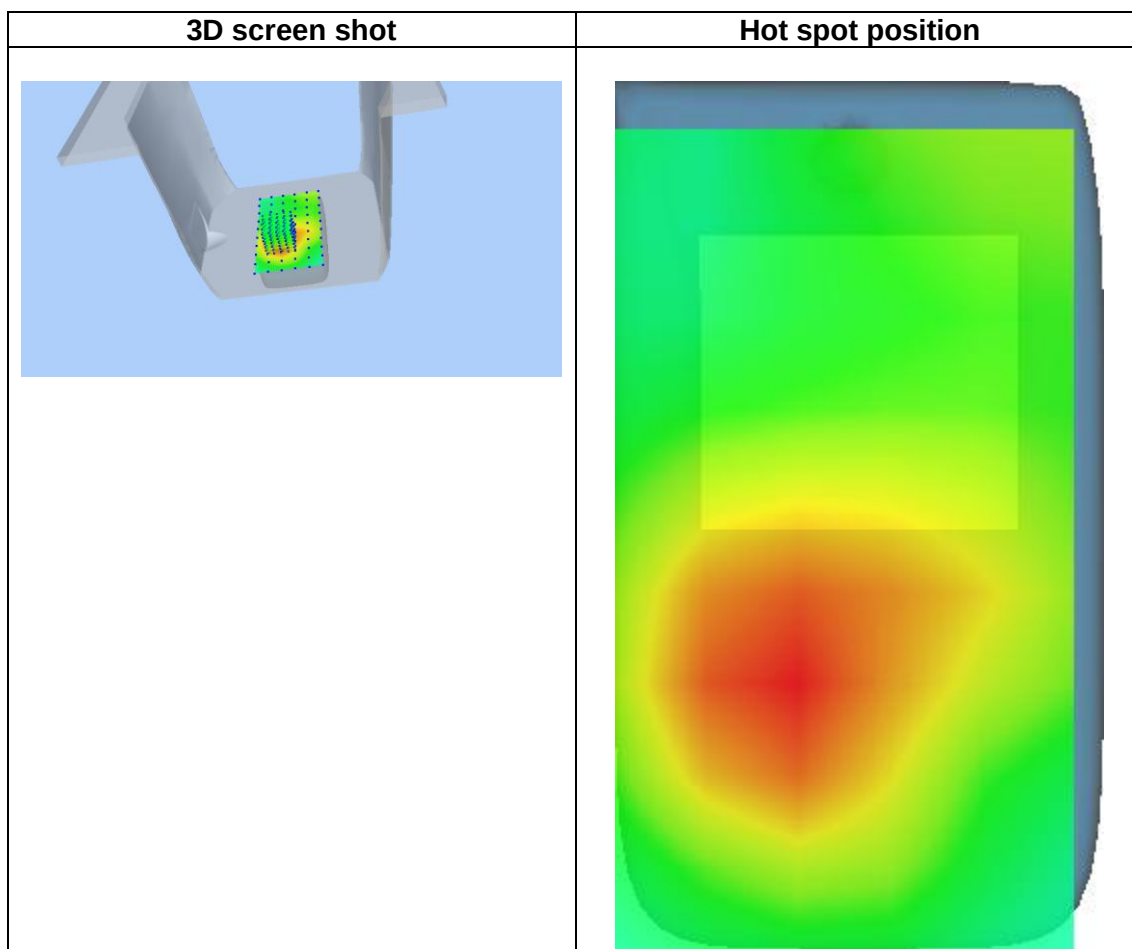
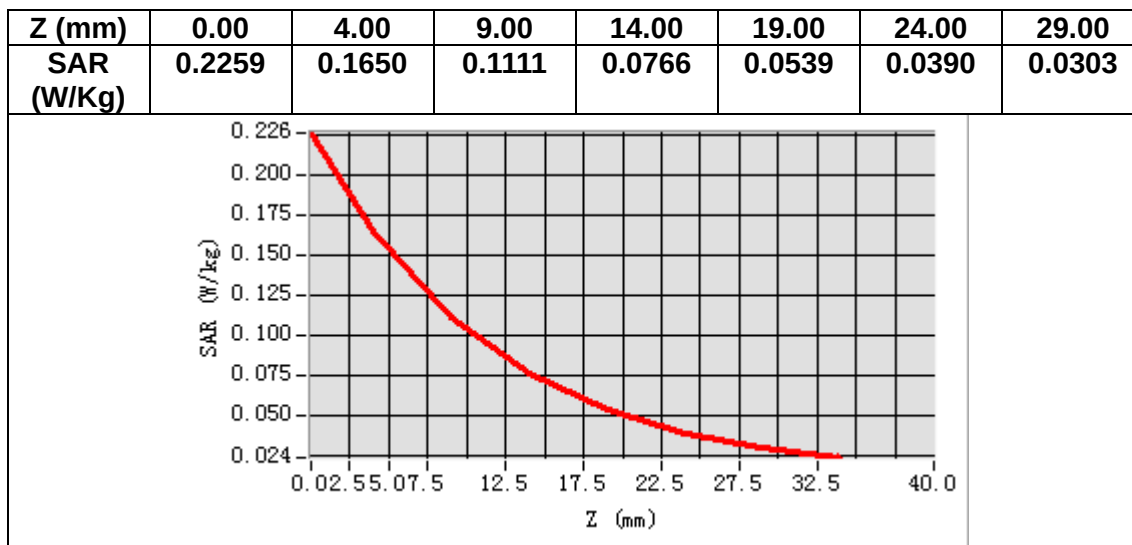
VOLUME SAR



Maximum location: X=-11.00, Y=-27.00

SAR Peak: 0.23 W/kg

SAR 10g (W/Kg)	0.103112
SAR 1g (W/Kg)	0.159504



MEASUREMENT 11

Date of measurement: 10/3/2024

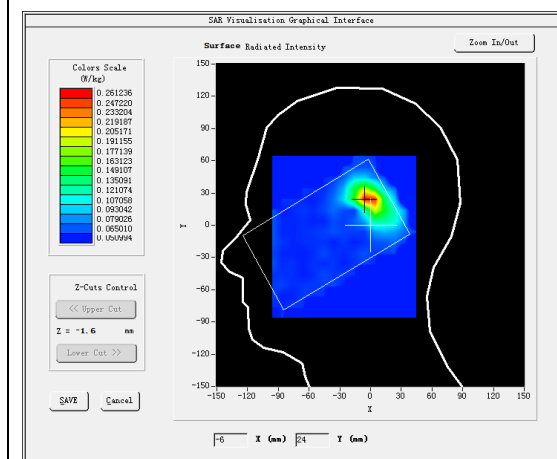
A. Experimental conditions.

<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>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>IEEE 802.11a U-NII</u>
<u>Channels</u>	<u>Low</u>
<u>Signal</u>	<u>IEEE802.11a (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.07</u>

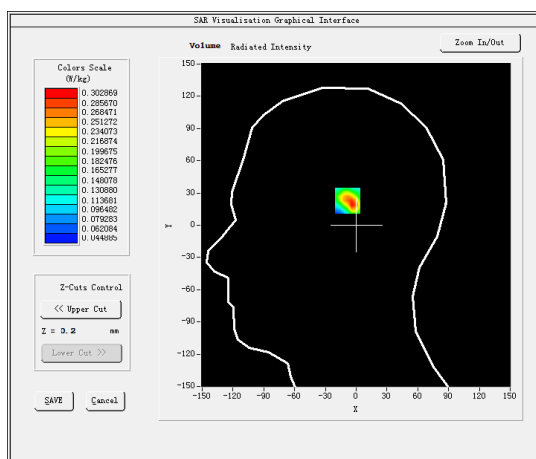
B. SAR Measurement Results

Frequency (MHz)	5180.000000
Relative permittivity (real part)	34.839580
Relative permittivity (imaginary part)	15.738020
Conductivity (S/m)	4.529052
Variation (%)	-1.060000

SURFACE SAR



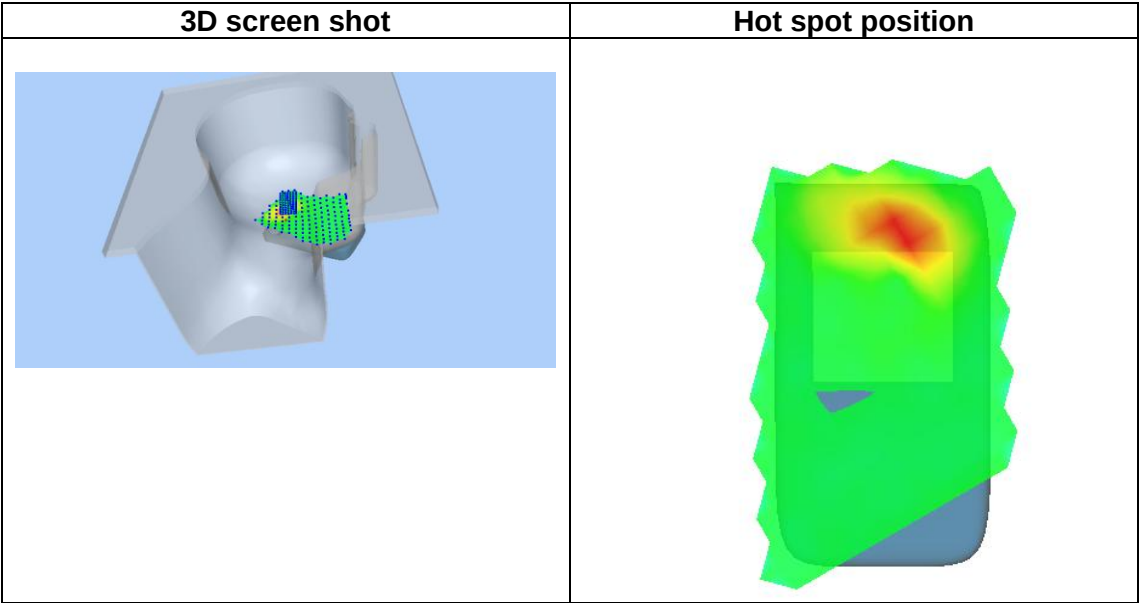
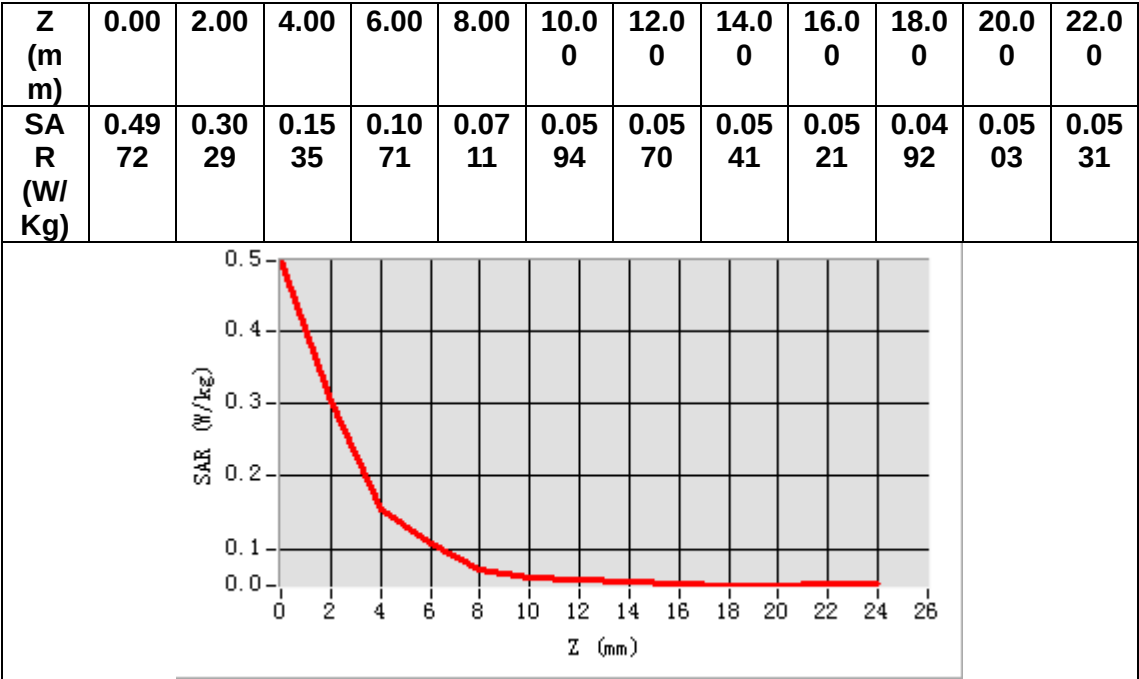
VOLUME SAR



Maximum location: X=-5.00, Y=25.00

SAR Peak: 0.77 W/kg

SAR 10g (W/Kg)	0.134039
SAR 1g (W/Kg)	0.294023



MEASUREMENT 12

Date of measurement: 11/3/2024

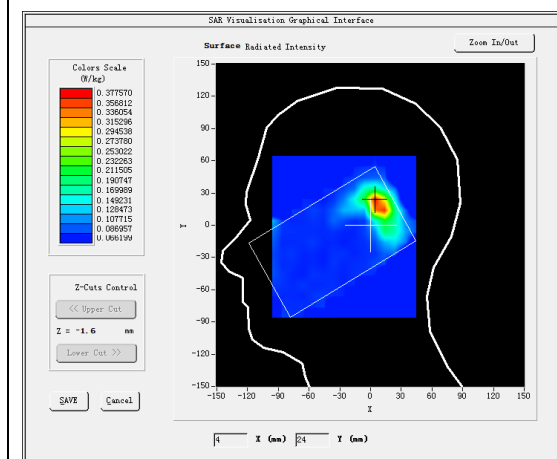
A. Experimental conditions.

<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>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>IEEE 802.11a U-NII</u>
<u>Channels</u>	<u>High</u>
<u>Signal</u>	<u>IEEE802.11a (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.04</u>

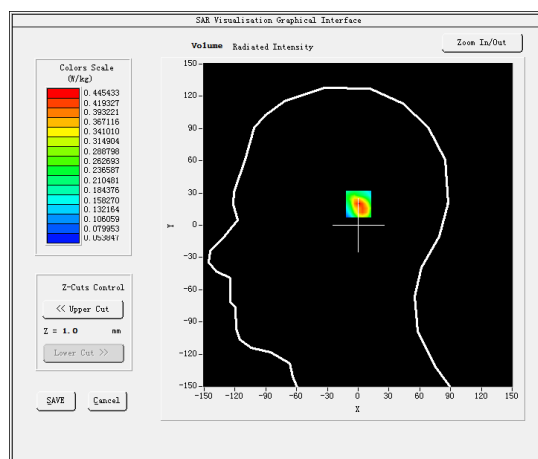
B. SAR Measurement Results

Frequency (MHz)	5825.000000
Relative permittivity (real part)	34.138488
Relative permittivity (imaginary part)	16.231130
Conductivity (S/m)	5.252574
Variation (%)	-0.560000

SURFACE SAR



VOLUME SAR

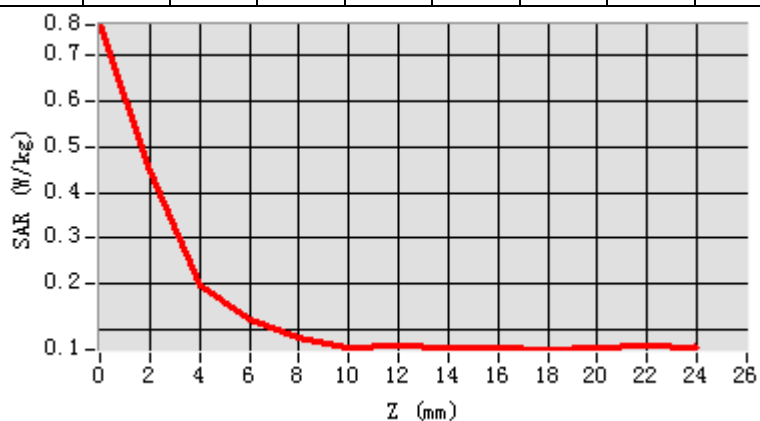


Maximum location: X=6.00, Y=21.00

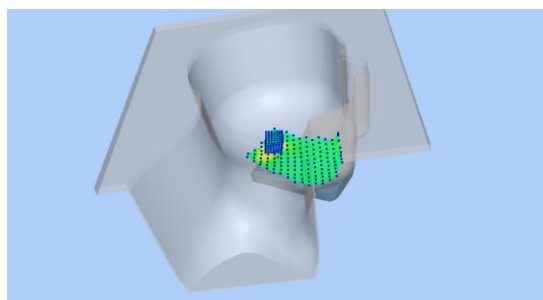
SAR Peak: 1.23 W/kg

SAR 10g (W/Kg)	0.186400
SAR 1g (W/Kg)	0.431958

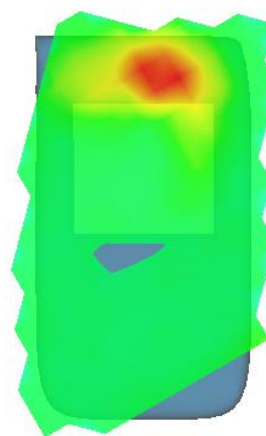
Z (m m)	0.00	2.00	4.00	6.00	8.00	10.0 0	12.0 0	14.0 0	16.0 0	18.0 0	20.0 0	22.0 0
SAR (W/ Kg)	0.76 51	0.44 54	0.19 90	0.12 41	0.08 44	0.06 36	0.06 36	0.06 22	0.05 96	0.05 70	0.05 95	0.06 40



3D screen shot



Hot spot position



MEASUREMENT 13

Date of measurement: 10/3/2024

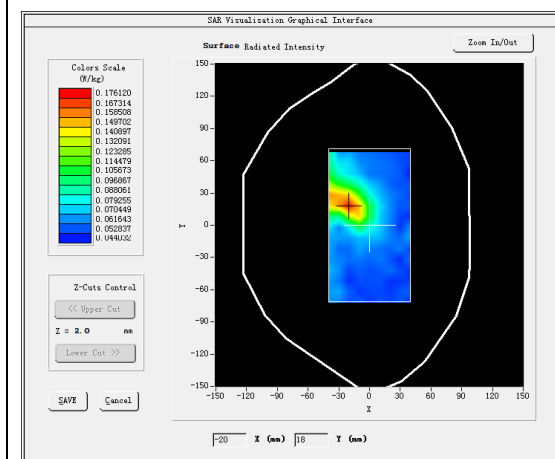
A. Experimental conditions.

<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>Low</u>
<u>Signal</u>	<u>IEEE802.11a (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.07</u>

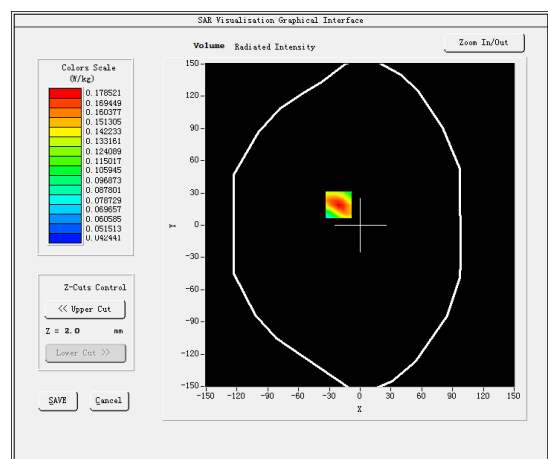
B. SAR Measurement Results

Frequency (MHz)	5180.000000
Relative permittivity (real part)	34.839580
Relative permittivity (imaginary part)	15.738020
Conductivity (S/m)	4.529052
Variation (%)	-2.050000

SURFACE SAR



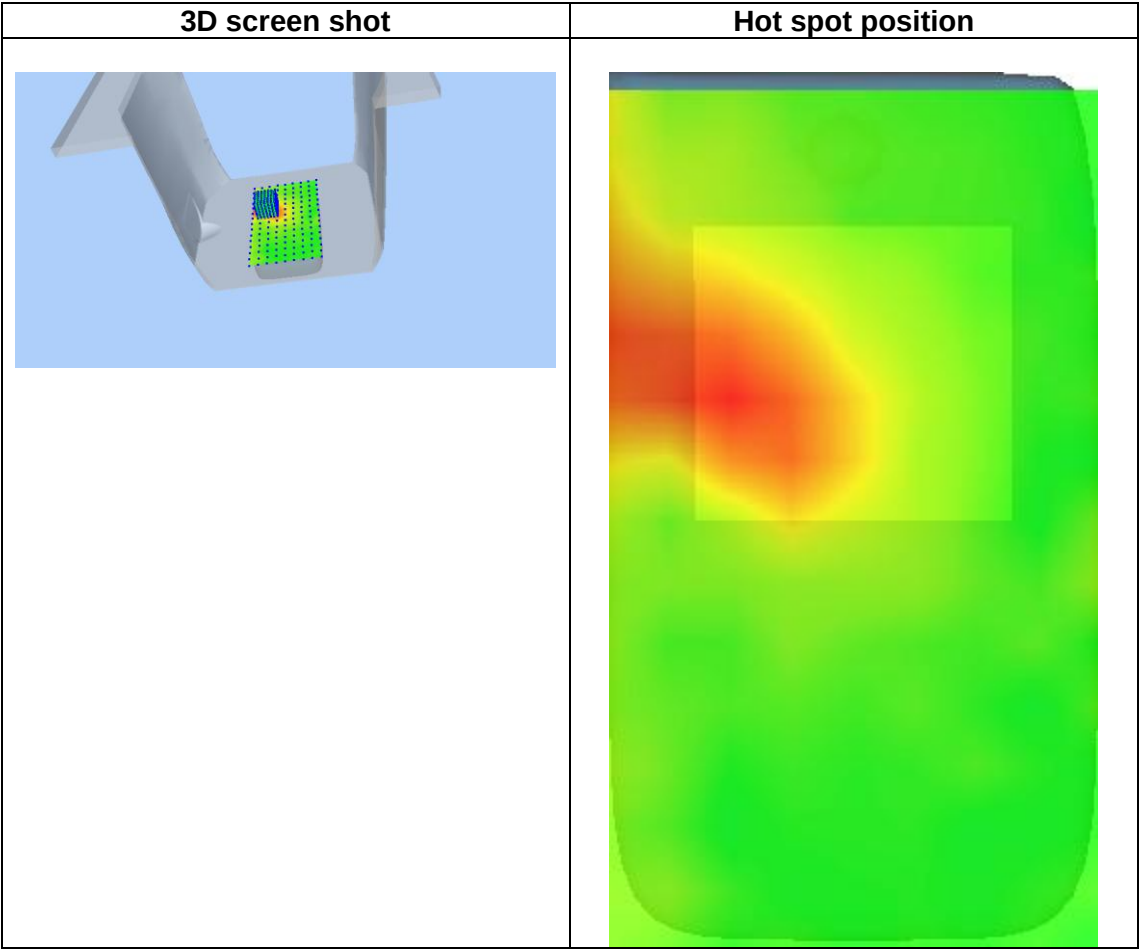
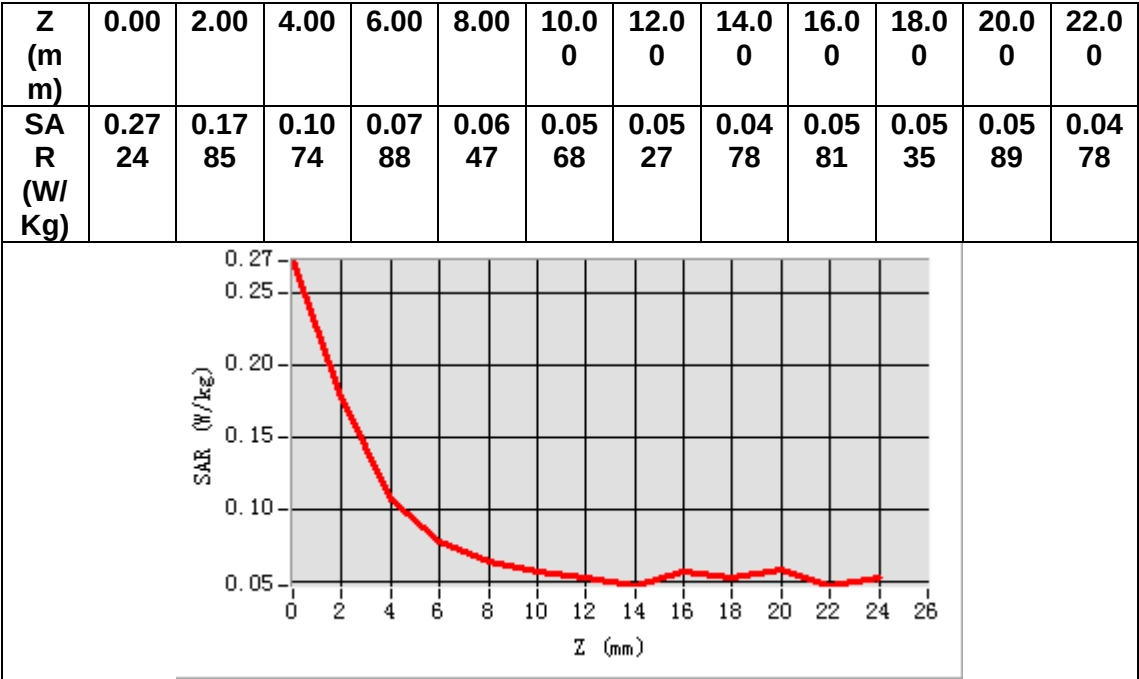
VOLUME SAR



Maximum location: X=-21.00, Y=19.00

SAR Peak: 0.29 W/kg

SAR 10g (W/Kg)	0.080049
SAR 1g (W/Kg)	0.123960



MEASUREMENT 14

Date of measurement: 11/3/2024

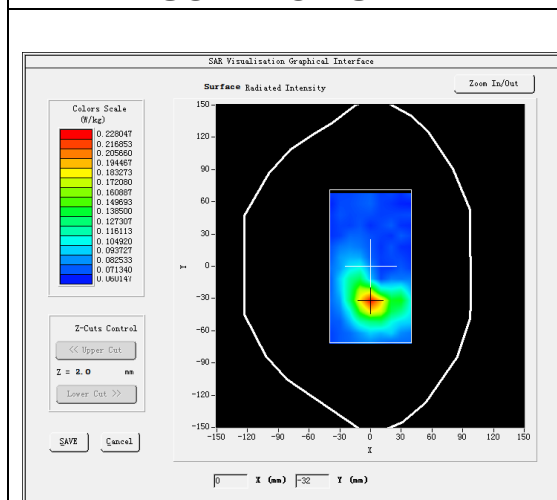
A. Experimental conditions.

<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>High</u>
<u>Signal</u>	<u>IEEE802.11a (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.04</u>

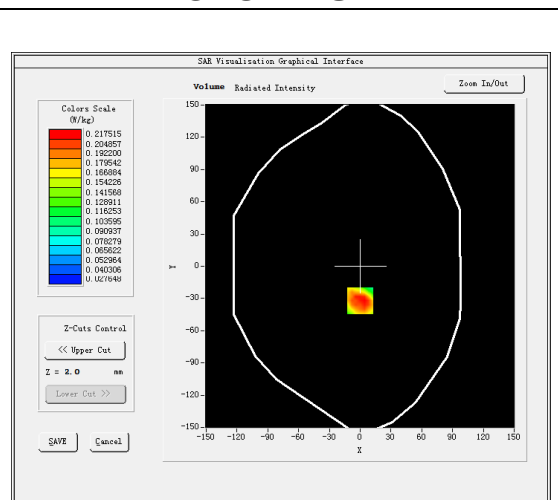
B. SAR Measurement Results

Frequency (MHz)	5825.000000
Relative permittivity (real part)	34.138488
Relative permittivity (imaginary part)	16.231130
Conductivity (S/m)	5.252574
Variation (%)	0.920000

SURFACE SAR



VOLUME SAR

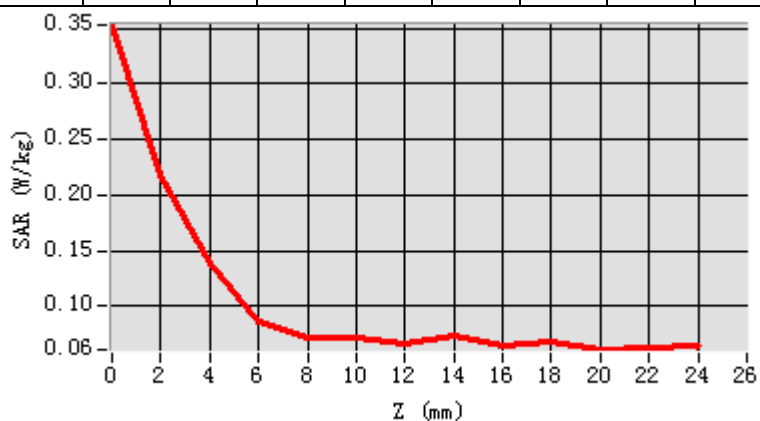


Maximum location: X=0.00, Y=-32.00

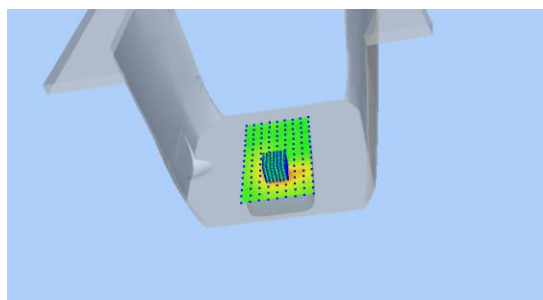
SAR Peak: 0.38 W/kg

SAR 10g (W/Kg)	0.099503
SAR 1g (W/Kg)	0.152191

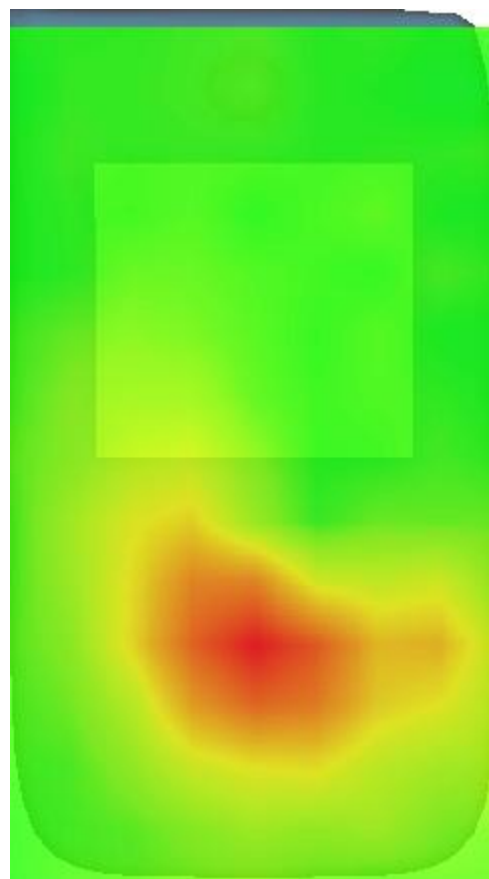
Z (m m)	0.00	2.00	4.00	6.00	8.00	10.0 0	12.0 0	14.0 0	16.0 0	18.0 0	20.0 0	22.0 0
SAR (W/ Kg)	0.35 31	0.21 75	0.13 82	0.08 60	0.07 20	0.07 21	0.06 56	0.07 38	0.06 42	0.06 76	0.06 07	0.06 18



3D screen shot



Hot spot position



MEASUREMENT 15

Date of measurement: 9/3/2024

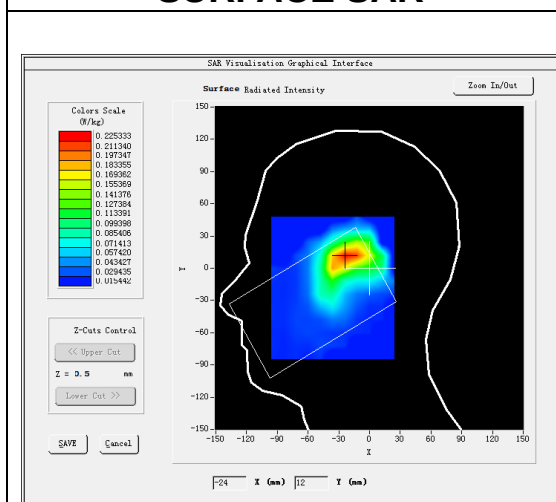
A. Experimental conditions.

<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>Left head</u>
<u>Device Position</u>	<u>Cheek</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>
<u>ConvF</u>	<u>2.85</u>

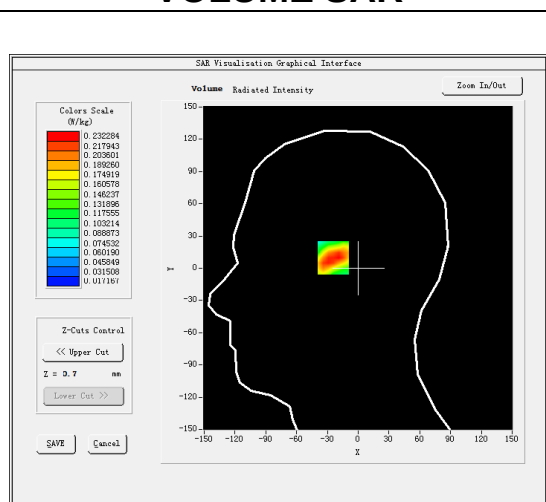
B. SAR Measurement Results

Frequency (MHz)	2437.000000
Relative permittivity (real part)	37.774258
Relative permittivity (imaginary part)	12.821736
Conductivity (S/m)	1.735921
Variation (%)	-2.290000

SURFACE SAR



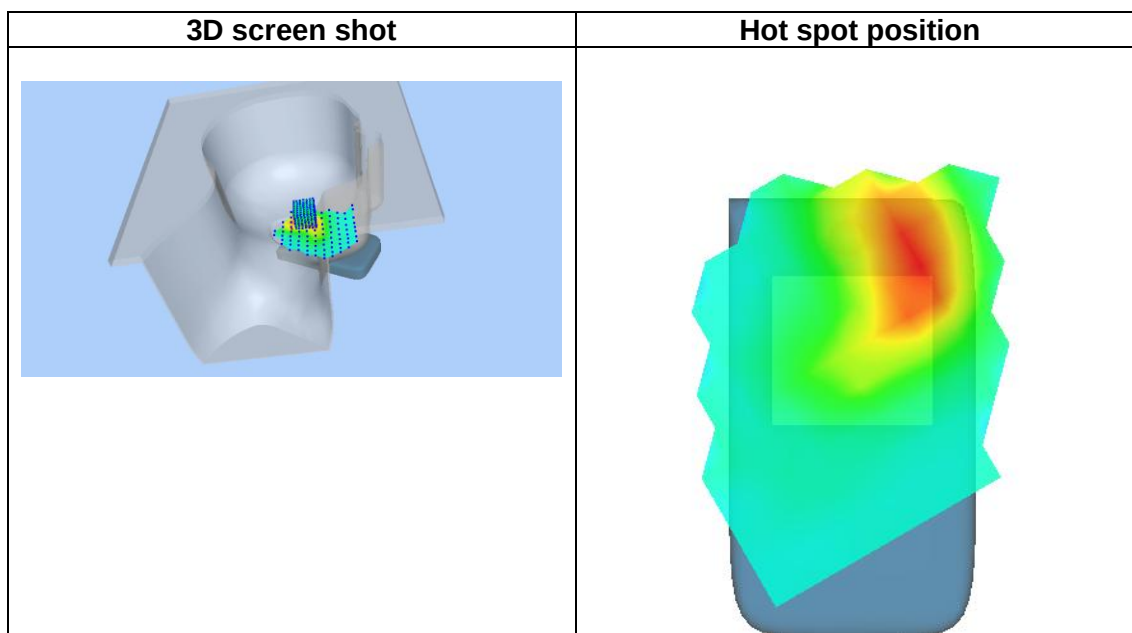
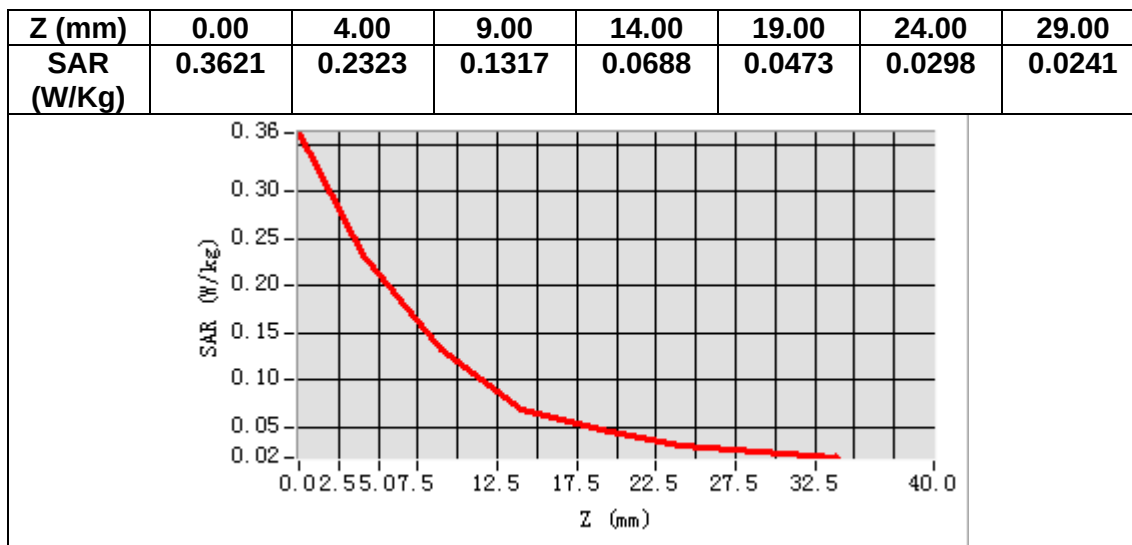
VOLUME SAR



Maximum location: X=-23.00, Y=11.00

SAR Peak: 0.38 W/kg

SAR 10g (W/Kg)	0.119467
SAR 1g (W/Kg)	0.217849



MEASUREMENT 16

Date of measurement: 9/3/2024

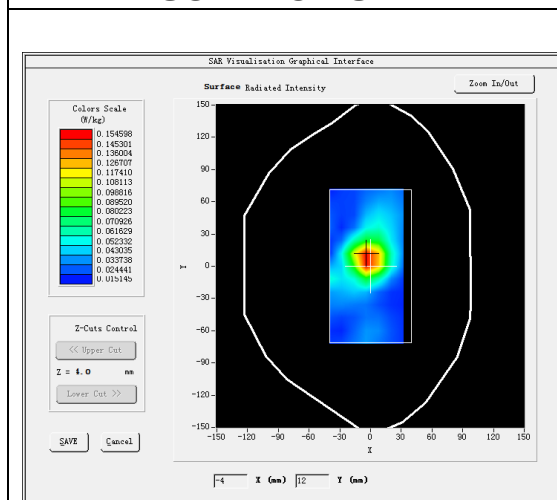
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.85</u>

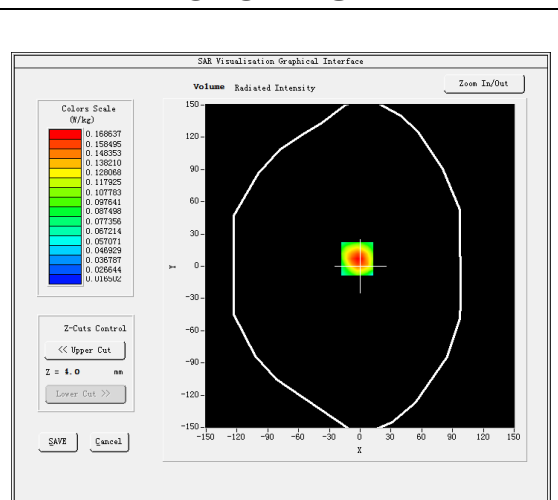
B. SAR Measurement Results

Frequency (MHz)	2437.000000
Relative permittivity (real part)	37.774258
Relative permittivity (imaginary part)	12.821736
Conductivity (S/m)	1.735921
Variation (%)	2.960000

SURFACE SAR



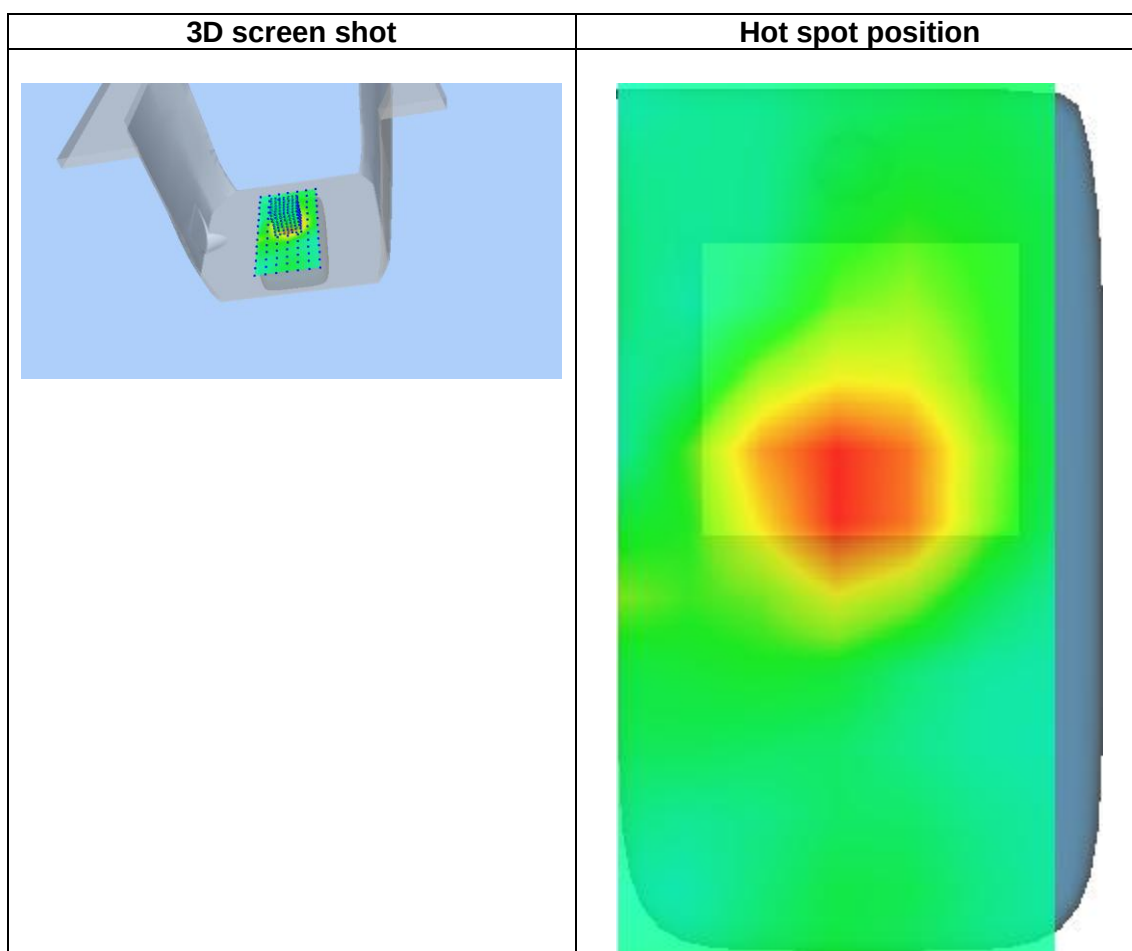
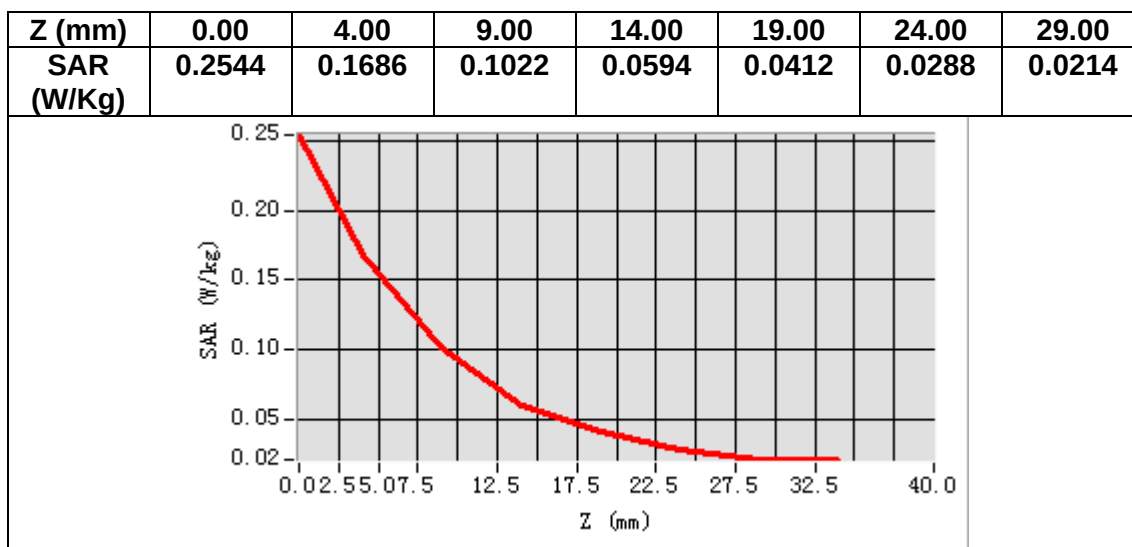
VOLUME SAR



Maximum location: X=-3.00, Y=7.00

SAR Peak: 0.26 W/kg

SAR 10g (W/Kg)	0.089442
SAR 1g (W/Kg)	0.157927



MEASUREMENT 17

Date of measurement: 2/3/2024

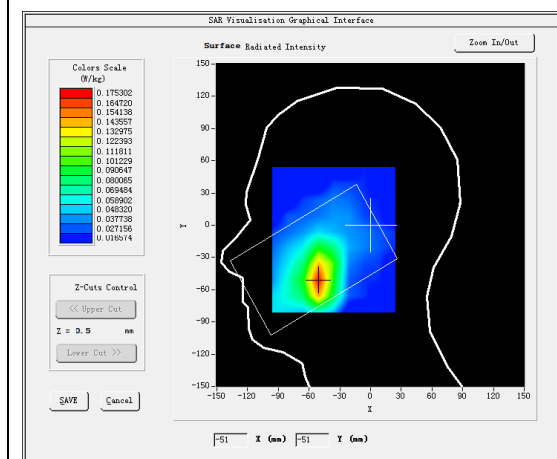
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.63</u>

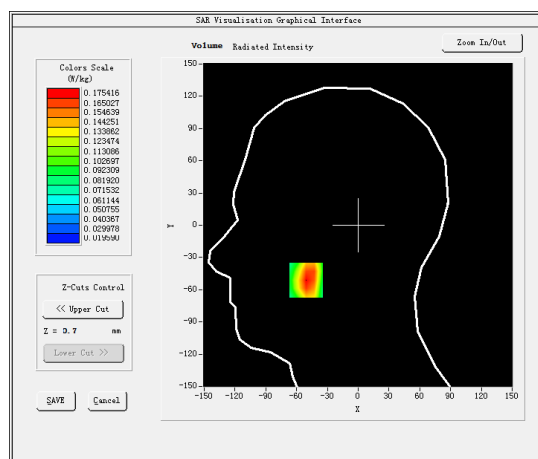
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.975822
Relative permittivity (imaginary part)	13.747208
Conductivity (S/m)	1.435820
Variation (%)	1.390000

SURFACE SAR



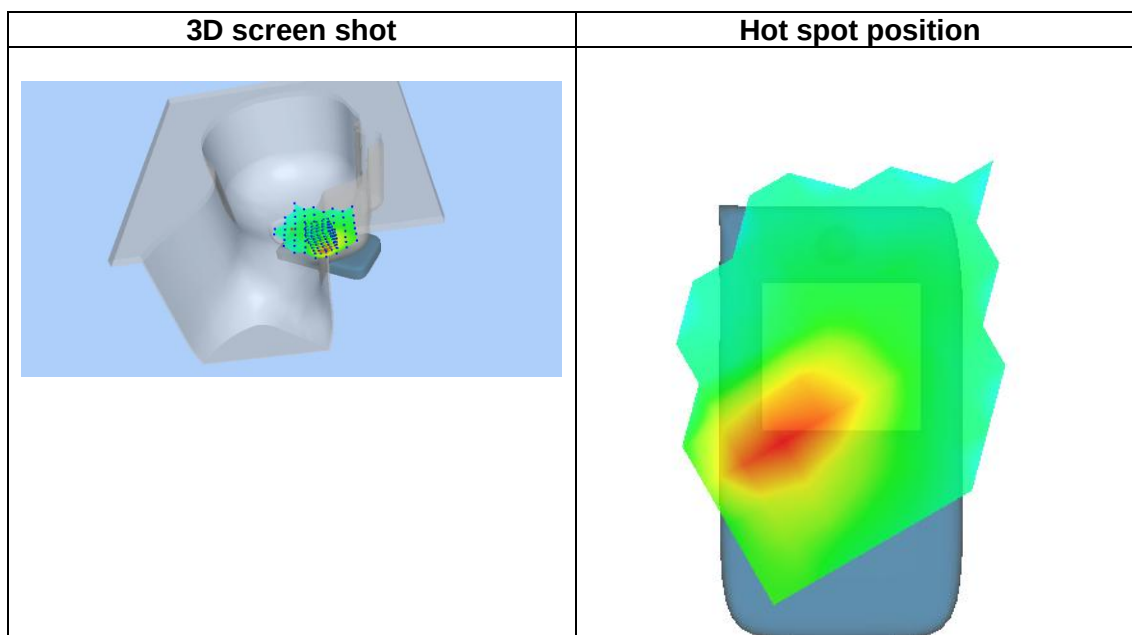
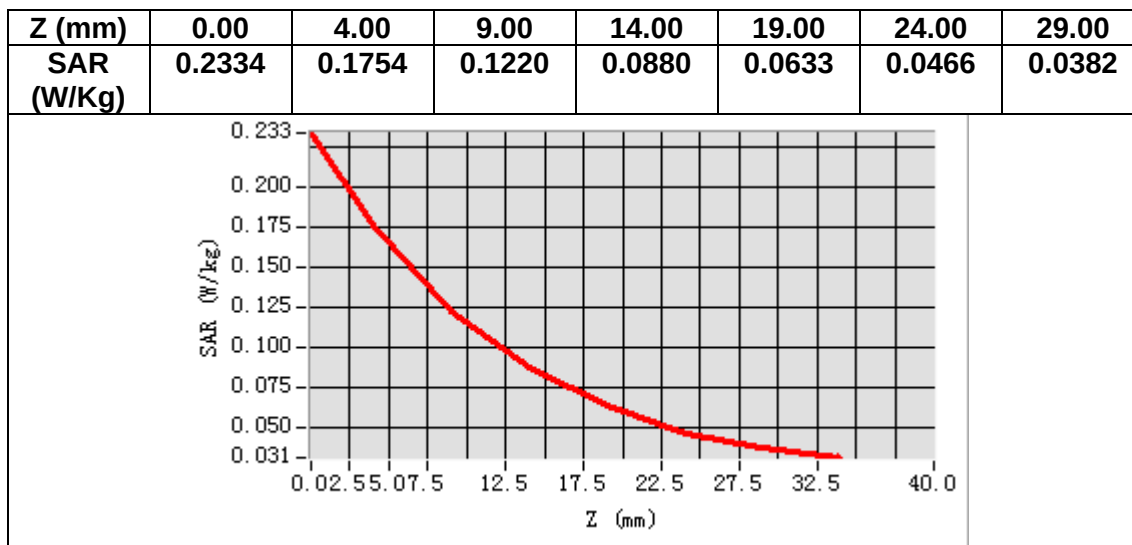
VOLUME SAR



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

SAR Peak: 0.25 W/kg

SAR 10g (W/Kg)	0.107500
SAR 1g (W/Kg)	0.172432



MEASUREMENT 18

Date of measurement: 2/3/2024

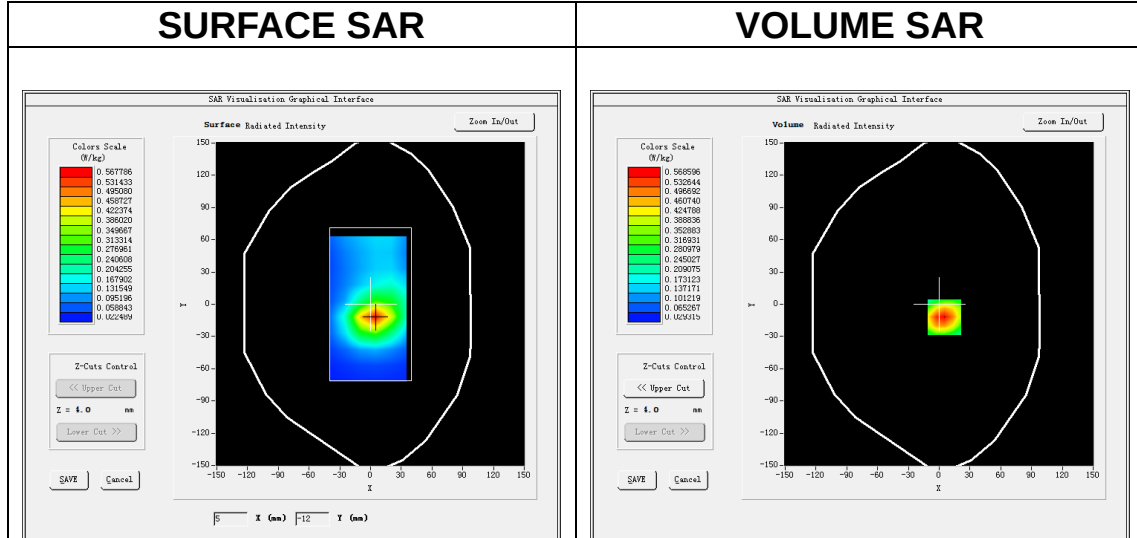
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.63</u>

B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.975822
Relative permittivity (imaginary part)	13.747208
Conductivity (S/m)	1.435820
Variation (%)	-0.470000

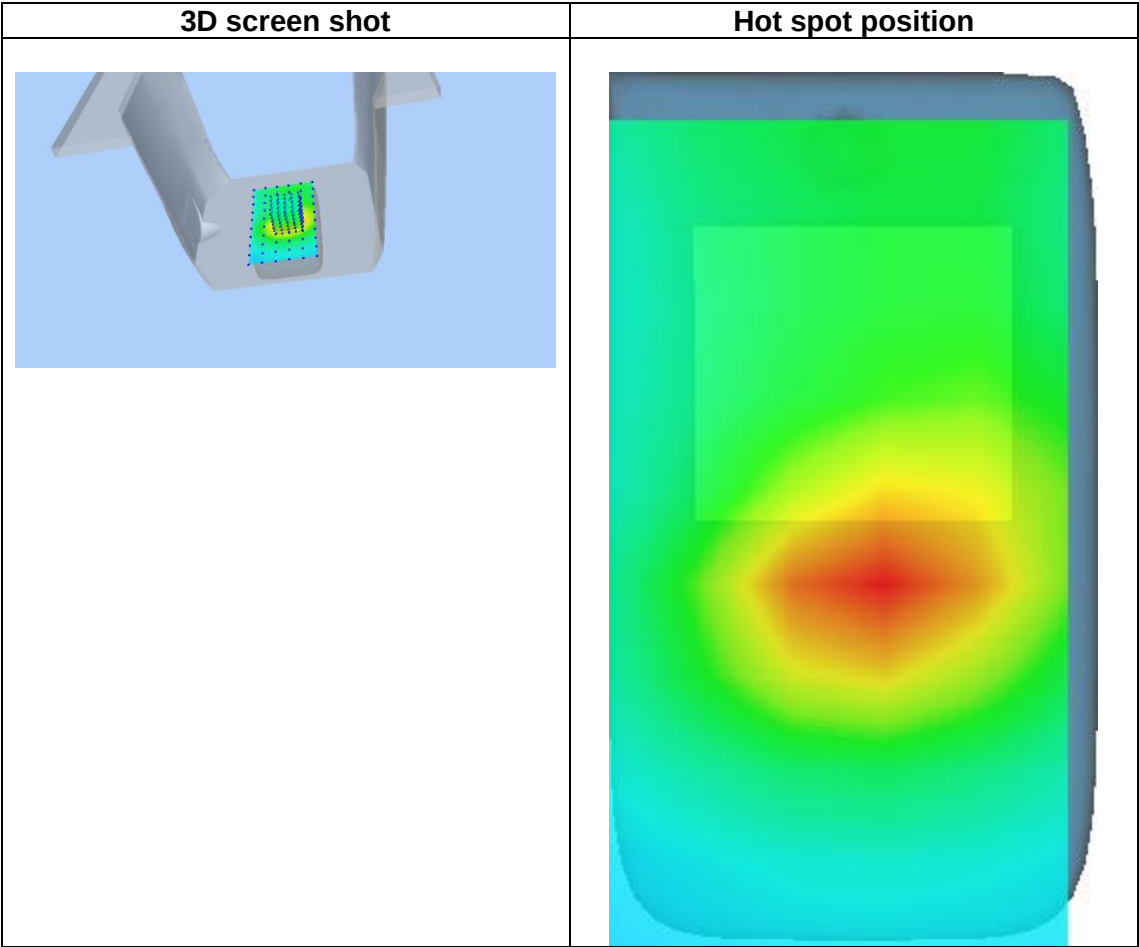
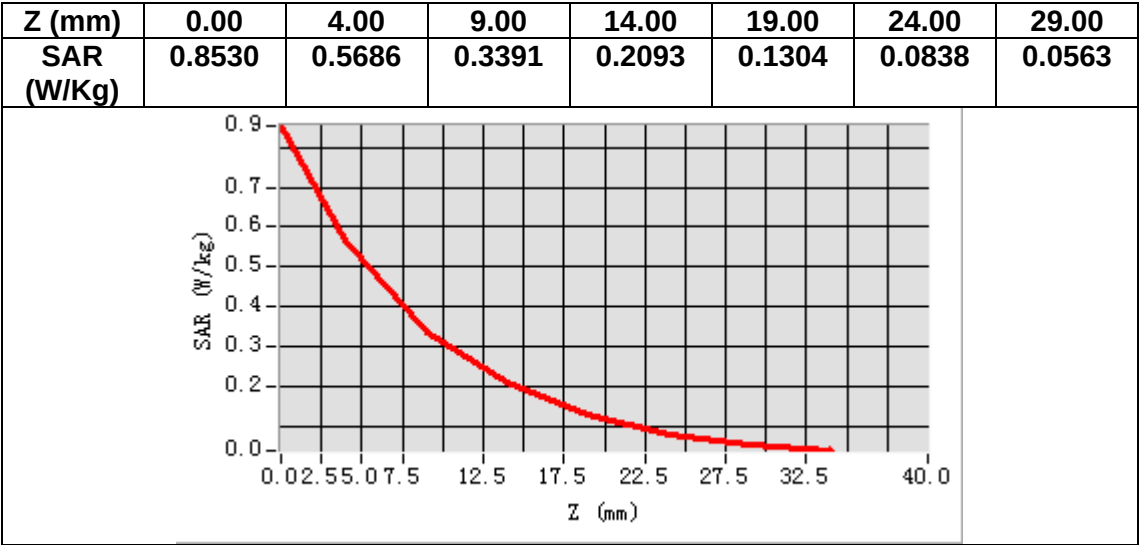
SURFACE SAR



Maximum location: X=5.00, Y=-12.00

SAR Peak: 0.85 W/kg

SAR 10g (W/Kg)	0.310698
SAR 1g (W/Kg)	0.553513



MEASUREMENT 19

Date of measurement: 29/2/2024

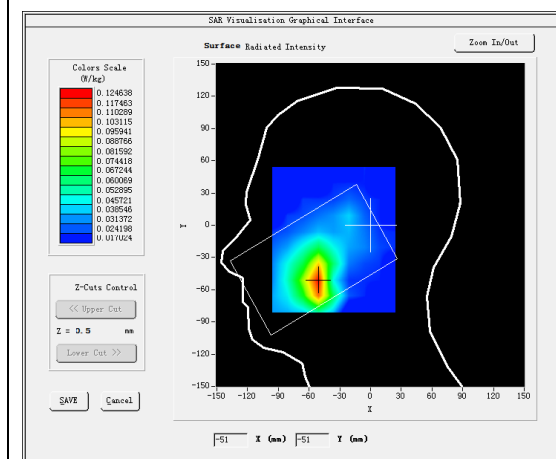
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.45</u>

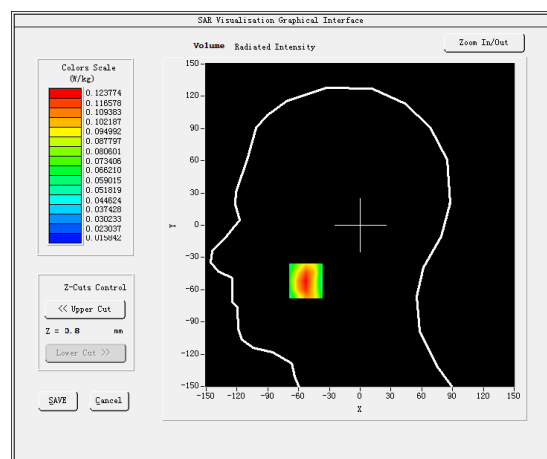
B. SAR Measurement Results

Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.664005
Relative permittivity (imaginary part)	13.856113
Conductivity (S/m)	1.333651
Variation (%)	-1.430000

SURFACE SAR



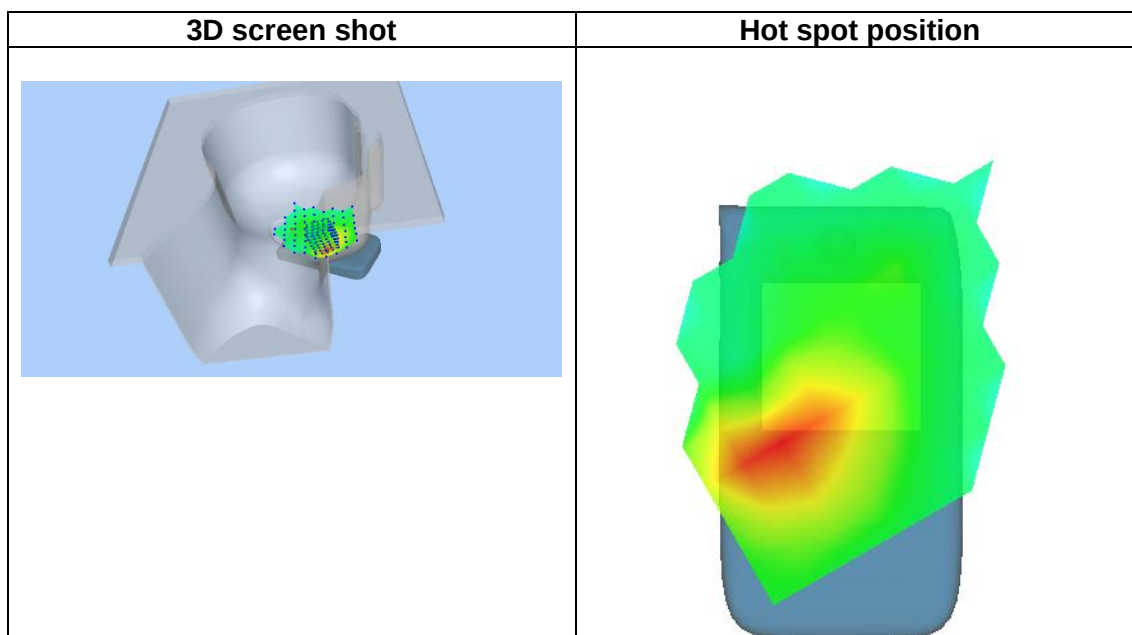
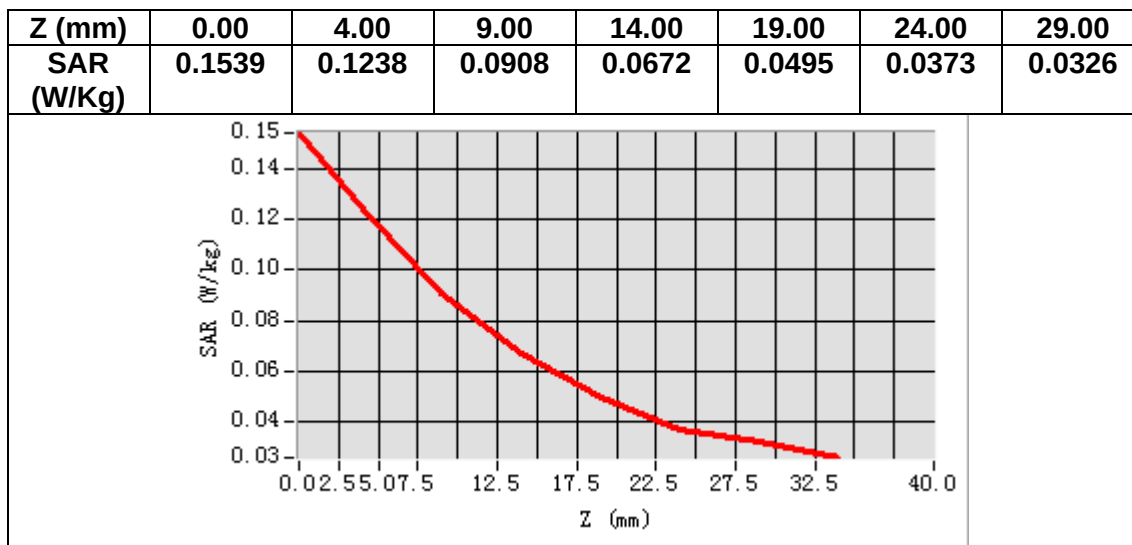
VOLUME SAR



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

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.078761
SAR 1g (W/Kg)	0.117373



MEASUREMENT 20

Date of measurement: 29/2/2024

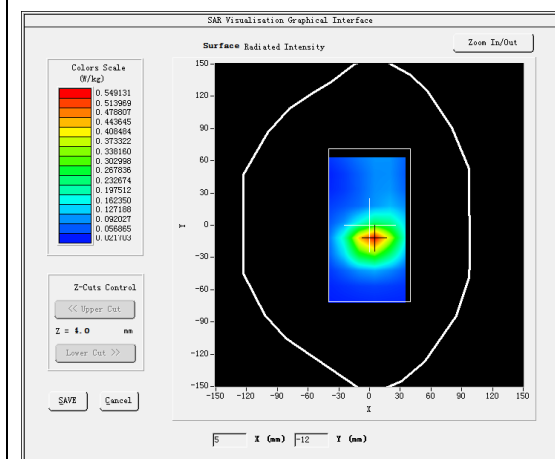
A. Experimental conditions.

<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>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.45</u>

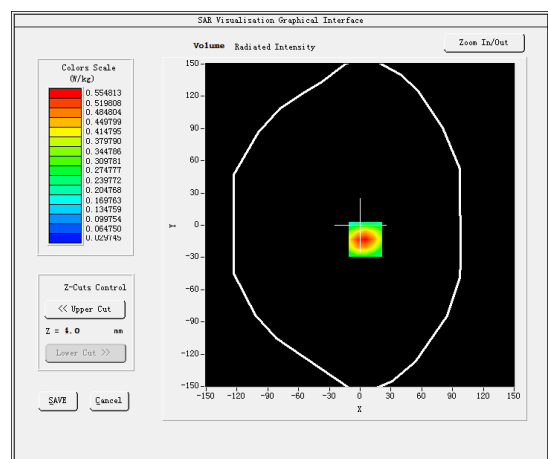
B. SAR Measurement Results

Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.664005
Relative permittivity (imaginary part)	13.856113
Conductivity (S/m)	1.333651
Variation (%)	-0.350000

SURFACE SAR



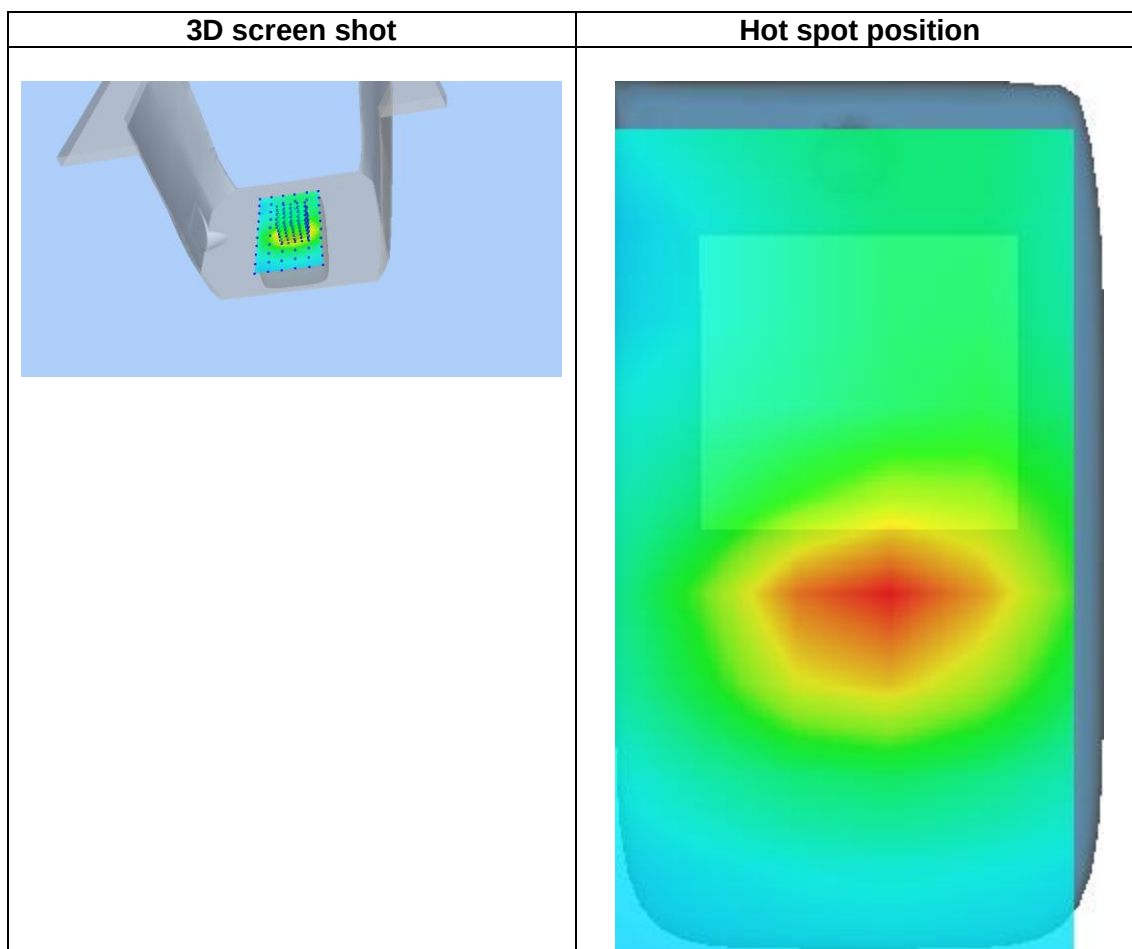
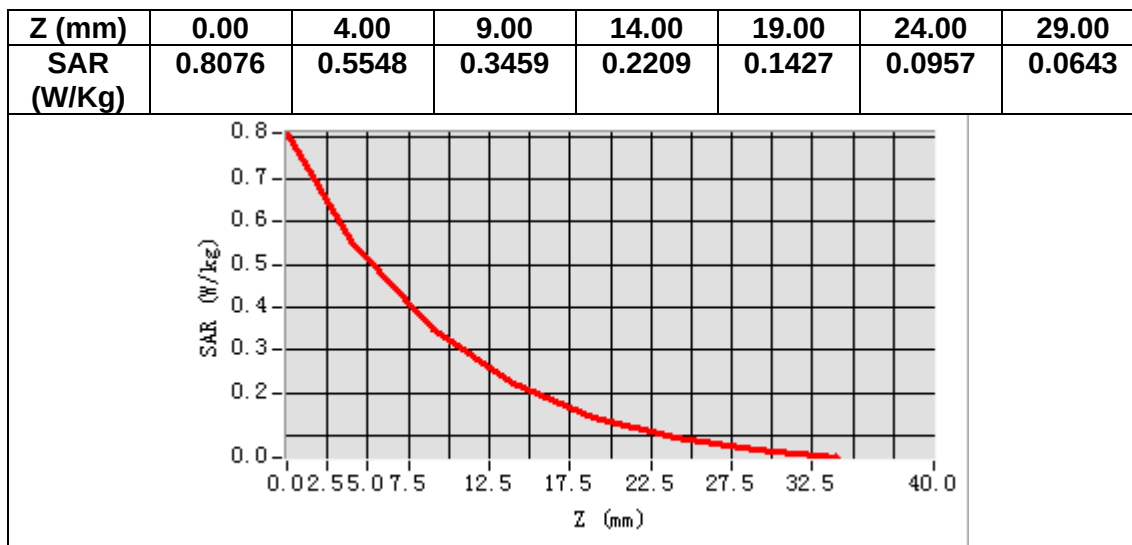
VOLUME SAR



Maximum location: X=5.00, Y=-13.00

SAR Peak: 0.81 W/kg

SAR 10g (W/Kg)	0.304641
SAR 1g (W/Kg)	0.526996



MEASUREMENT 21

Date of measurement: 1/3/2024

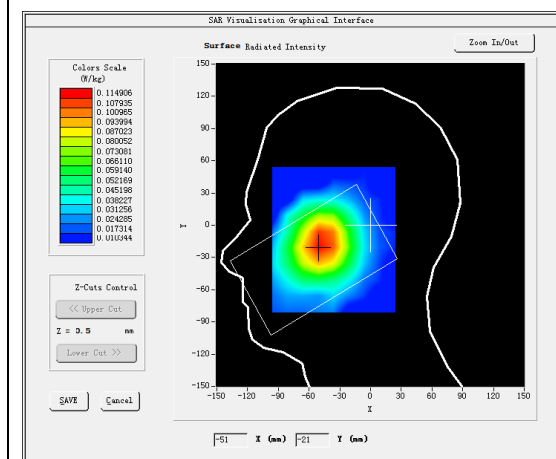
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.32</u>

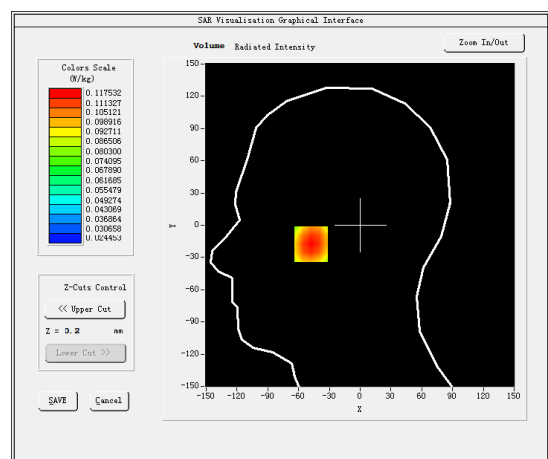
B. SAR Measurement Results

Frequency (MHz)	836.500000
Relative permittivity (real part)	41.304111
Relative permittivity (imaginary part)	19.318996
Conductivity (S/m)	0.897797
Variation (%)	3.760000

SURFACE SAR



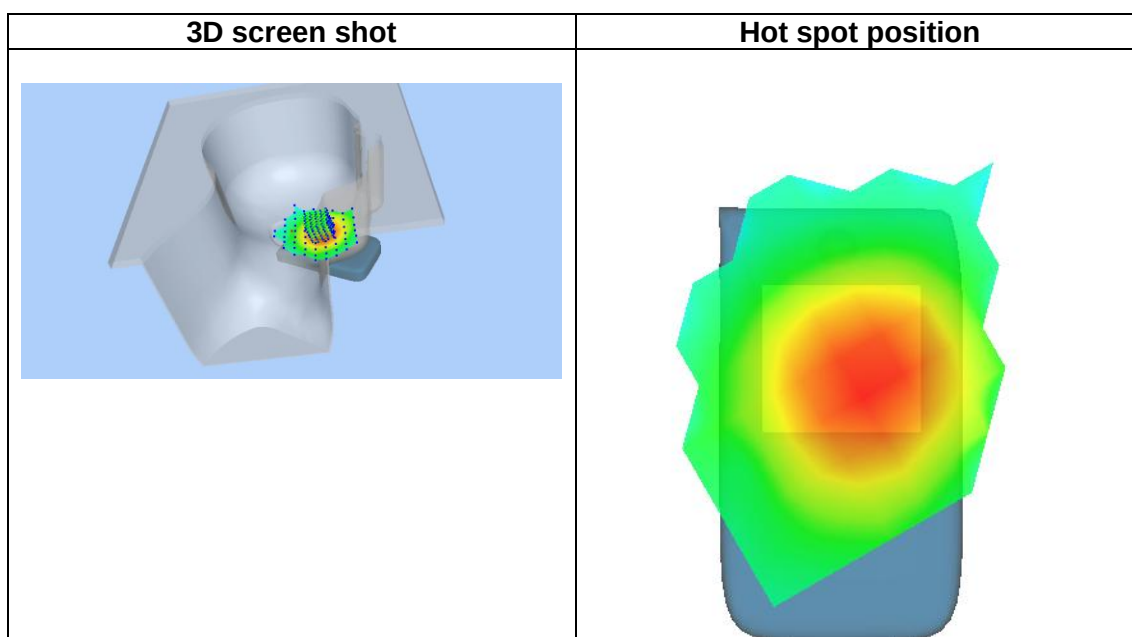
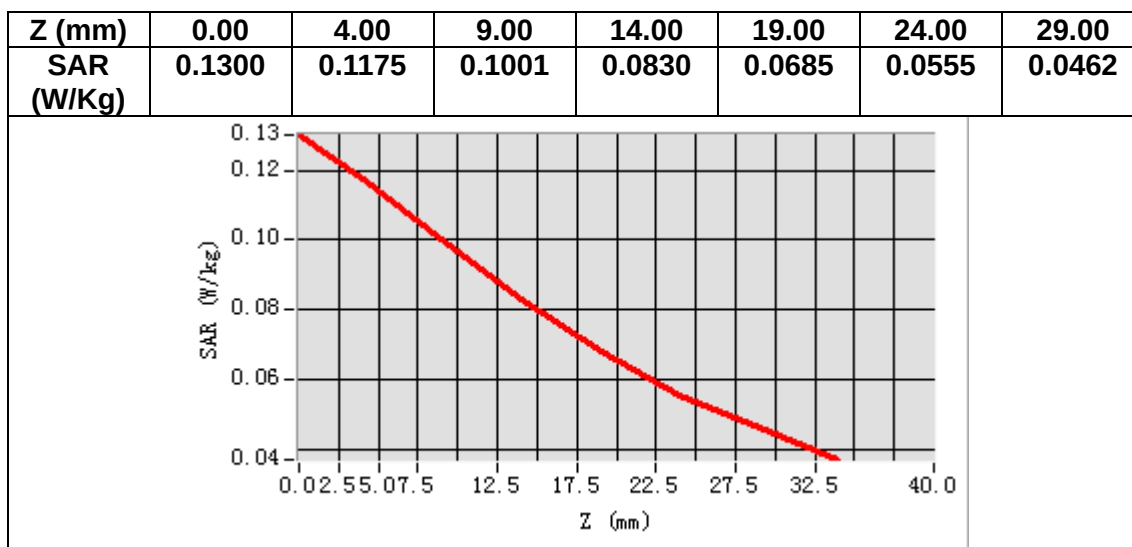
VOLUME SAR



Maximum location: X=-48.00, Y=-17.00

SAR Peak: 0.13 W/kg

SAR 10g (W/Kg)	0.089480
SAR 1g (W/Kg)	0.113851



MEASUREMENT 22

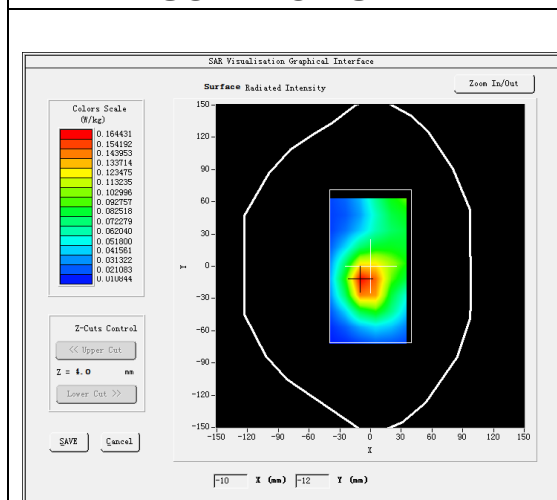
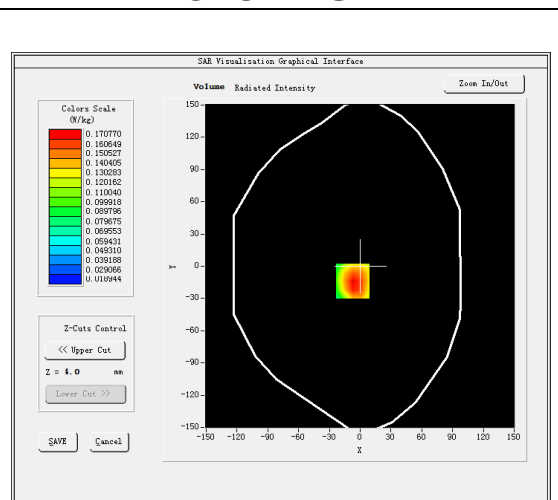
Date of measurement: 1/3/2024

A. Experimental conditions.

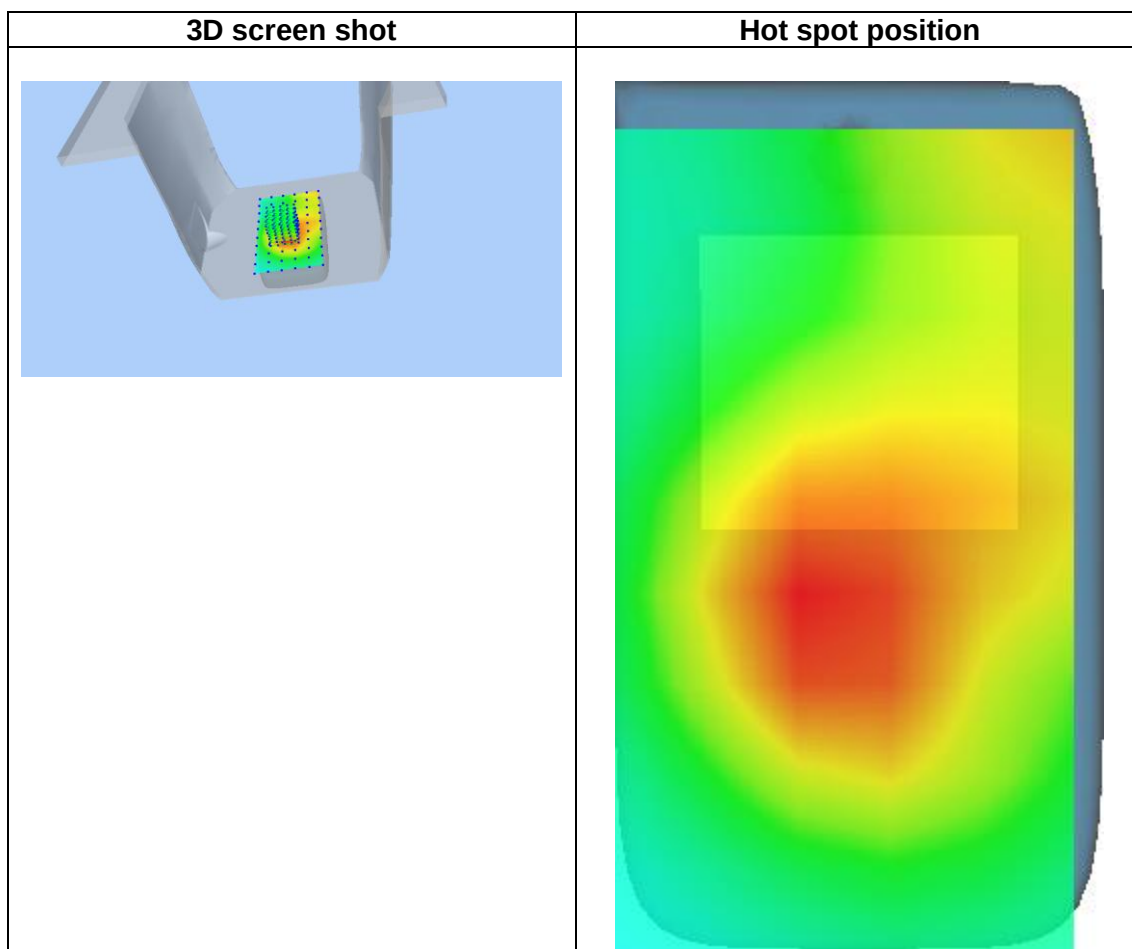
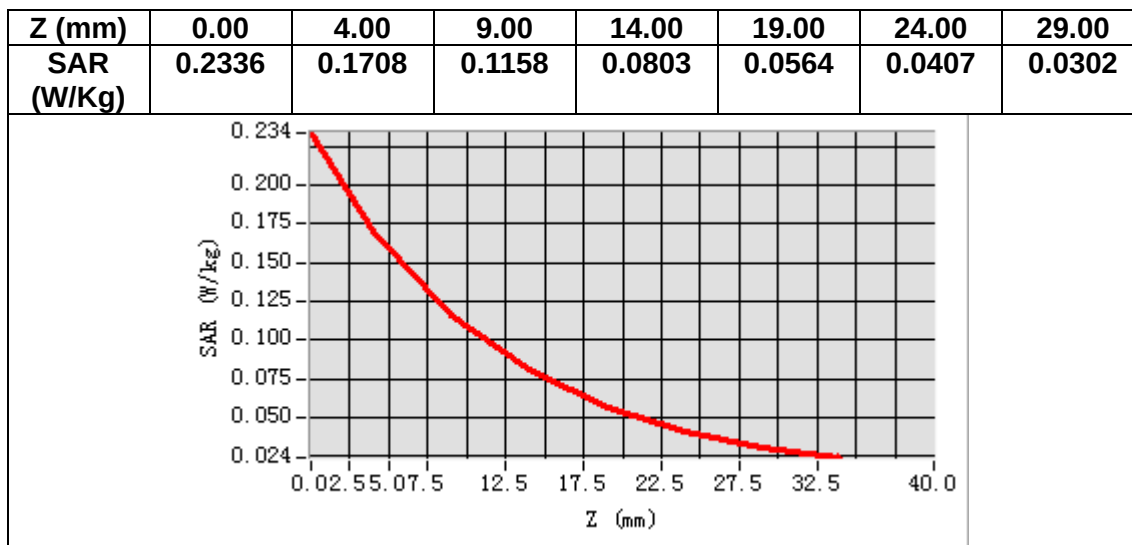
<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 5</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.32</u>

B. SAR Measurement Results

Frequency (MHz)	836.500000
Relative permittivity (real part)	41.304111
Relative permittivity (imaginary part)	19.318996
Conductivity (S/m)	0.897797
Variation (%)	-0.370000

SURFACE SAR**VOLUME SAR****Maximum location: X=-7.00, Y=-14.00****SAR Peak: 0.24 W/kg**

SAR 10g (W/Kg)	0.106194
SAR 1g (W/Kg)	0.165677



MEASUREMENT 23

Date of measurement: 8/3/2024

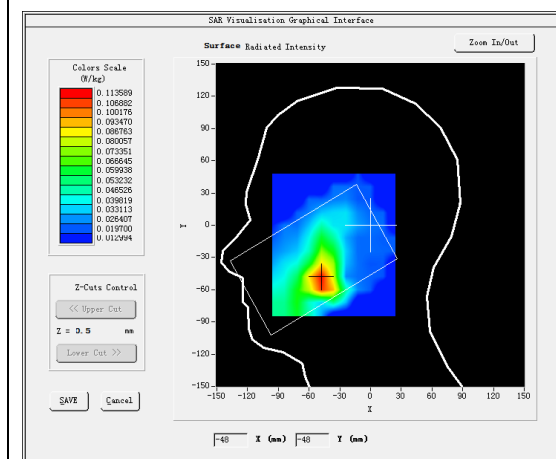
A. Experimental conditions.

<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>Left head</u>
<u>Device Position</u>	<u>Cheek</u>
<u>Band</u>	<u>LTE band 7</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.65</u>

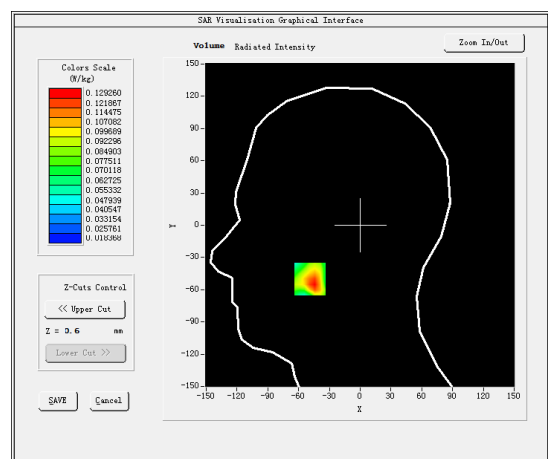
B. SAR Measurement Results

Frequency (MHz)	2535.000000
Relative permittivity (real part)	39.116543
Relative permittivity (imaginary part)	13.427232
Conductivity (S/m)	1.891002
Variation (%)	3.710000

SURFACE SAR



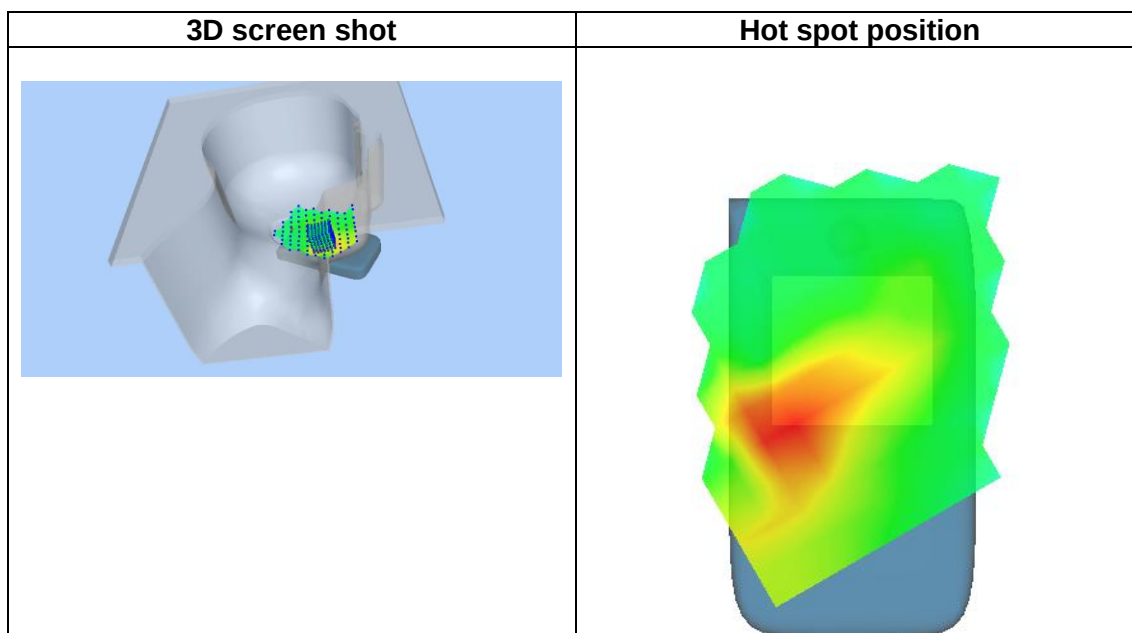
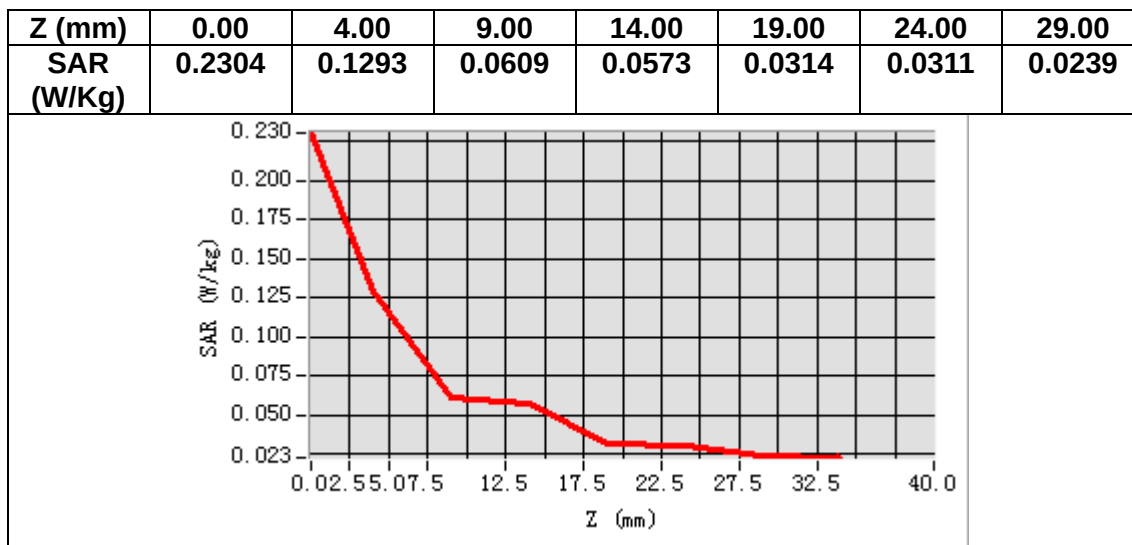
VOLUME SAR



Maximum location: X=-49.00, Y=-50.00

SAR Peak: 0.19 W/kg

SAR 10g (W/Kg)	0.068427
SAR 1g (W/Kg)	0.119370



MEASUREMENT 24

Date of measurement: 8/3/2024

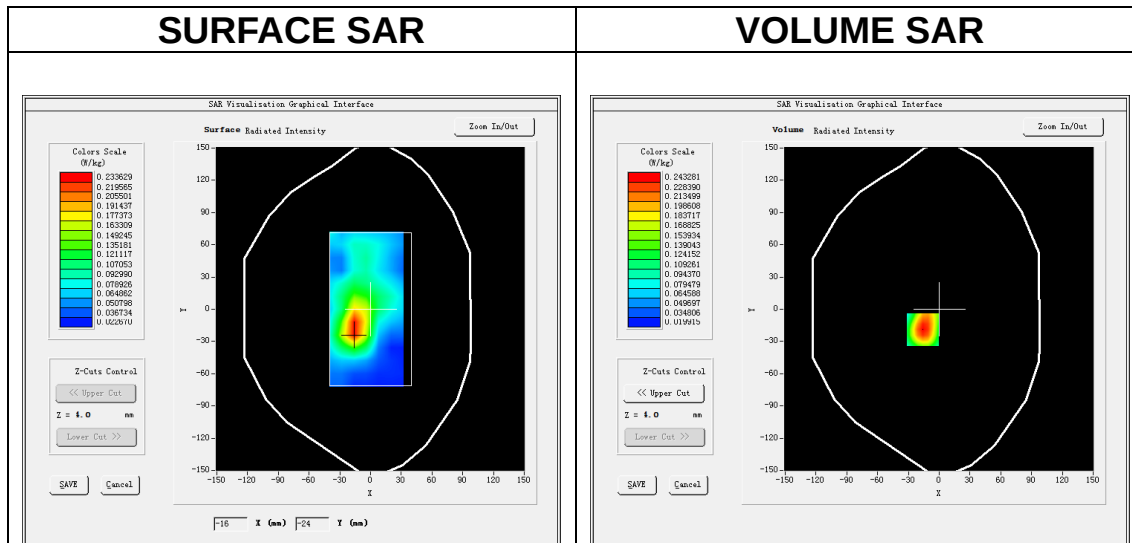
A. Experimental conditions.

<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>LTE band 7</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.65</u>

B. SAR Measurement Results

Frequency (MHz)	2535.000000
Relative permittivity (real part)	39.116543
Relative permittivity (imaginary part)	13.427232
Conductivity (S/m)	1.891002
Variation (%)	-4.840000

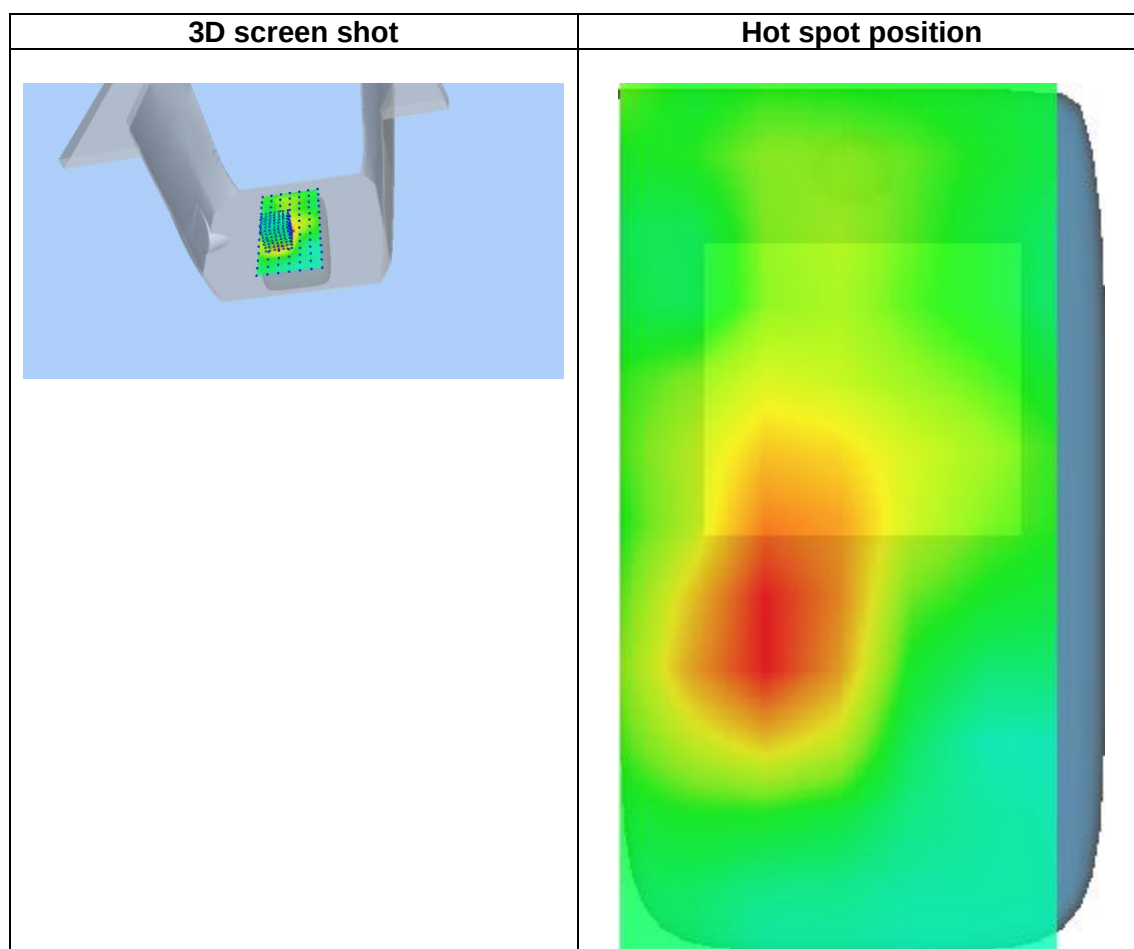
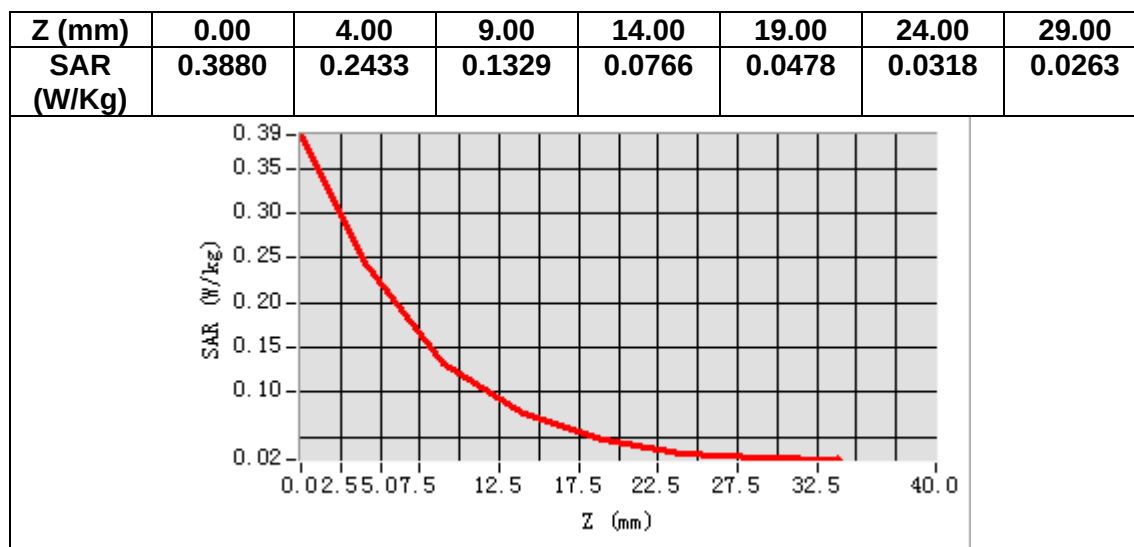
SURFACE SAR



Maximum location: X=-16.00, Y=-19.00

SAR Peak: 0.39 W/kg

SAR 10g (W/Kg)	0.125047
SAR 1g (W/Kg)	0.229652



MEASUREMENT 25

Date of measurement: 27/2/2024

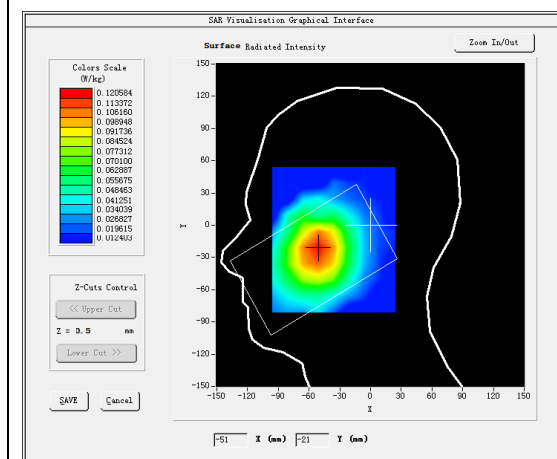
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.37</u>

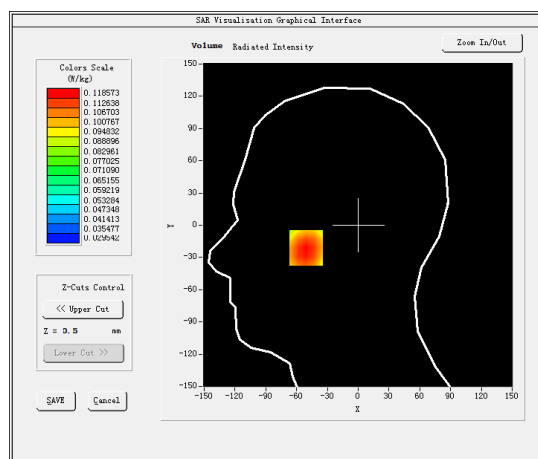
B. SAR Measurement Results

Frequency (MHz)	707.500000
Relative permittivity (real part)	41.575062
Relative permittivity (imaginary part)	21.919670
Conductivity (S/m)	0.861565
Variation (%)	-4.590000

SURFACE SAR



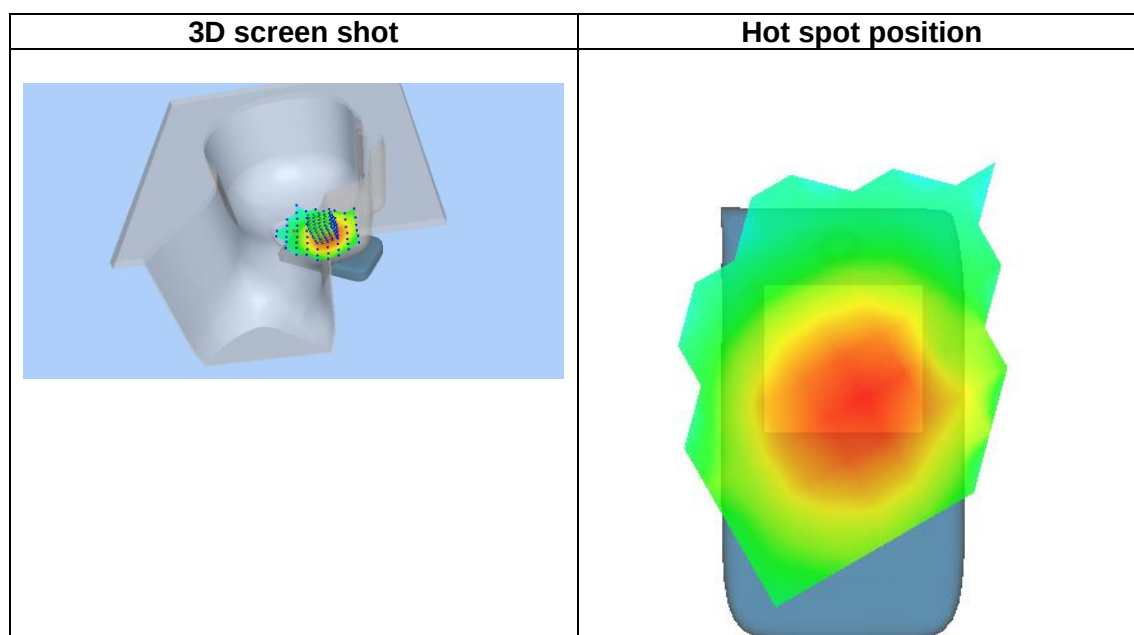
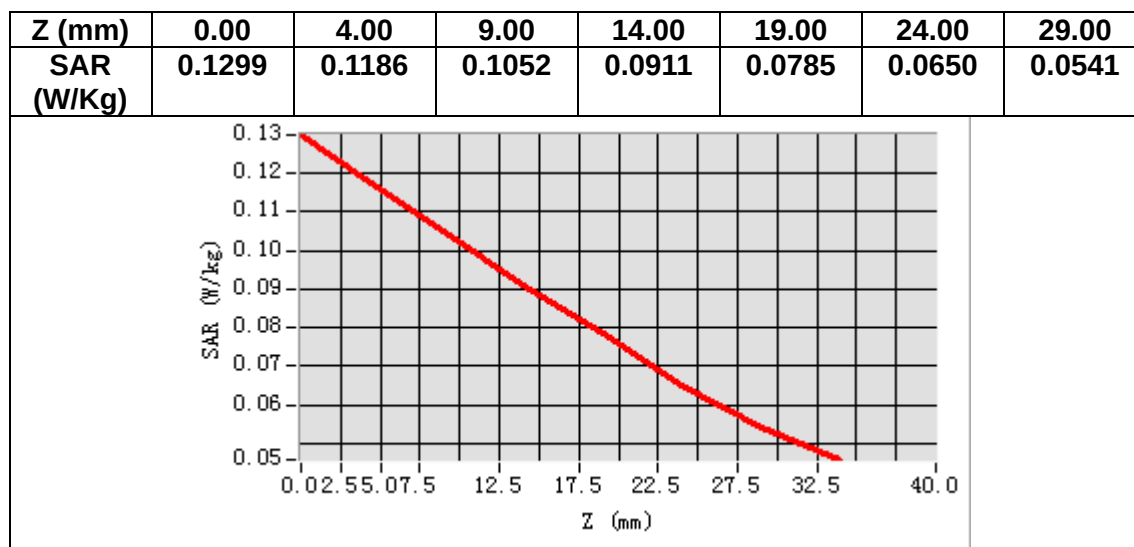
VOLUME SAR



Maximum location: X=-51.00, Y=-21.00

SAR Peak: 0.13 W/kg

SAR 10g (W/Kg)	0.095710
SAR 1g (W/Kg)	0.116238



MEASUREMENT 26

Date of measurement: 27/2/2024

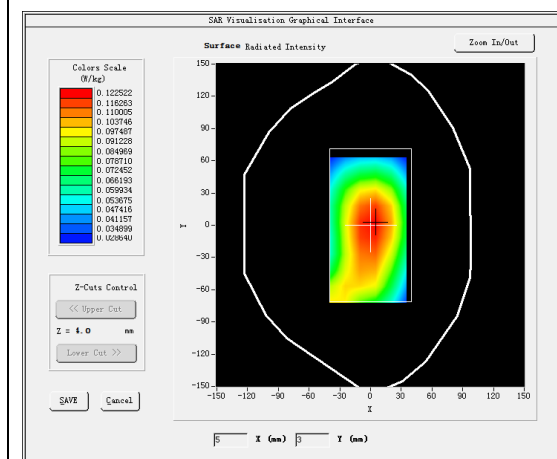
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.37</u>

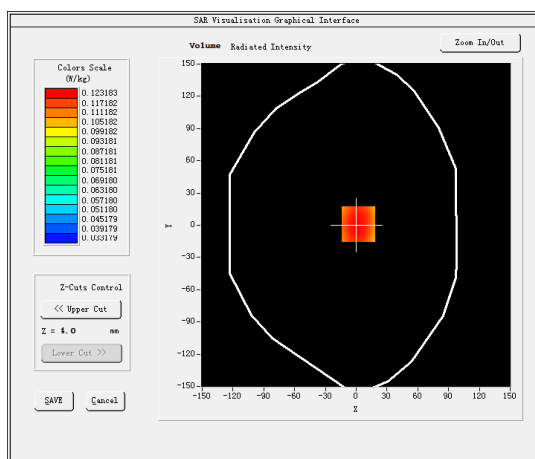
B. SAR Measurement Results

Frequency (MHz)	707.500000
Relative permittivity (real part)	41.575062
Relative permittivity (imaginary part)	21.919670
Conductivity (S/m)	0.861565
Variation (%)	0.000000

SURFACE SAR



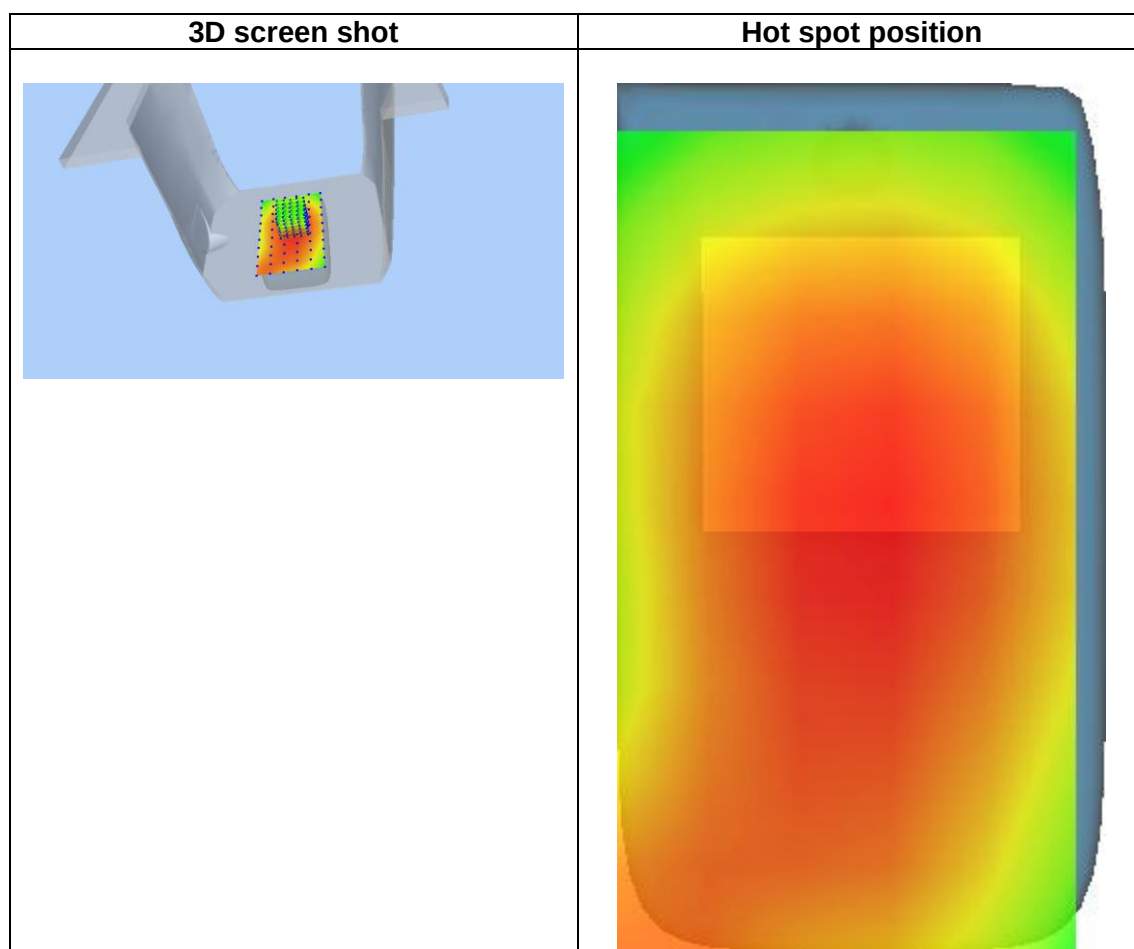
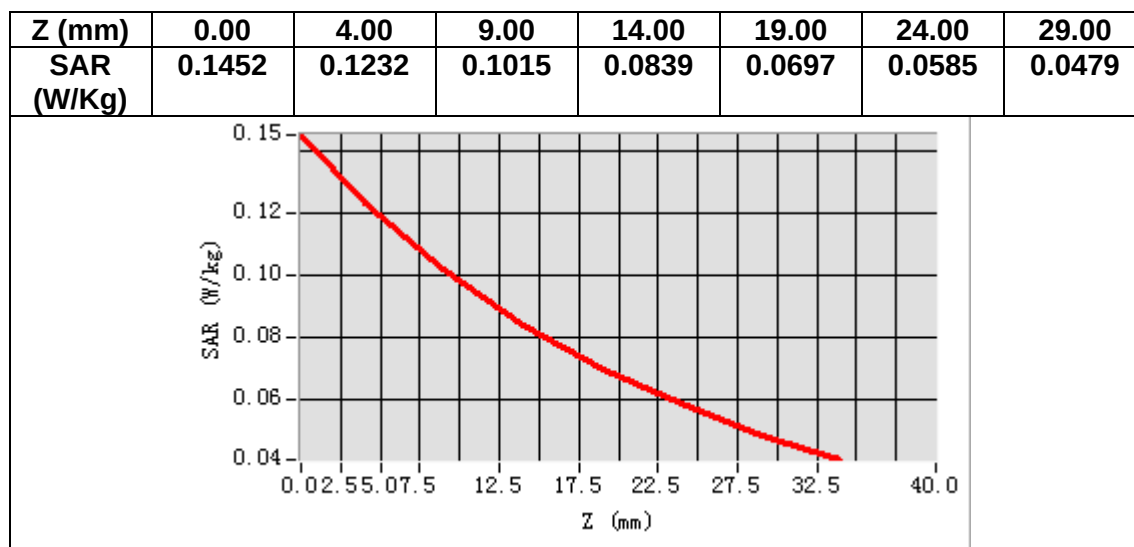
VOLUME SAR



Maximum location: X=2.00, Y=1.00

SAR Peak: 0.15 W/kg

SAR 10g (W/Kg)	0.096418
SAR 1g (W/Kg)	0.120806



MEASUREMENT 27

Date of measurement: 27/2/2024

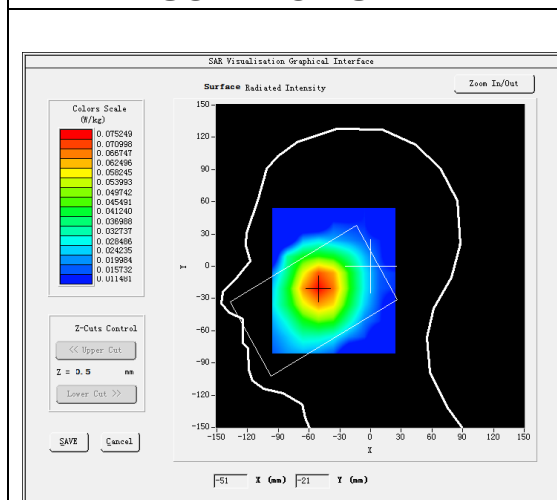
A. Experimental conditions.

<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 13</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.37</u>

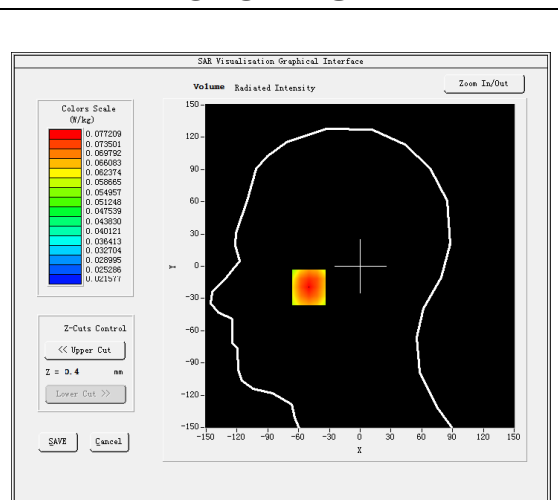
B. SAR Measurement Results

Frequency (MHz)	782.000000
Relative permittivity (real part)	40.834933
Relative permittivity (imaginary part)	21.294679
Conductivity (S/m)	0.925135
Variation (%)	1.500000

SURFACE SAR



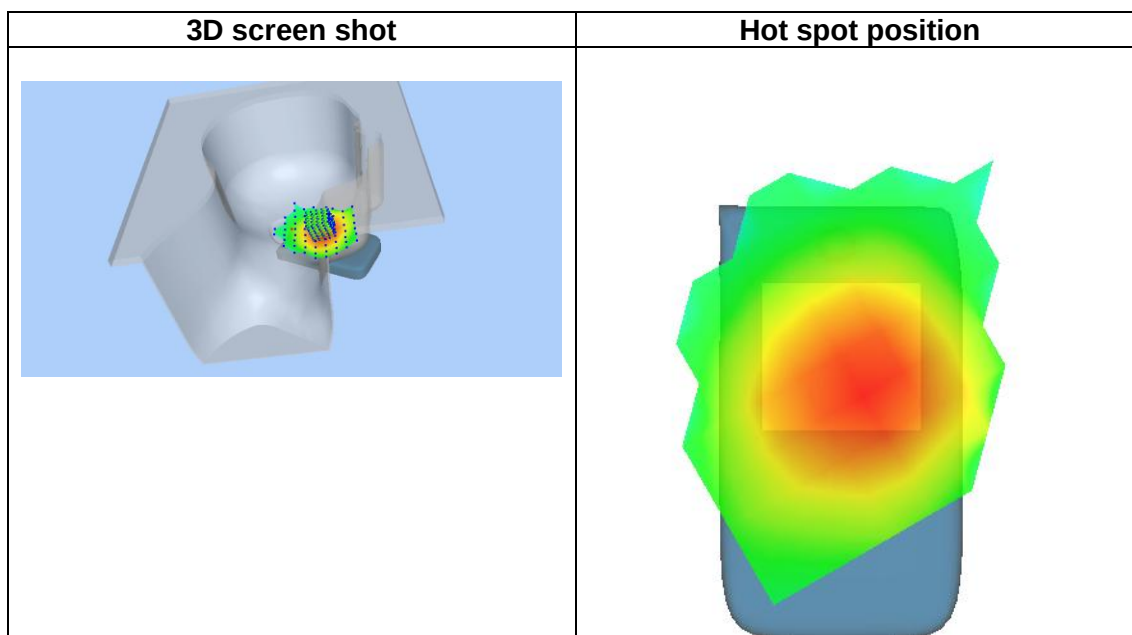
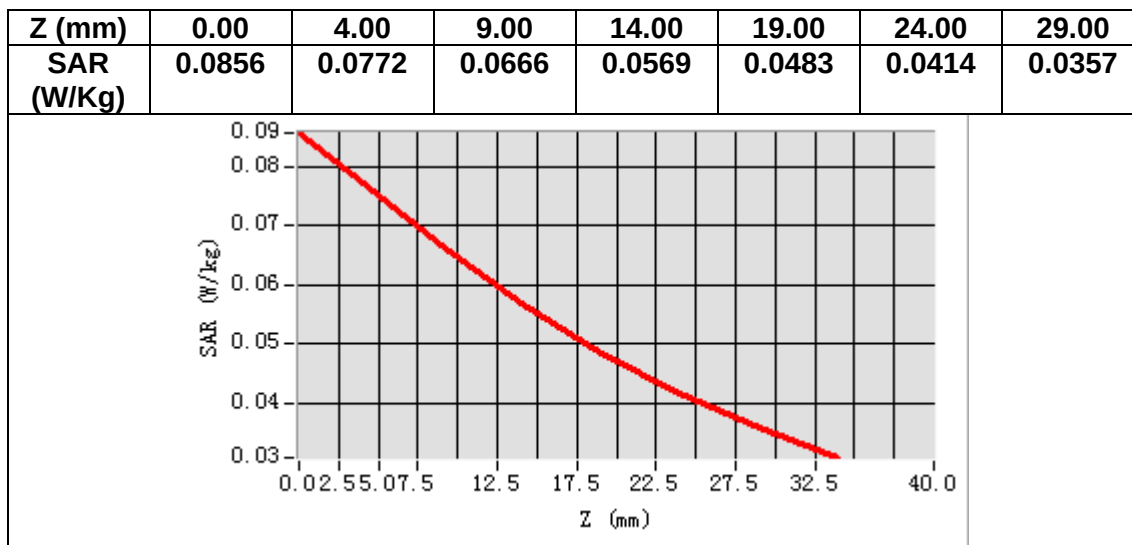
VOLUME SAR



Maximum location: X=-50.00, Y=-19.00

SAR Peak: 0.09 W/kg

SAR 10g (W/Kg)	0.061100
SAR 1g (W/Kg)	0.075452



MEASUREMENT 28

Date of measurement: 27/2/2024

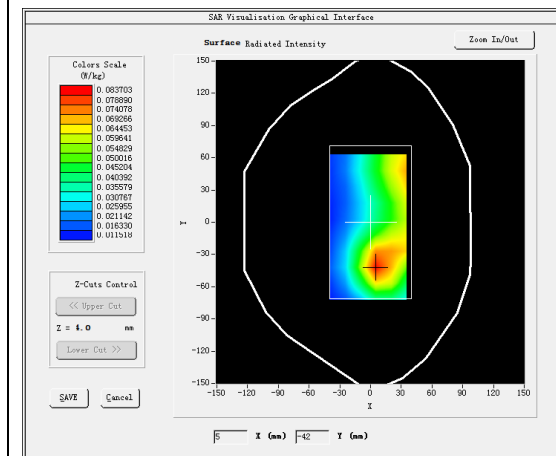
A. Experimental conditions.

<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 13</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.37</u>

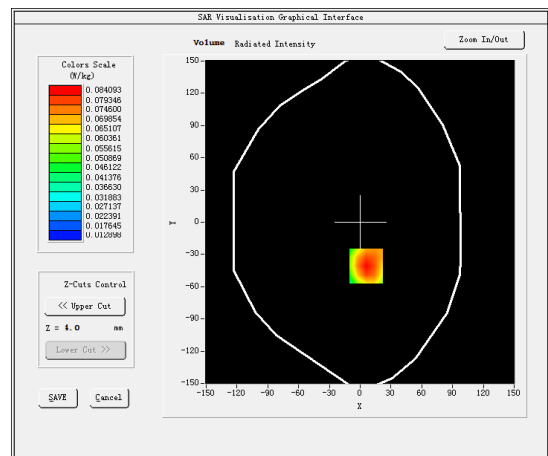
B. SAR Measurement Results

Frequency (MHz)	782.000000
Relative permittivity (real part)	40.834933
Relative permittivity (imaginary part)	21.294679
Conductivity (S/m)	0.925135
Variation (%)	2.310000

SURFACE SAR



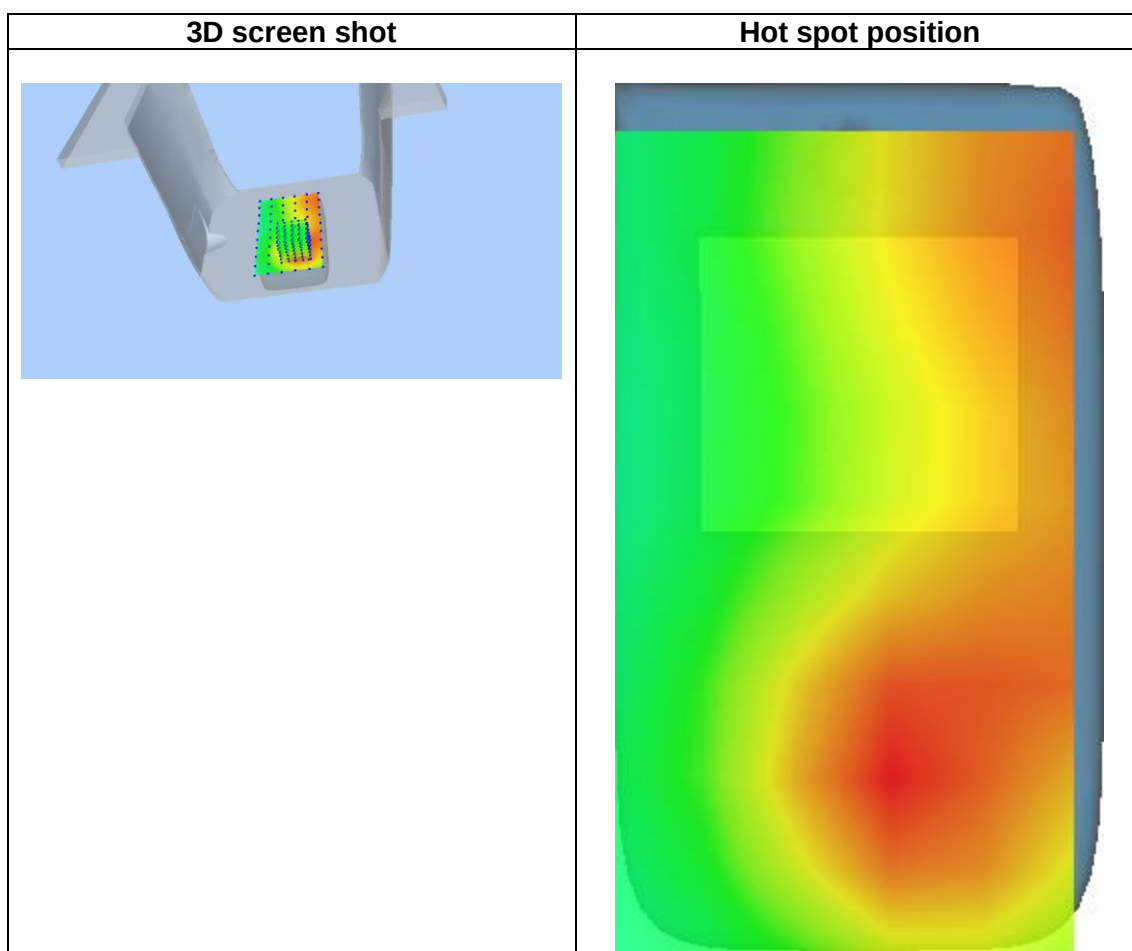
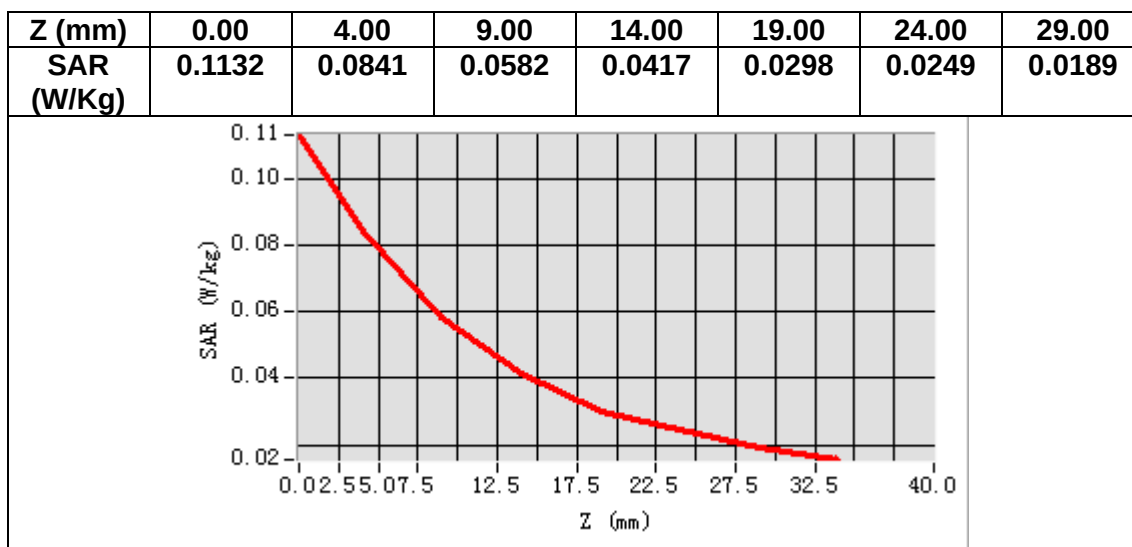
VOLUME SAR



Maximum location: X=6.00, Y=-41.00

SAR Peak: 0.11 W/kg

SAR 10g (W/Kg)	0.054702
SAR 1g (W/Kg)	0.081663



MEASUREMENT 29

Date of measurement: 27/2/2024

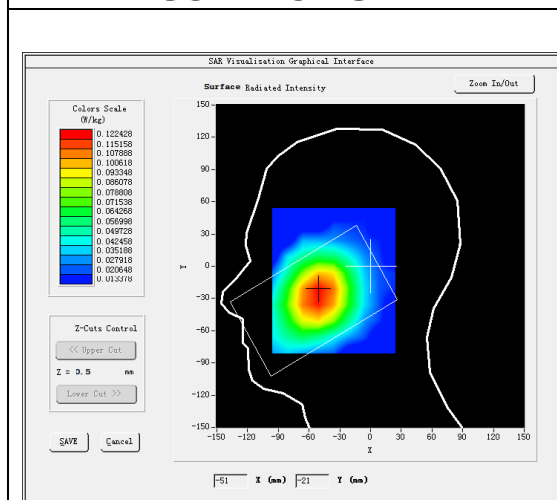
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.37</u>

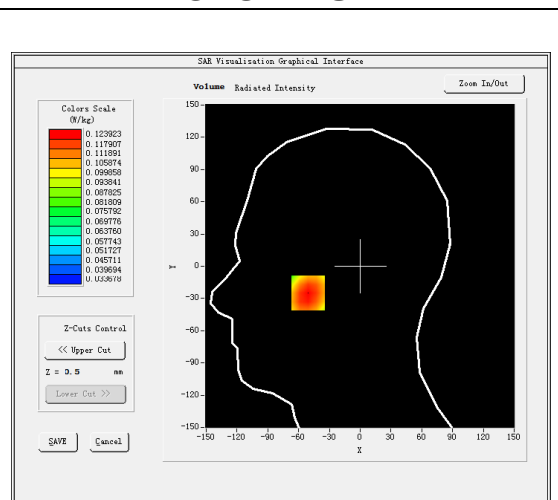
B. SAR Measurement Results

Frequency (MHz)	710.000000
Relative permittivity (real part)	41.707233
Relative permittivity (imaginary part)	21.977579
Conductivity (S/m)	0.866893
Variation (%)	-3.480000

SURFACE SAR



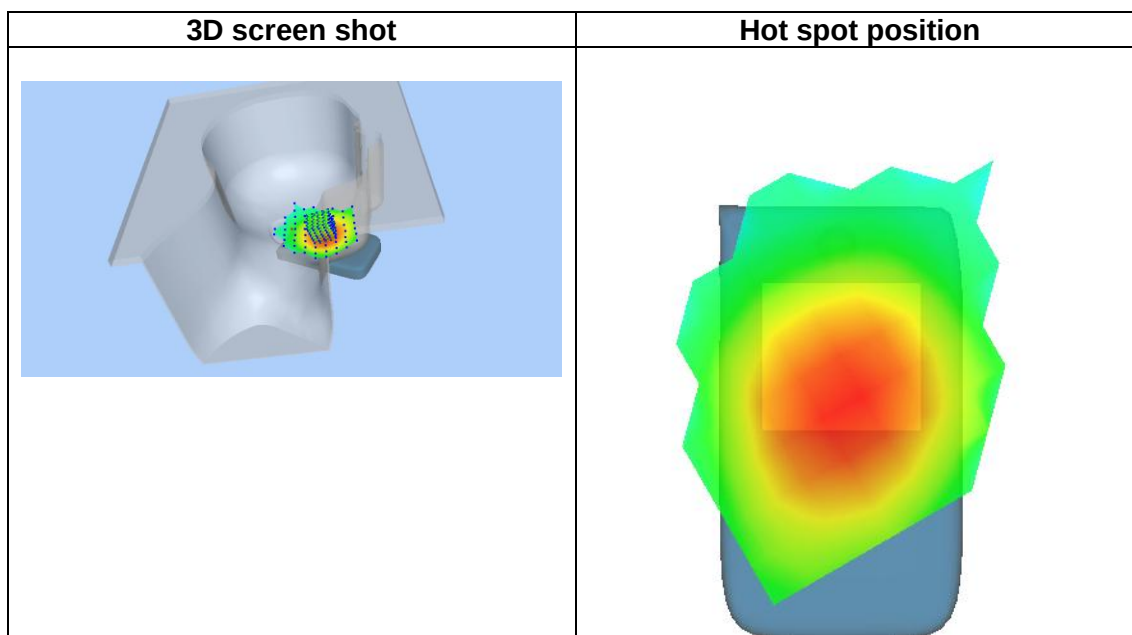
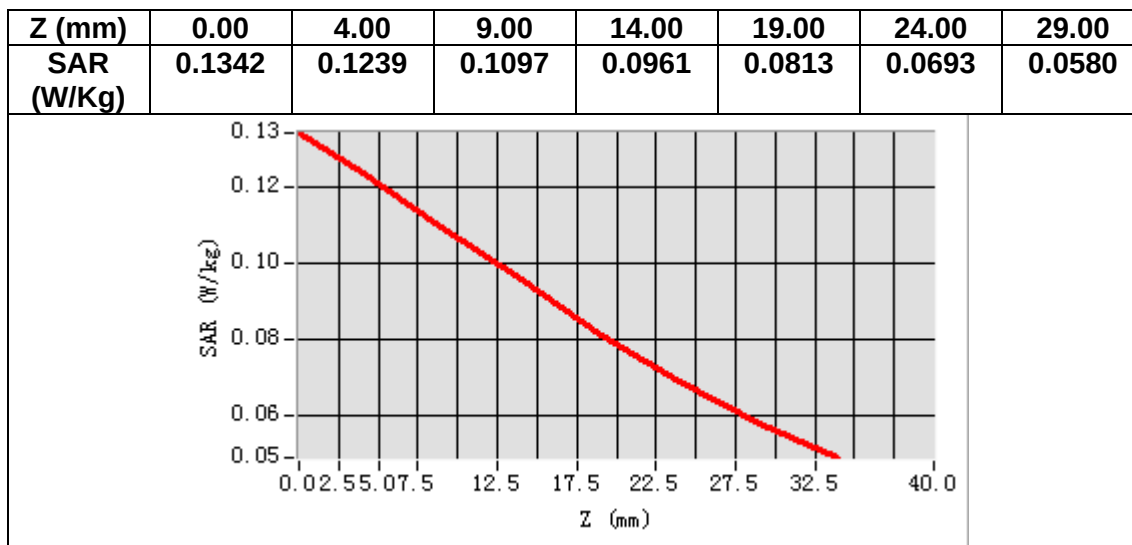
VOLUME SAR



Maximum location: X=-51.00, Y=-25.00

SAR Peak: 0.13 W/kg

SAR 10g (W/Kg)	0.099781
SAR 1g (W/Kg)	0.120742



MEASUREMENT 30

Date of measurement: 27/2/2024

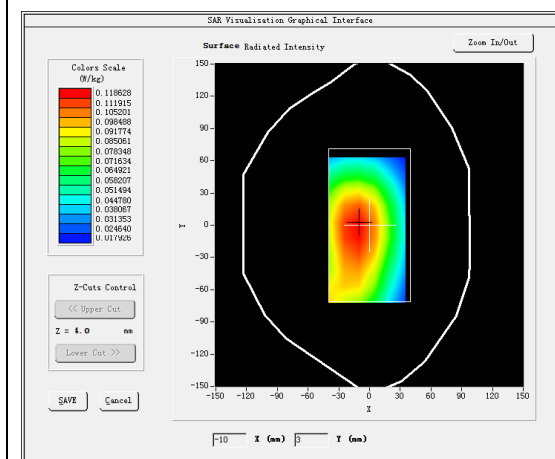
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.37</u>

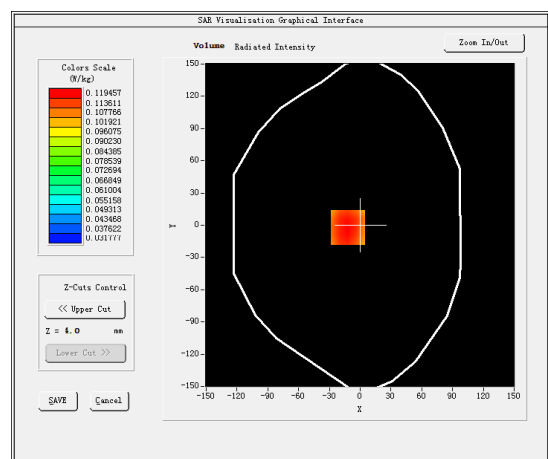
B. SAR Measurement Results

Frequency (MHz)	710.000000
Relative permittivity (real part)	41.707233
Relative permittivity (imaginary part)	21.977579
Conductivity (S/m)	0.866893
Variation (%)	0.530000

SURFACE SAR



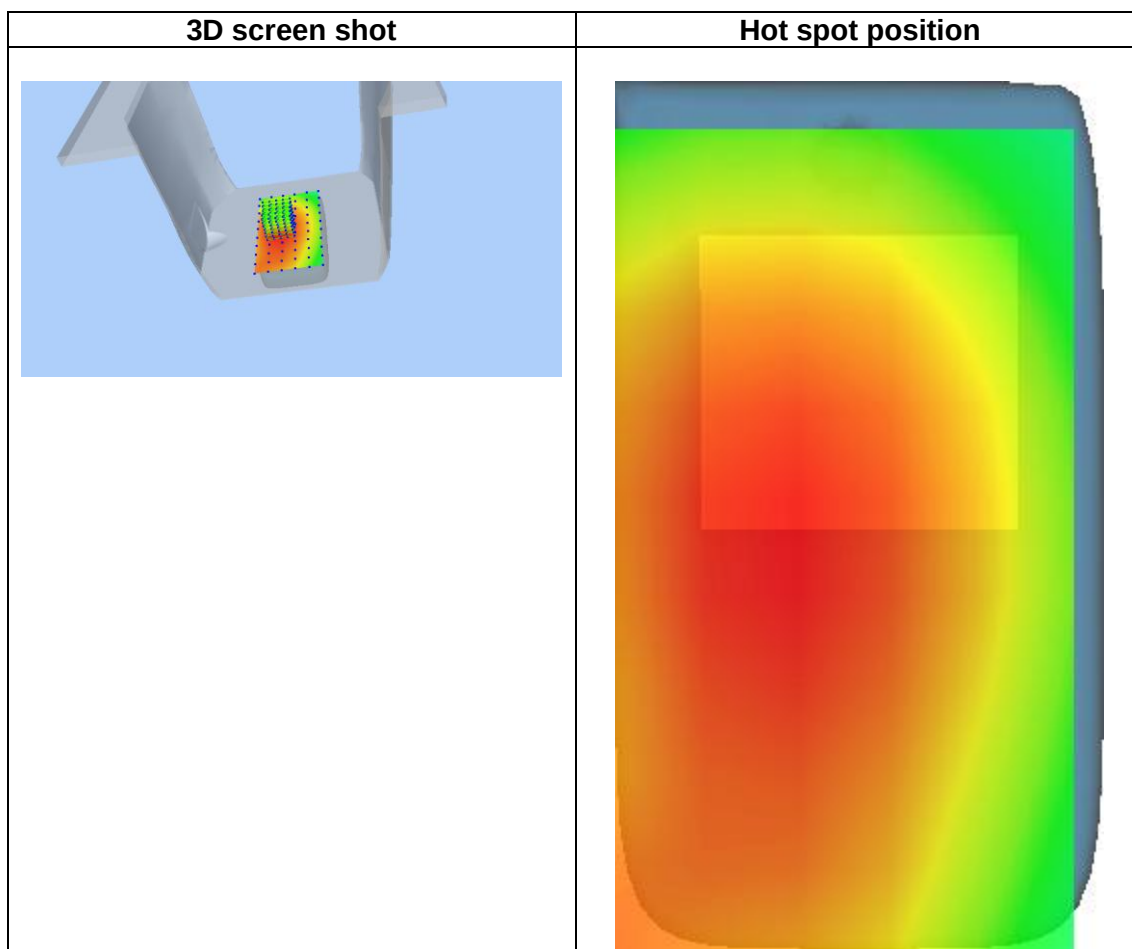
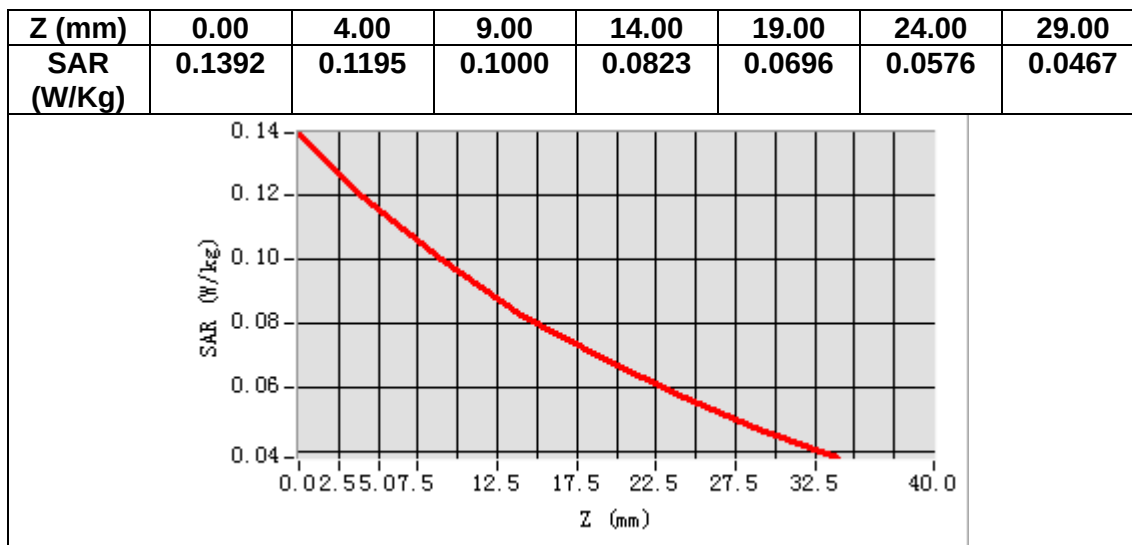
VOLUME SAR



Maximum location: X=-12.00, Y=-2.00

SAR Peak: 0.14 W/kg

SAR 10g (W/Kg)	0.093387
SAR 1g (W/Kg)	0.116876



MEASUREMENT 31

Date of measurement: 2/3/2024

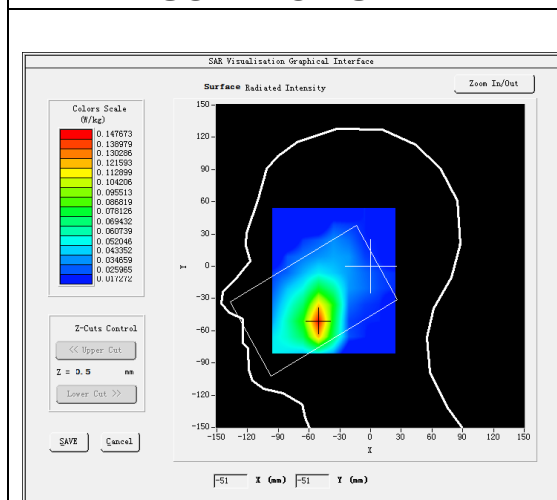
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.63</u>

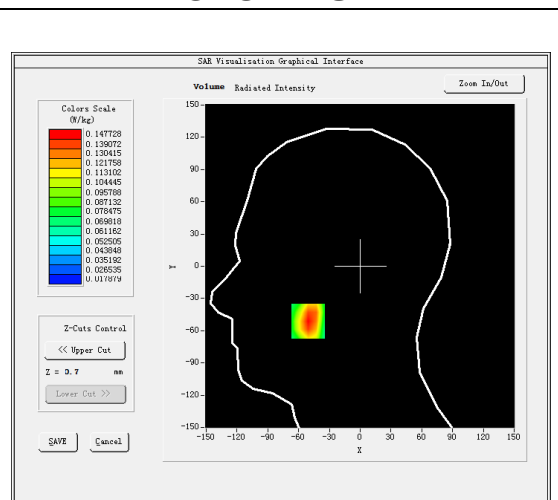
B. SAR Measurement Results

Frequency (MHz)	1882.500000
Relative permittivity (real part)	38.983822
Relative permittivity (imaginary part)	13.738008
Conductivity (S/m)	1.436385
Variation (%)	3.340000

SURFACE SAR



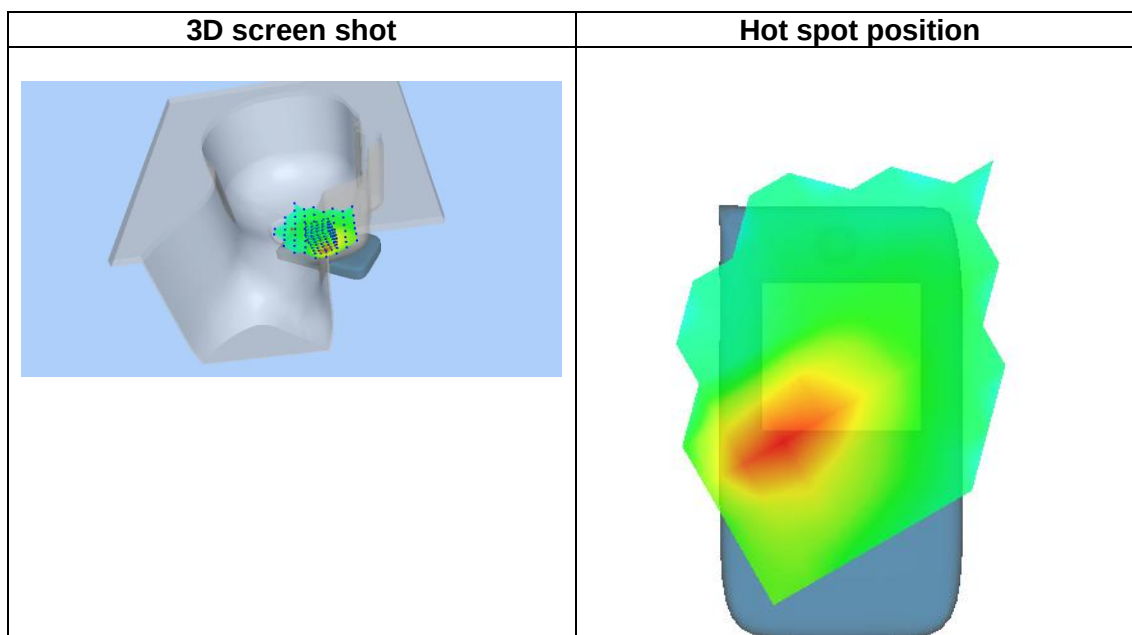
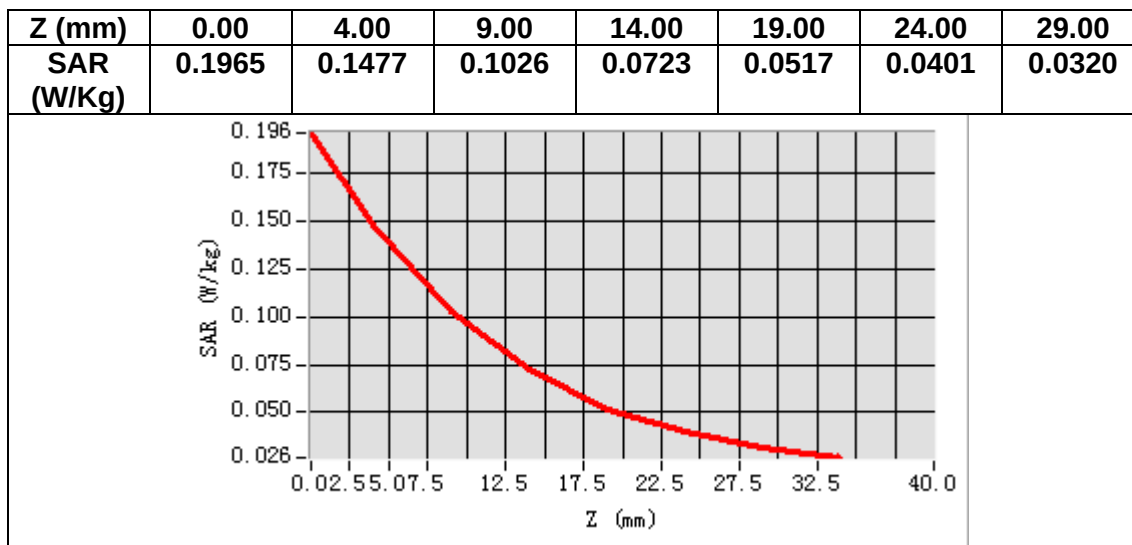
VOLUME SAR



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

SAR Peak: 0.20 W/kg

SAR 10g (W/Kg)	0.090042
SAR 1g (W/Kg)	0.143797



MEASUREMENT 32

Date of measurement: 2/3/2024

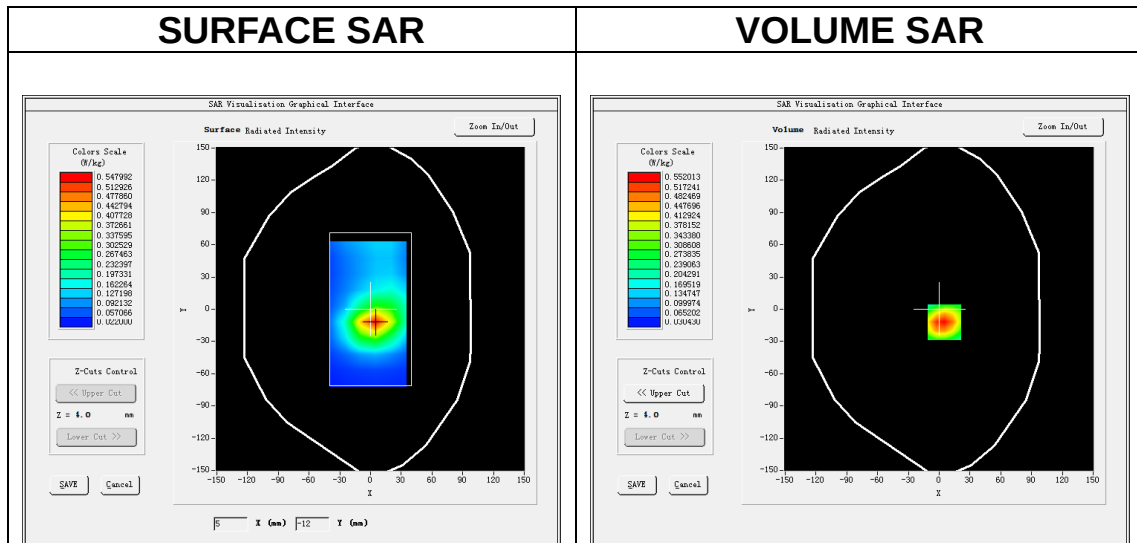
A. Experimental conditions.

<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>
<u>ConvF</u>	<u>2.63</u>

B. SAR Measurement Results

Frequency (MHz)	1882.500000
Relative permittivity (real part)	38.983822
Relative permittivity (imaginary part)	13.738008
Conductivity (S/m)	1.436385
Variation (%)	-0.560000

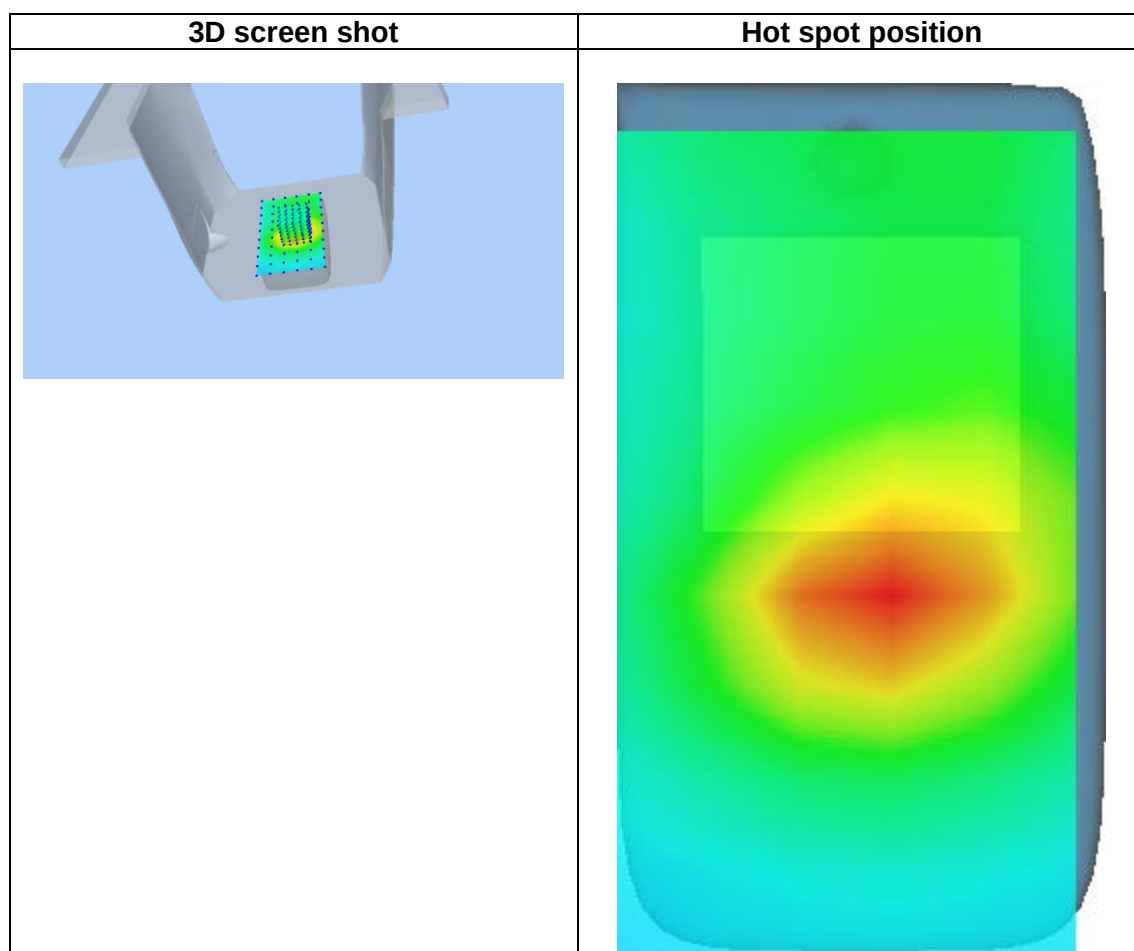
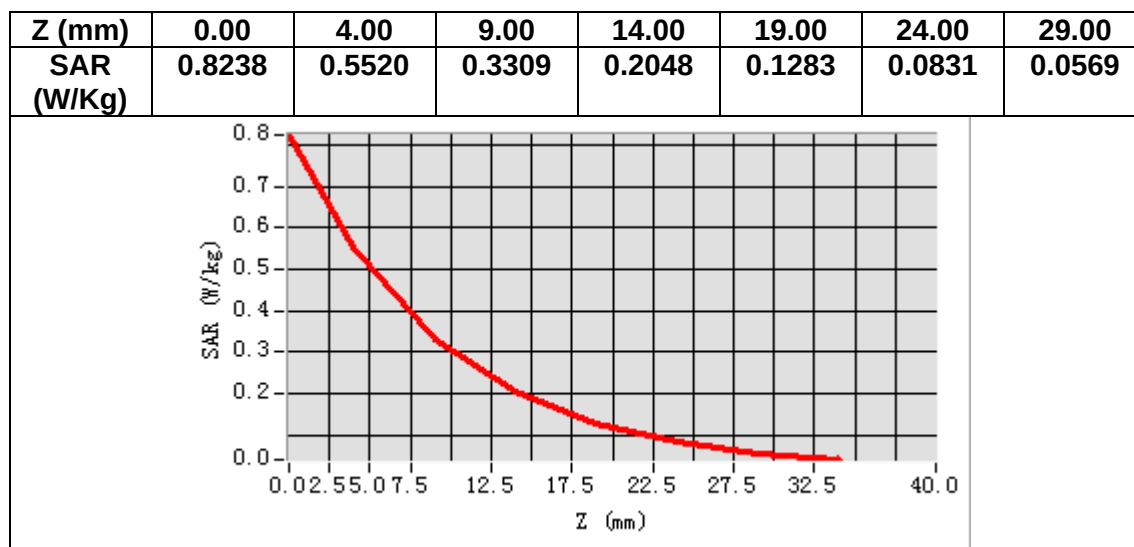
SURFACE SAR



Maximum location: X=5.00, Y=-12.00

SAR Peak: 0.82 W/kg

SAR 10g (W/Kg)	0.302871
SAR 1g (W/Kg)	0.536724



MEASUREMENT 33

Date of measurement: 1/3/2024

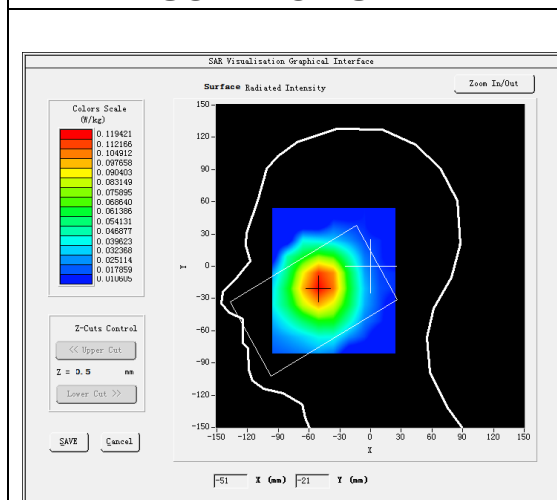
A. Experimental conditions.

<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>FDDBand26A</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.32</u>

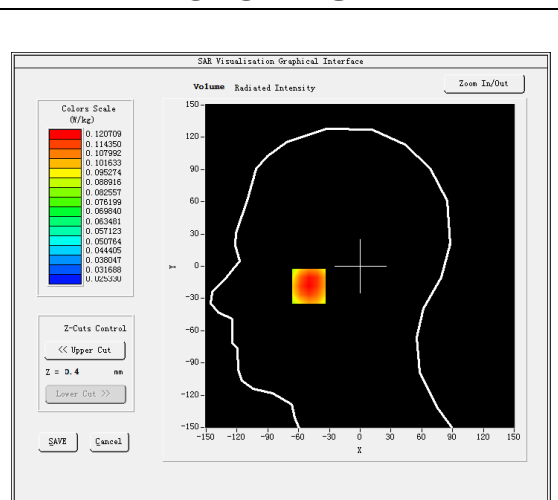
B. SAR Measurement Results

Frequency (MHz)	819.000000
Relative permittivity (real part)	41.559860
Relative permittivity (imaginary part)	19.242996
Conductivity (S/m)	0.875556
Variation (%)	-0.820000

SURFACE SAR



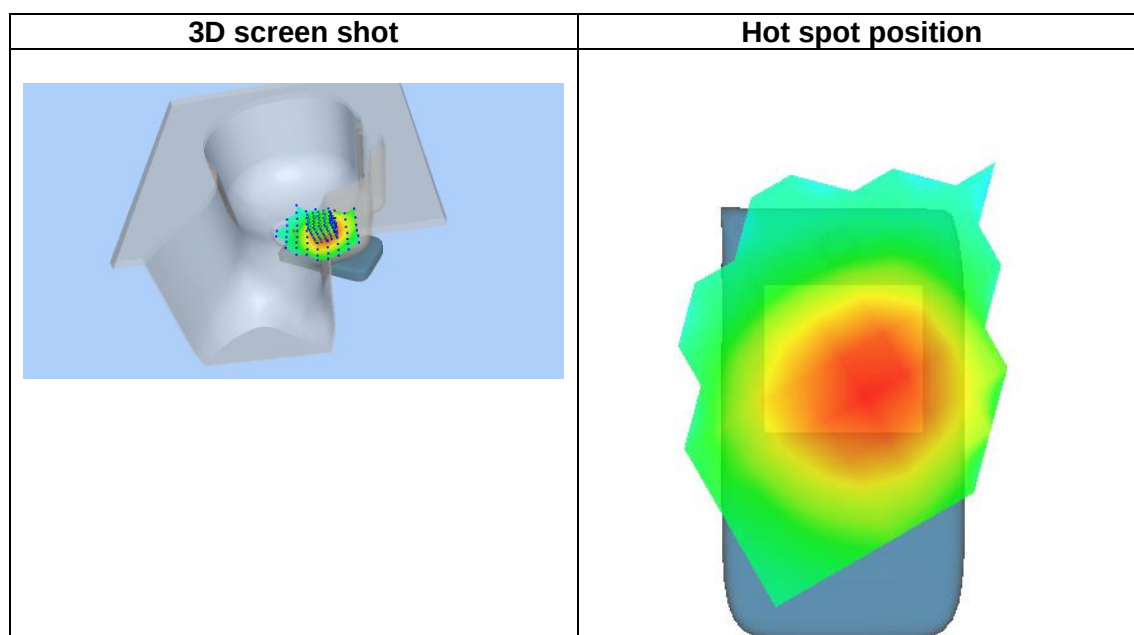
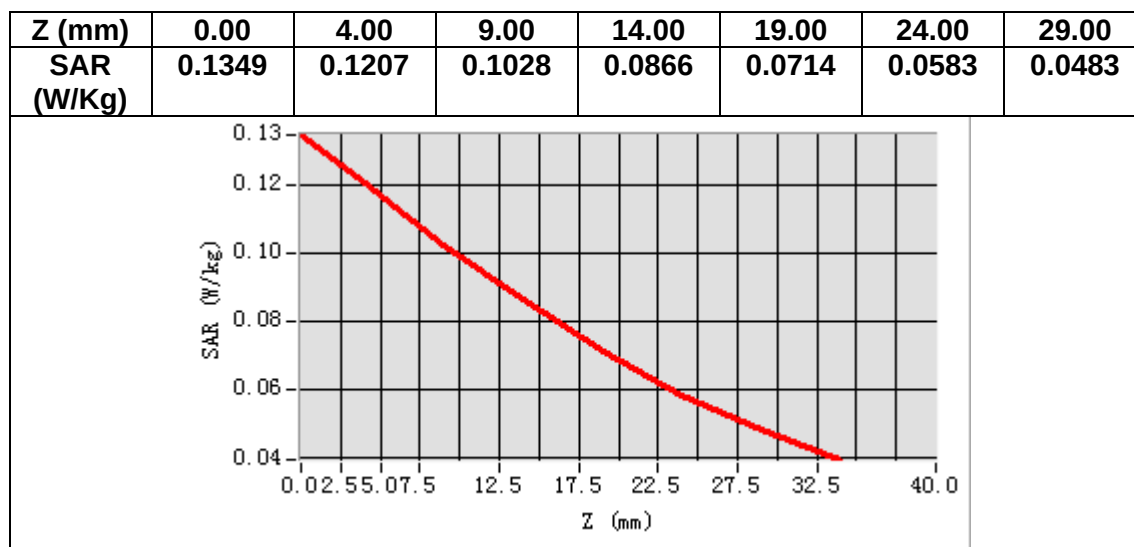
VOLUME SAR



Maximum location: X=-50.00, Y=-18.00

SAR Peak: 0.14 W/kg

SAR 10g (W/Kg)	0.092610
SAR 1g (W/Kg)	0.117178



MEASUREMENT 34

Date of measurement: 1/3/2024

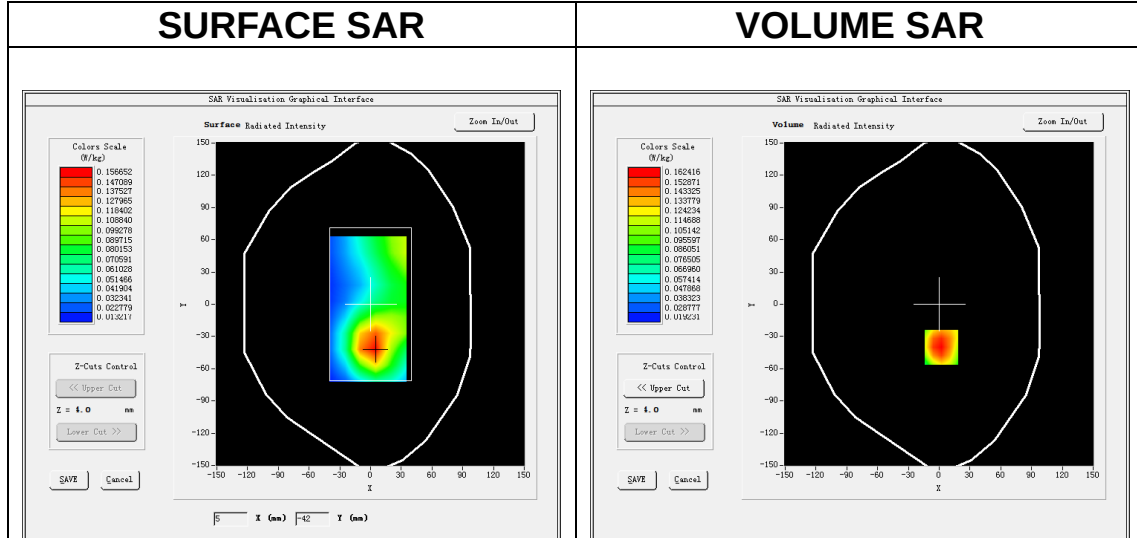
A. Experimental conditions.

<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>FDDBand26A</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.32</u>

B. SAR Measurement Results

Frequency (MHz)	819.000000
Relative permittivity (real part)	41.559860
Relative permittivity (imaginary part)	19.242996
Conductivity (S/m)	0.875556
Variation (%)	1.070000

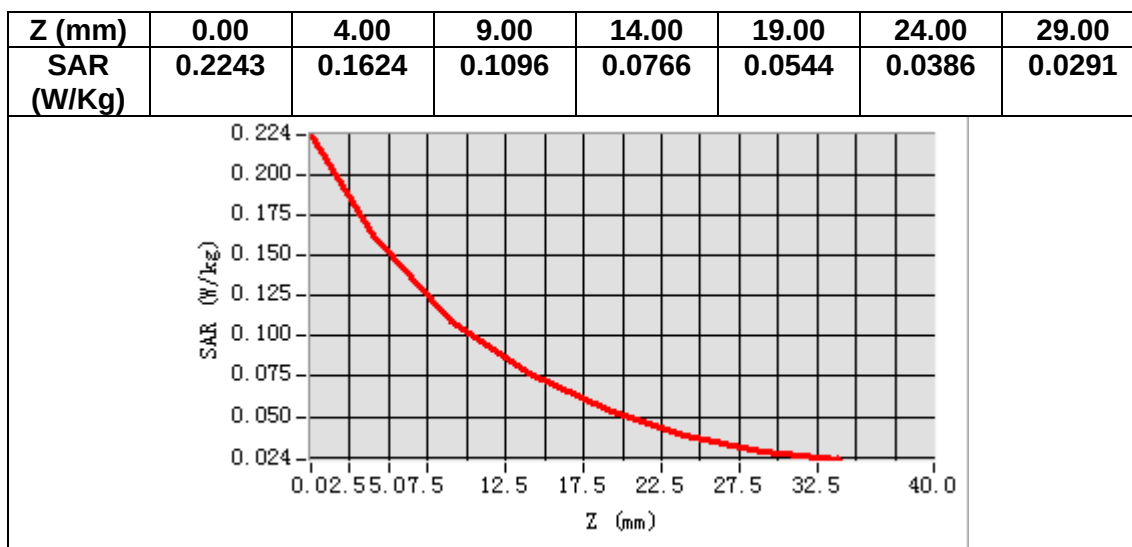
SURFACE SAR



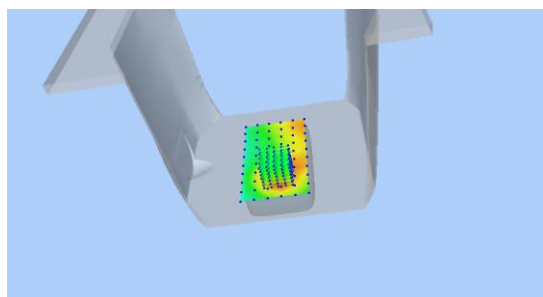
Maximum location: X=2.00, Y=-40.00

SAR Peak: 0.22 W/kg

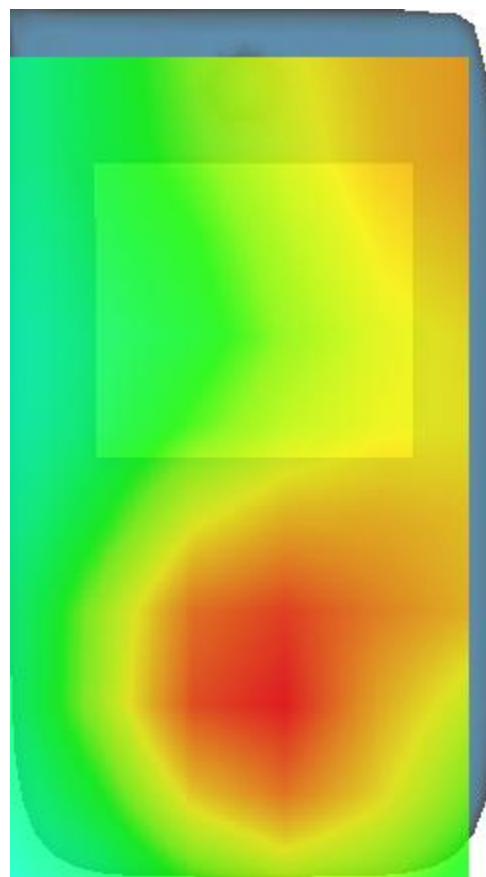
SAR 10g (W/Kg)	0.101631
SAR 1g (W/Kg)	0.157121



3D screen shot



Hot spot position



MEASUREMENT 35

Date of measurement: 1/3/2024

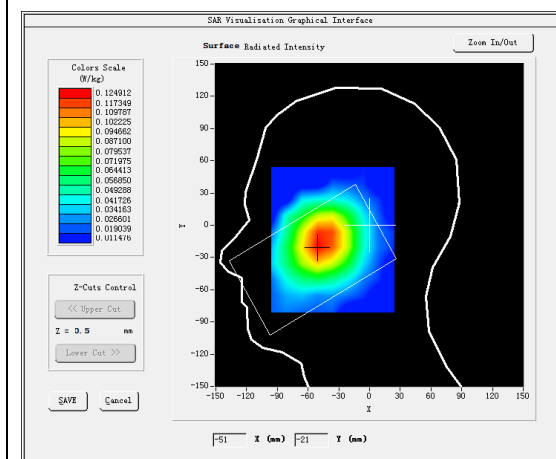
A. Experimental conditions.

<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>FDDBand26B</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.32</u>

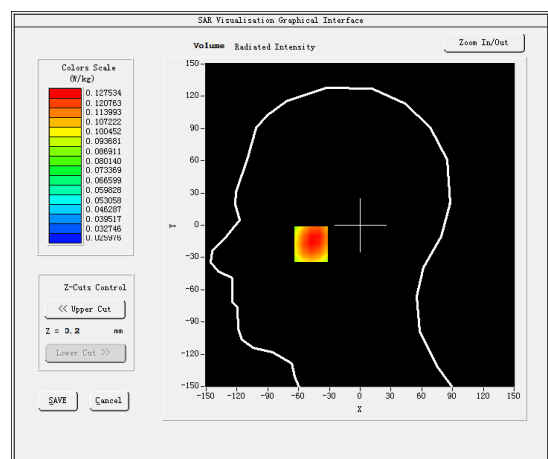
B. SAR Measurement Results

Frequency (MHz)	831.500000
Relative permittivity (real part)	41.352760
Relative permittivity (imaginary part)	19.299545
Conductivity (S/m)	0.891532
Variation (%)	0.240000

SURFACE SAR



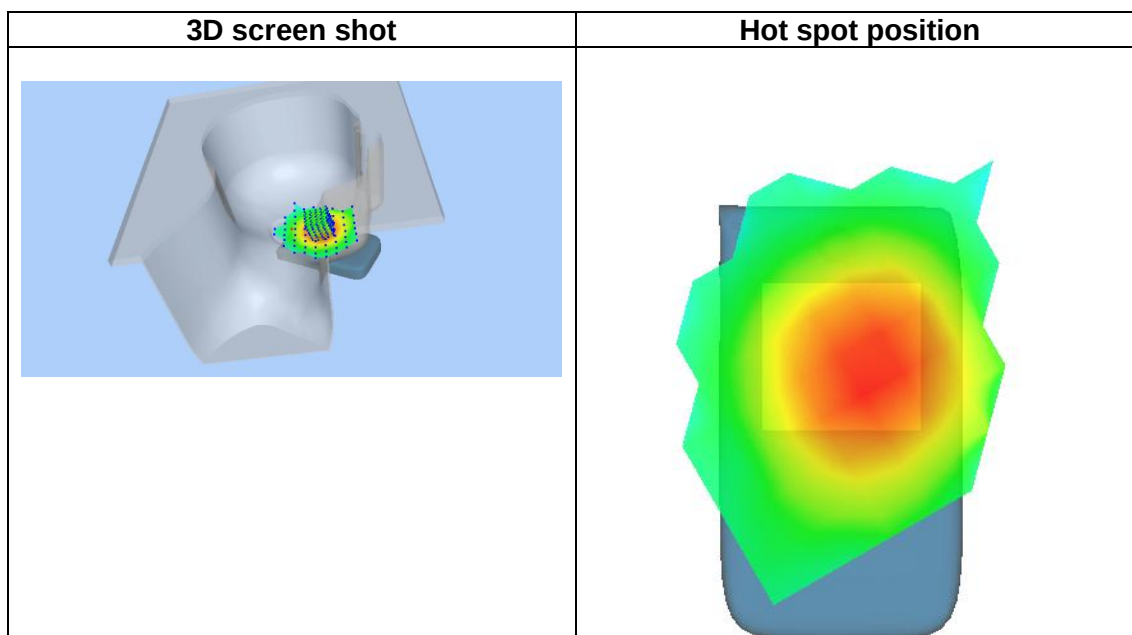
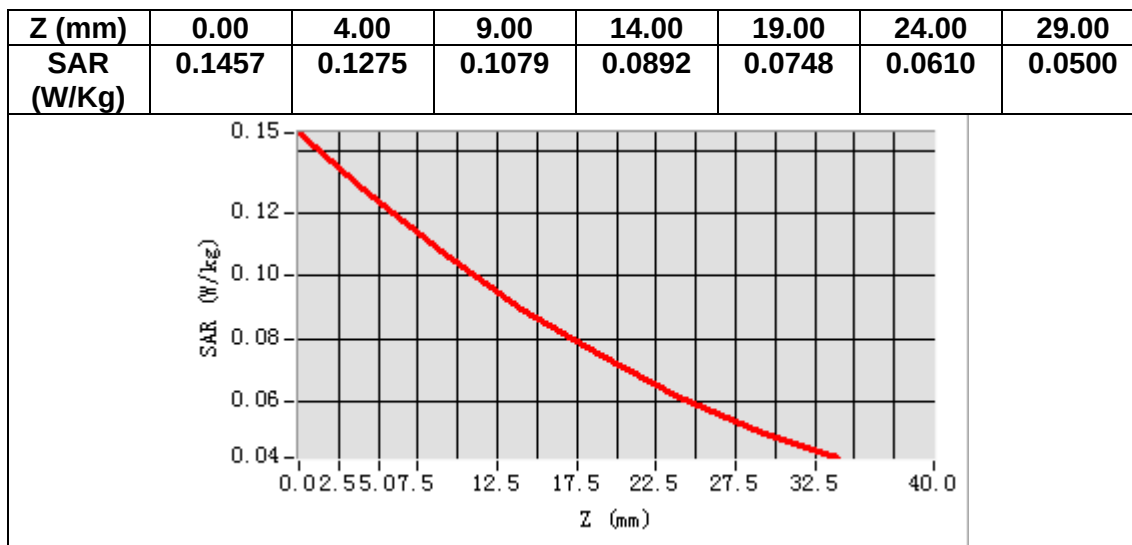
VOLUME SAR



Maximum location: X=-48.00, Y=-17.00

SAR Peak: 0.15 W/kg

SAR 10g (W/Kg)	0.098131
SAR 1g (W/Kg)	0.124871



MEASUREMENT 36

Date of measurement: 1/3/2024

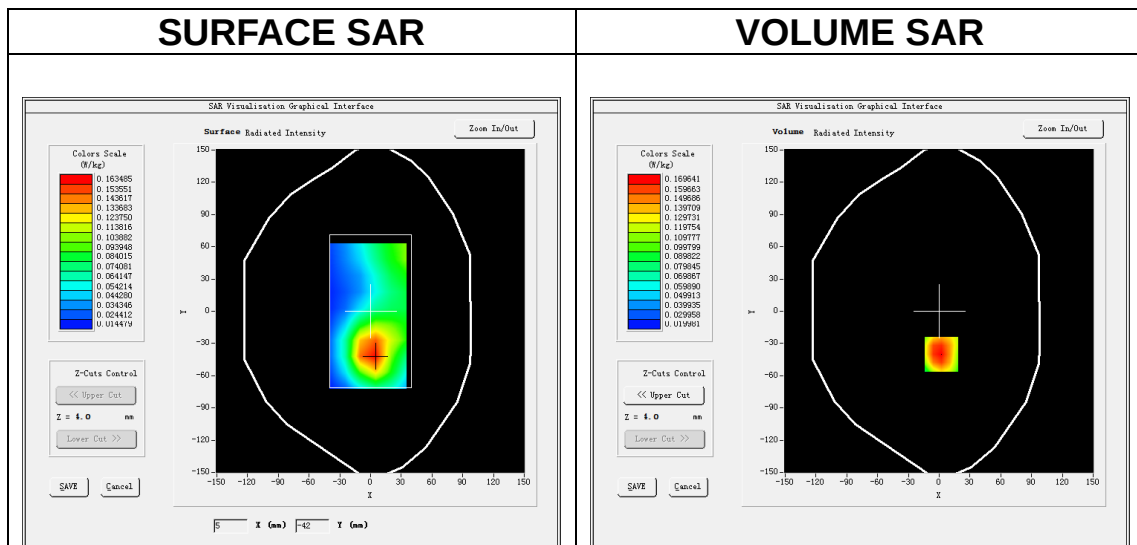
A. Experimental conditions.

<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>FDDBand26B</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.32</u>

B. SAR Measurement Results

Frequency (MHz)	831.500000
Relative permittivity (real part)	41.352760
Relative permittivity (imaginary part)	19.299545
Conductivity (S/m)	0.891532
Variation (%)	0.630000

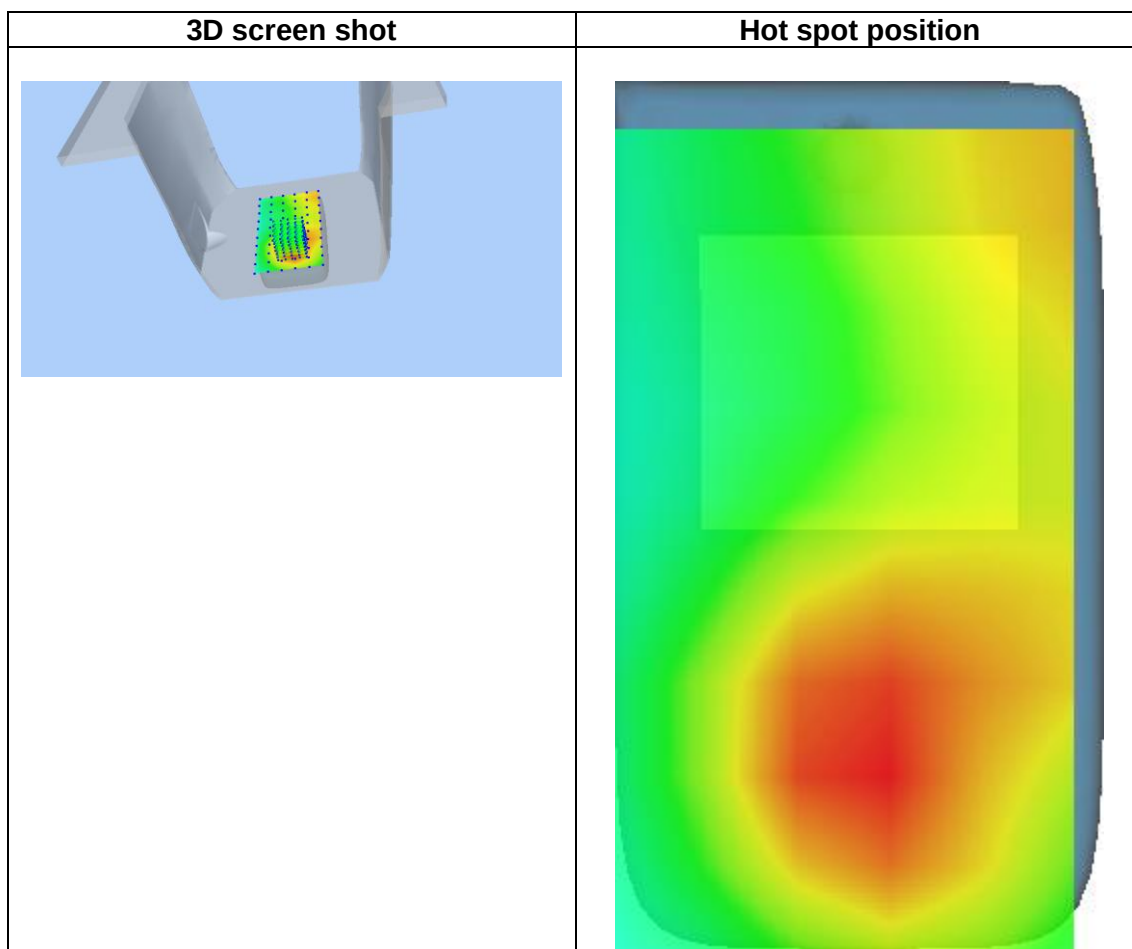
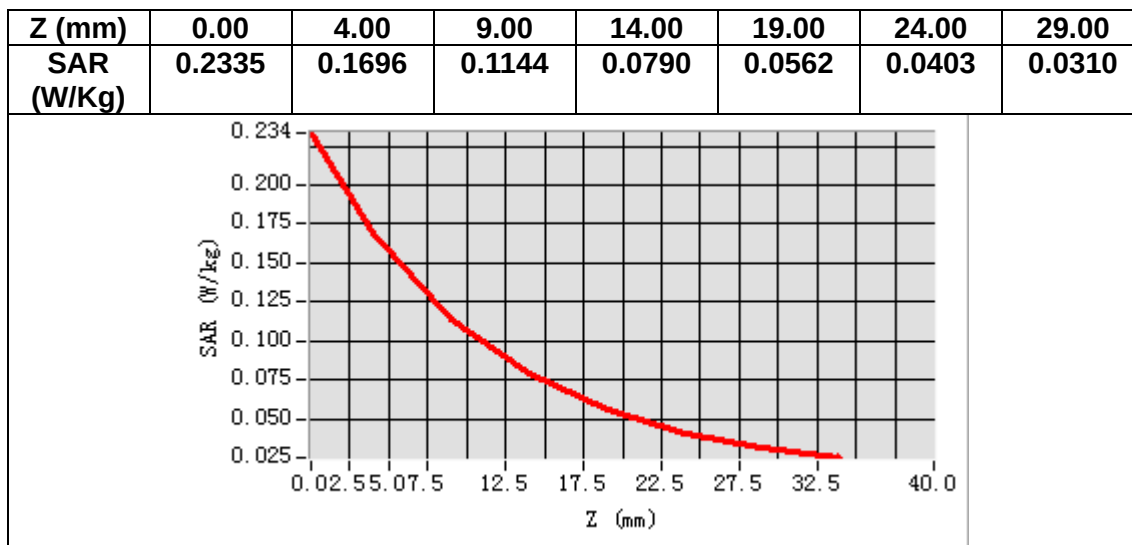
SURFACE SAR



Maximum location: X=2.00, Y=-40.00

SAR Peak: 0.24 W/kg

SAR 10g (W/Kg)	0.106190
SAR 1g (W/Kg)	0.164290



MEASUREMENT 37

Date of measurement: 29/2/2024

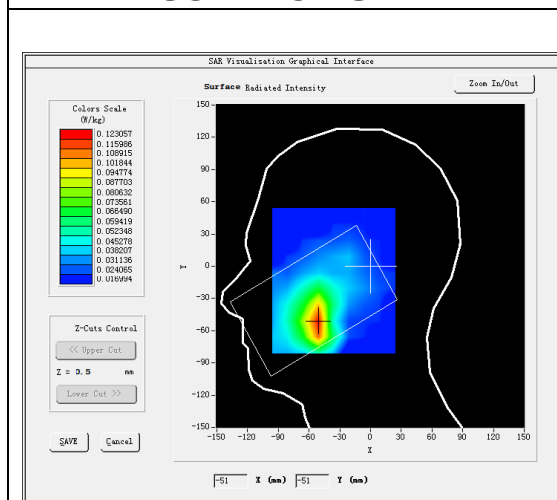
A. Experimental conditions.

<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>FDDBand66</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.45</u>

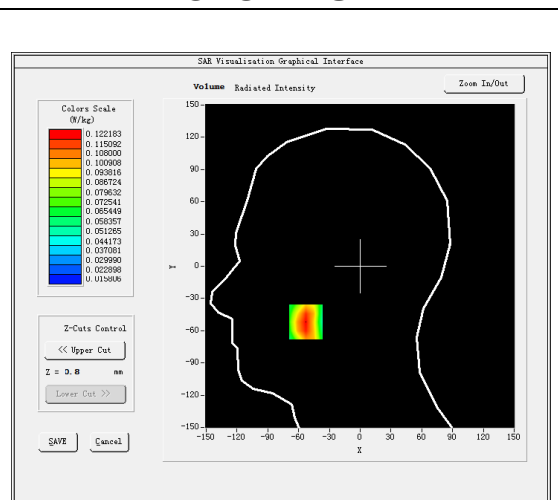
B. SAR Measurement Results

Frequency (MHz)	1745.000000
Relative permittivity (real part)	39.592205
Relative permittivity (imaginary part)	13.853663
Conductivity (S/m)	1.343036
Variation (%)	-0.420000

SURFACE SAR



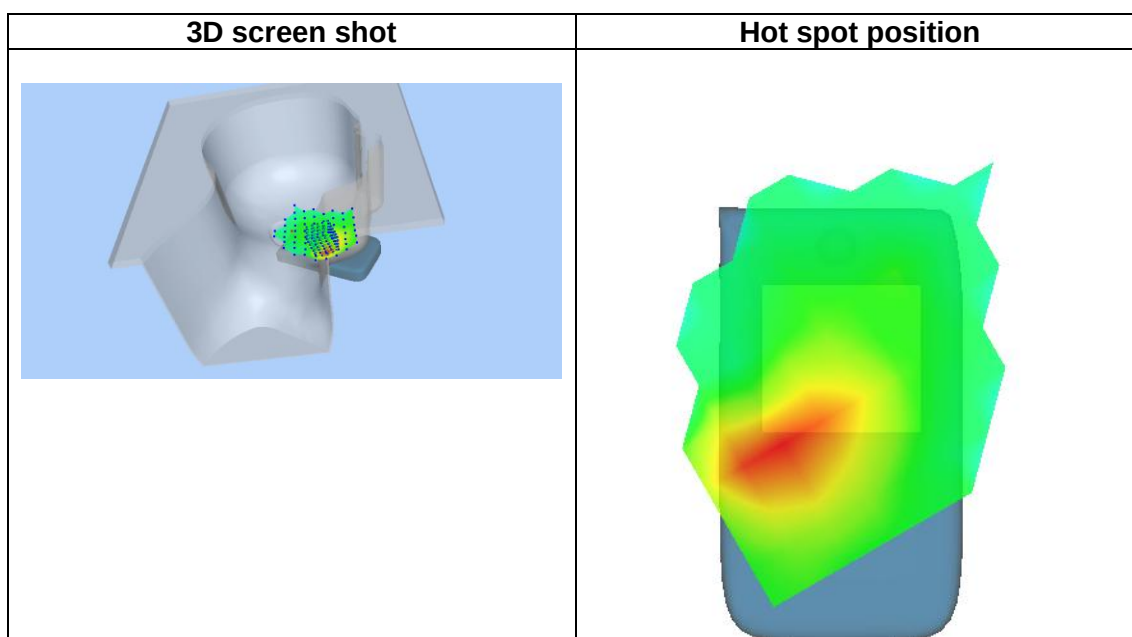
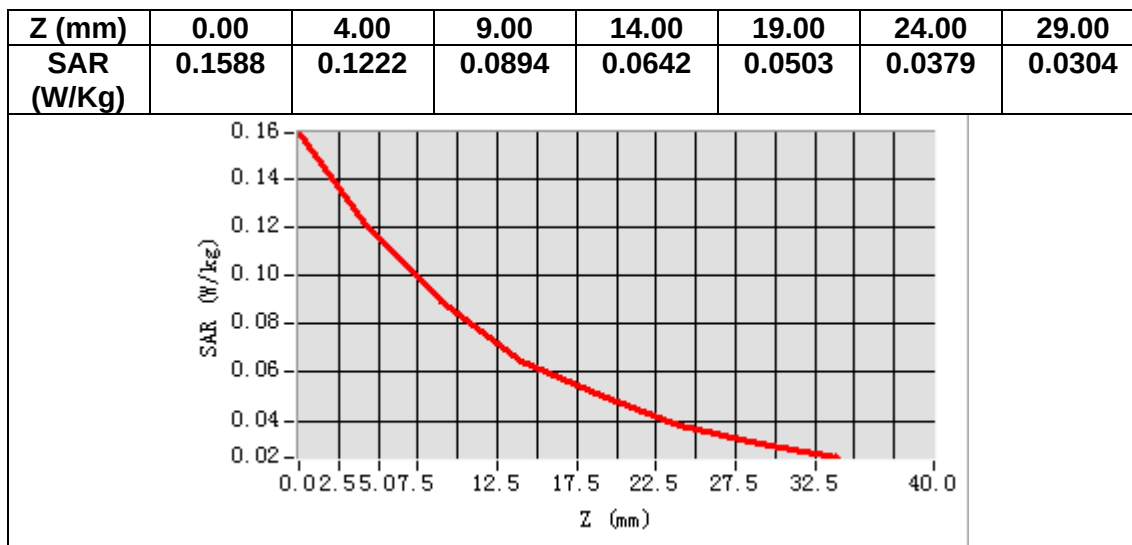
VOLUME SAR



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

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.077954
SAR 1g (W/Kg)	0.116152



MEASUREMENT 38

Date of measurement: 29/2/2024

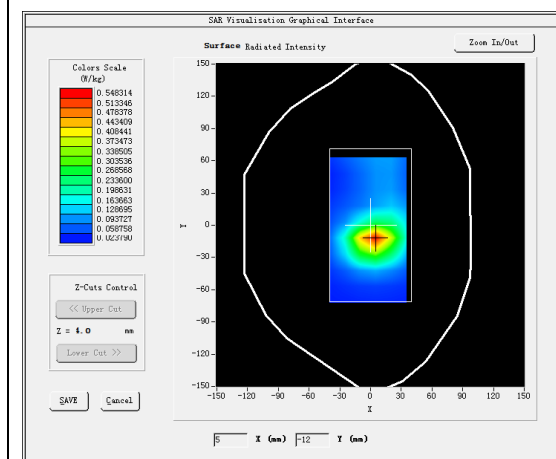
A. Experimental conditions.

<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>FDDBand66</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.45</u>

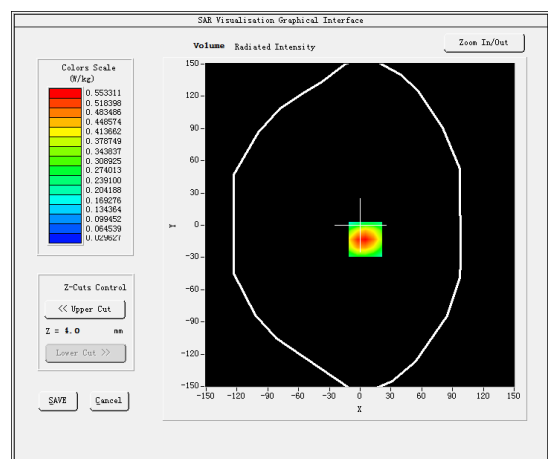
B. SAR Measurement Results

Frequency (MHz)	1745.000000
Relative permittivity (real part)	39.592205
Relative permittivity (imaginary part)	13.853663
Conductivity (S/m)	1.343036
Variation (%)	-0.240000

SURFACE SAR



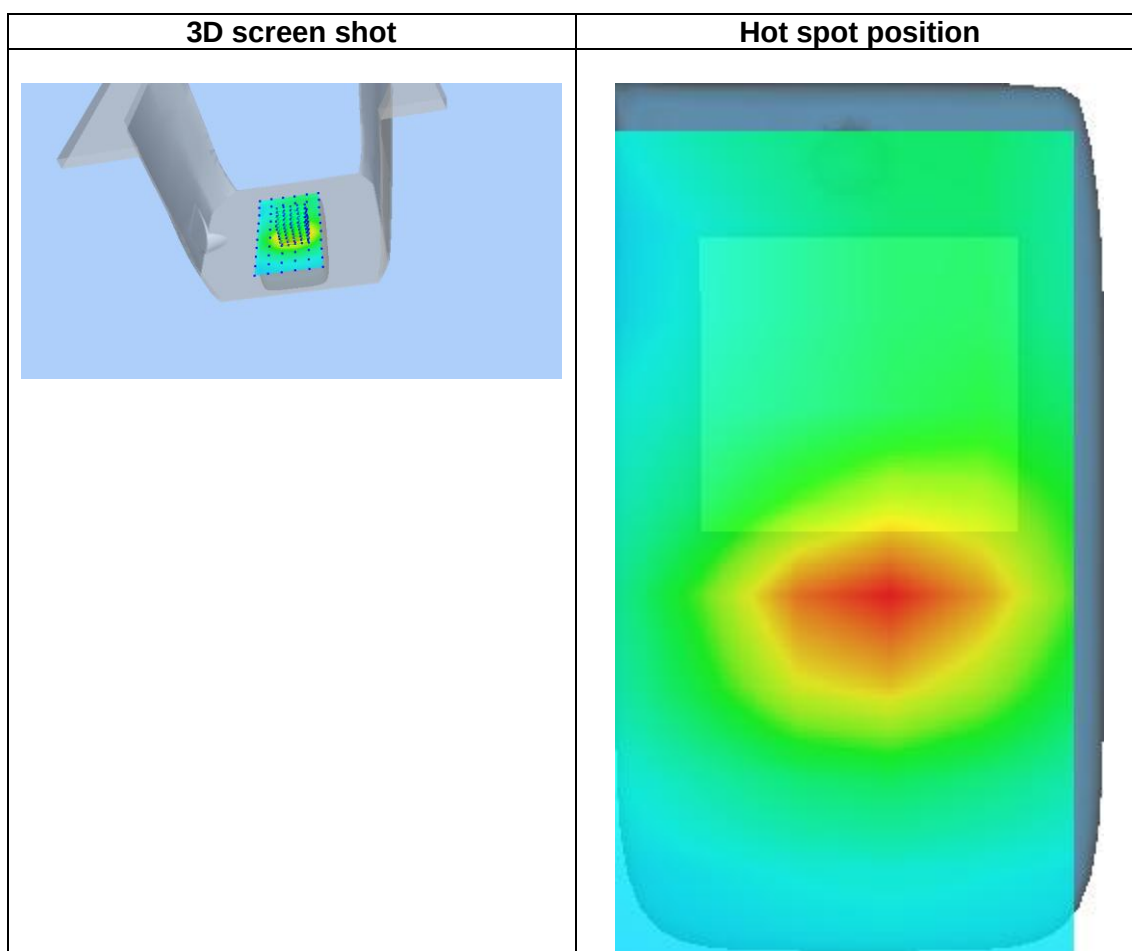
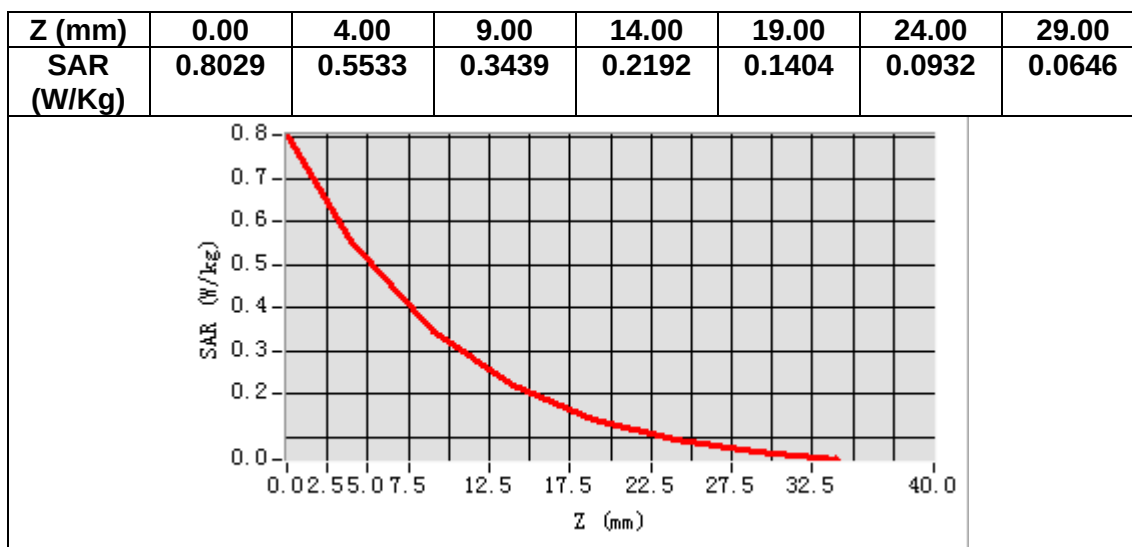
VOLUME SAR



Maximum location: X=5.00, Y=-13.00

SAR Peak: 0.80 W/kg

SAR 10g (W/Kg)	0.303503
SAR 1g (W/Kg)	0.525537



2. Appendix D. Calibration Certificate

Table of contents
E Field Probe - 3423-EPGO-426
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
2600 MHz Dipole - SN 03/15 DIP 2G600-356
5000-6000 MHz Dipole - SN 13/14 WGA 33
Extended Calibration Certificate



COMOSAR E-Field Probe Calibration Report

Ref : ACR.261.11.23.BES.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.: 3423-EPGO-426

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon
29280 PLOUZANE - FRANCE

Calibration date: 09/18/2023



Accreditations #2-6789
Scope available on www.cofrac.fr

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Summary:

This document presents the method and results from an accredited COMOSAR Dosimetric E-Field Probe calibration performed at MVG, using the CALIPROBE test bench, for use with a MVG COMOSAR system only. The test results covered by accreditation are traceable to the International System of Units (SI).



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.261.11.23.BES.A

	<i>Name</i>	<i>Function</i>	<i>Date</i>	<i>Signature</i>
<i>Prepared by :</i>	Cyrille ONNEE	Measurement Responsible	9/18/2023	
<i>Checked & approved by:</i>	Jérôme Luc	Technical Manager	9/18/2023	
<i>Authorized by:</i>	Yann Toutain	Laboratory Director	9/19/2023	

Yann
Toutain IDSignature
numérique de
Yann Toutain ID
Date : 2023.09.19
09:08:14 +02'00'

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

<i>Issue</i>	<i>Name</i>	<i>Date</i>	<i>Modifications</i>
A	Cyrille ONNEE	9/18/2023	Initial release



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.261.11.23.BES.A

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.261.11.23.BES.A

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	3423-EPGO-426
Product Condition (new / used)	New
Frequency Range of Probe	0.15 GHz-7.5GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.261 MΩ Dipole 2: R2=0.213 MΩ Dipole 3: R3=0.233 MΩ

2 PRODUCT DESCRIPTION

2.1 GENERAL INFORMATION

MVG's COMOSAR E field Probes are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards.



Figure 1 – MVG COMOSAR Dosimetric E field Probe

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 IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide recommended practices for the probe calibrations, including the performance characteristics of interest and methods by which to assess their effect. All calibrations / measurements performed meet the fore-mentioned standards.

3.1 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 for frequency range 600-7500MHz and using the calorimeter cell method (transfer method) as outlined in the standards for frequency 150-450 MHz.



COMOSAR E-FIELD PROBE CALIBRATION REPORT

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3.2 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.

3.3 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 to 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°).

3.4 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.

The boundary effect uncertainty can be estimated according to the following uncertainty approximation formula based on linear and exponential extrapolations between the surface and $d_{be} + d_{step}$ along lines that are approximately normal to the surface:

$$SAR_{uncertainty} [\%] = \Delta SAR_{be} \frac{(d_{be} + d_{step})^2}{2d_{step}} \frac{(e^{-d_{be}/\delta} - e^{-(d_{be} + d_{step})/\delta})}{\delta/2} \quad \text{for } (d_{be} + d_{step}) < 10 \text{ mm}$$

where

$SAR_{uncertainty}$	is the uncertainty in percent of the probe boundary effect
d_{be}	is the distance between the surface and the closest <i>zoom-scan</i> measurement point, in millimetre
Δ_{step}	is the separation distance between the first and second measurement points that are closest to the phantom surface, in millimetre, assuming the boundary effect at the second location is negligible
δ	is the minimum penetration depth in millimetres of the head tissue-equivalent liquids defined in this standard, i.e., $\delta \approx 14$ mm at 3 GHz;
ΔSAR_{be}	in percent of SAR is the deviation between the measured SAR value, at the distance d_{be} from the boundary, and the analytical SAR value.

The measured worst case boundary effect SARuncertainty[%] for scanning distances larger than 4mm is 1.0% Limit ,2%).



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4 MEASUREMENT UNCERTAINTY

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty associated with a SAR probe calibration using the waveguide or calorimetric cell technique depending on the frequency.

The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-11% for the frequency range 150-450MHz.

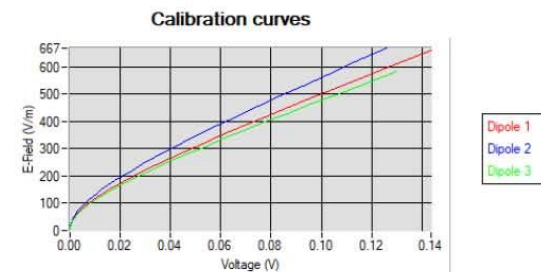
The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-14% for the frequency range 600-7500MHz.

5 CALIBRATION RESULTS

Ambient condition	
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

5.1 CALIBRATION IN AIR

The following curve represents the measurement in waveguide of the voltage picked up by the probe toward the E-field generated inside the waveguide.



From this curve, the sensitivity in air is calculated using the below formula.

$$E^2 = \sum_{i=1}^3 \frac{V_i (1 + V_i / DCP_i)}{Norm_i}$$

where

V_i =voltage readings on the 3 channels of the probe

DCP_i =diode compression point given below for the 3 channels of the probe

$Norm_i$ =dipole sensitivity given below for the 3 channels of the probe



COMOSAR E-FIELD PROBE CALIBRATION REPORT

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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 ($\mu\text{V}/(\text{V}/\text{m})^2$)
0.78	0.62	0.85

DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
105	108	107

5.2 CALIBRATION IN LIQUID

The calorimeter cell or the waveguide is used to determine the calibration in liquid using the formula below.

$$\text{ConvF} = \frac{E_{\text{liquid}}^2}{E_{\text{air}}^2}$$

The E-field in the liquid is determined from the SAR measurement according to the below formula.

$$E_{\text{liquid}}^2 = \frac{\rho \text{ SAR}}{\sigma}$$

where

σ =the conductivity of the liquid

ρ =the volumetric density of the liquid

SAR=the SAR measured from the formula that depends on the setup used. The SAR formulas are given below

For the calorimeter cell (150-450 MHz), the formula is:

$$\text{SAR} = c \frac{dT}{dt}$$

where

c =the specific heat for the liquid

dT/dt =the temperature rises over the time

For the waveguide setup (600-75000 MHz), the formula is:

$$\text{SAR} = \frac{4P_W}{ab\delta} e^{-\frac{2z}{\delta}}$$

where

a =the larger cross-sectional of the waveguide

b =the smaller cross-sectional of the waveguide

δ =the skin depth for the liquid in the waveguide

P_W =the power delivered to the liquid

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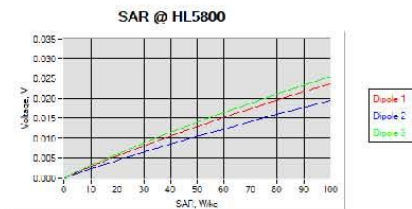
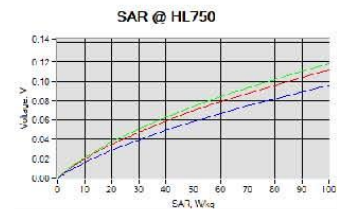
COMOSAR E-FIELD PROBE CALIBRATION REPORT

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The below table summarize the ConvF for the calibrated liquid. The curves give examples for the measured SAR depending on the voltage in some liquid.

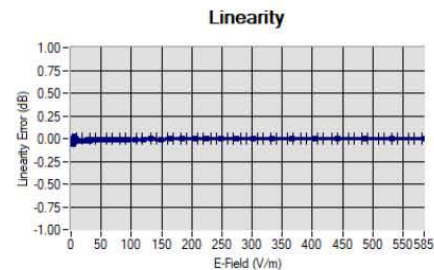
Liquid	Frequency (MHz*)	ConvF
HL750	750	2.37
HL850	835	2.32
HL900	900	2.23
HL1800	1800	2.45
HL1900	1900	2.63
HL2000	2000	2.83
HL2300	2300	2.81
HL2450	2450	2.85
HL2600	2600	2.65
HL3300	3300	2.21
HL3500	3500	2.20
HL3700	3700	2.11
HL3900	3900	2.40
HL4200	4200	2.40
HL4600	4600	2.33
HL4900	4900	2.37
HL5200	5200	2.07
HL5400	5400	2.11
HL5600	5600	2.20
HL5800	5800	2.04

(*) Frequency validity is +/-50MHz below 600MHz, +/-100MHz from 600MHz to 6GHz and +/-700MHz above 6GHz

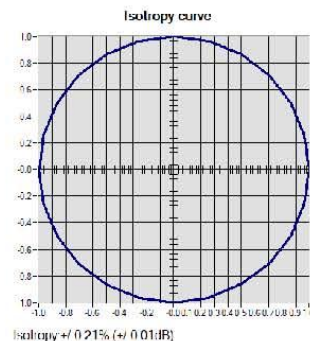


6 VERIFICATION RESULTS

The figures below represent the measured linearity and axial isotropy for this probe. The probe specification is +/-0.2 dB for linearity and +/-0.15 dB for axial isotropy.



Linearity: +/-1.42% (+/-0.06dB)



Isotropy: +/-0.21% (+/-0.01dB)