

MEASUREMENT 4

Date of measurement: 14/5/2024

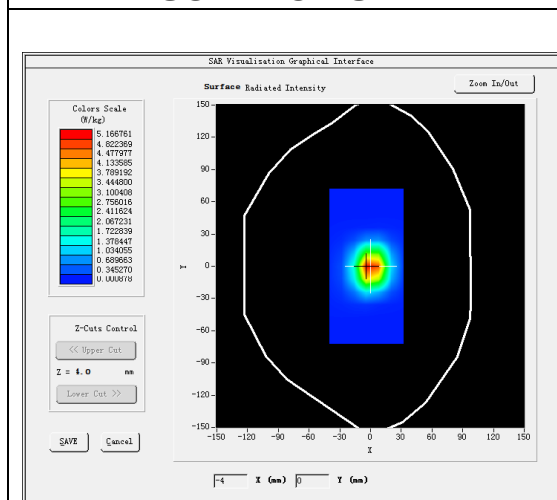
A. Experimental conditions.

<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>Dipole</u>
<u>Band</u>	<u>CW2450</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>CW (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.85</u>

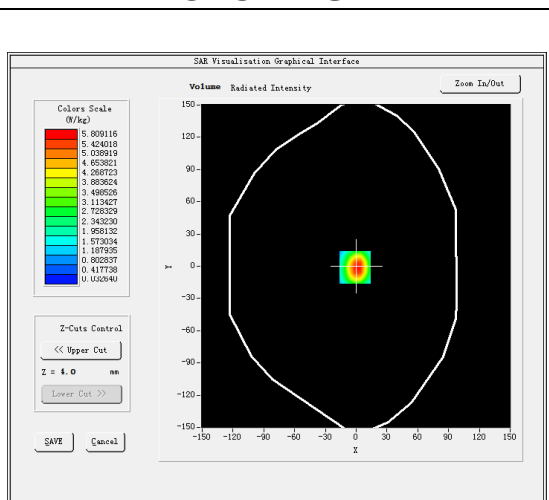
B. SAR Measurement Results

Frequency (MHz)	2450.000000
Relative permittivity (real part)	37.667635
Relative permittivity (imaginary part)	13.049236
Conductivity (S/m)	1.776146
Variation (%)	2.740000

SURFACE SAR



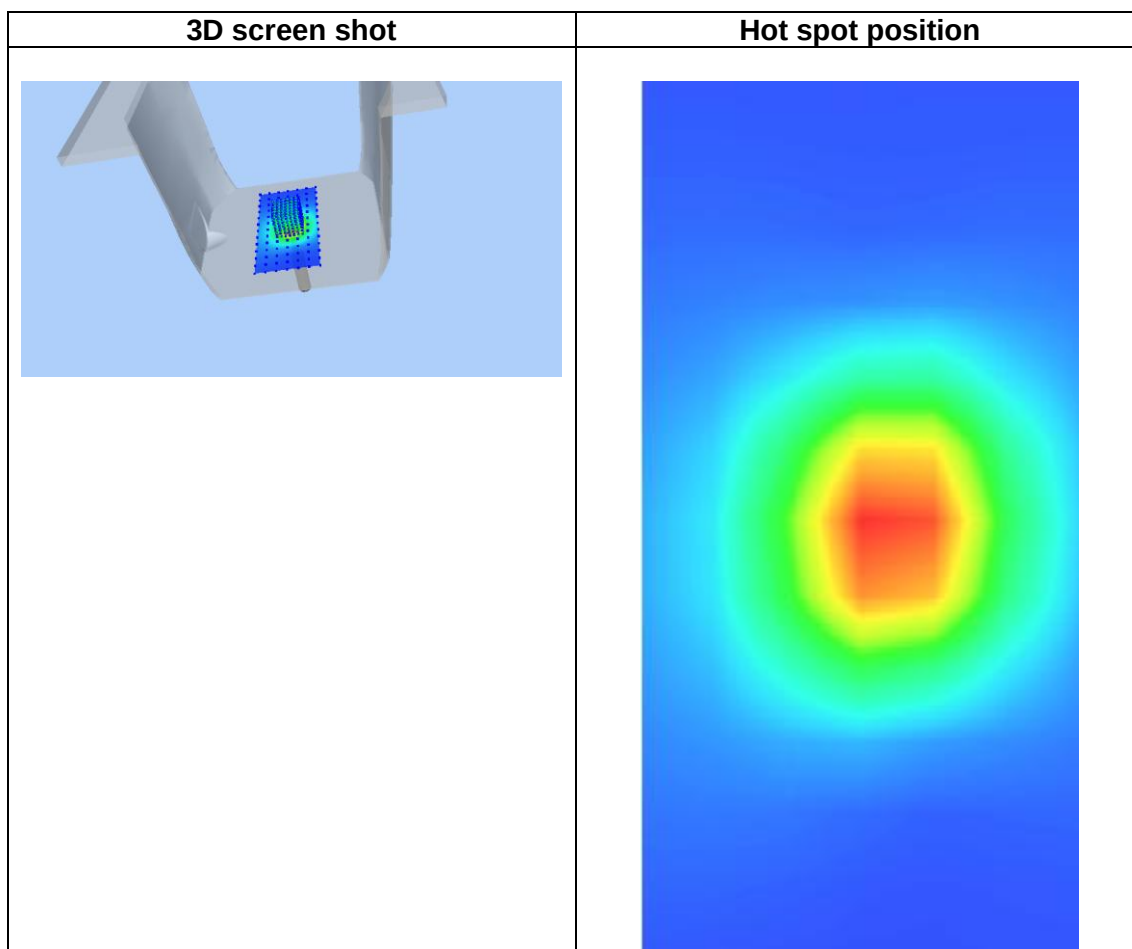
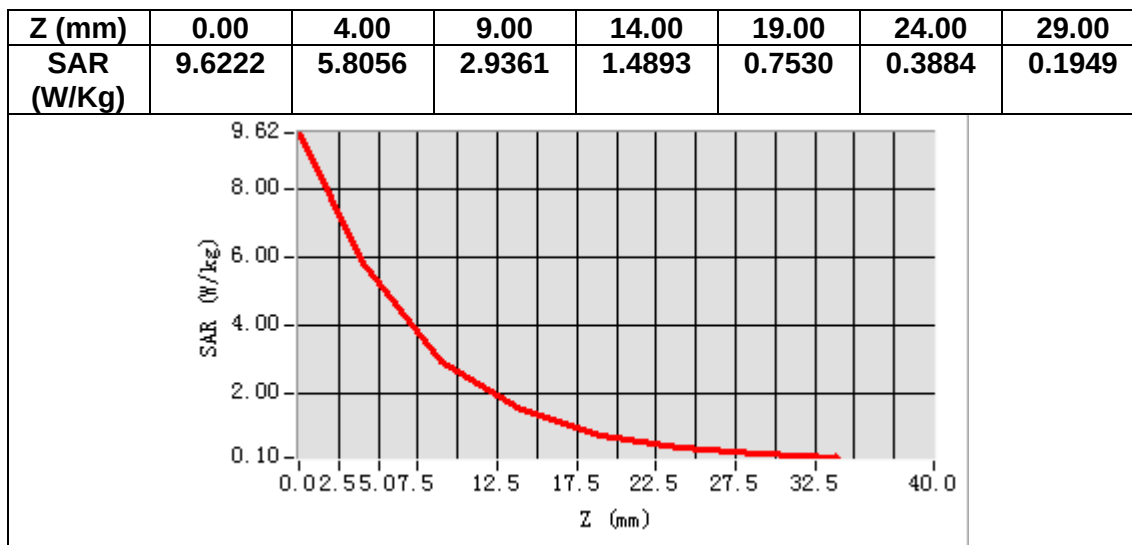
VOLUME SAR



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

SAR Peak: 9.73 W/kg

SAR 10g (W/Kg)	2.228150
SAR 1g (W/Kg)	4.719345



MEASUREMENT 5

Date of measurement: 10/5/2024

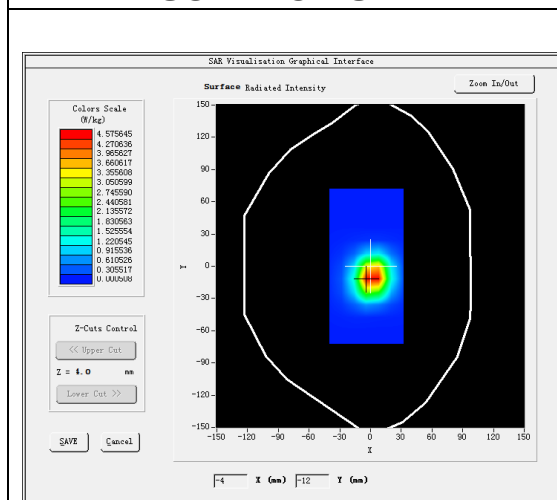
A. Experimental conditions.

<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>Dipole</u>
<u>Band</u>	<u>CW2600</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>CW (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.65</u>

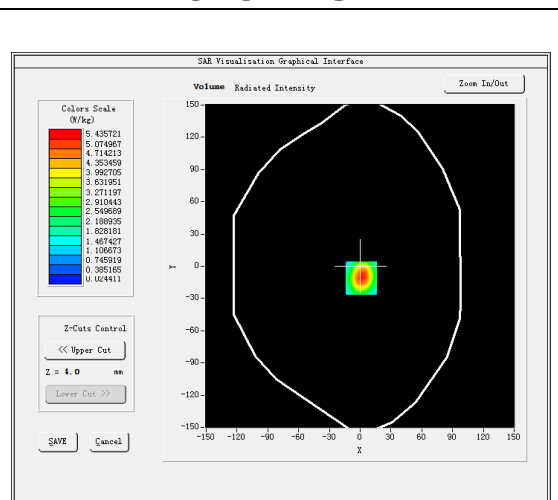
B. SAR Measurement Results

Frequency (MHz)	2600.000000
Relative permittivity (real part)	39.019763
Relative permittivity (imaginary part)	13.815390
Conductivity (S/m)	1.995556
Variation (%)	-0.990000

SURFACE SAR



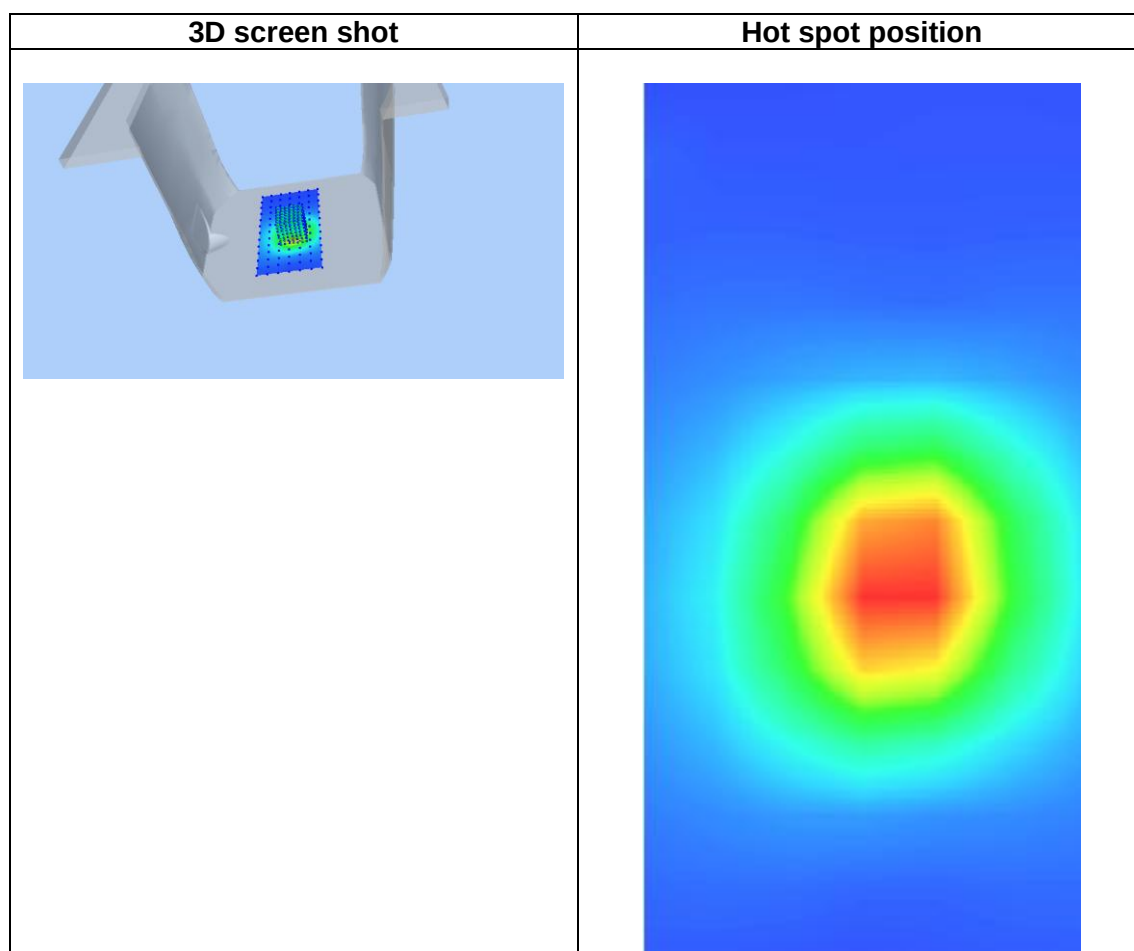
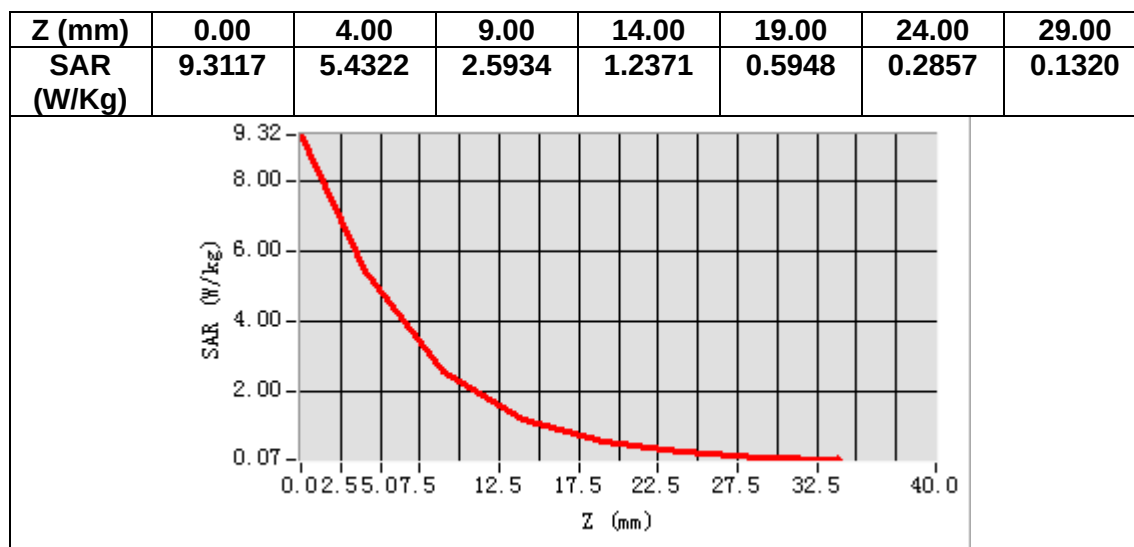
VOLUME SAR



Maximum location: X=1.00, Y=-11.00

SAR Peak: 9.29 W/kg

SAR 10g (W/Kg)	2.622256
SAR 1g (W/Kg)	5.536161



MEASUREMENT 6

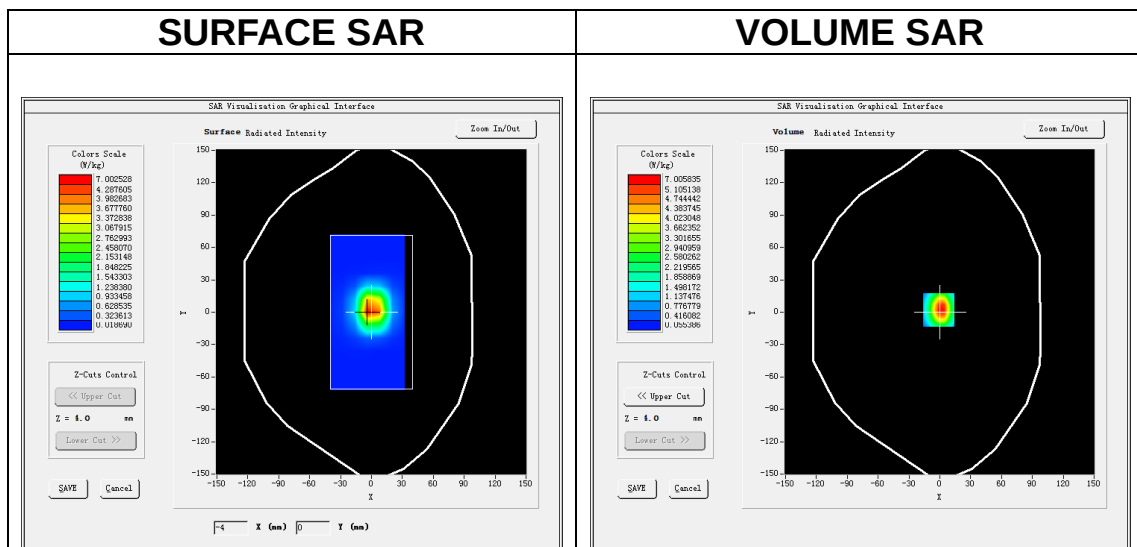
Date of measurement: 11/6/2024

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>Dipole</u>
<u>Band</u>	<u>CW3500</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>CW (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.20</u>

B. SAR Measurement Results

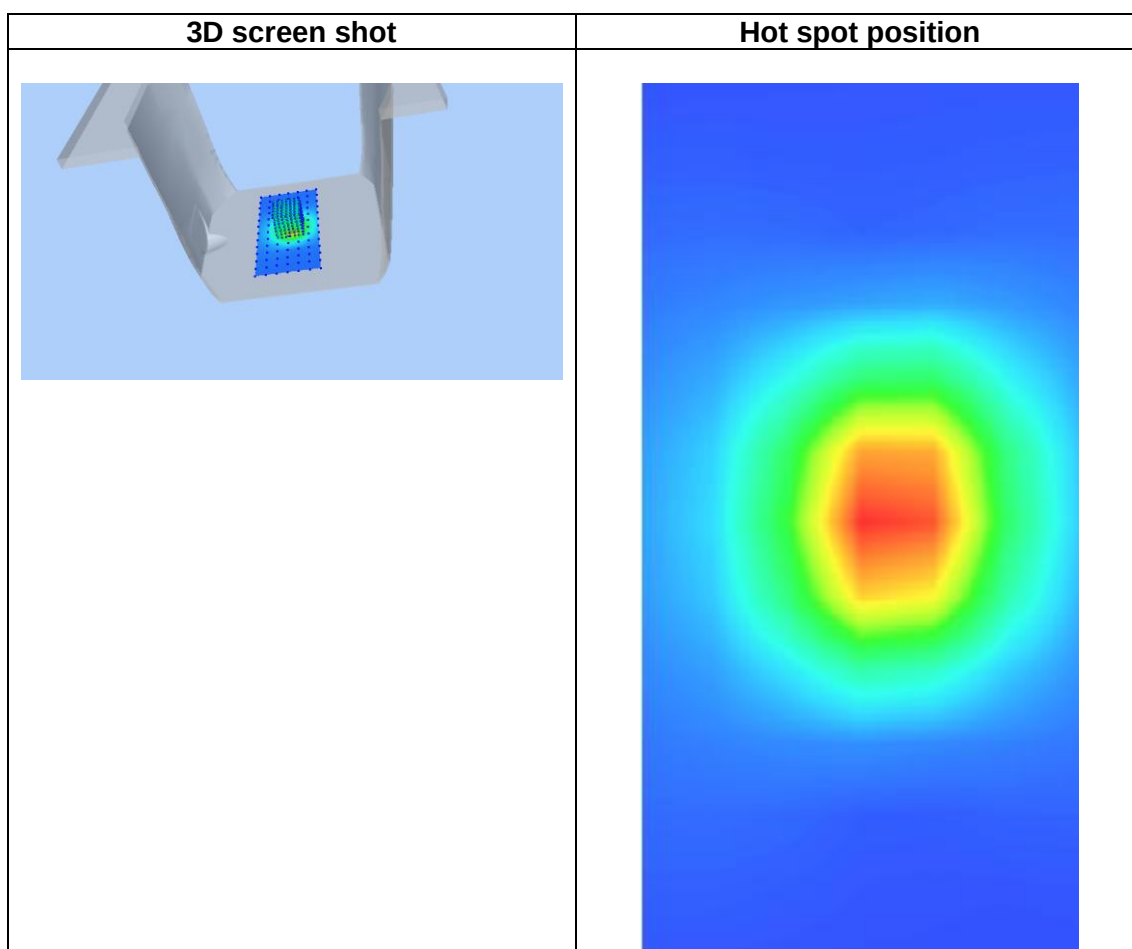
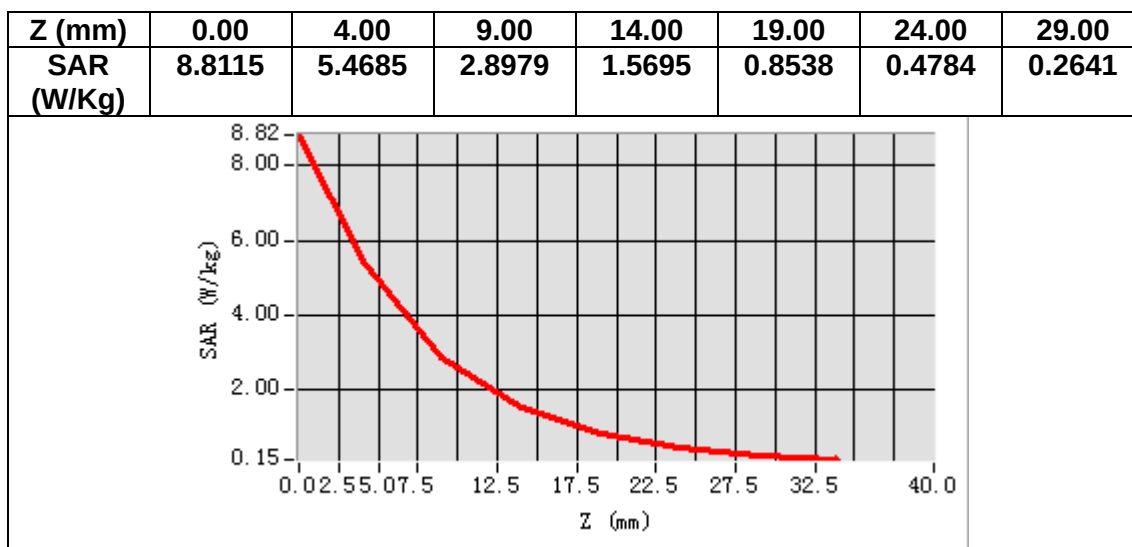
Frequency (MHz)	3500.000000
Relative permittivity (real part)	38.014514
Relative permittivity (imaginary part)	14.574846
Conductivity (S/m)	2.833998
Variation (%)	-0.800000



Maximum location: X=-1.00, Y=2.00

SAR Peak: 9.07 W/kg

SAR 10g (W/Kg)	2.378225
SAR 1g (W/Kg)	6.557037



MEASUREMENT 7

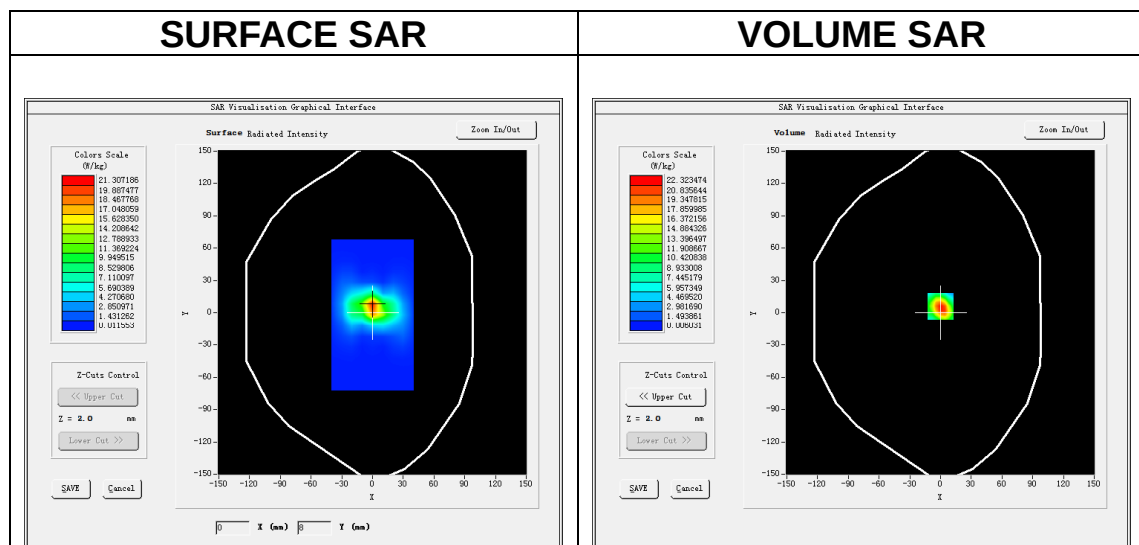
Date of measurement: 11/5/2024

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>Dipole</u>
<u>Band</u>	<u>CW5200</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>CW (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.07</u>

B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative permittivity (real part)	34.675906
Relative permittivity (imaginary part)	15.795970
Conductivity (S/m)	4.563280
Variation (%)	3.250000

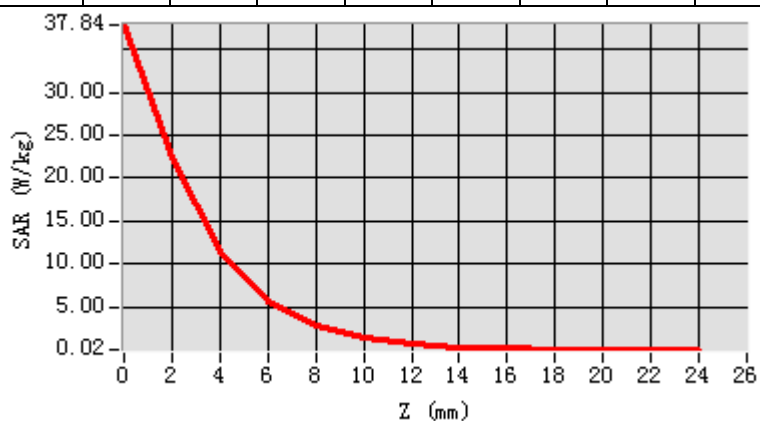


Maximum location: X=0.00, Y=6.00

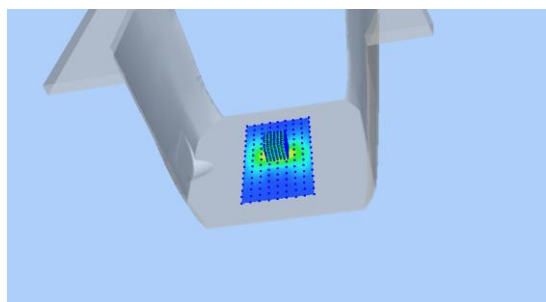
SAR Peak: 40.06 W/kg

SAR 10g (W/Kg)	5.205311
SAR 1g (W/Kg)	17.146103

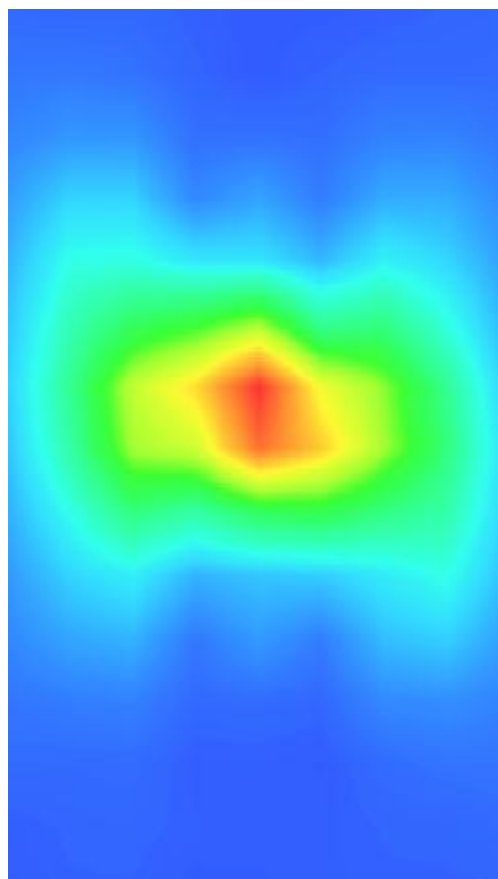
Z (m m)	0.00	2.00	4.00	6.00	8.00	10.0 0	12.0 0	14.0 0	16.0 0	18.0 0	20.0 0	22.0 0
SAR (W/ Kg)	37.8 38	22.3 14	11.3 07	5.66 82	2.82 45	1.40 06	0.71 90	0.36 70	0.18 99	0.10 66	0.05 11	0.03 96



3D screen shot



Hot spot position



MEASUREMENT 8

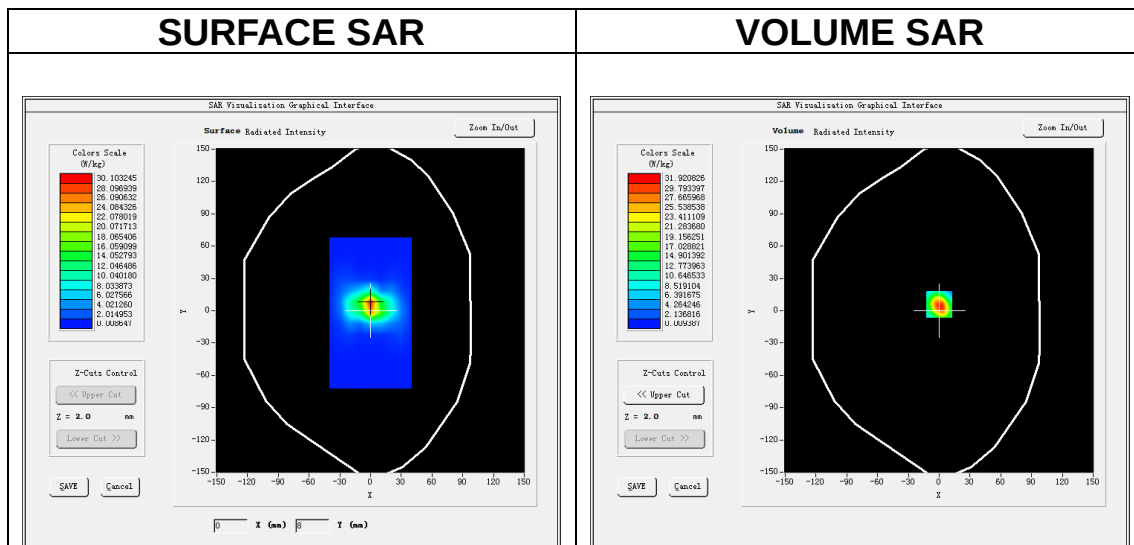
Date of measurement: 12/5/2024

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>Dipole</u>
<u>Band</u>	<u>CW5800</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>CW (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.04</u>

B. SAR Measurement Results

Frequency (MHz)	5800.000000
Relative permittivity (real part)	34.107056
Relative permittivity (imaginary part)	16.182741
Conductivity (S/m)	5.214439
Variation (%)	3.210000

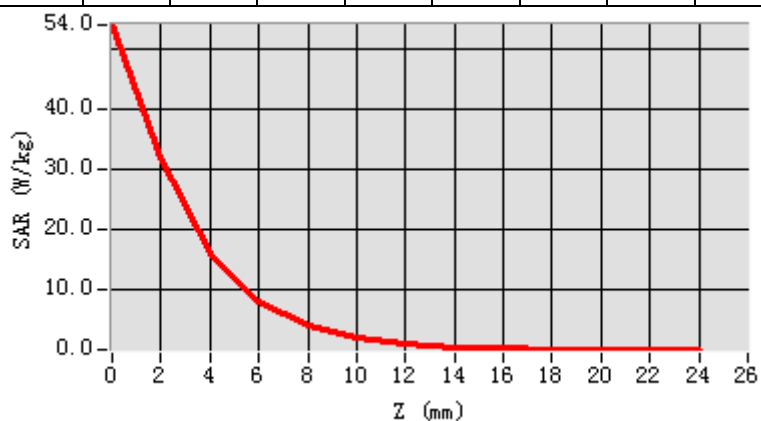


Maximum location: X=0.00, Y=6.00

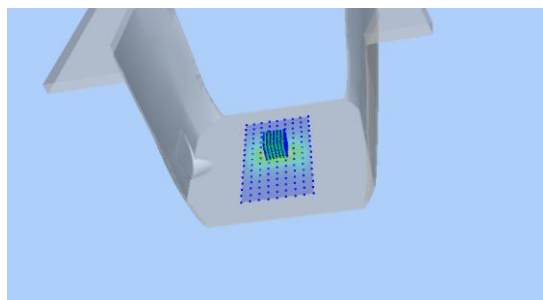
SAR Peak: 57.37 W/kg

SAR 10g (W/Kg)	5.555184
SAR 1g (W/Kg)	16.473233

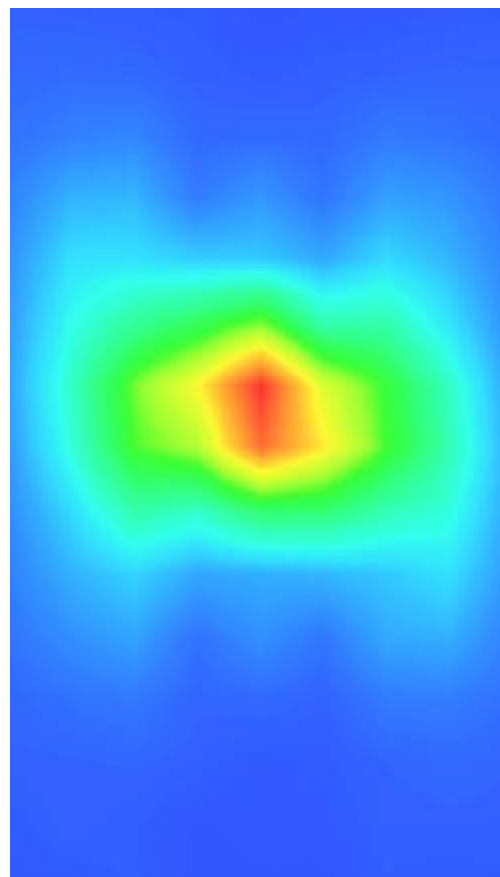
Z (m m)	0.00	2.00	4.00	6.00	8.00	10.0 0	12.0 0	14.0 0	16.0 0	18.0 0	20.0 0	22.0 0
SAR (W/ Kg)	54.0 27	31.9 80	16.1 88	8.17 21	4.08 60	2.05 64	1.03 91	0.51 26	0.27 23	0.15 00	0.07 97	0.04 44



3D screen shot



Hot spot position



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MEASUREMENT 32 SA n78 Body
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MEASUREMENT 1

Date of measurement: 25/4/2024

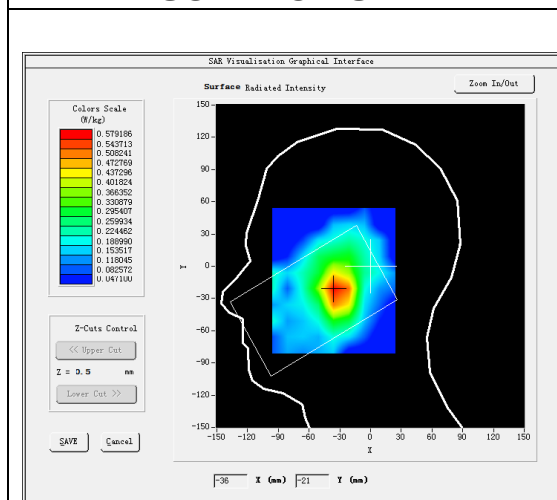
A. Experimental conditions.

<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>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>

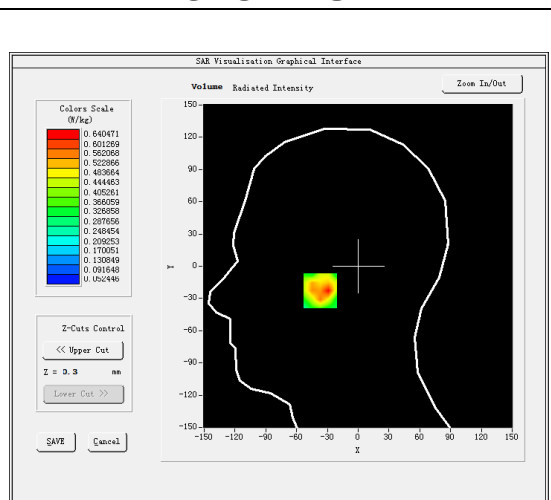
B. SAR Measurement Results

Frequency (MHz)	836.400000
Relative permittivity (real part)	41.404362
Relative permittivity (imaginary part)	19.407654
Conductivity (S/m)	0.901809
Variation (%)	-0.390000

SURFACE SAR



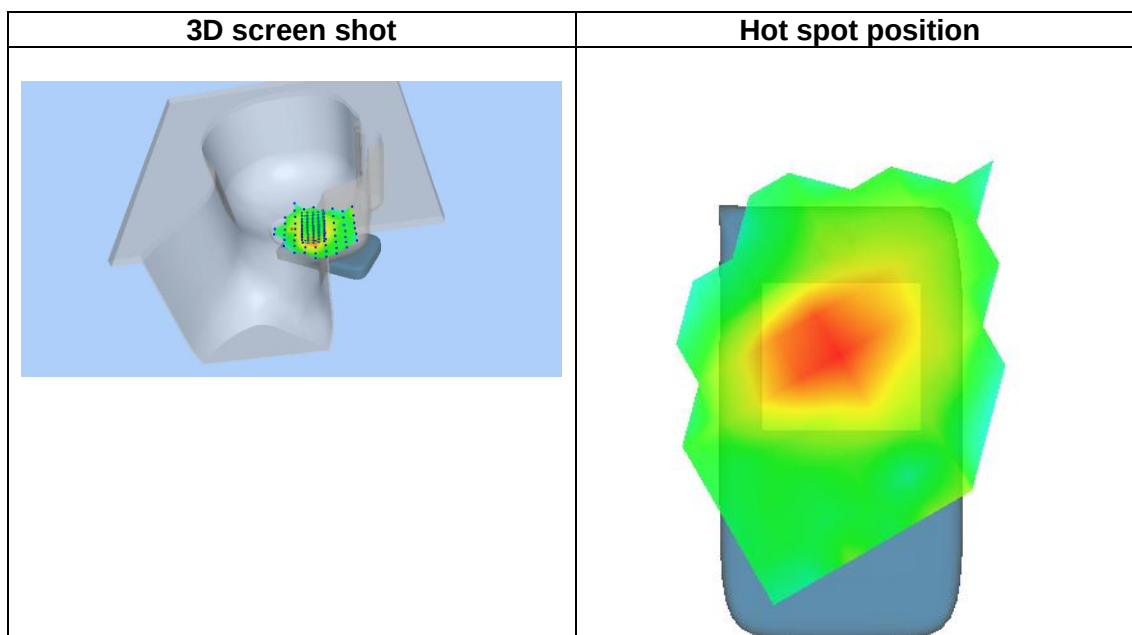
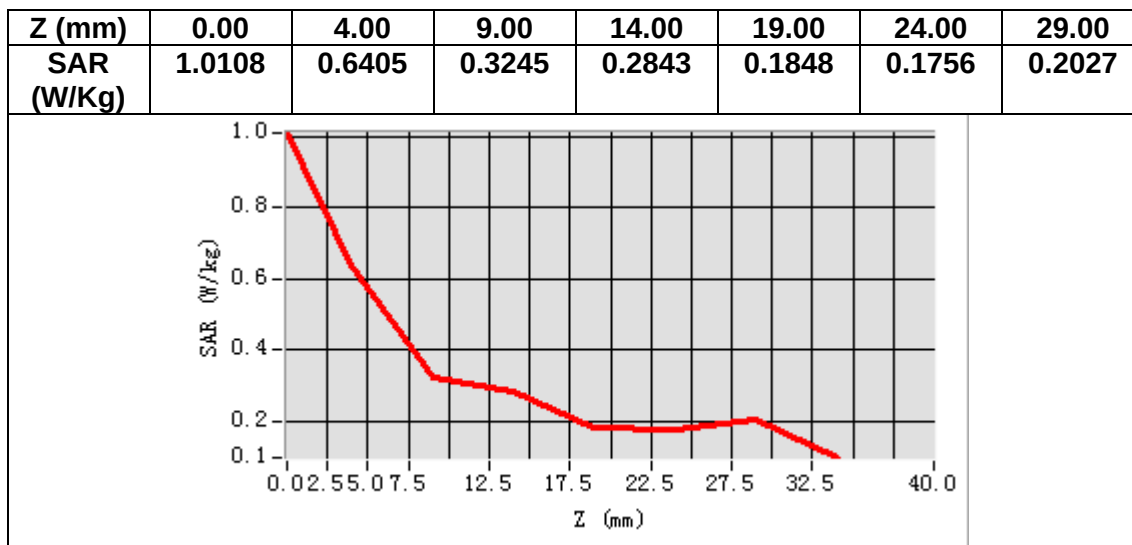
VOLUME SAR



Maximum location: X=-33.00, Y=-23.00

SAR Peak: 0.90 W/kg

SAR 10g (W/Kg)	0.347981
SAR 1g (W/Kg)	0.526501



MEASUREMENT 2

Date of measurement: 25/4/2024

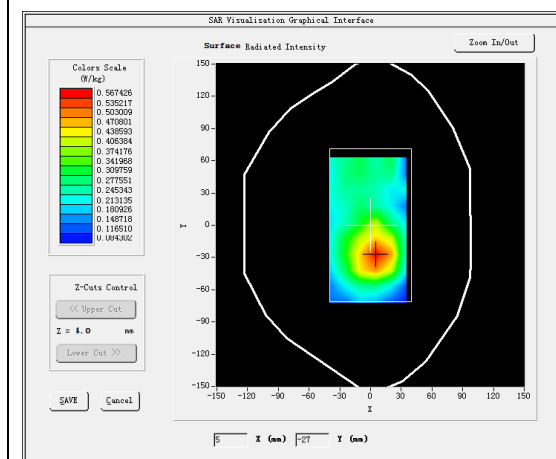
A. Experimental conditions.

<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>

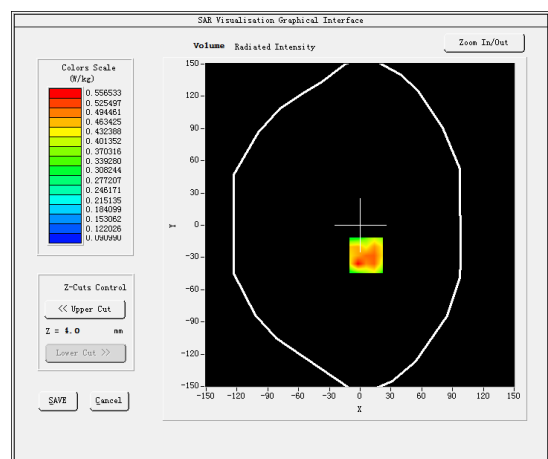
B. SAR Measurement Results

Frequency (MHz)	836.400000
Relative permittivity (real part)	41.404362
Relative permittivity (imaginary part)	19.407654
Conductivity (S/m)	0.901809
Variation (%)	1.680000

SURFACE SAR



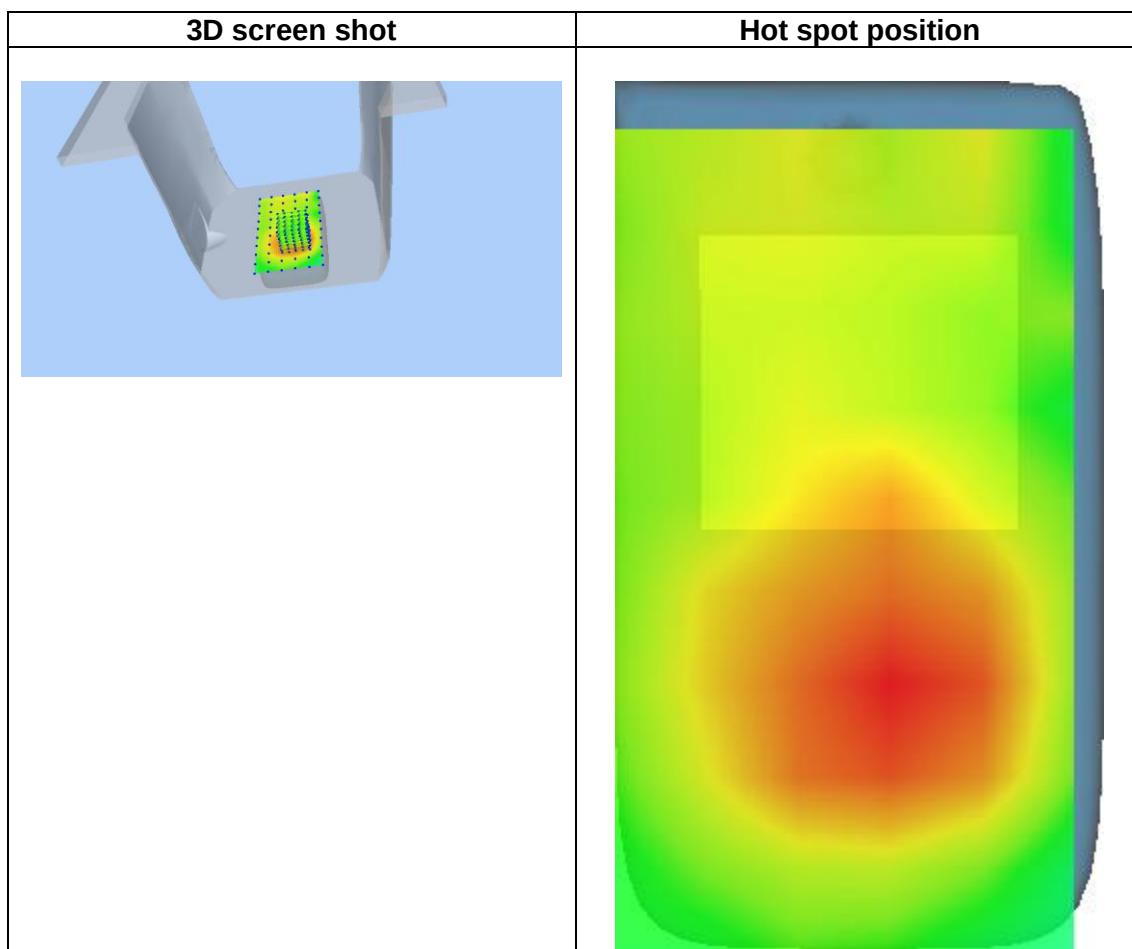
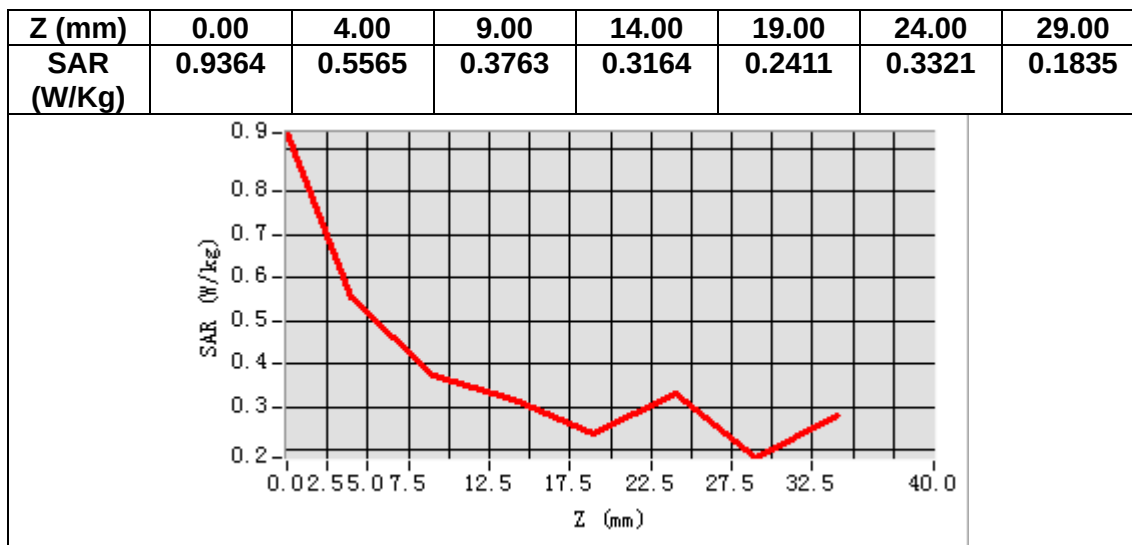
VOLUME SAR



Maximum location: X=6.00, Y=-28.00

SAR Peak: 0.98 W/kg

SAR 10g (W/Kg)	0.371726
SAR 1g (W/Kg)	0.549140



MEASUREMENT 3

Date of measurement: 15/5/2024

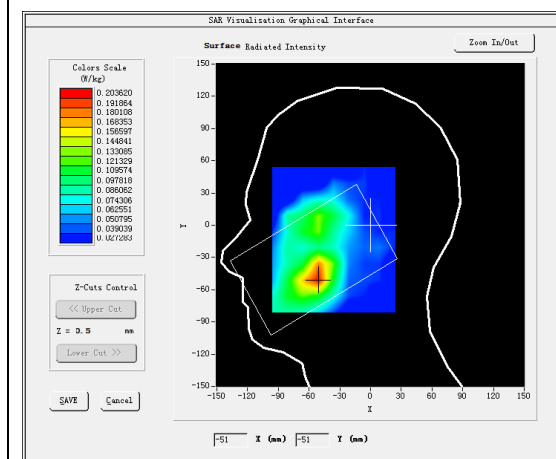
A. Experimental conditions.

<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>

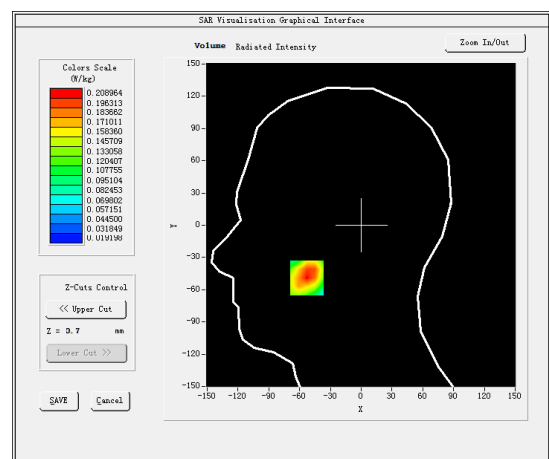
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	39.005302
Relative permittivity (imaginary part)	13.791376
Conductivity (S/m)	1.440433
Variation (%)	-4.110000

SURFACE SAR



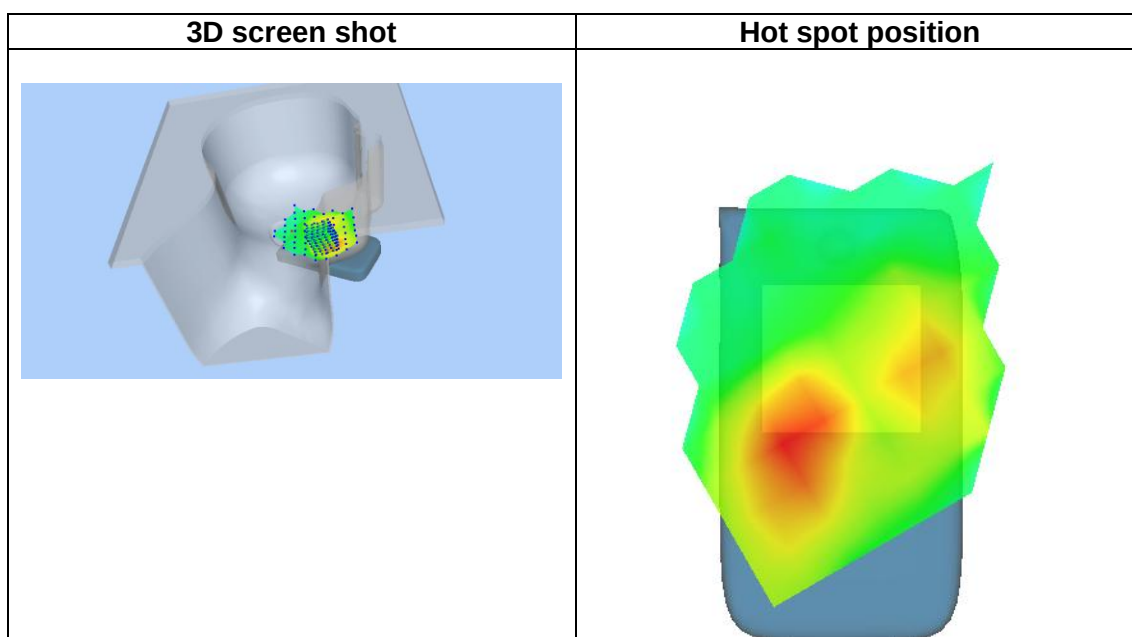
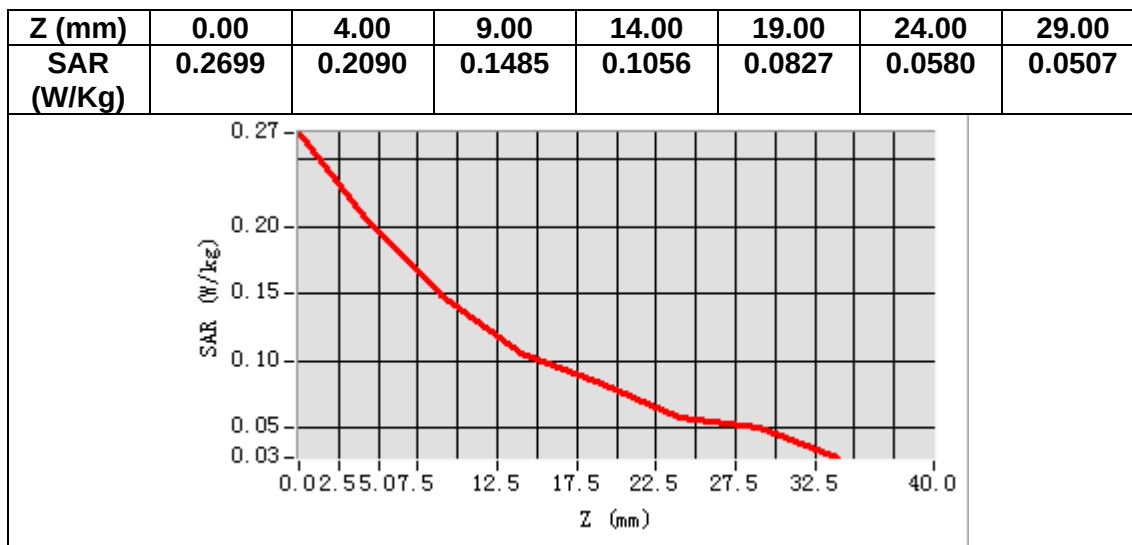
VOLUME SAR



Maximum location: X=-53.00, Y=-49.00

SAR Peak: 0.28 W/kg

SAR 10g (W/Kg)	0.130415
SAR 1g (W/Kg)	0.202570



MEASUREMENT 4

Date of measurement: 15/5/2024

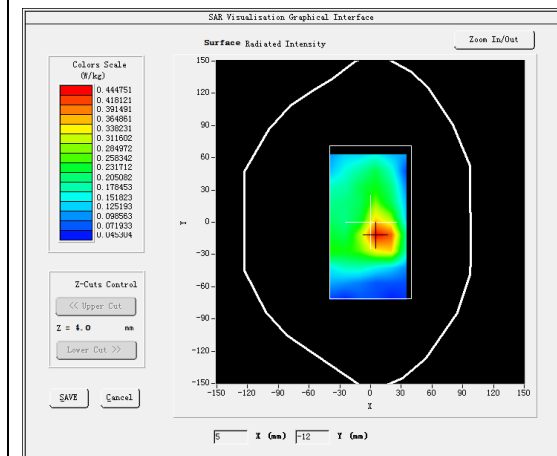
A. Experimental conditions.

<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>

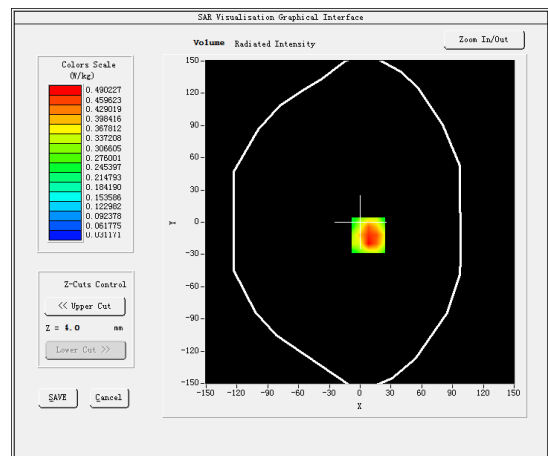
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	39.005302
Relative permittivity (imaginary part)	13.791376
Conductivity (S/m)	1.440433
Variation (%)	0.500000

SURFACE SAR



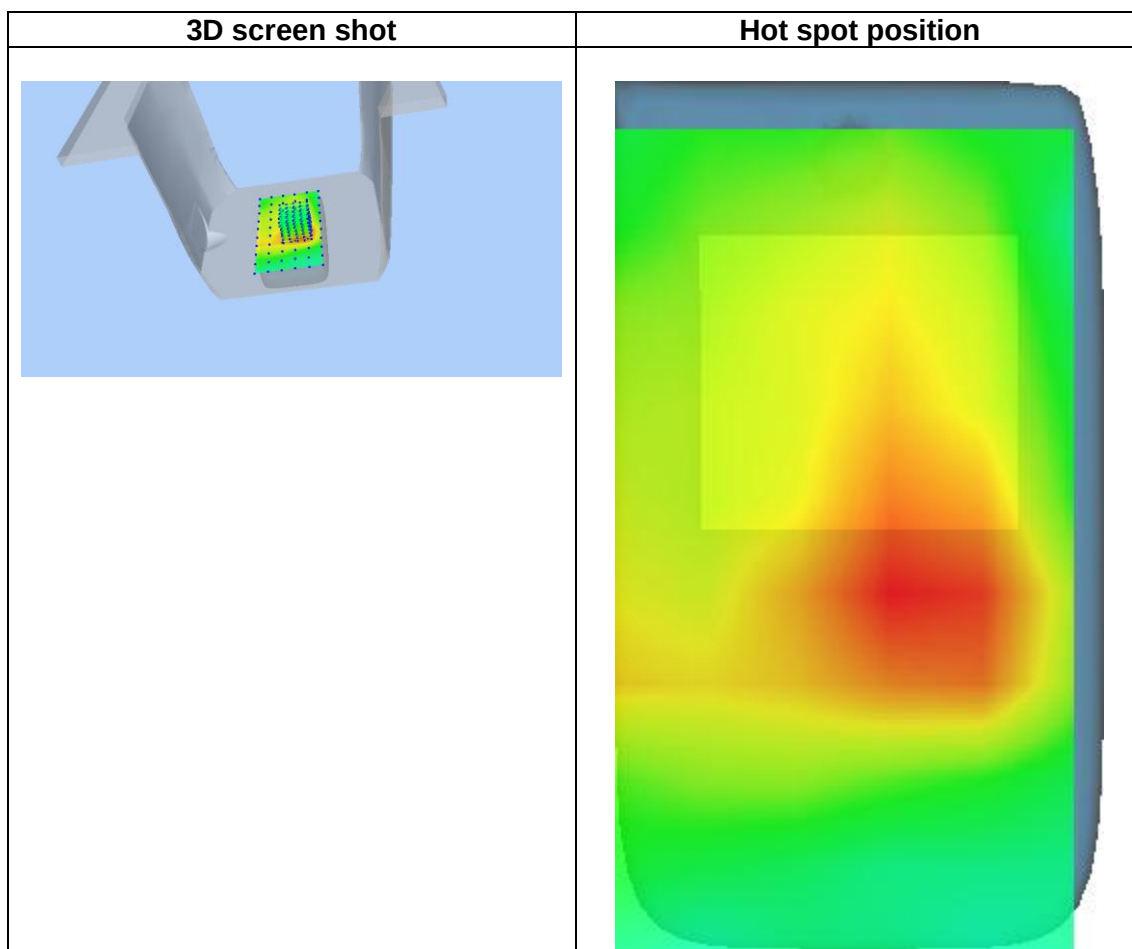
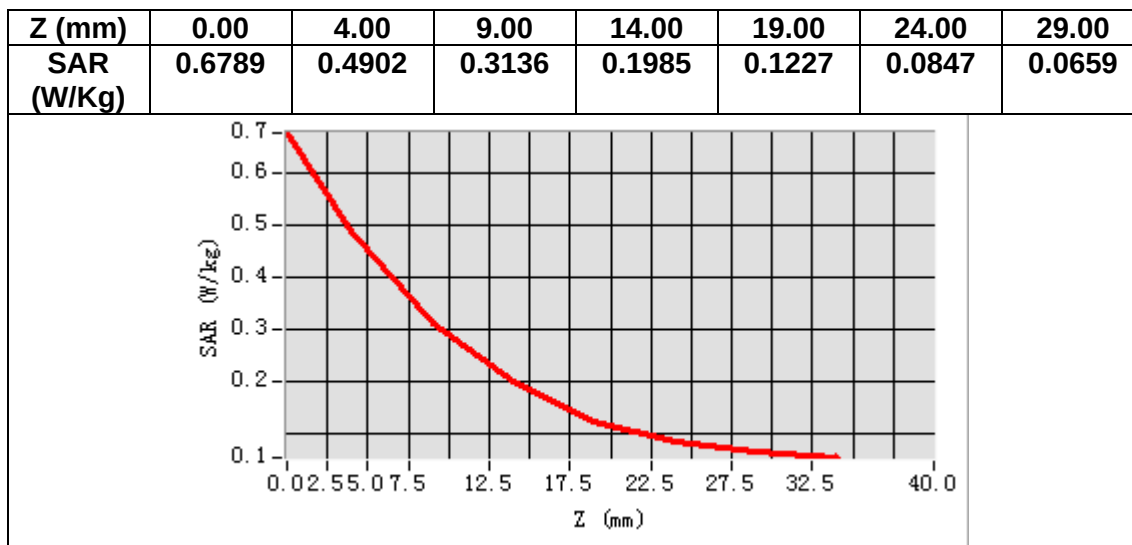
VOLUME SAR



Maximum location: X=8.00, Y=-12.00

SAR Peak: 0.80 W/kg

SAR 10g (W/Kg)	0.278395
SAR 1g (W/Kg)	0.487661



MEASUREMENT 5

Date of measurement: 15/5/2024

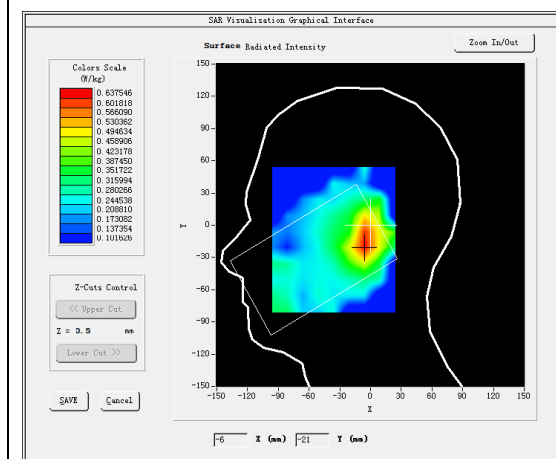
A. Experimental conditions.

<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>

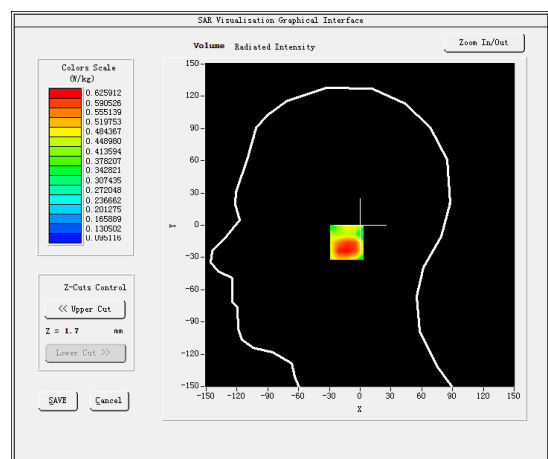
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	39.005302
Relative permittivity (imaginary part)	13.791376
Conductivity (S/m)	1.440433
Variation (%)	0.400000

SURFACE SAR



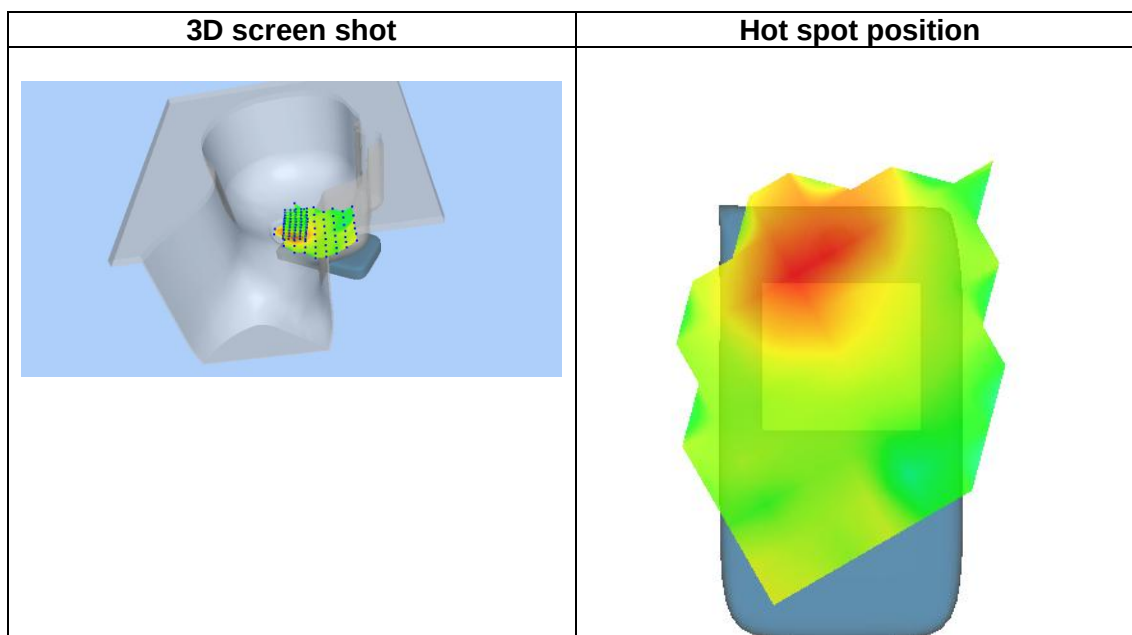
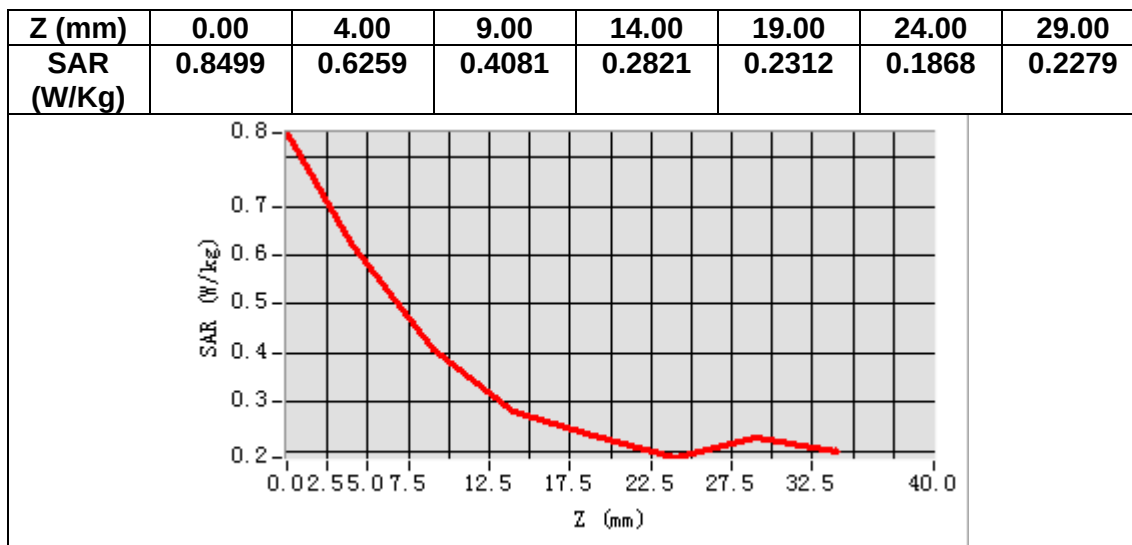
VOLUME SAR



Maximum location: X=-5.00, Y=-16.00

SAR Peak: 0.93 W/kg

SAR 10g (W/Kg)	0.394305
SAR 1g (W/Kg)	0.612213



MEASUREMENT 6

Date of measurement: 15/5/2024

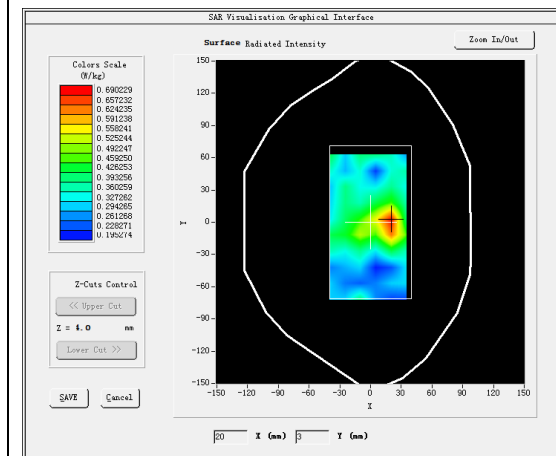
A. Experimental conditions.

<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>

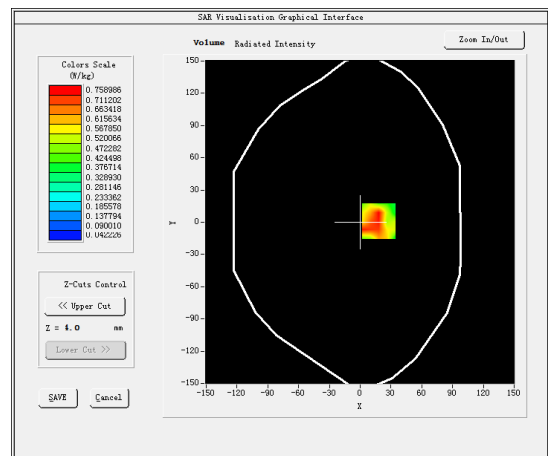
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	39.005302
Relative permittivity (imaginary part)	13.791376
Conductivity (S/m)	1.440433
Variation (%)	-0.470000

SURFACE SAR



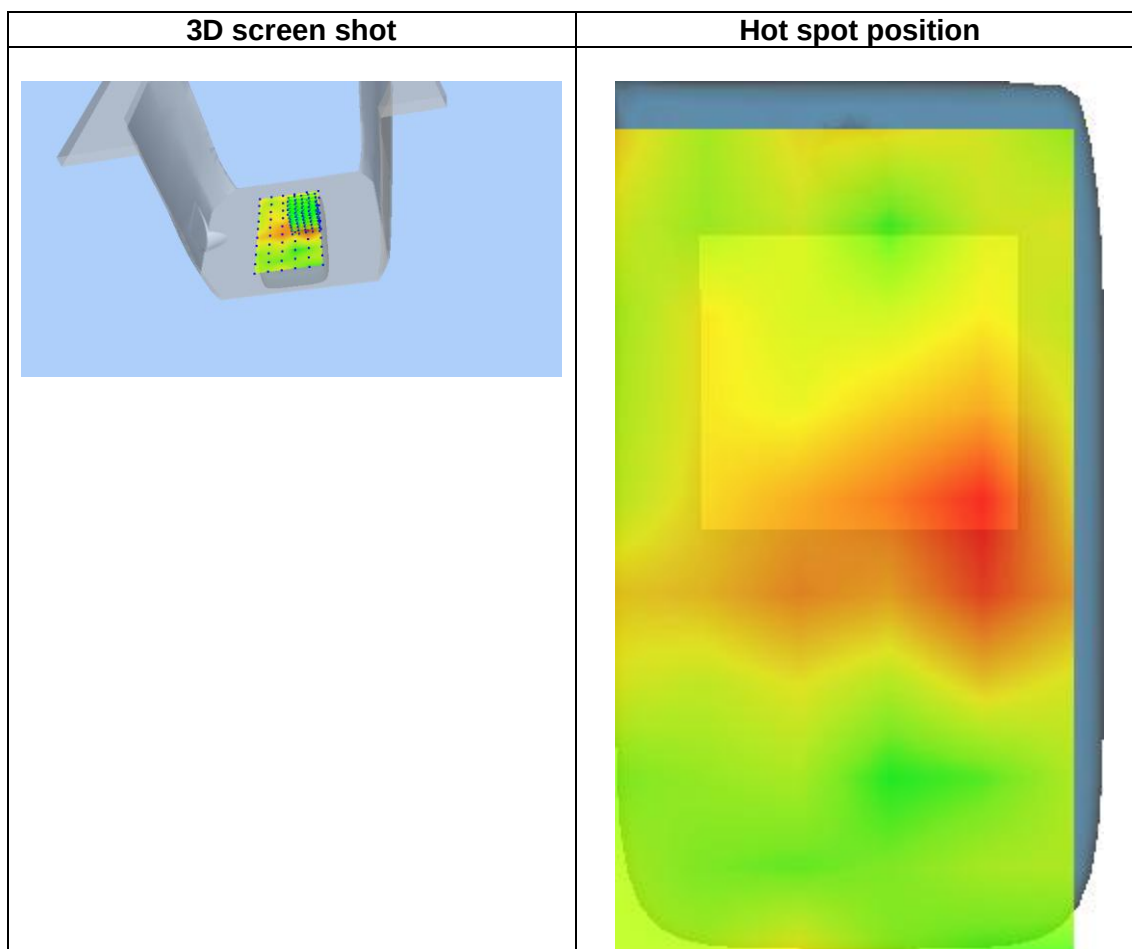
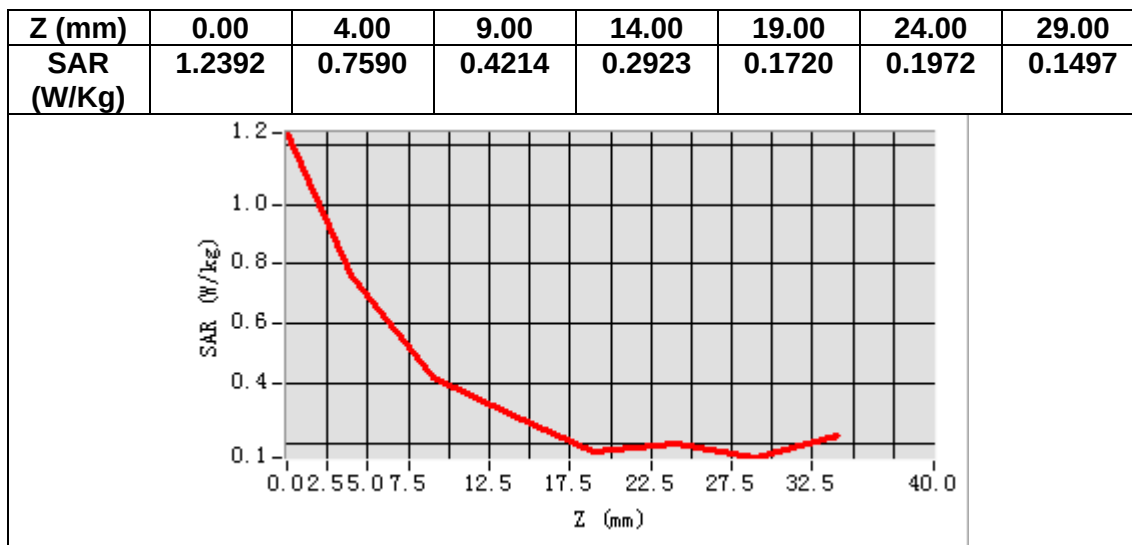
VOLUME SAR



Maximum location: X=18.00, Y=1.00

SAR Peak: 1.60 W/kg

SAR 10g (W/Kg)	0.422953
SAR 1g (W/Kg)	0.743936



MEASUREMENT 7

Date of measurement: 7/5/2024

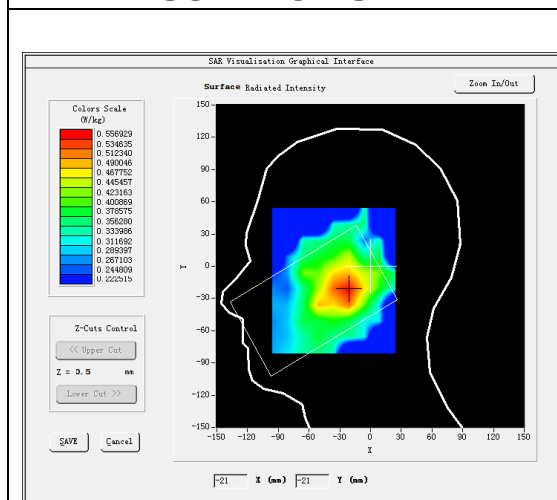
A. Experimental conditions.

<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>

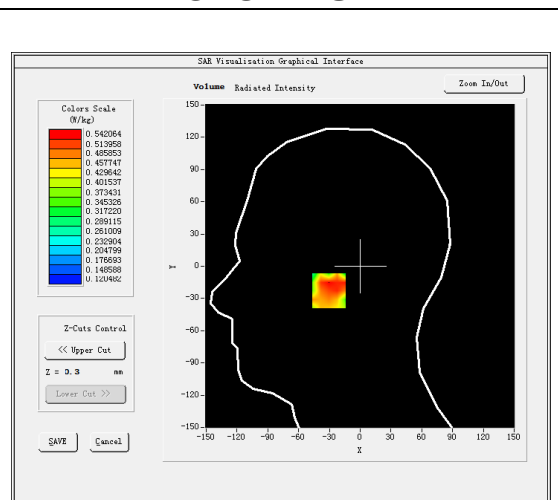
B. SAR Measurement Results

Frequency (MHz)	1732.600000
Relative permittivity (real part)	39.858624
Relative permittivity (imaginary part)	13.902263
Conductivity (S/m)	1.337707
Variation (%)	3.480000

SURFACE SAR



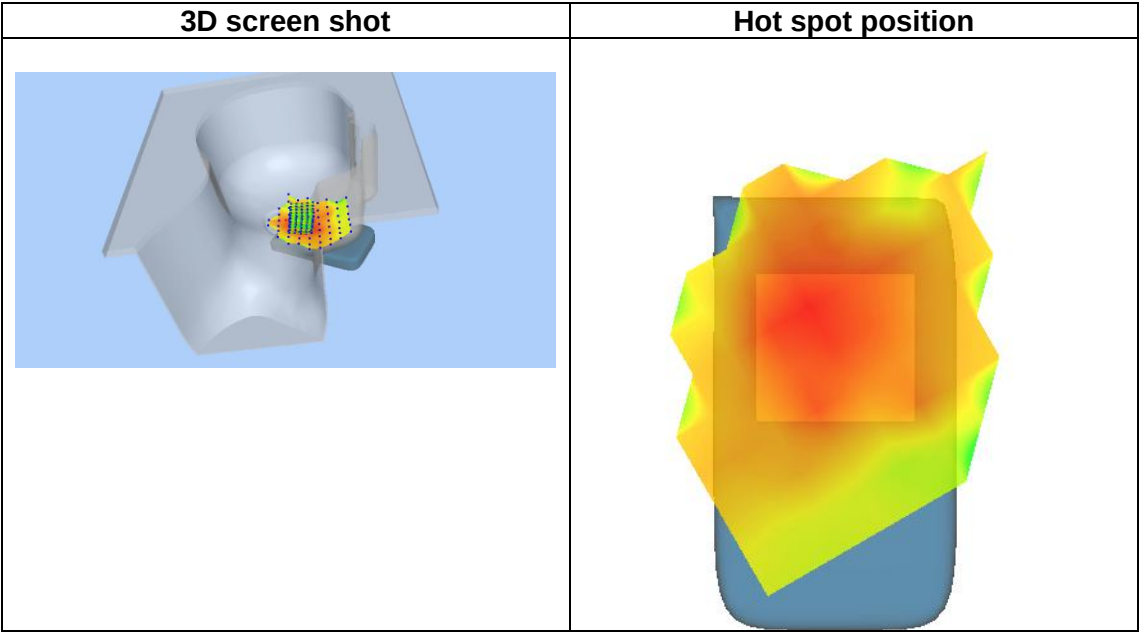
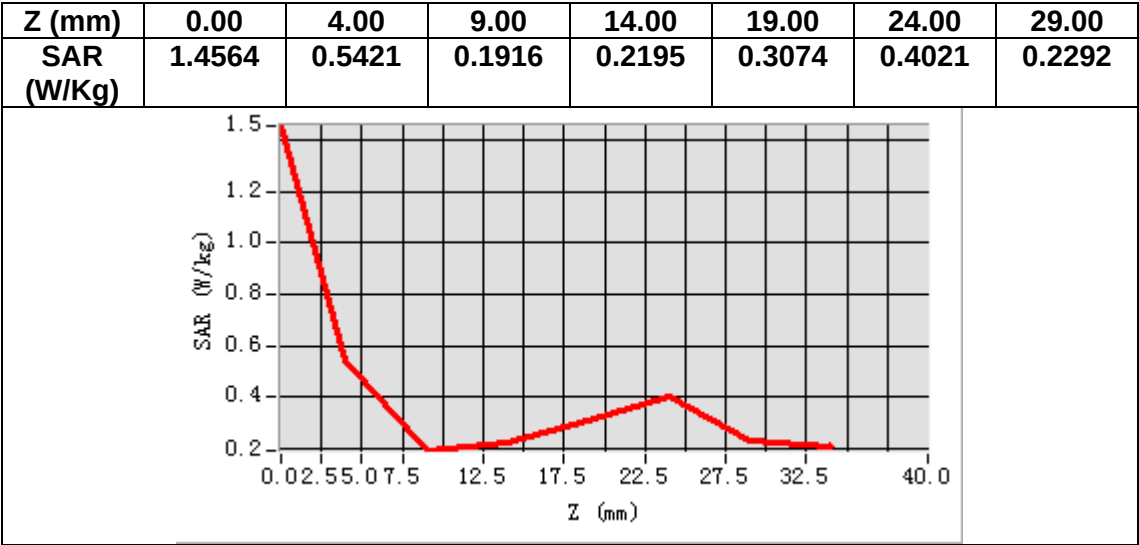
VOLUME SAR



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

SAR Peak: 1.36 W/kg

SAR 10g (W/Kg)	0.395415
SAR 1g (W/Kg)	0.634245



MEASUREMENT 8

Date of measurement: 7/5/2024

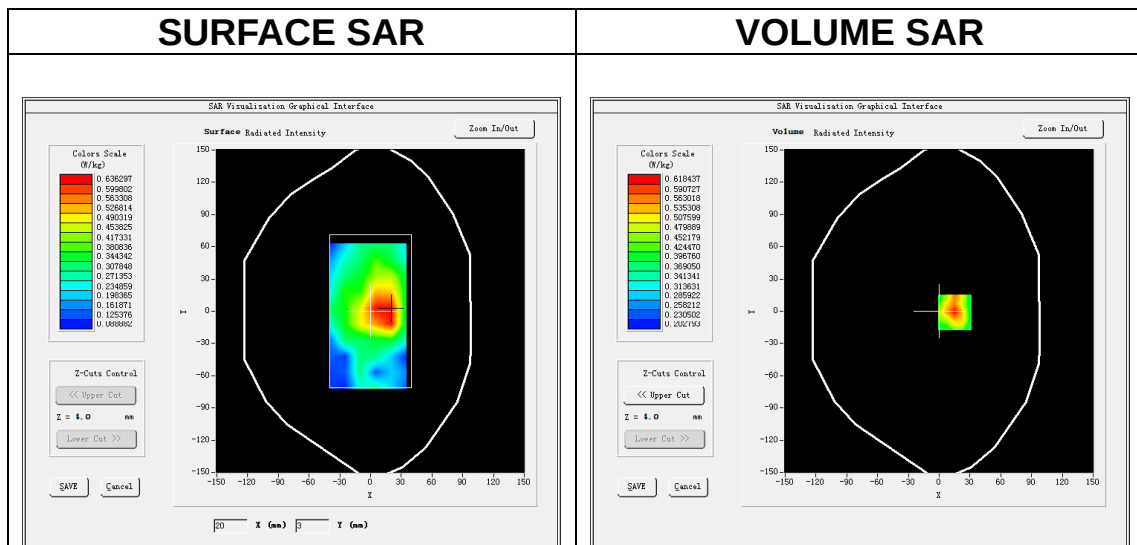
A. Experimental conditions.

<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)	39.858624
Relative permittivity (imaginary part)	13.902263
Conductivity (S/m)	1.337707
Variation (%)	3.770000

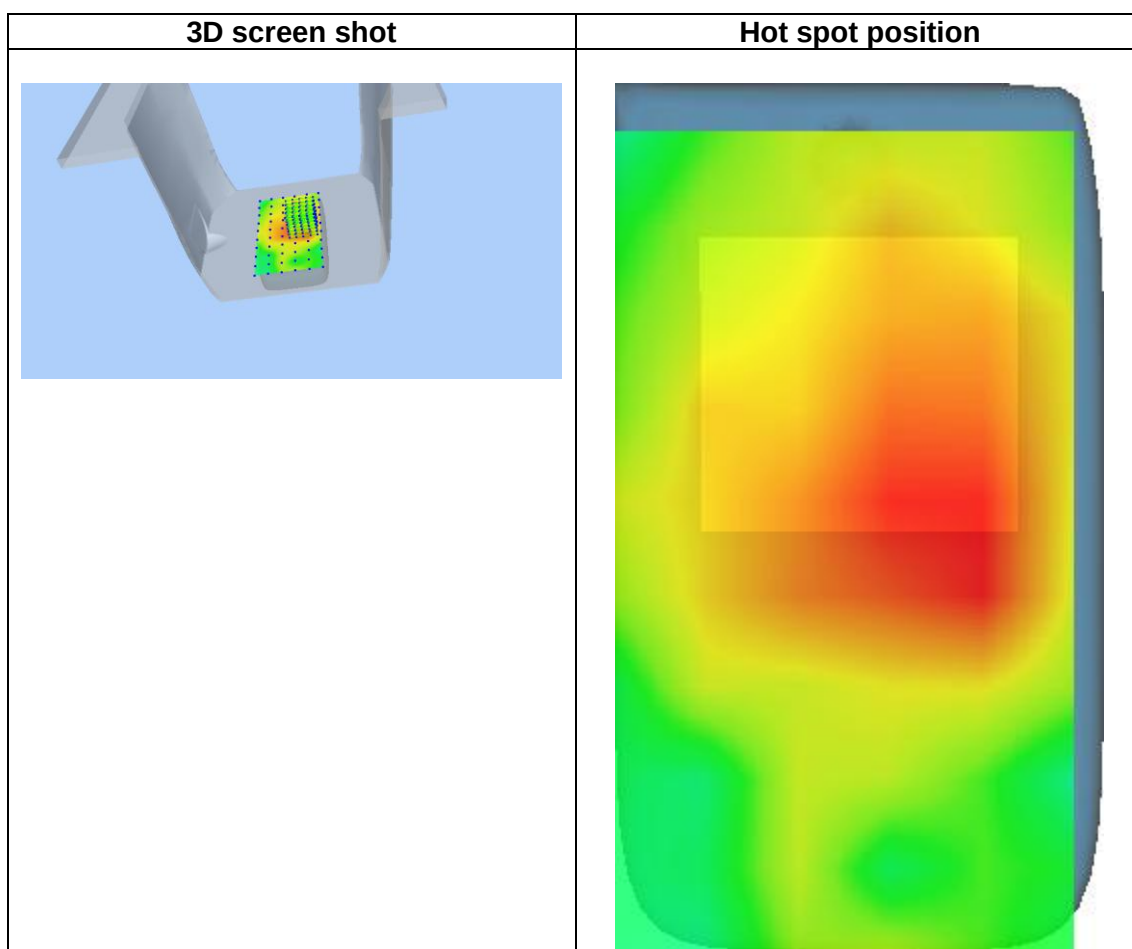
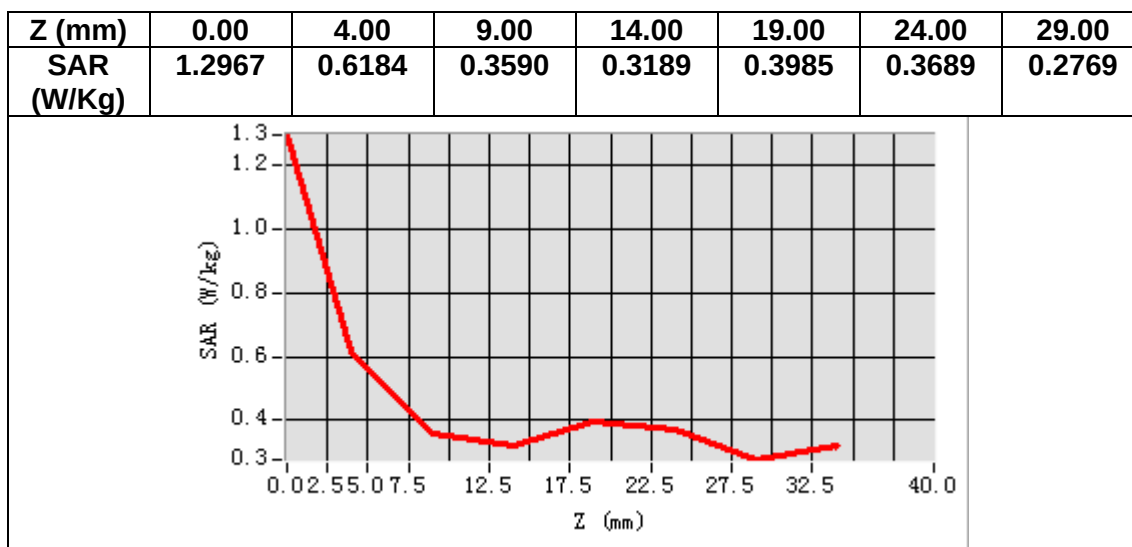
SURFACE SAR



Maximum location: X=15.00, Y=-1.00

SAR Peak: 1.27 W/kg

SAR 10g (W/Kg)	0.434042
SAR 1g (W/Kg)	0.656133



MEASUREMENT 9

Date of measurement: 25/4/2024

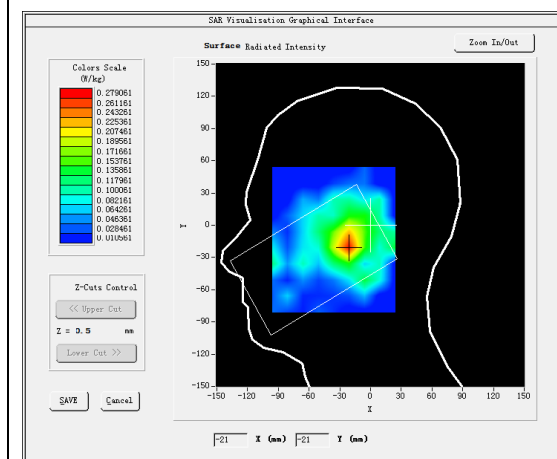
A. Experimental conditions.

<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>

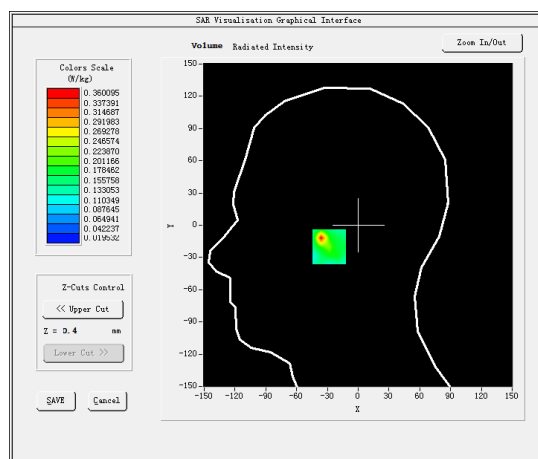
B. SAR Measurement Results

Frequency (MHz)	836.400000
Relative permittivity (real part)	41.404362
Relative permittivity (imaginary part)	19.407654
Conductivity (S/m)	0.901809
Variation (%)	-4.550000

SURFACE SAR



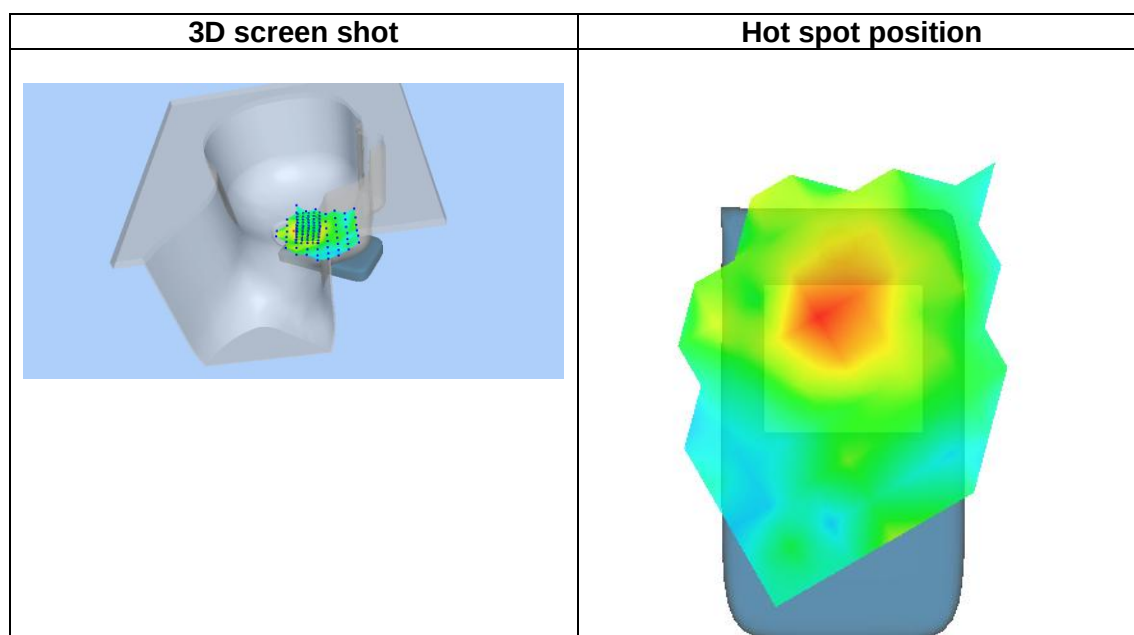
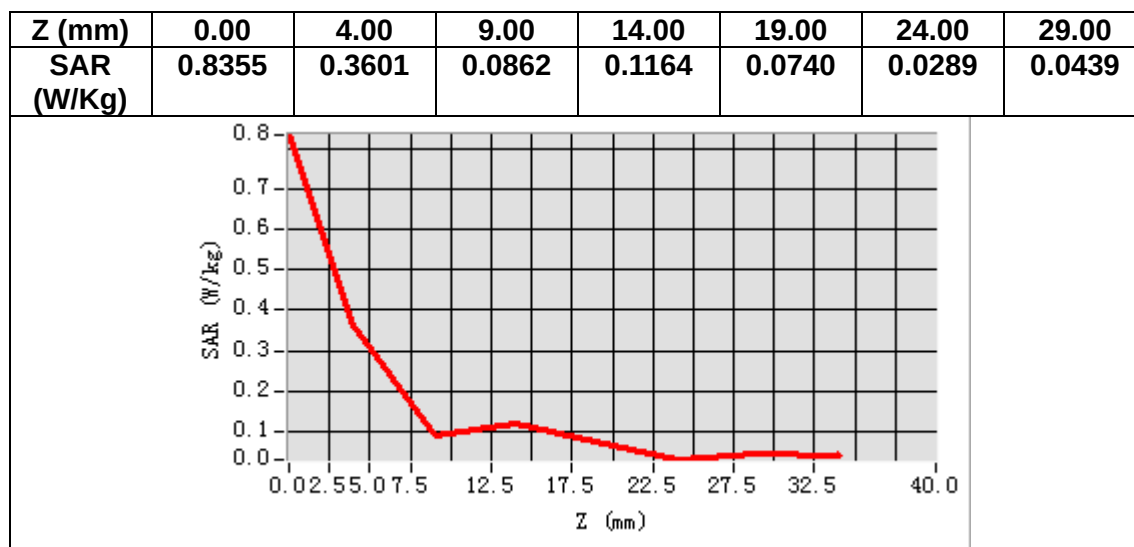
VOLUME SAR



Maximum location: X=-21.00, Y=-20.00

SAR Peak: 0.78 W/kg

SAR 10g (W/Kg)	0.148762
SAR 1g (W/Kg)	0.324011



MEASUREMENT 10

Date of measurement: 25/4/2024

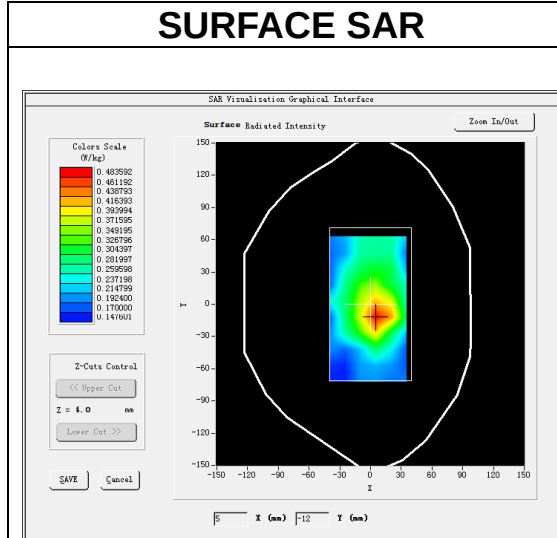
A. Experimental conditions.

<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>

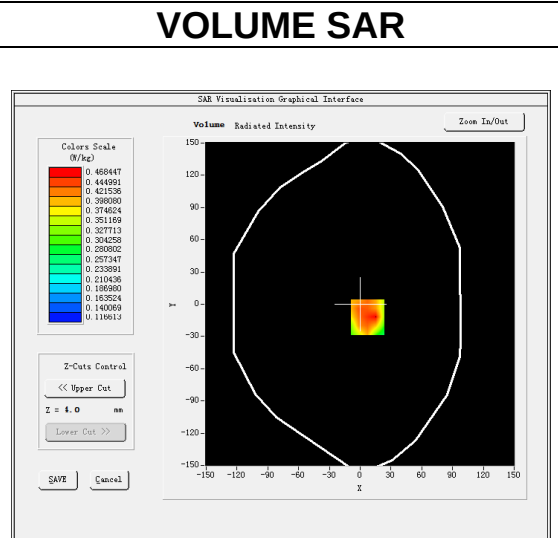
B. SAR Measurement Results

Frequency (MHz)	836.400000
Relative permittivity (real part)	41.404362
Relative permittivity (imaginary part)	19.407654
Conductivity (S/m)	0.901809
Variation (%)	0.240000

SURFACE SAR



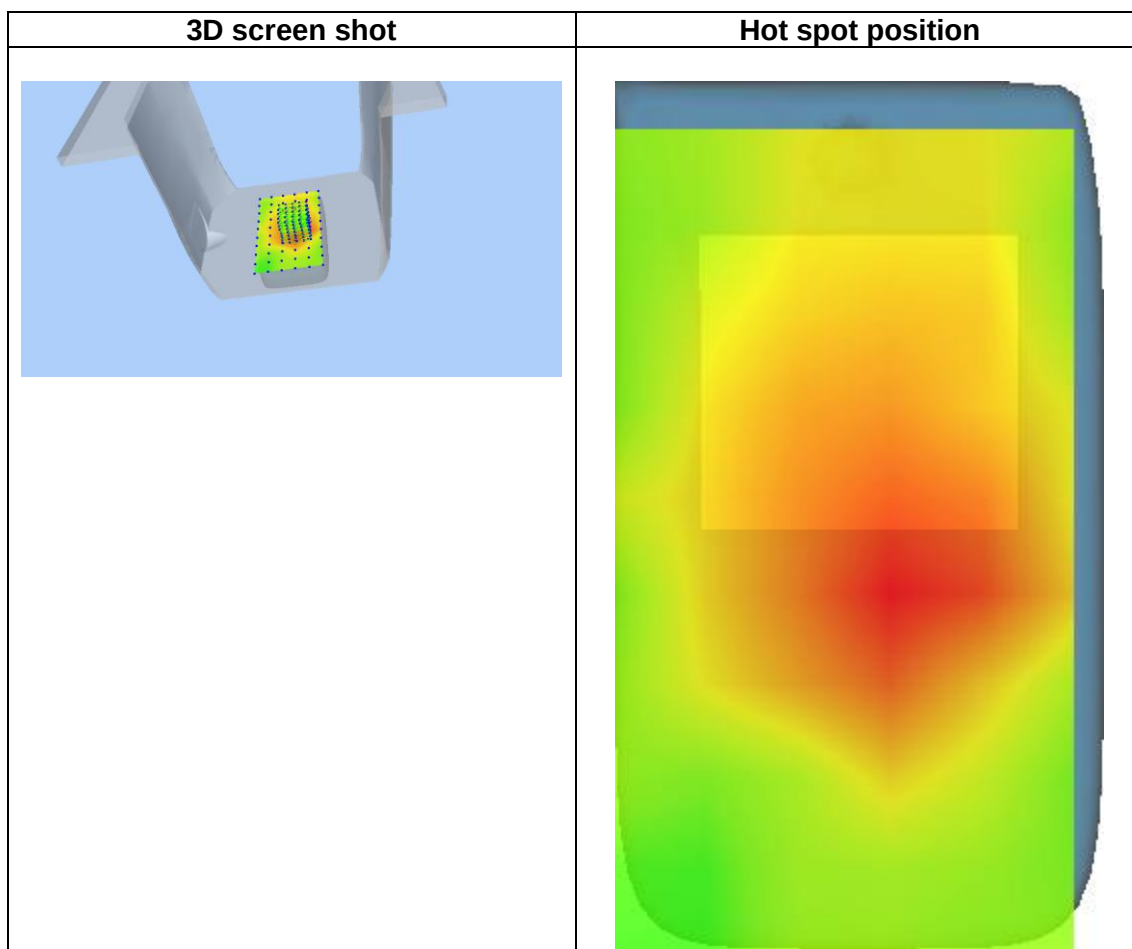
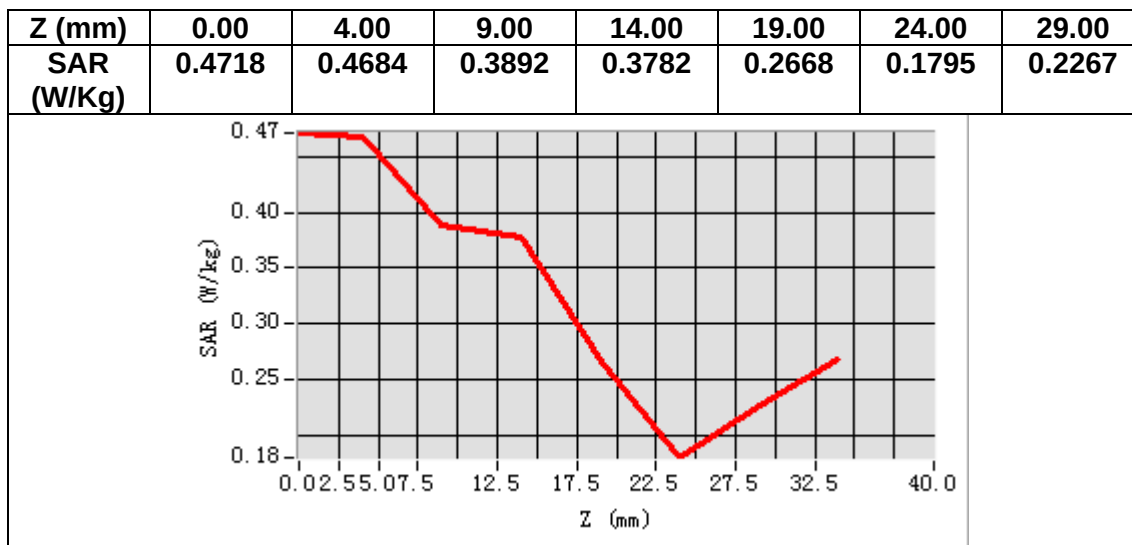
VOLUME SAR



Maximum location: X=7.00, Y=-12.00

SAR Peak: 0.56 W/kg

SAR 10g (W/Kg)	0.349789
SAR 1g (W/Kg)	0.436965



MEASUREMENT 11

Date of measurement: 11/5/2024

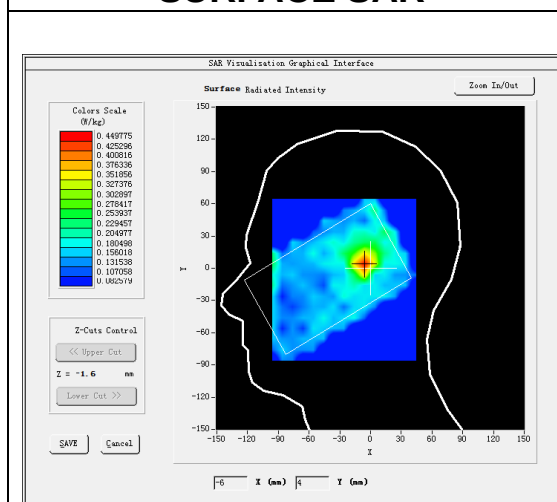
A. Experimental conditions.

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

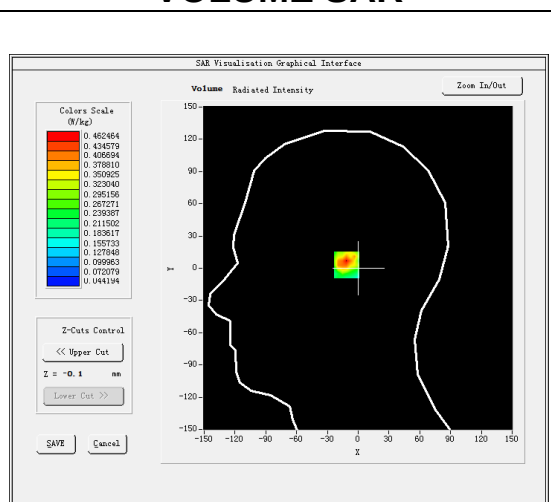
B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative permittivity (real part)	34.675907
Relative permittivity (imaginary part)	15.795970
Conductivity (S/m)	4.563280
Variation (%)	-1.280000

SURFACE SAR



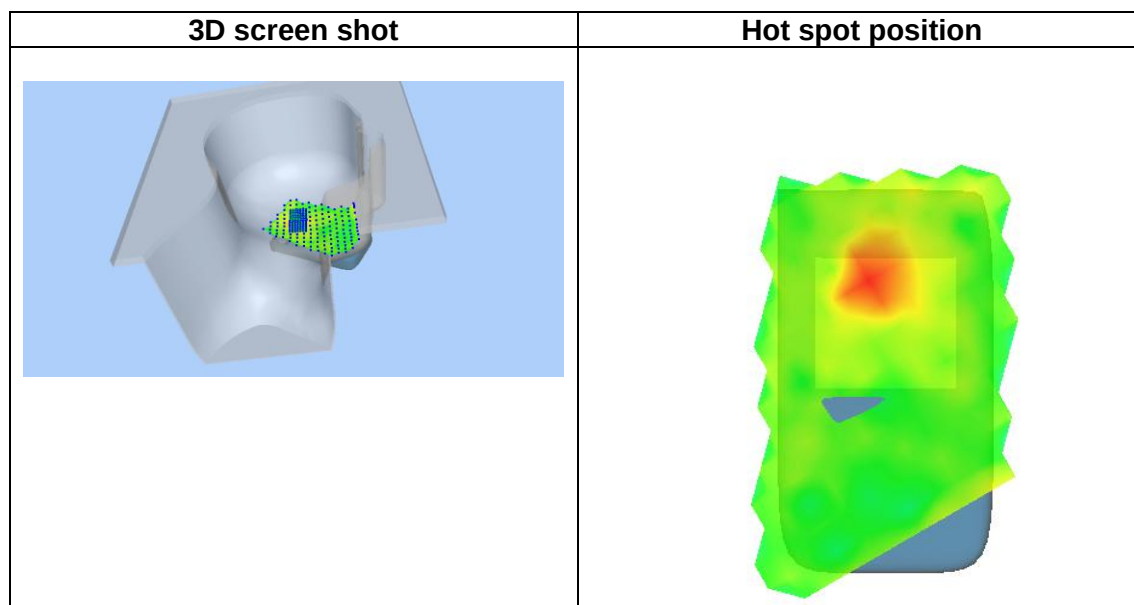
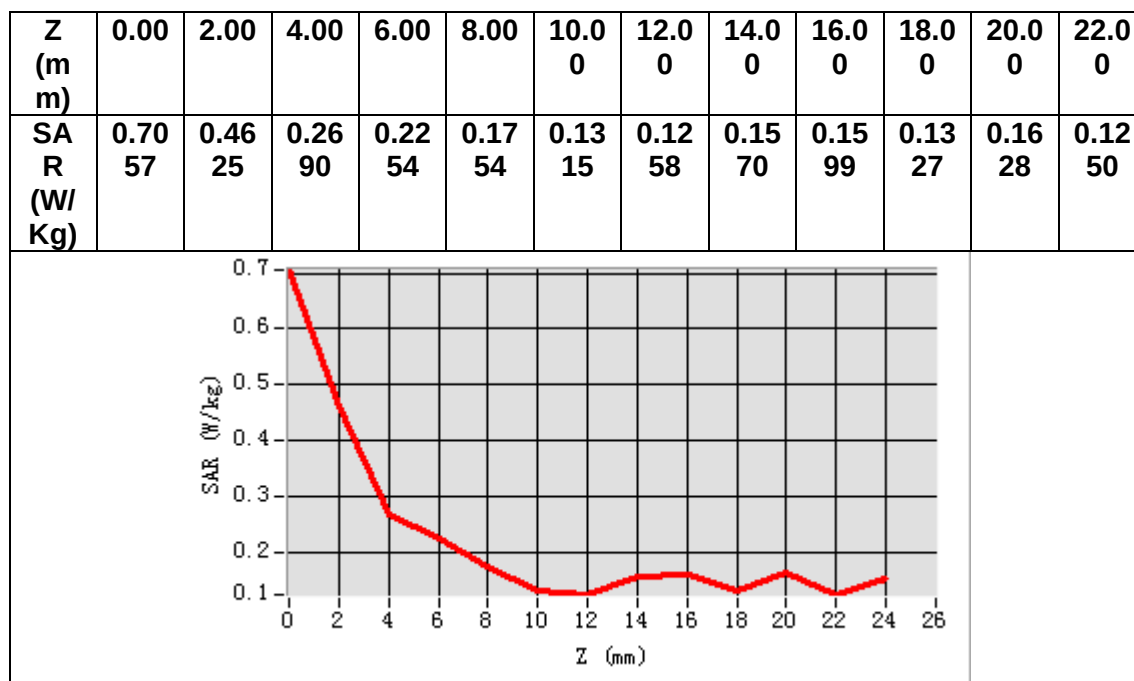
VOLUME SAR



Maximum location: X=-7.00, Y=3.00

SAR Peak: 1.10 W/kg

SAR 10g (W/Kg)	0.247116
SAR 1g (W/Kg)	0.425673



MEASUREMENT 12

Date of measurement: 12/5/2024

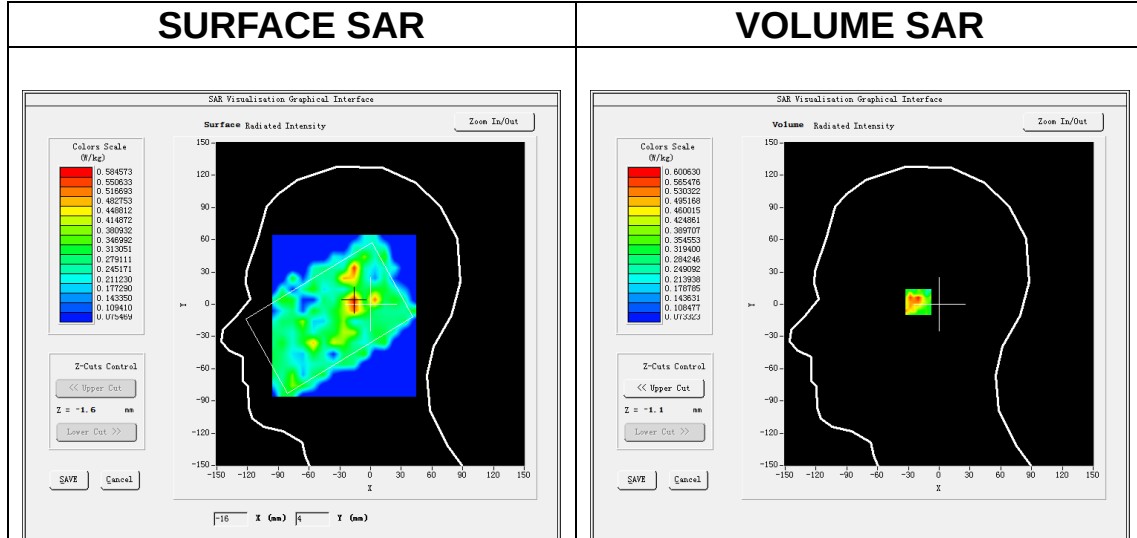
A. Experimental conditions.

<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)	34.040967
Relative permittivity (imaginary part)	16.163672
Conductivity (S/m)	5.230744
Variation (%)	-3.680000

SURFACE SAR

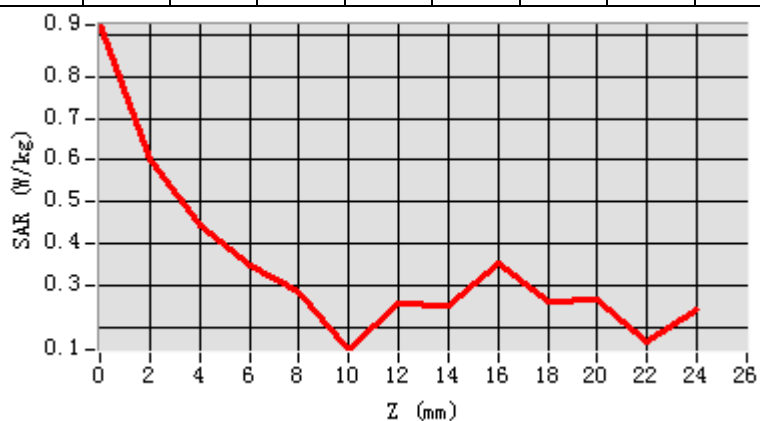


Maximum location: X=-17.00, Y=2.00

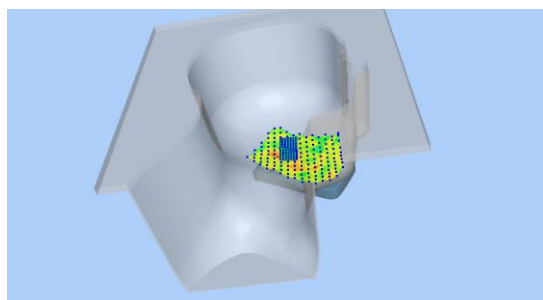
SAR Peak: 1.43 W/kg

SAR 10g (W/Kg)	0.330888
SAR 1g (W/Kg)	0.536193

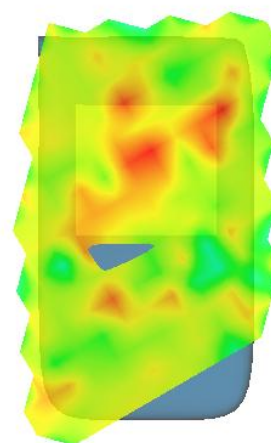
Z (m m)	0.00	2.00	4.00	6.00	8.00	10.0 0	12.0 0	14.0 0	16.0 0	18.0 0	20.0 0	22.0 0
SAR (W/ Kg)	0.92 34	0.60 06	0.44 28	0.34 91	0.28 42	0.14 60	0.25 60	0.25 12	0.35 35	0.25 90	0.26 38	0.16 71



3D screen shot



Hot spot position



MEASUREMENT 13

Date of measurement: 11/5/2024

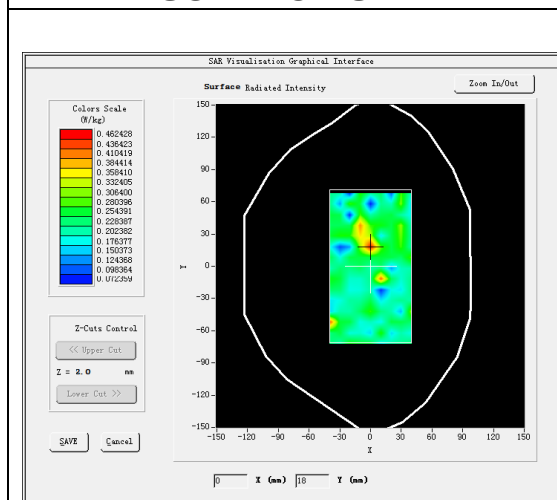
A. Experimental conditions.

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

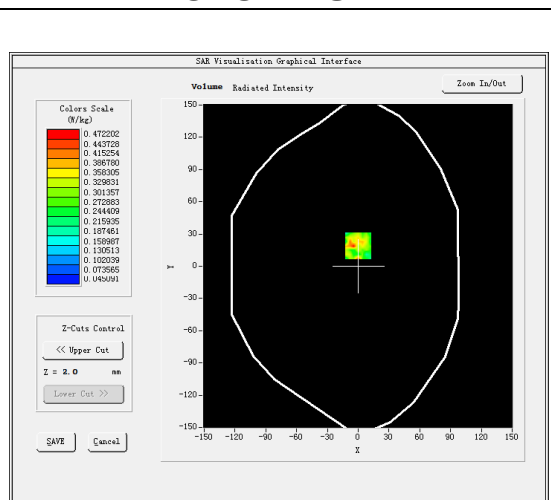
B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative permittivity (real part)	34.675907
Relative permittivity (imaginary part)	15.795970
Conductivity (S/m)	4.563280
Variation (%)	3.209999

SURFACE SAR



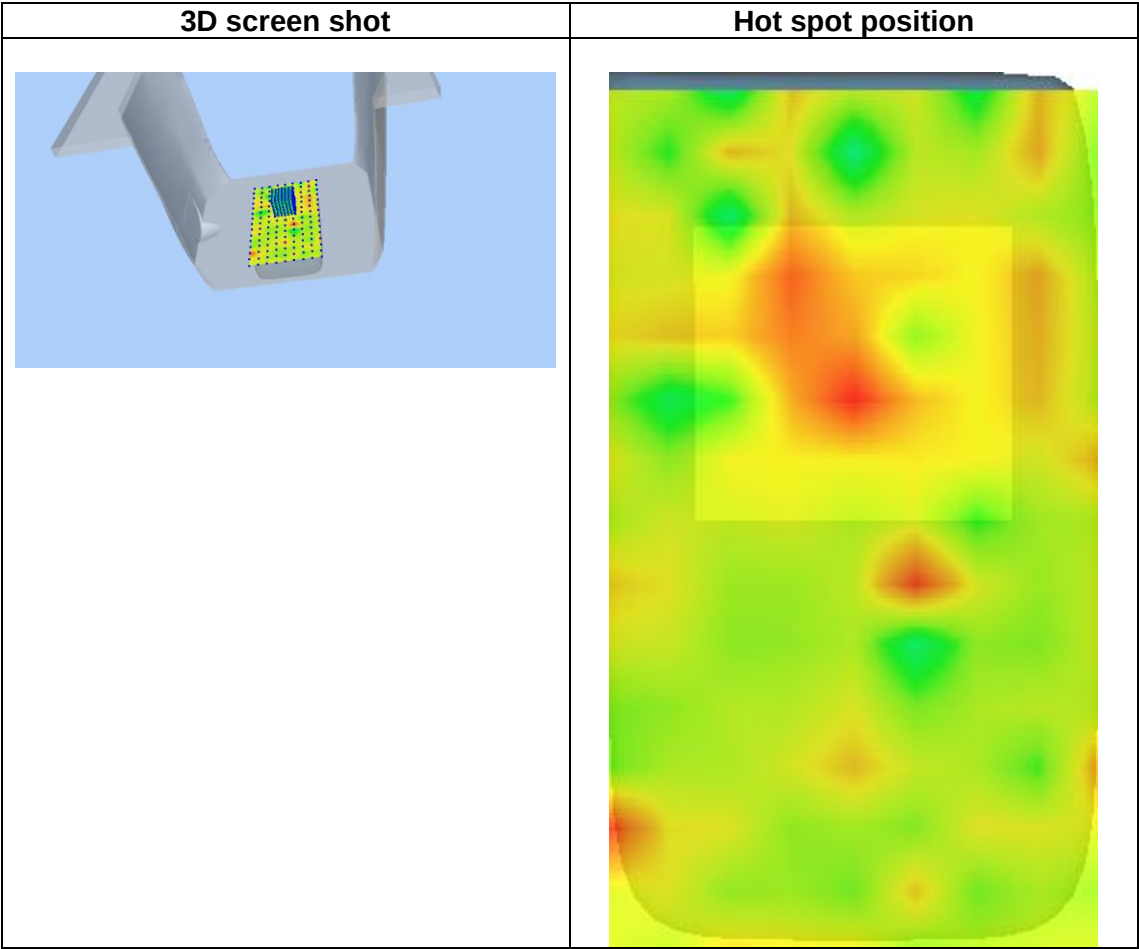
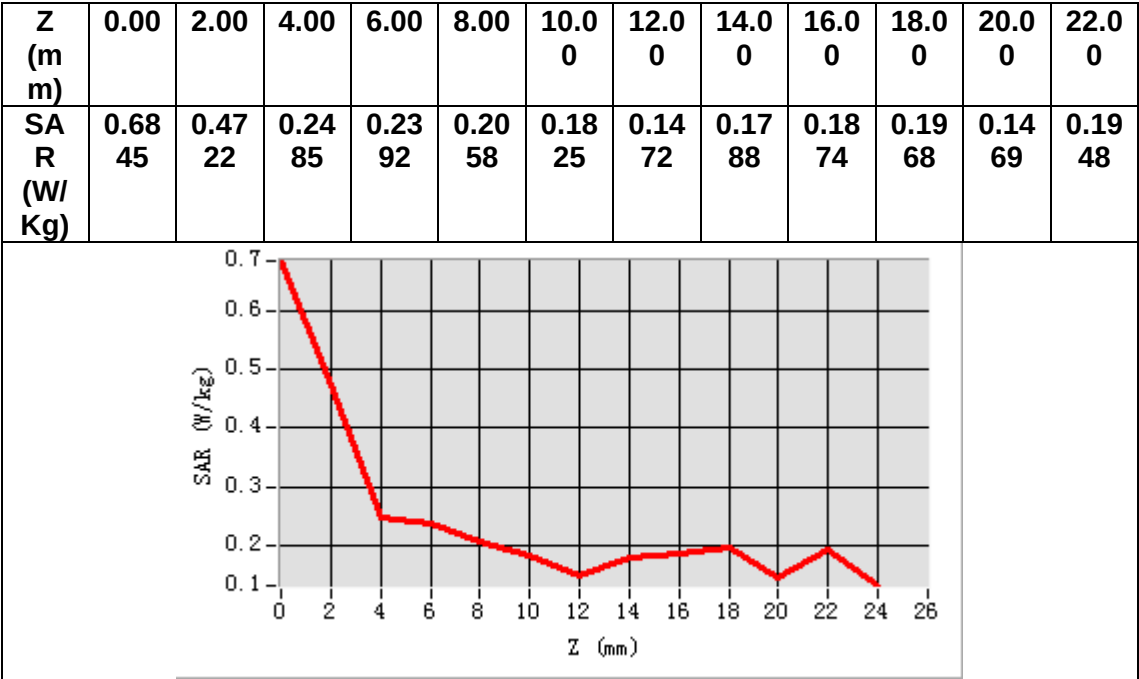
VOLUME SAR



Maximum location: X=0.00, Y=19.00

SAR Peak: 0.76 W/kg

SAR 10g (W/Kg)	0.222032
SAR 1g (W/Kg)	0.310108



MEASUREMENT 14

Date of measurement: 12/5/2024

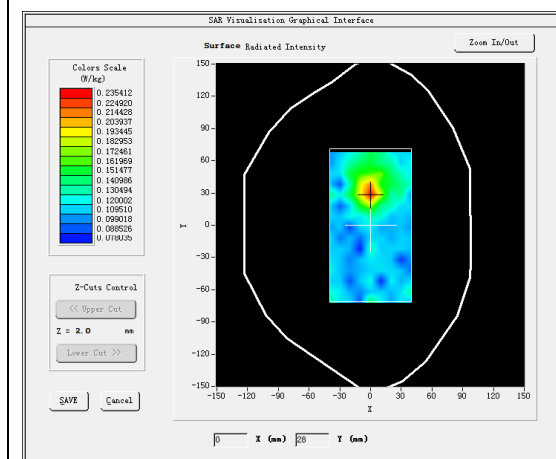
A. Experimental conditions.

<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>

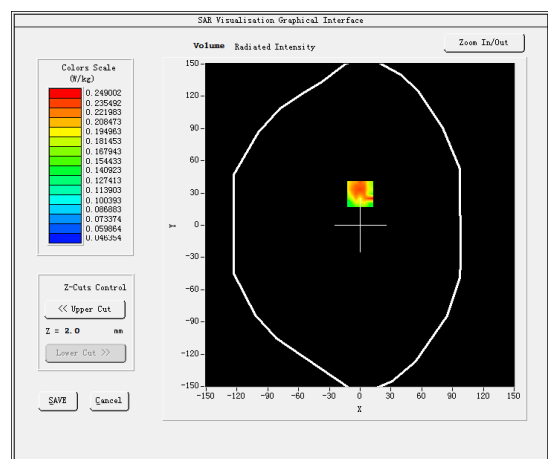
B. SAR Measurement Results

Frequency (MHz)	5825.000000
Relative permittivity (real part)	34.040967
Relative permittivity (imaginary part)	16.163672
Conductivity (S/m)	5.230744
Variation (%)	4.709999

SURFACE SAR



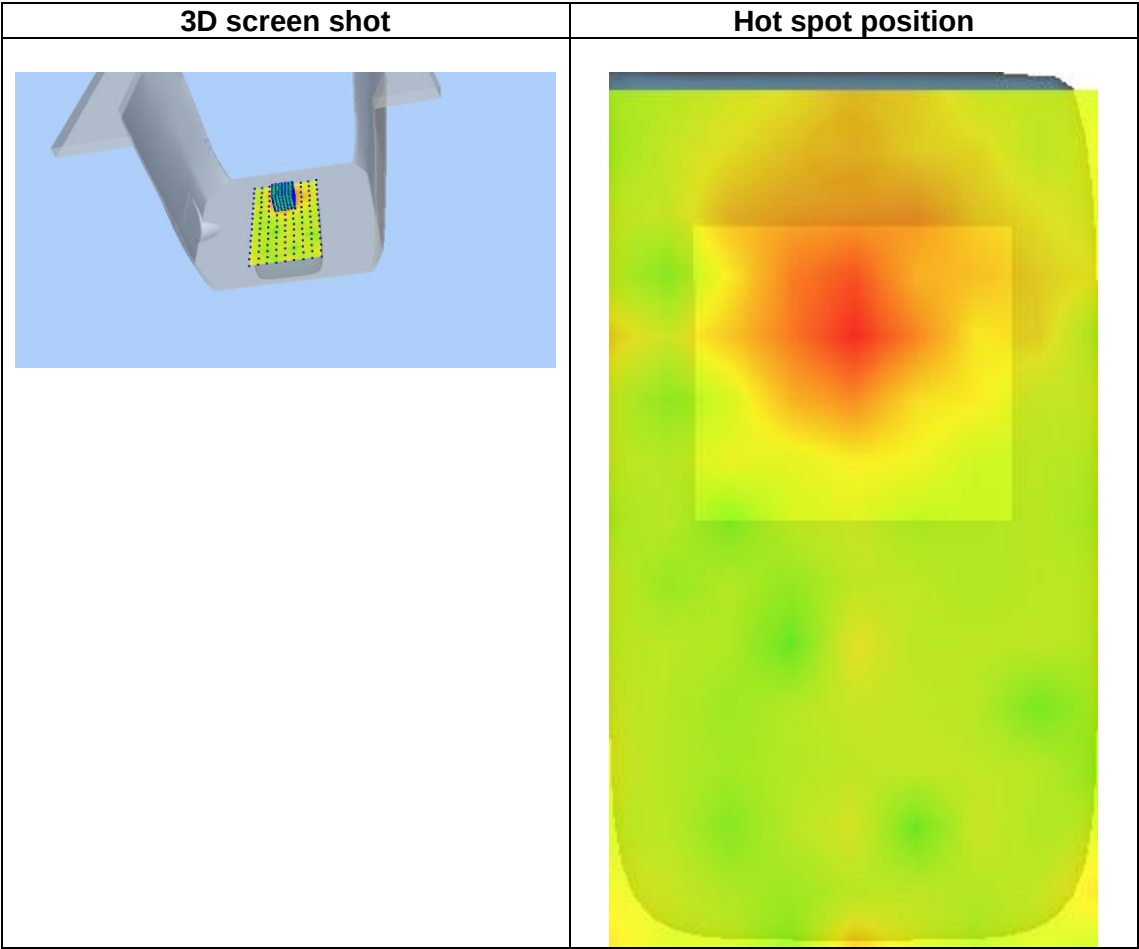
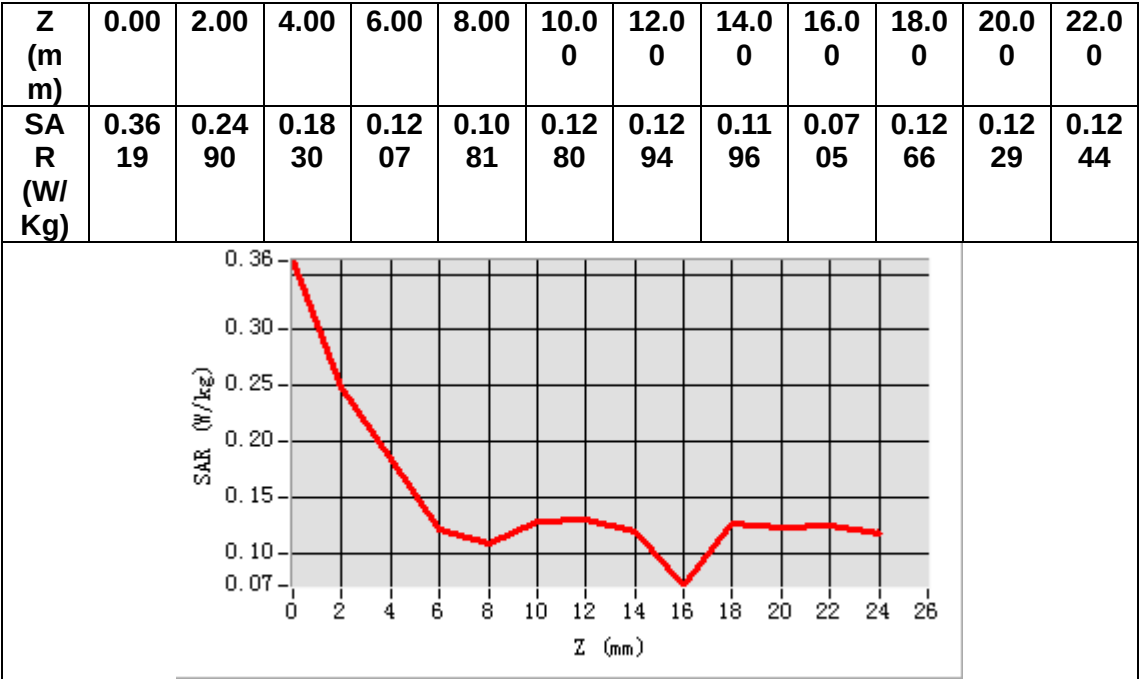
VOLUME SAR



Maximum location: X=0.00, Y=29.00

SAR Peak: 0.38 W/kg

SAR 10g (W/Kg)	0.145142
SAR 1g (W/Kg)	0.175903



MEASUREMENT 15

Date of measurement: 14/5/2024

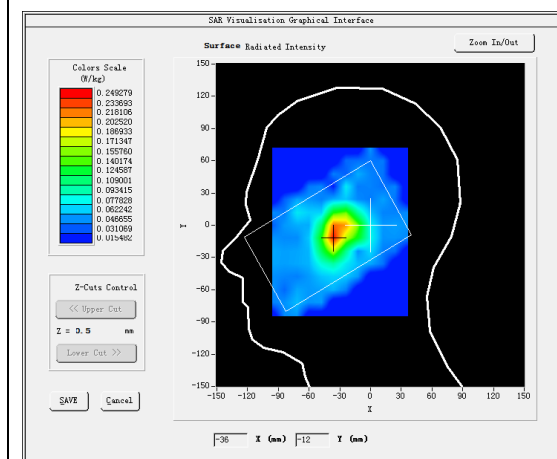
A. Experimental conditions.

<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>High</u>
<u>Signal</u>	<u>IEEE802.11b (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.85</u>

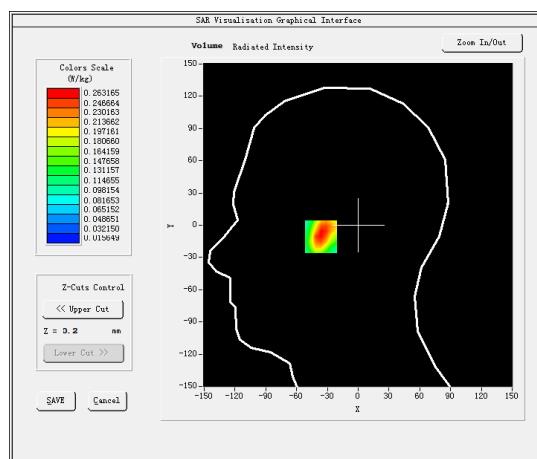
B. SAR Measurement Results

Frequency (MHz)	2462.000000
Relative permittivity (real part)	37.643635
Relative permittivity (imaginary part)	13.108536
Conductivity (S/m)	1.792956
Variation (%)	-4.470000

SURFACE SAR



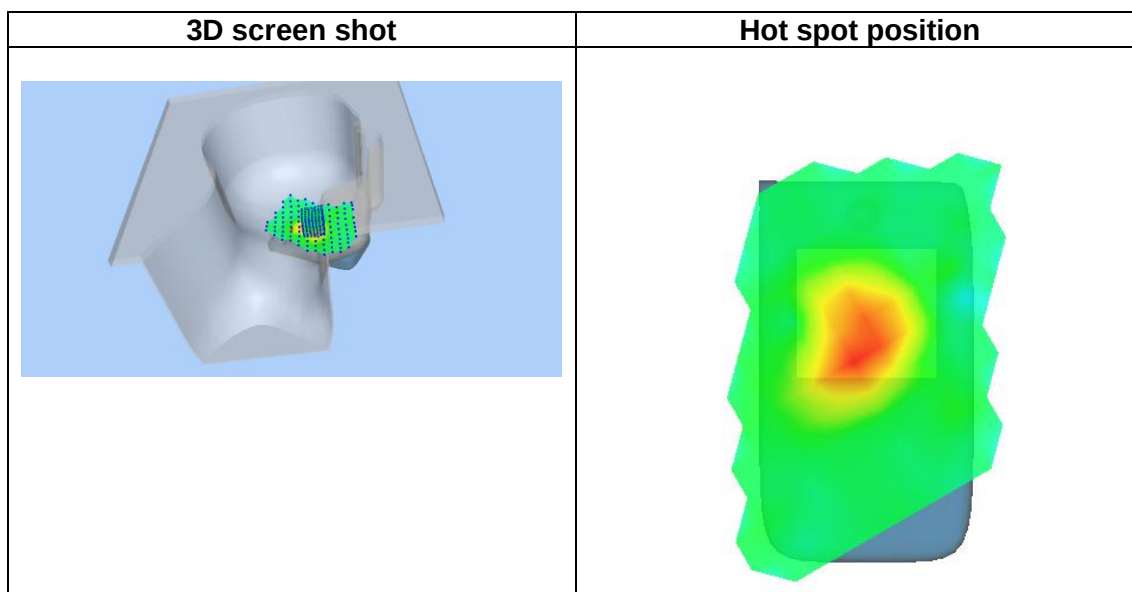
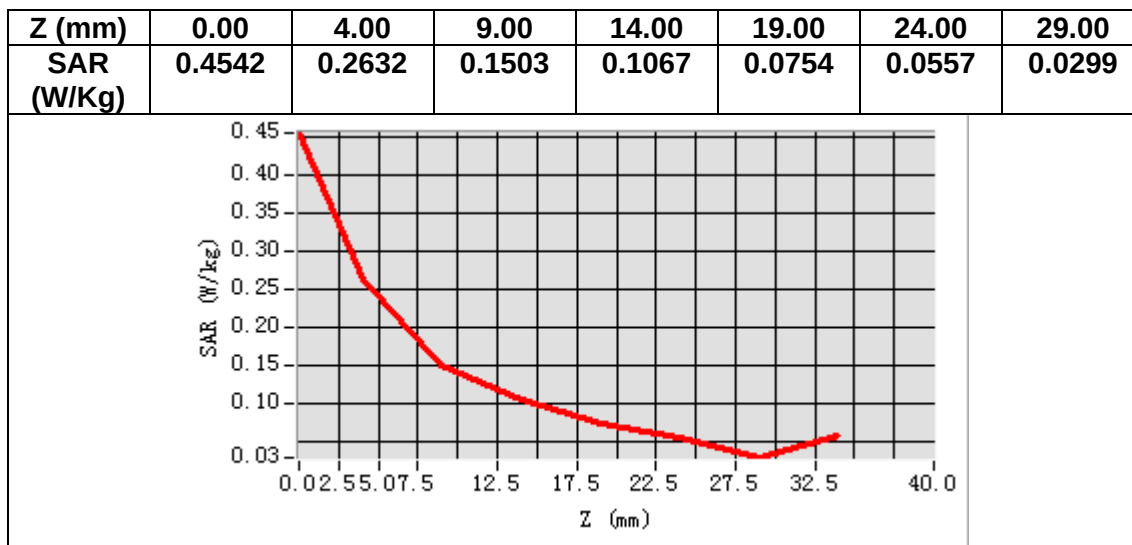
VOLUME SAR



Maximum location: X=-35.00, Y=-10.00

SAR Peak: 0.42 W/kg

SAR 10g (W/Kg)	0.144285
SAR 1g (W/Kg)	0.247375



MEASUREMENT 16

Date of measurement: 14/5/2024

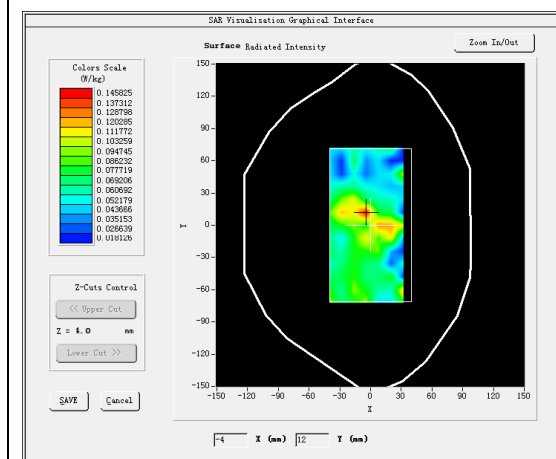
A. Experimental conditions.

<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>High</u>
<u>Signal</u>	<u>IEEE802.11b (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.85</u>

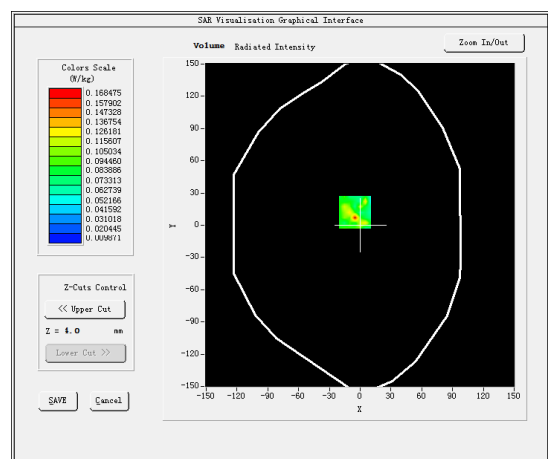
B. SAR Measurement Results

Frequency (MHz)	2462.000000
Relative permittivity (real part)	37.643635
Relative permittivity (imaginary part)	13.108536
Conductivity (S/m)	1.792956
Variation (%)	0.150000

SURFACE SAR



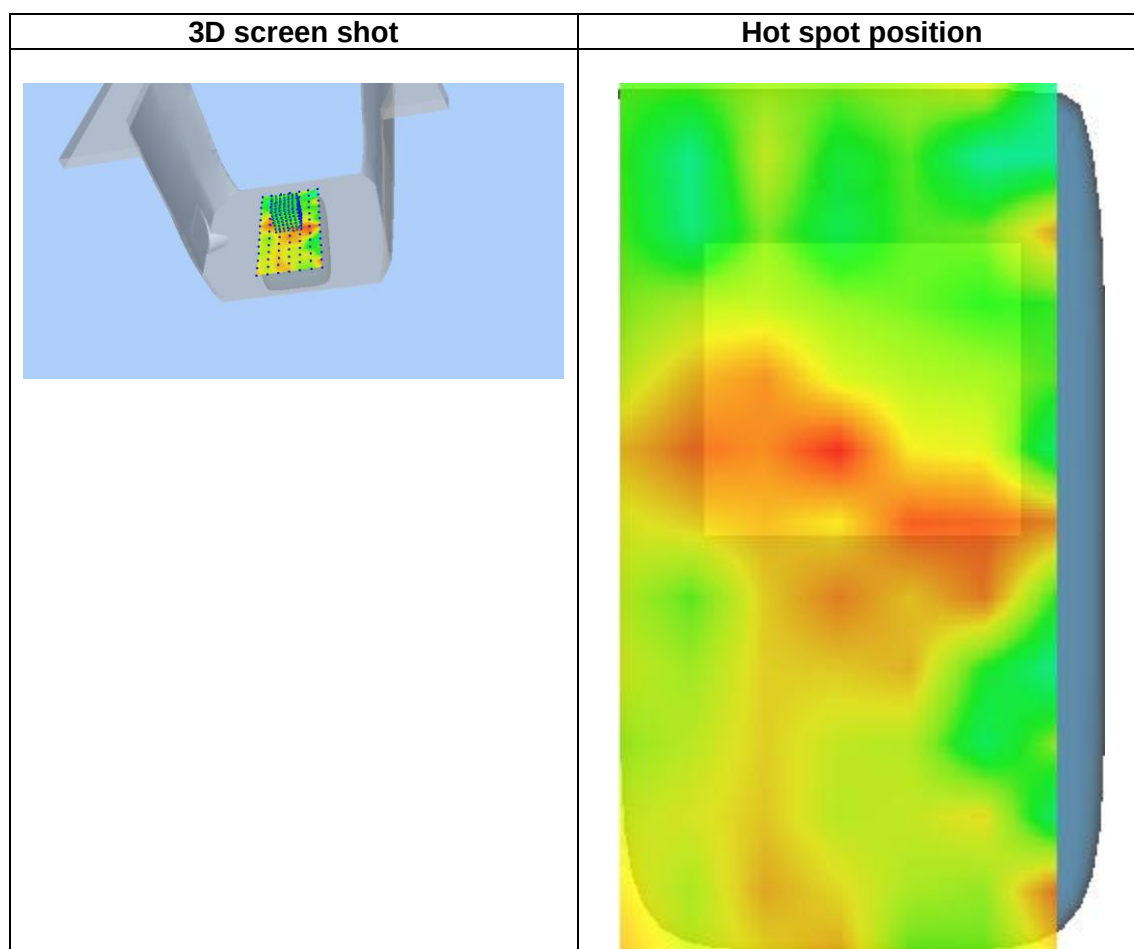
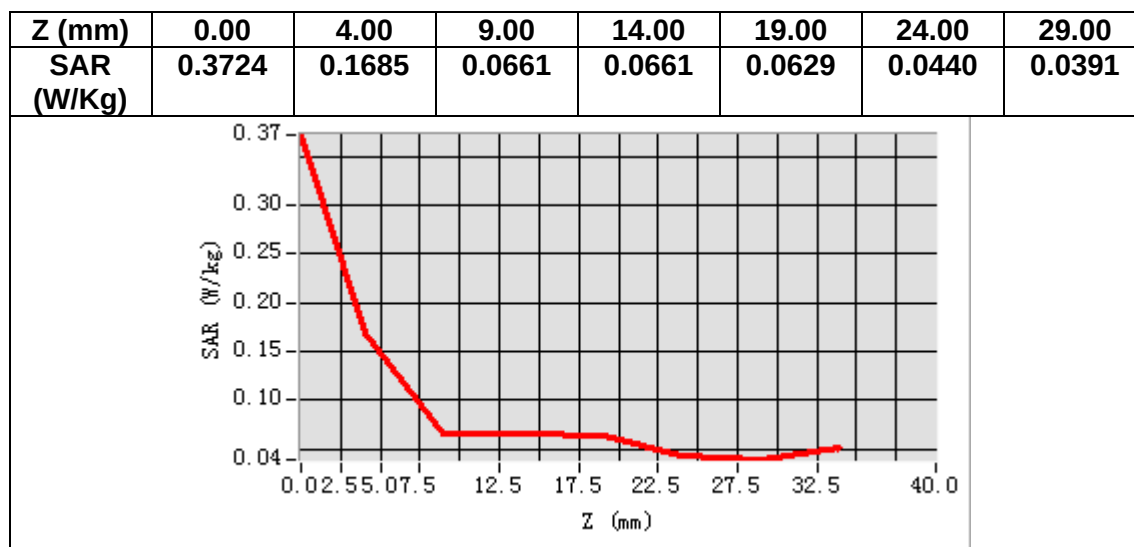
VOLUME SAR



Maximum location: X=-5.00, Y=12.00

SAR Peak: 0.32 W/kg

SAR 10g (W/Kg)	0.076388
SAR 1g (W/Kg)	0.126005



MEASUREMENT 17

Date of measurement: 15/5/2024

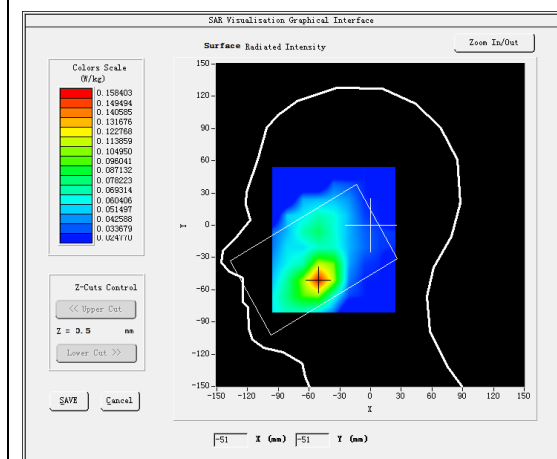
A. Experimental conditions.

<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>

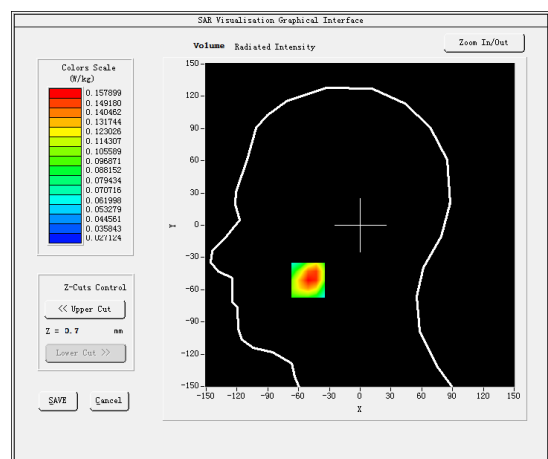
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	39.005302
Relative permittivity (imaginary part)	13.791376
Conductivity (S/m)	1.440433
Variation (%)	-3.700000

SURFACE SAR



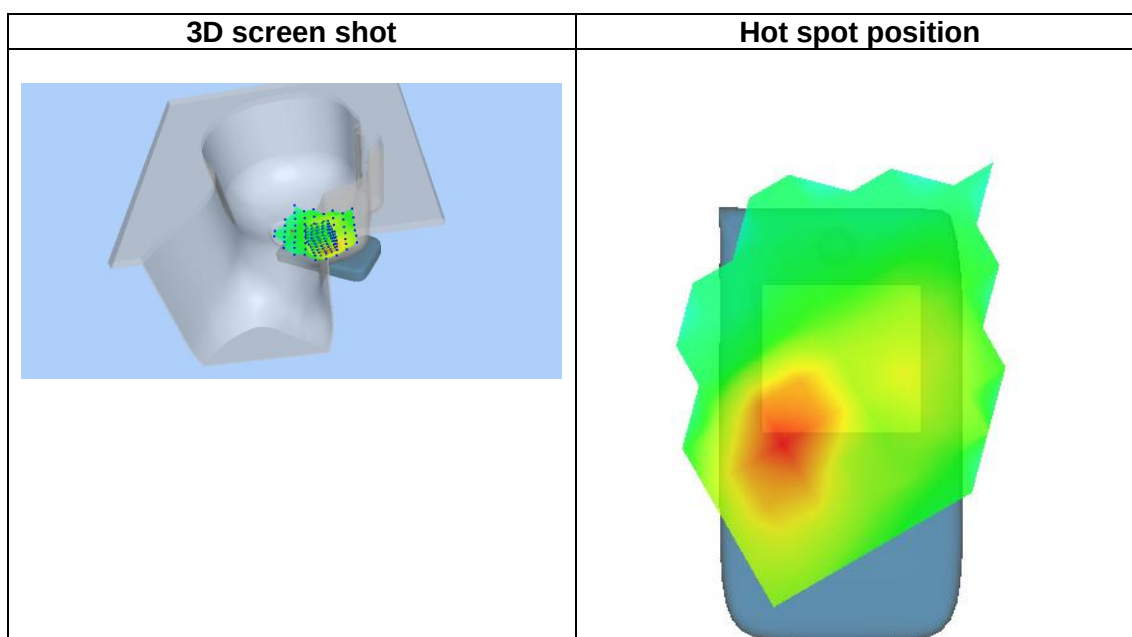
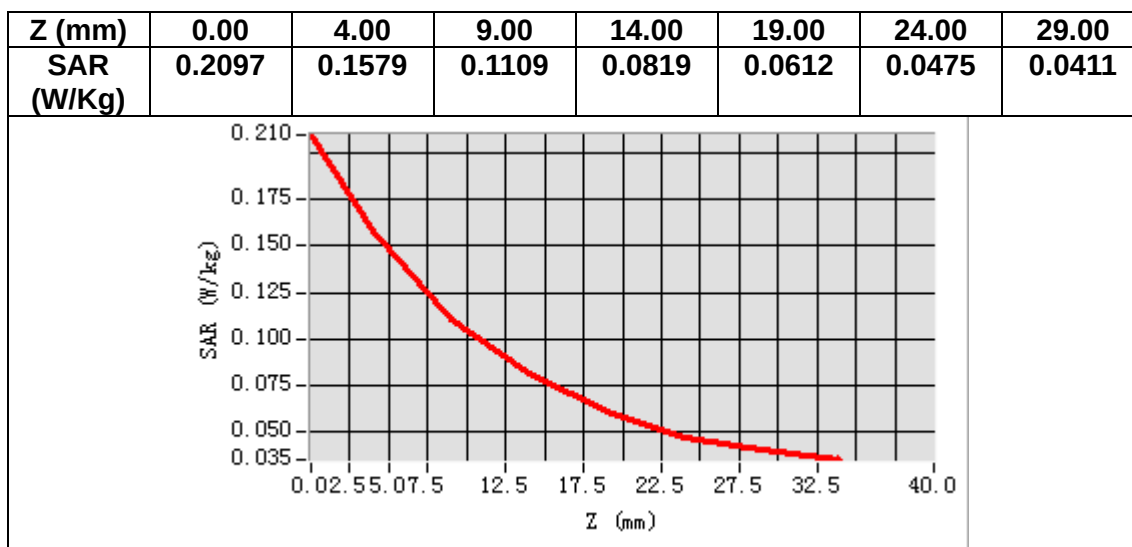
VOLUME SAR



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

SAR Peak: 0.22 W/kg

SAR 10g (W/Kg)	0.099428
SAR 1g (W/Kg)	0.156190



MEASUREMENT 18

Date of measurement: 15/5/2024

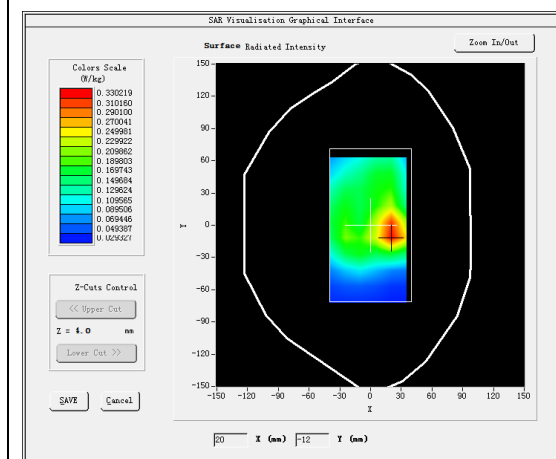
A. Experimental conditions.

<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>

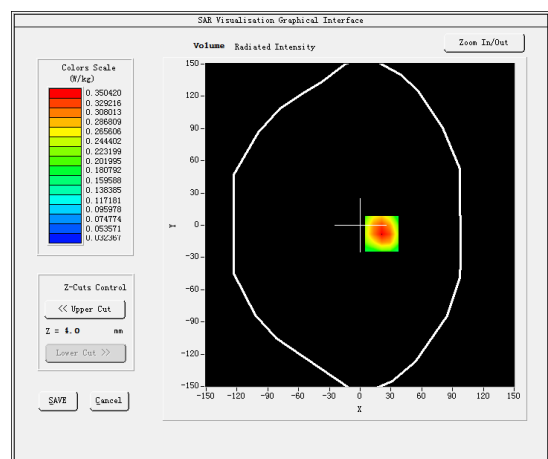
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	39.005302
Relative permittivity (imaginary part)	13.791376
Conductivity (S/m)	1.440433
Variation (%)	0.230000

SURFACE SAR



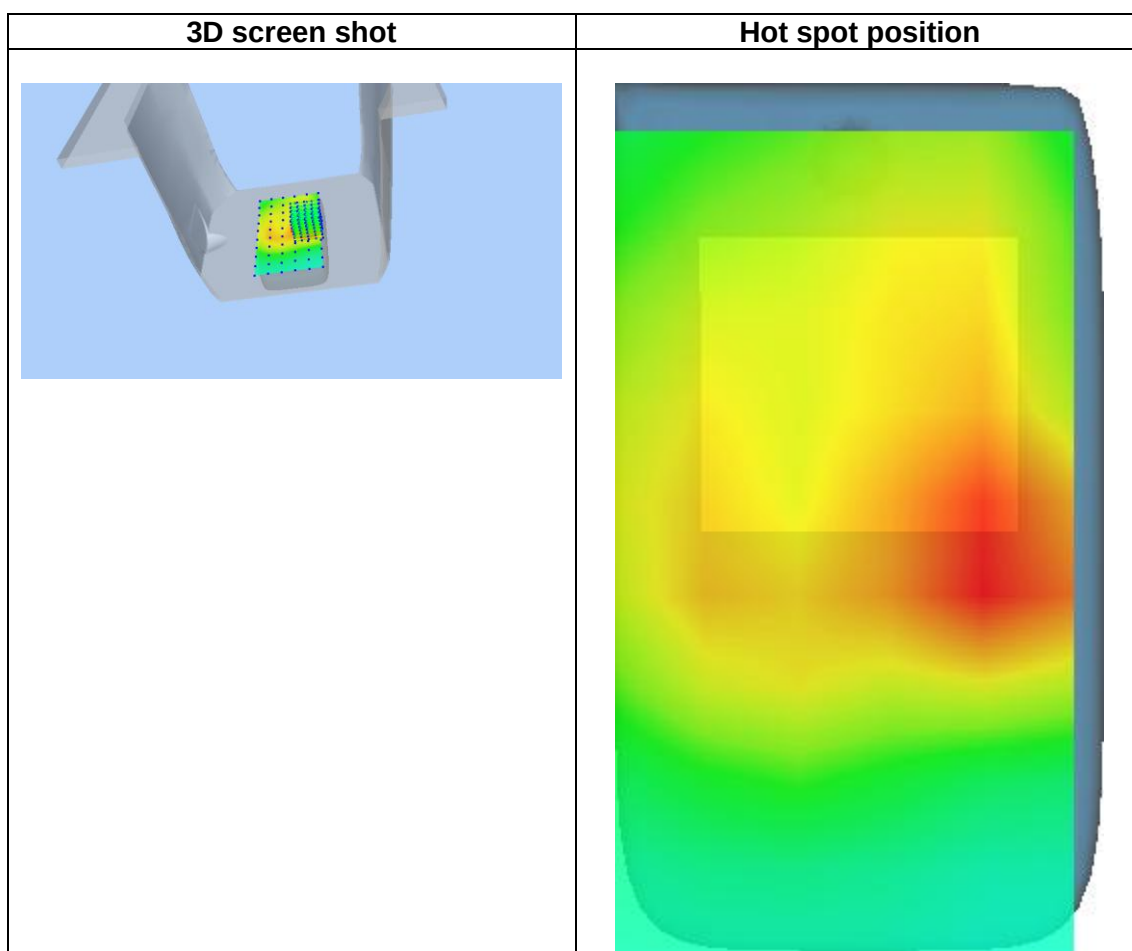
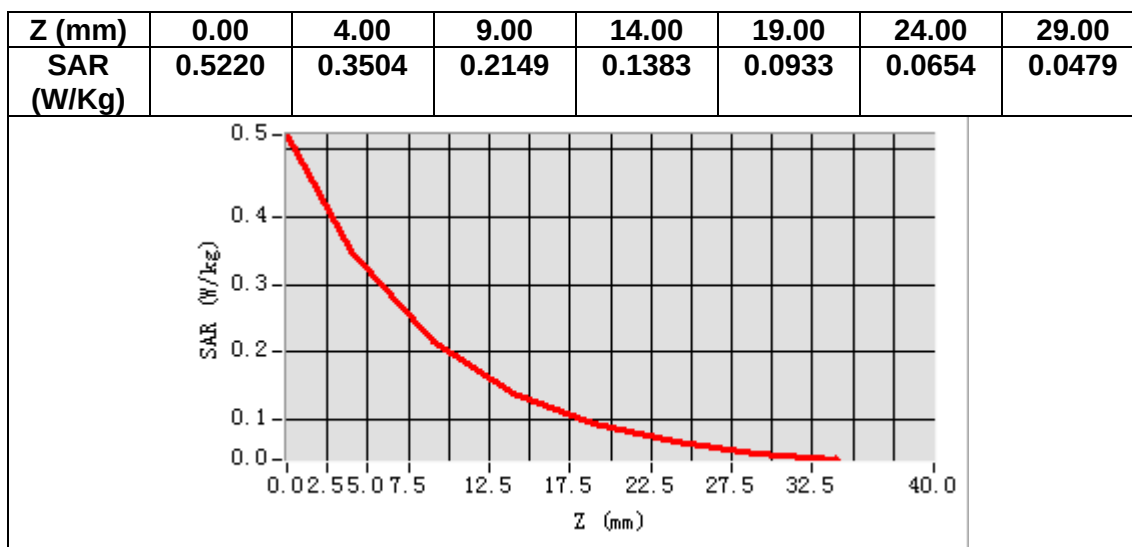
VOLUME SAR



Maximum location: X=21.00, Y=-8.00

SAR Peak: 0.52 W/kg

SAR 10g (W/Kg)	0.205164
SAR 1g (W/Kg)	0.344562



MEASUREMENT 19

Date of measurement: 7/5/2024

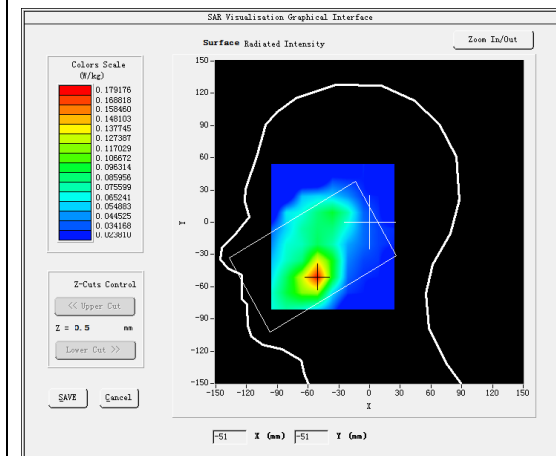
A. Experimental conditions.

<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>

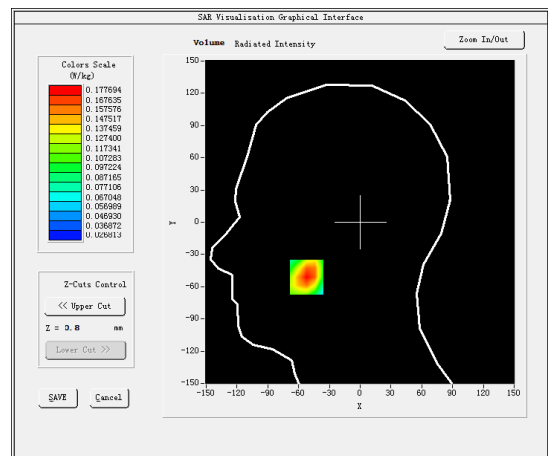
B. SAR Measurement Results

Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.866524
Relative permittivity (imaginary part)	13.887113
Conductivity (S/m)	1.336635
Variation (%)	-0.420000

SURFACE SAR



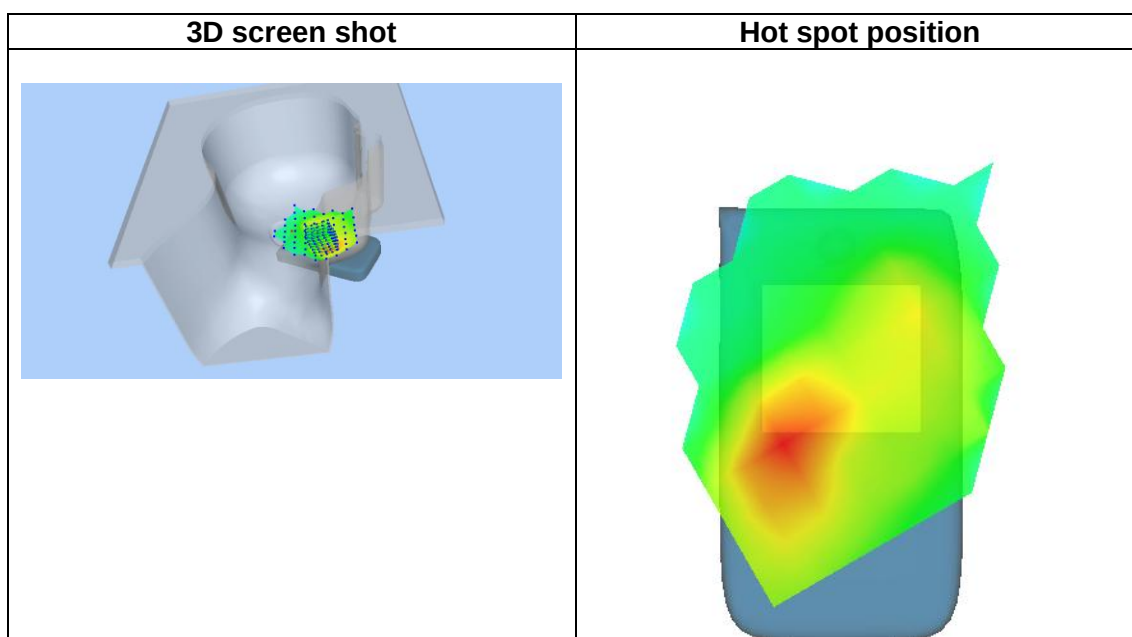
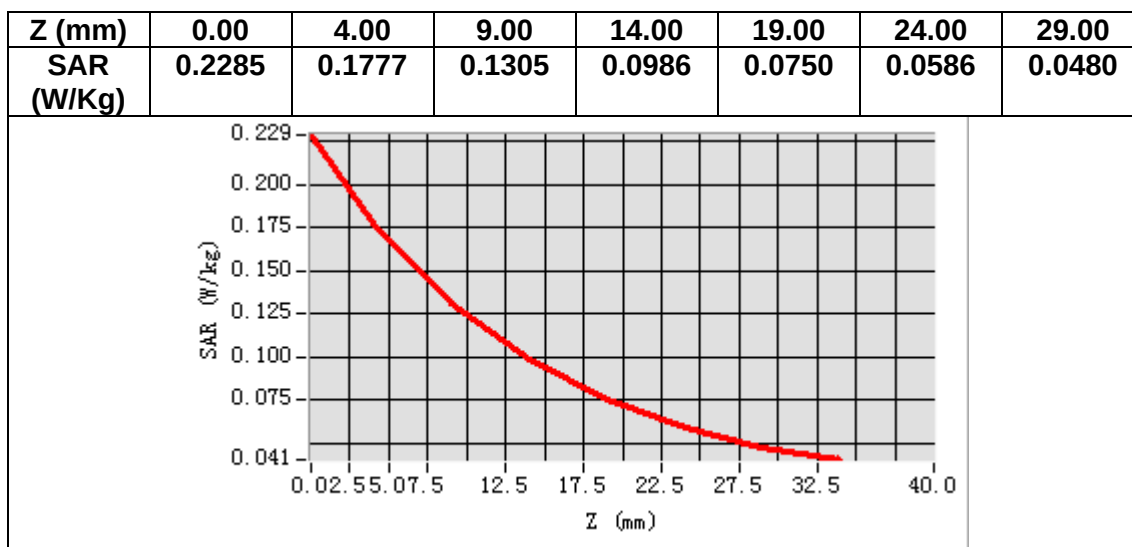
VOLUME SAR



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

SAR Peak: 0.24 W/kg

SAR 10g (W/Kg)	0.112779
SAR 1g (W/Kg)	0.170070



MEASUREMENT 20

Date of measurement: 7/5/2024

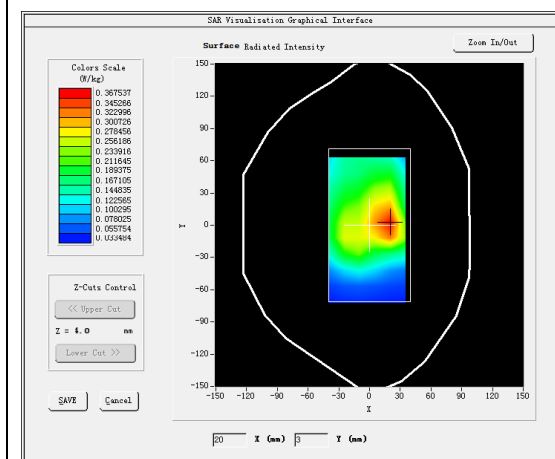
A. Experimental conditions.

<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>

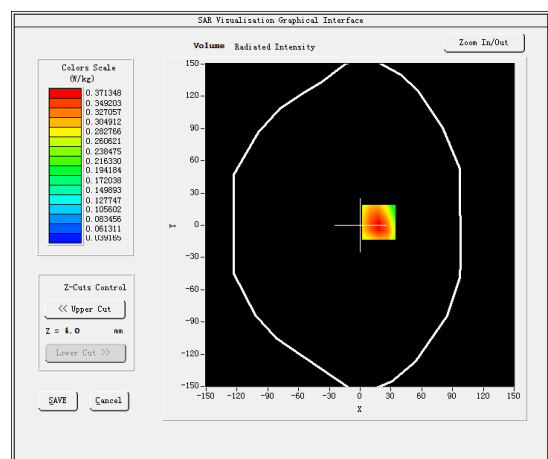
B. SAR Measurement Results

Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.866524
Relative permittivity (imaginary part)	13.887113
Conductivity (S/m)	1.336635
Variation (%)	0.030000

SURFACE SAR



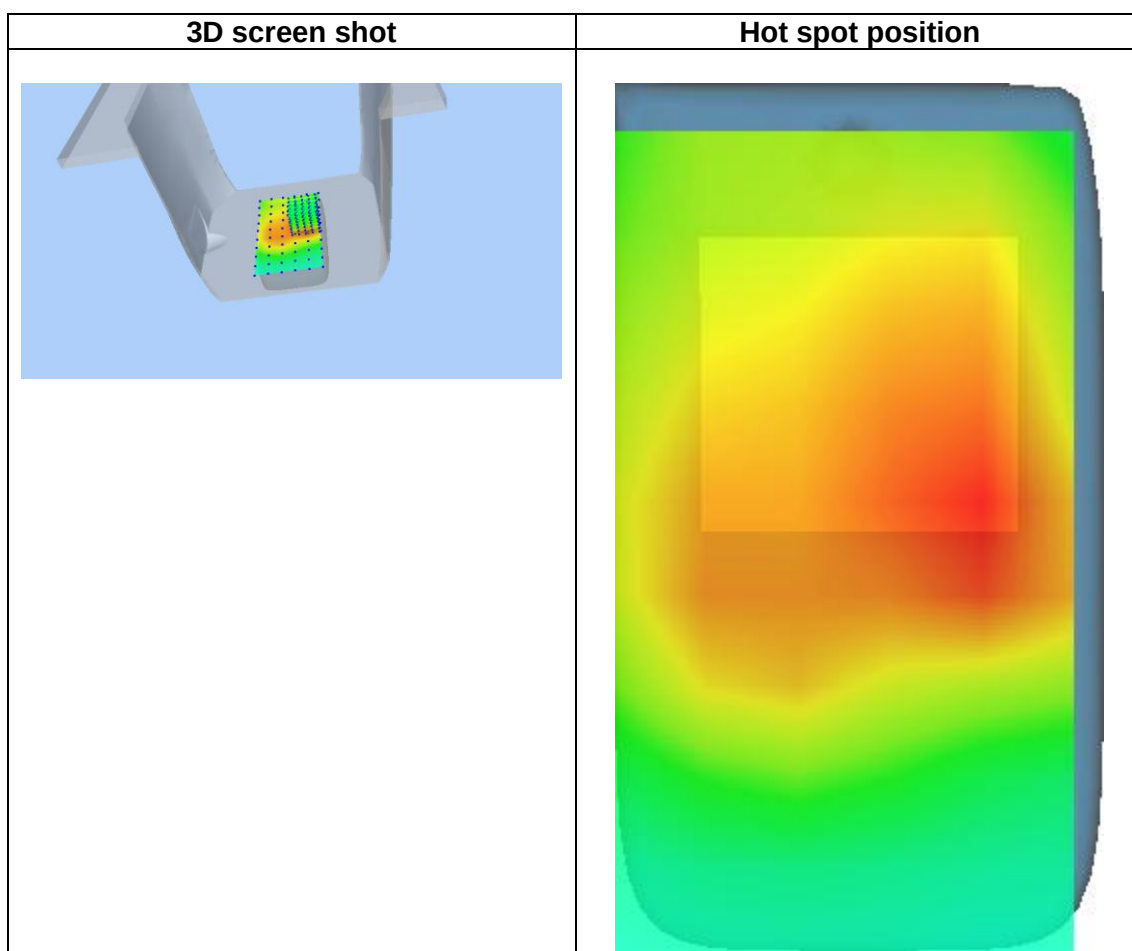
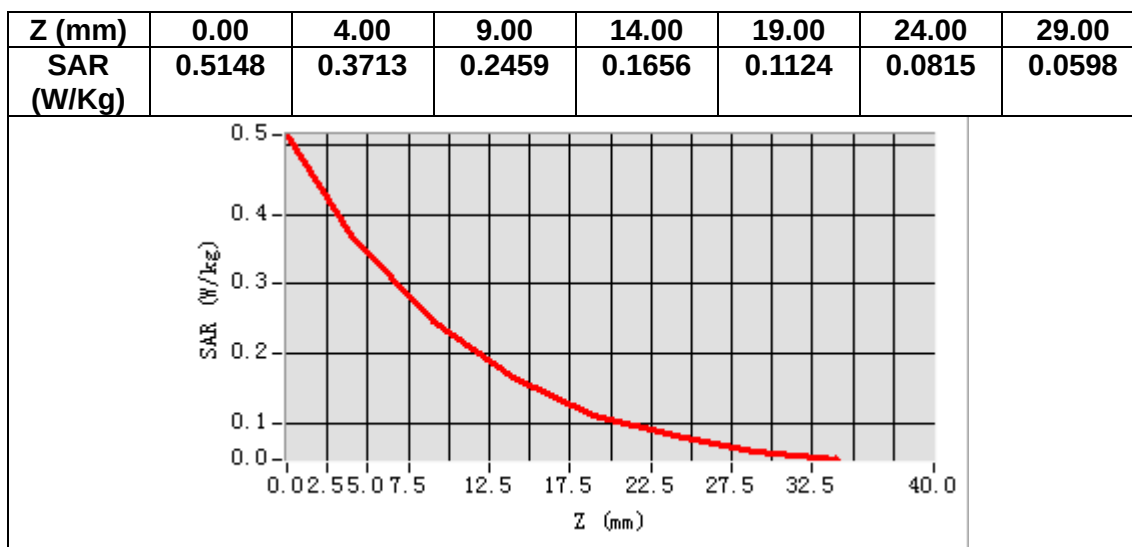
VOLUME SAR



Maximum location: X=18.00, Y=3.00

SAR Peak: 0.54 W/kg

SAR 10g (W/Kg)	0.229669
SAR 1g (W/Kg)	0.360652



MEASUREMENT 21

Date of measurement: 10/5/2024

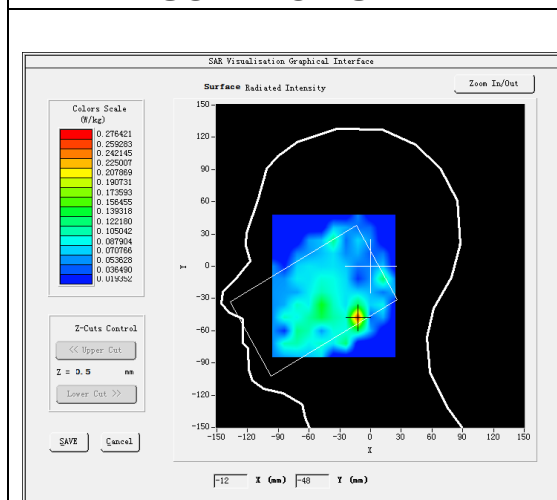
A. Experimental conditions.

<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>

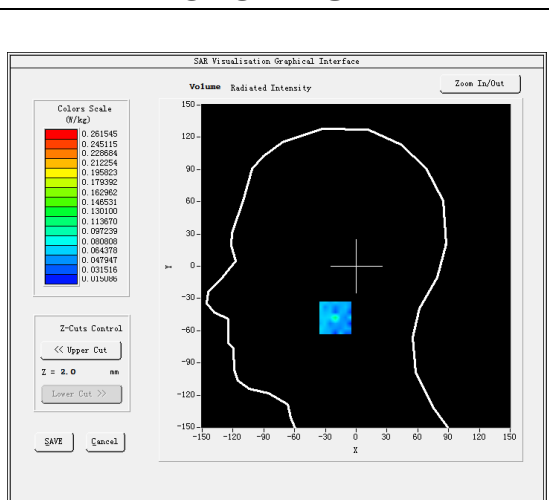
B. SAR Measurement Results

Frequency (MHz)	2535.000000
Relative permittivity (real part)	39.355064
Relative permittivity (imaginary part)	13.683290
Conductivity (S/m)	1.927063
Variation (%)	3.540000

SURFACE SAR



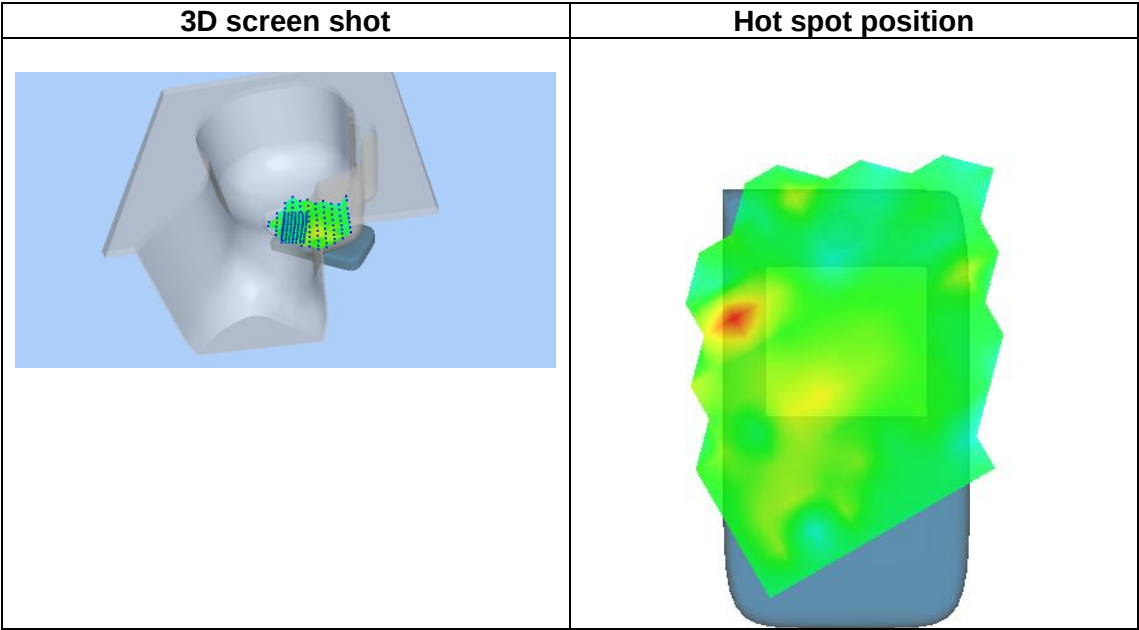
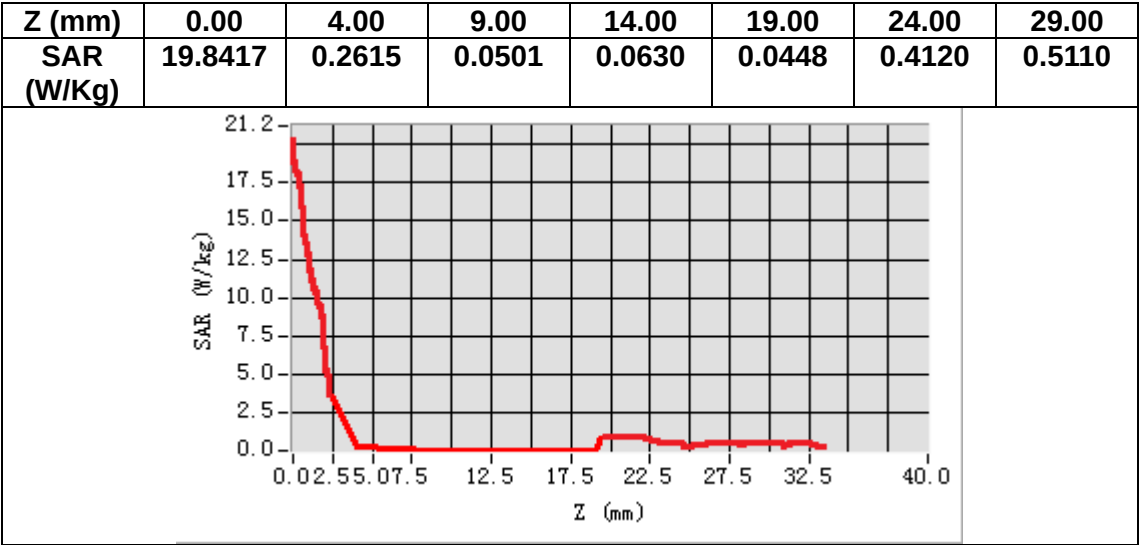
VOLUME SAR



Maximum location: X=-12.00, Y=-48.00

SAR Peak: 0.49 W/kg

SAR 10g (W/Kg)	0.061878
SAR 1g (W/Kg)	0.122961



MEASUREMENT 22

Date of measurement: 10/5/2024

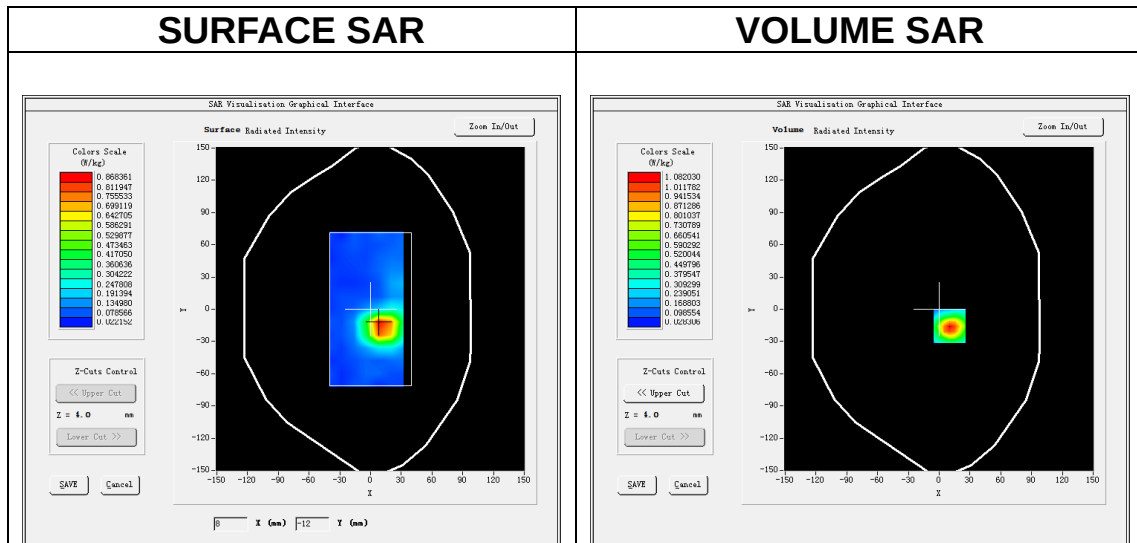
A. Experimental conditions.

<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>Low</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.65</u>

B. SAR Measurement Results

Frequency (MHz)	2510.000000
Relative permittivity (real part)	39.470161
Relative permittivity (imaginary part)	13.625990
Conductivity (S/m)	1.900069
Variation (%)	1.040000

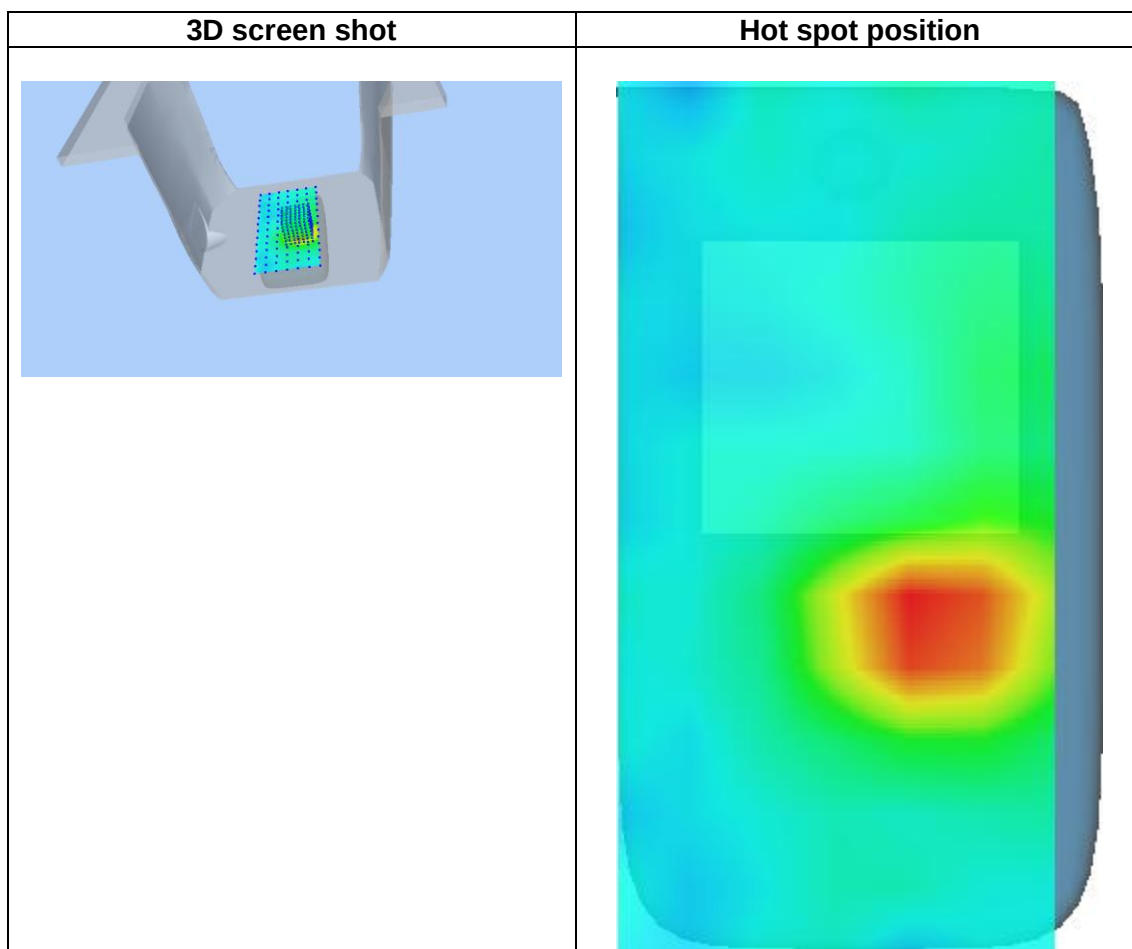
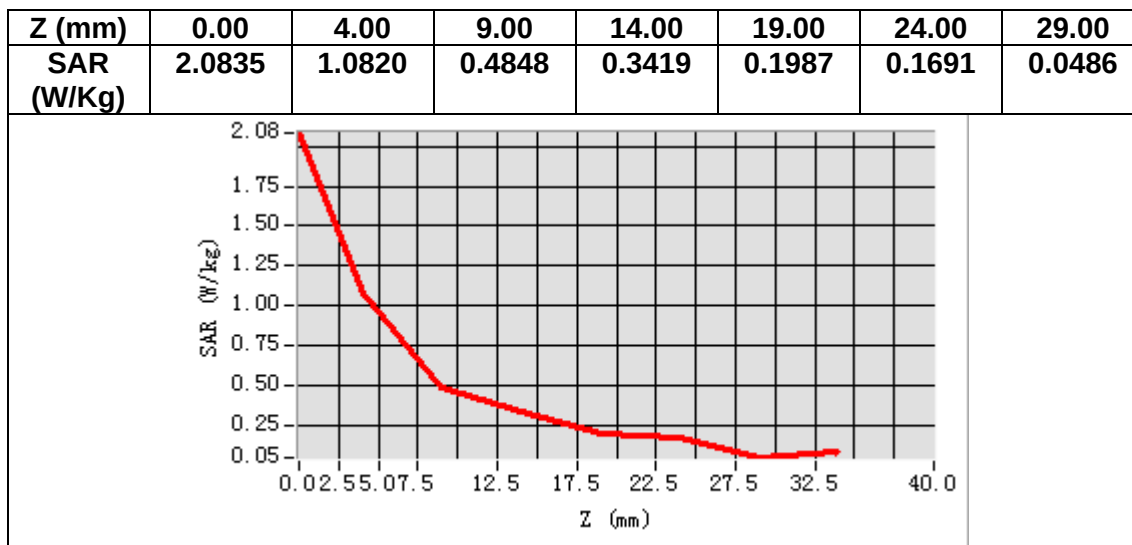
SURFACE SAR



Maximum location: X=10.00, Y=-16.00

SAR Peak: 2.02 W/kg

SAR 10g (W/Kg)	0.476981
SAR 1g (W/Kg)	1.015383



MEASUREMENT 23

Date of measurement: 10/5/2024

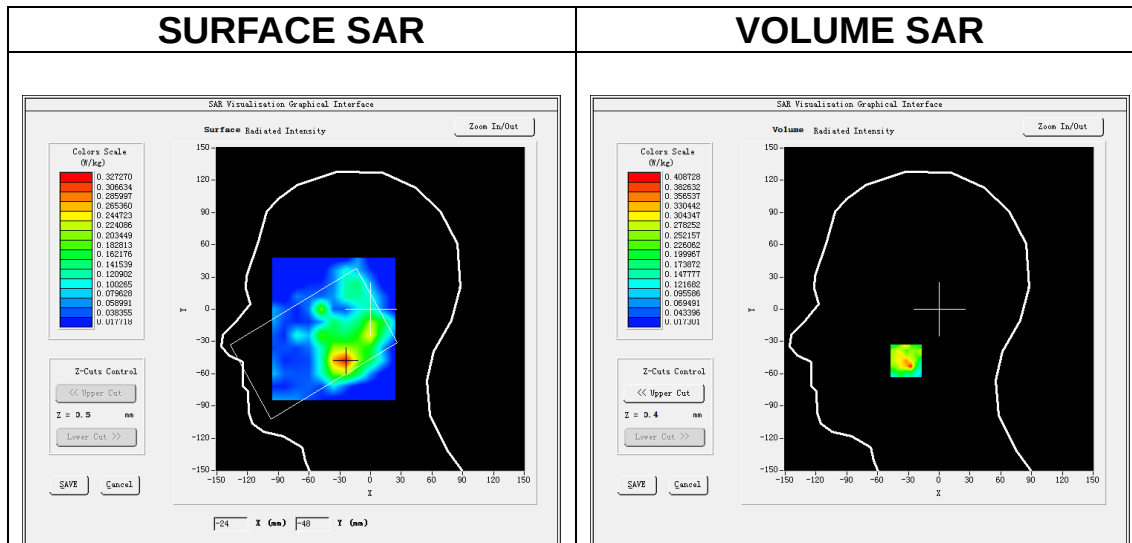
A. Experimental conditions.

<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>SA_n41</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.65</u>

B. SAR Measurement Results

Frequency (MHz)	2592.990000
Relative permittivity (real part)	39.072884
Relative permittivity (imaginary part)	13.847131
Conductivity (S/m)	1.994748
Variation (%)	1.049999

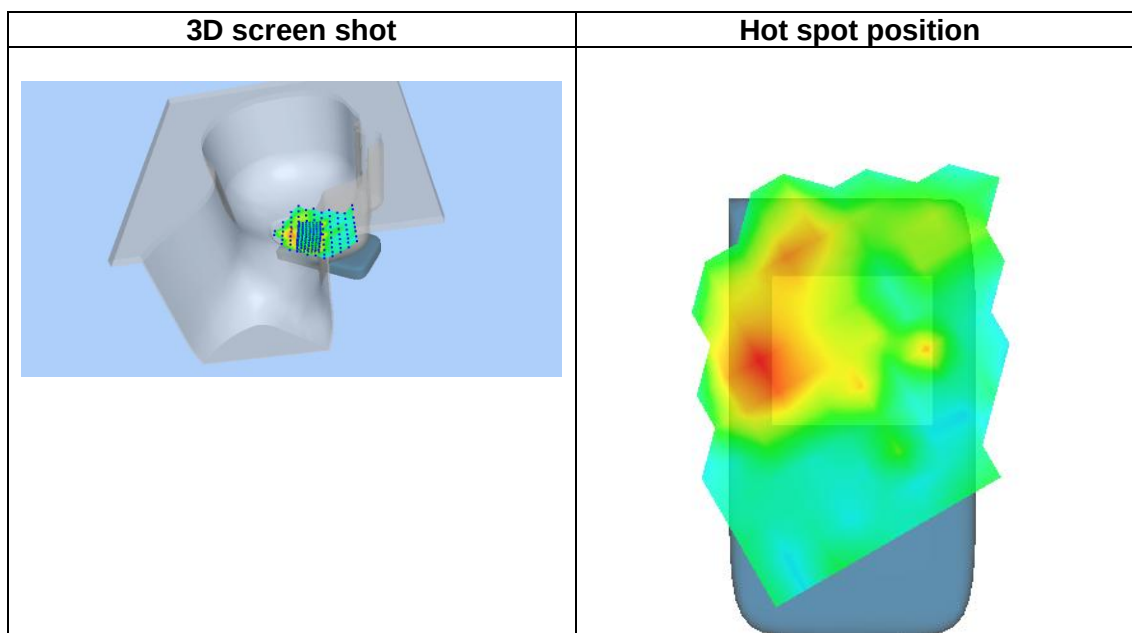
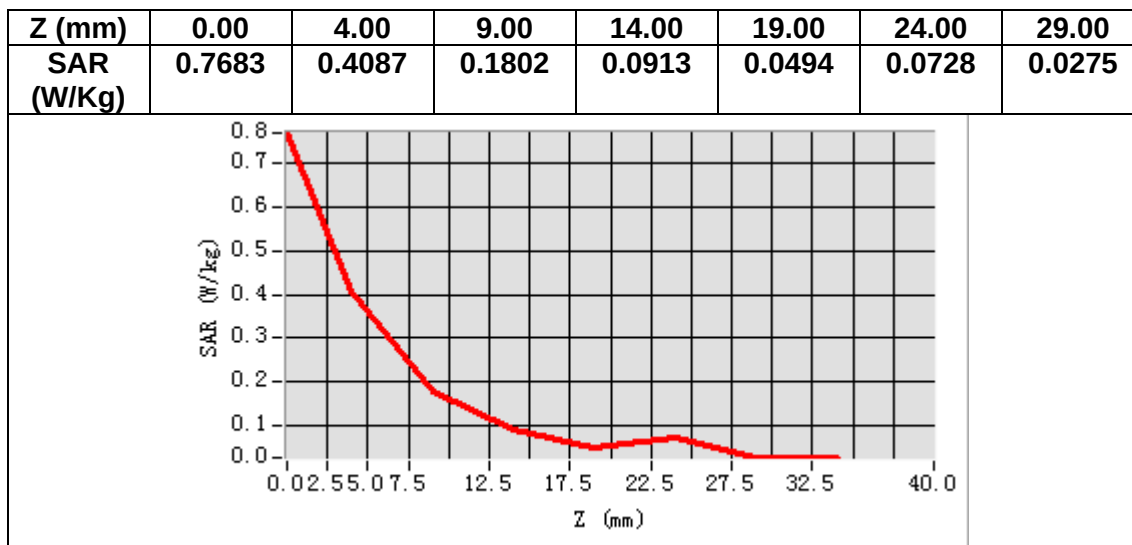
SURFACE SAR



Maximum location: X=-25.00, Y=-48.00

SAR Peak: 0.91 W/kg

SAR 10g (W/Kg)	0.159743
SAR 1g (W/Kg)	0.340138



MEASUREMENT 24

Date of measurement: 10/5/2024

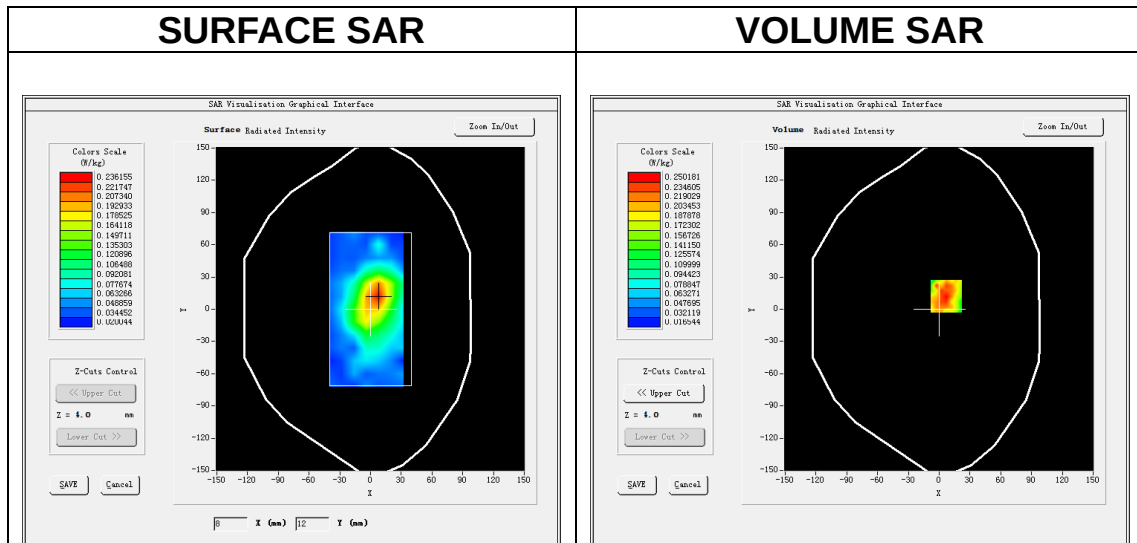
A. Experimental conditions.

<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>SA_n41</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.65</u>

B. SAR Measurement Results

Frequency (MHz)	2592.990000
Relative permittivity (real part)	39.072884
Relative permittivity (imaginary part)	13.847131
Conductivity (S/m)	1.994748
Variation (%)	0.090000

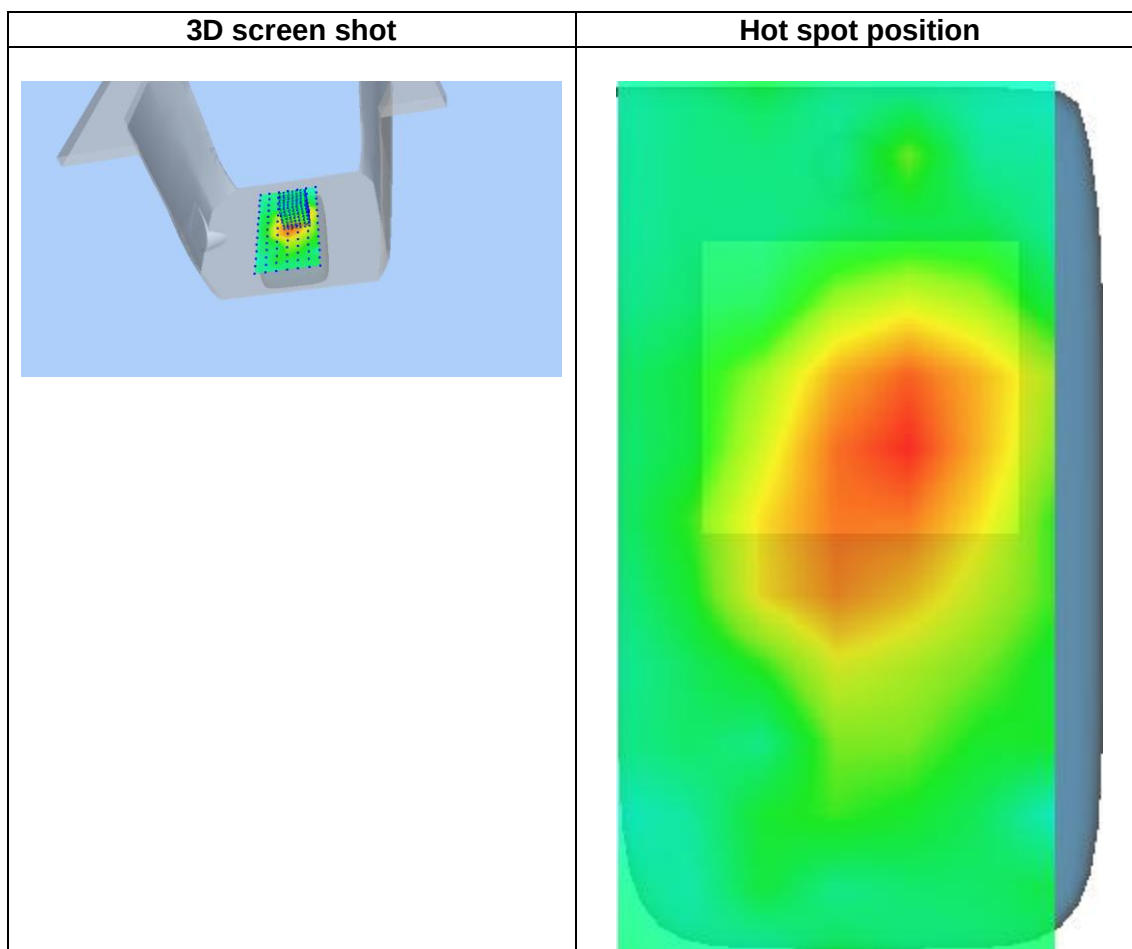
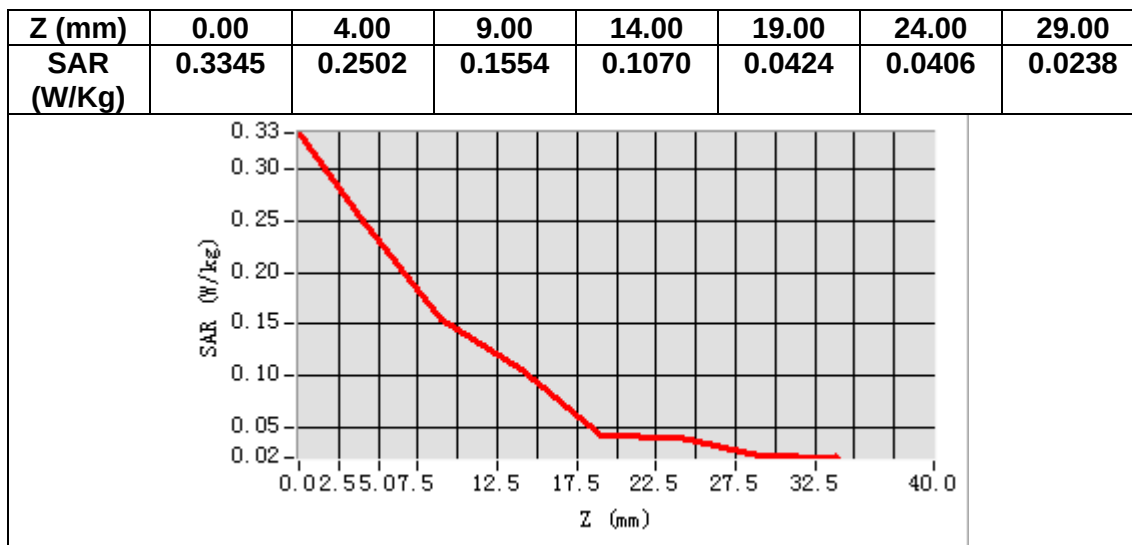
SURFACE SAR



Maximum location: X=7.00, Y=12.00

SAR Peak: 0.43 W/kg

SAR 10g (W/Kg)	0.138321
SAR 1g (W/Kg)	0.224298



MEASUREMENT 25

Date of measurement: 7/5/2024

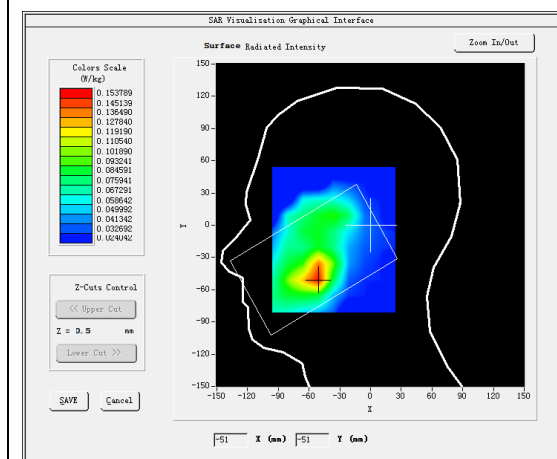
A. Experimental conditions.

<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>

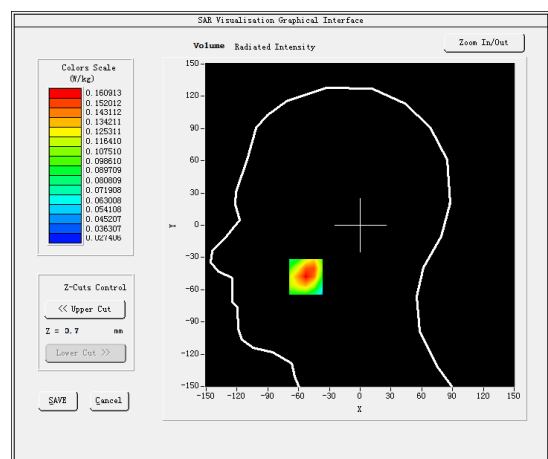
B. SAR Measurement Results

Frequency (MHz)	1745.000000
Relative permittivity (real part)	39.794724
Relative permittivity (imaginary part)	13.884663
Conductivity (S/m)	1.346041
Variation (%)	-3.280000

SURFACE SAR



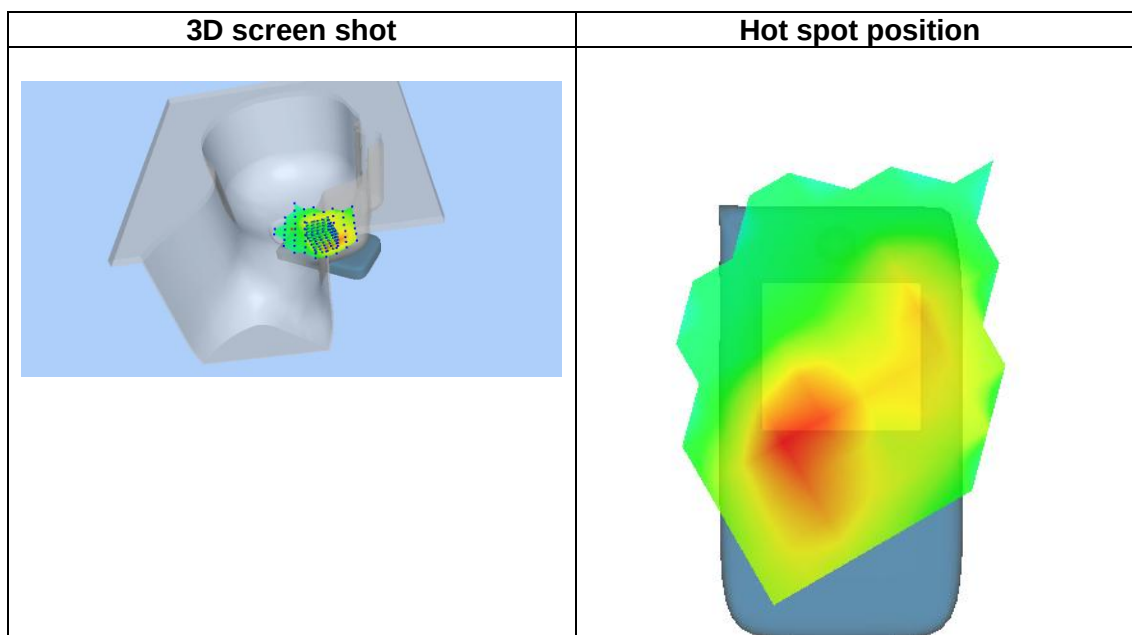
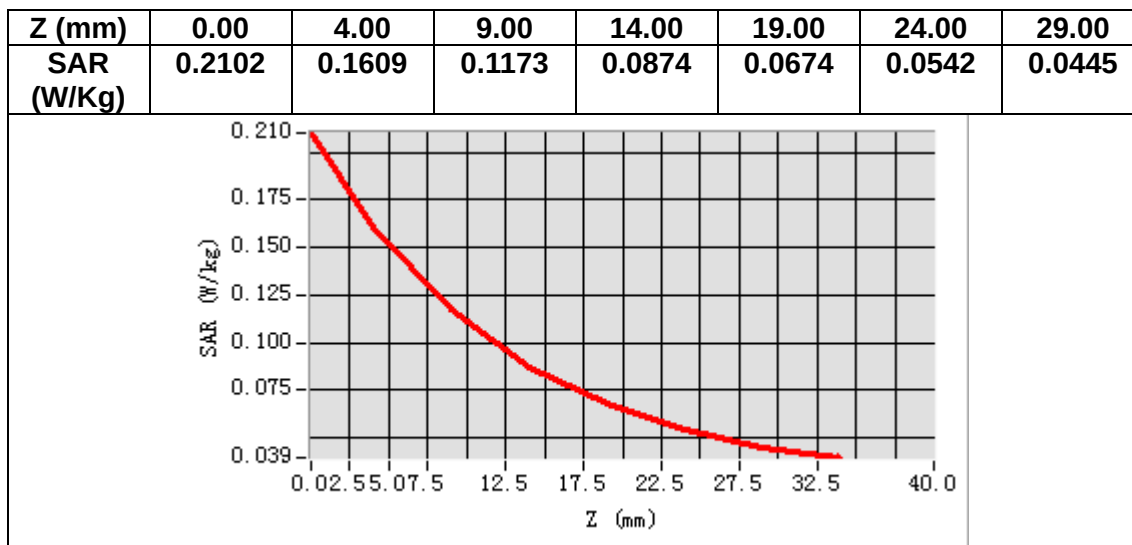
VOLUME SAR



Maximum location: X=-53.00, Y=-48.00

SAR Peak: 0.22 W/kg

SAR 10g (W/Kg)	0.102266
SAR 1g (W/Kg)	0.154390



MEASUREMENT 26

Date of measurement: 7/5/2024

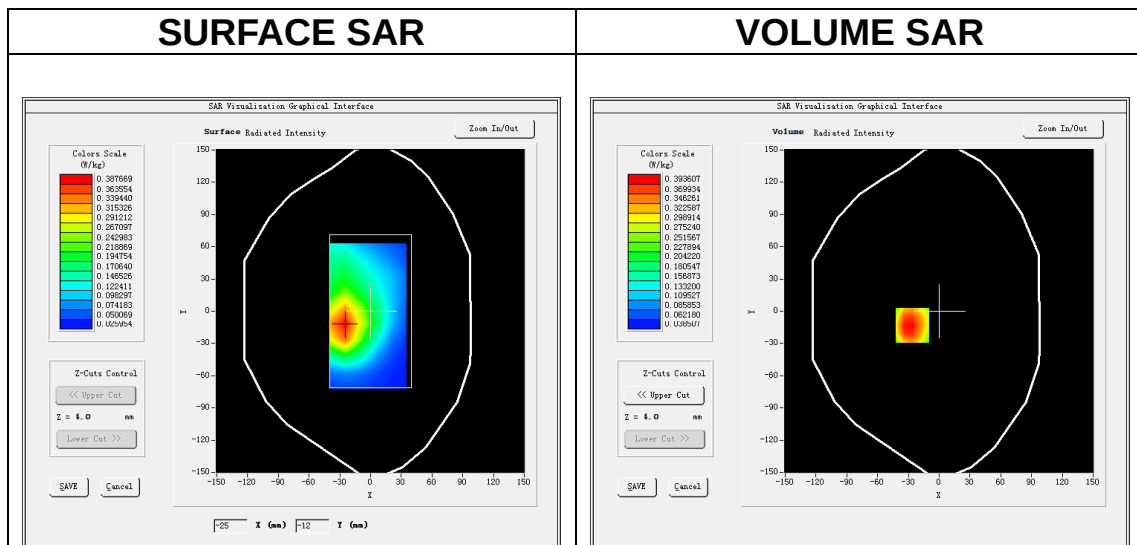
A. Experimental conditions.

<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)	39.794724
Relative permittivity (imaginary part)	13.884663
Conductivity (S/m)	1.346041
Variation (%)	-0.580000

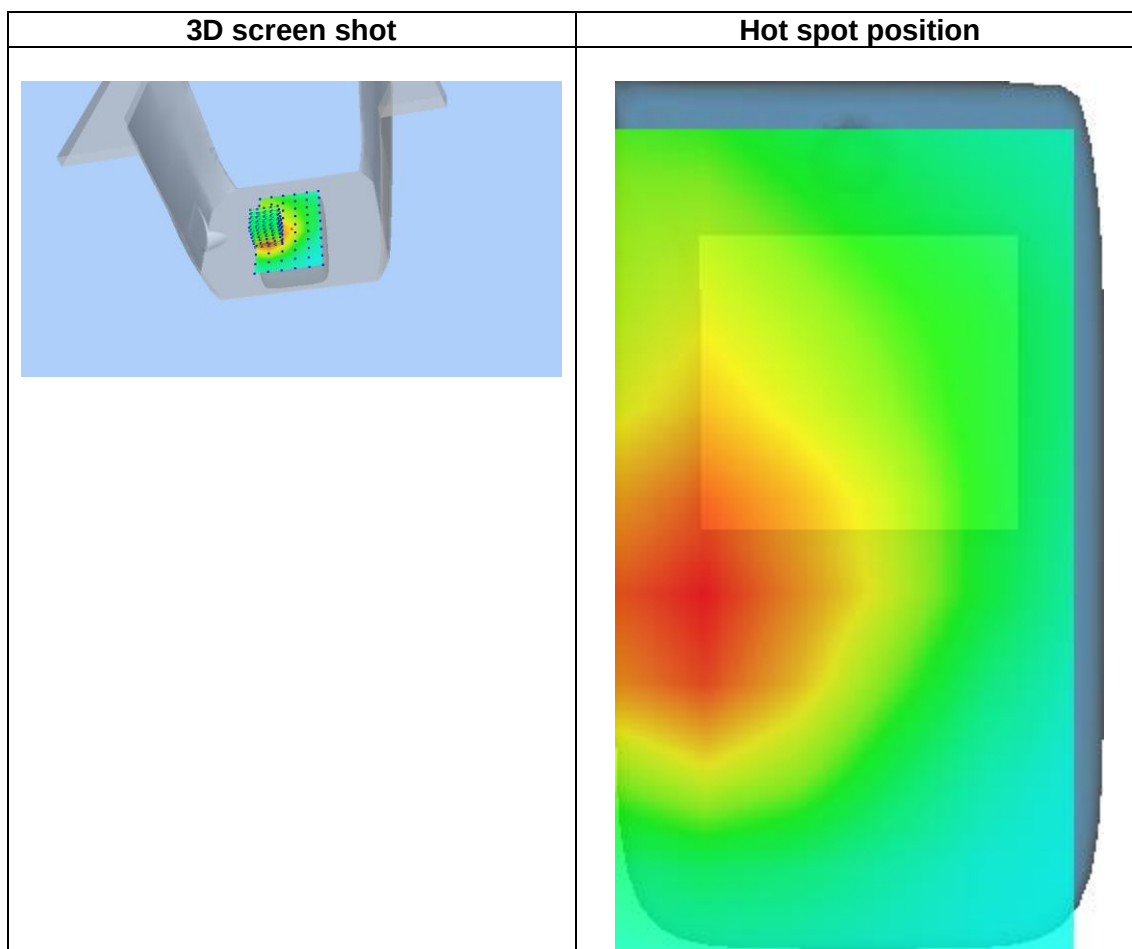
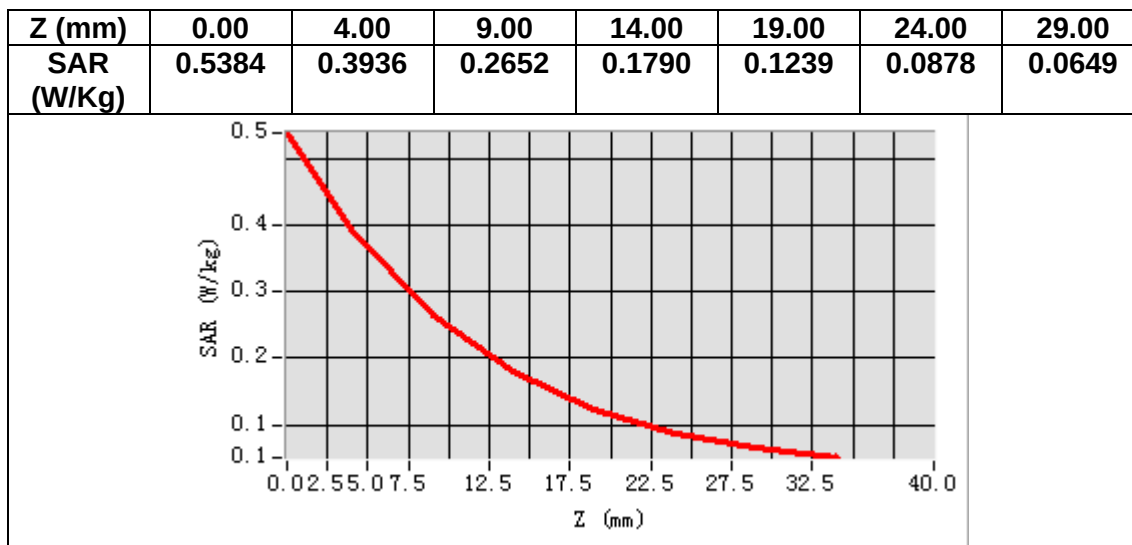
SURFACE SAR



Maximum location: X=-26.00, Y=-13.00

SAR Peak: 0.56 W/kg

SAR 10g (W/Kg)	0.243891
SAR 1g (W/Kg)	0.384969



MEASUREMENT 27

Date of measurement: 10/5/2024

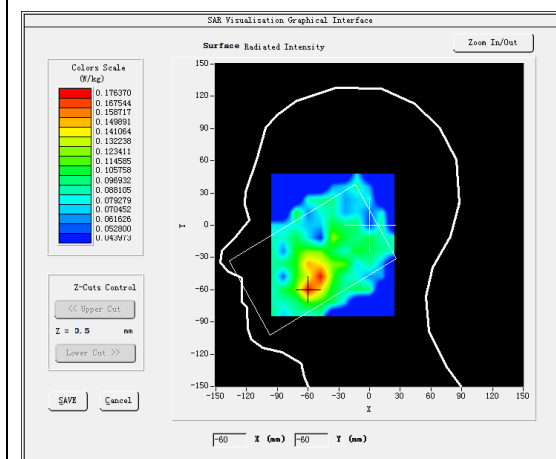
A. Experimental conditions.

<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>SA n7</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.65</u>

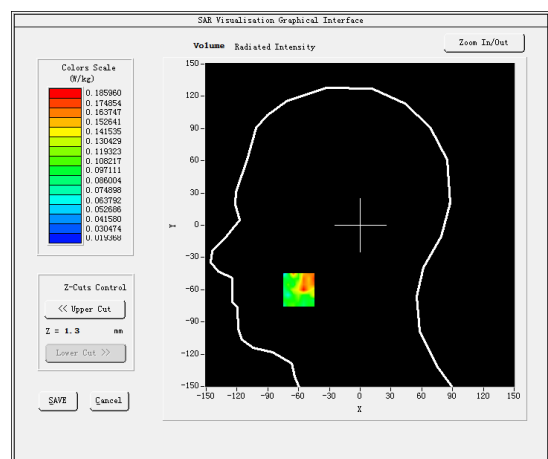
B. SAR Measurement Results

Frequency (MHz)	2535.000000
Relative permittivity (real part)	39.355064
Relative permittivity (imaginary part)	13.683290
Conductivity (S/m)	1.927063
Variation (%)	-2.250000

SURFACE SAR



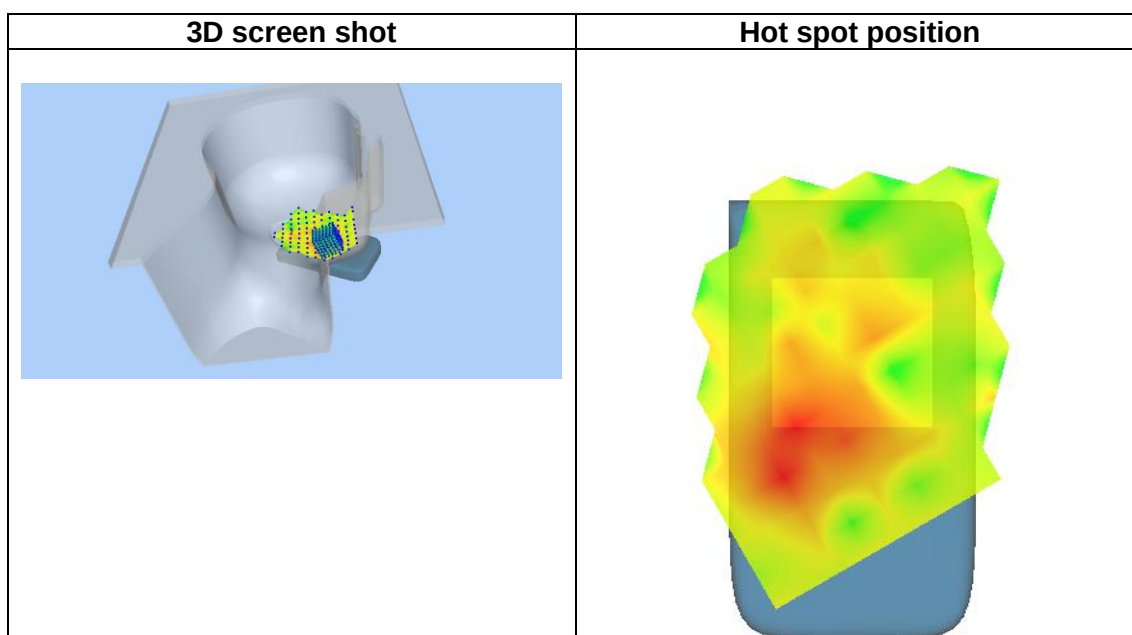
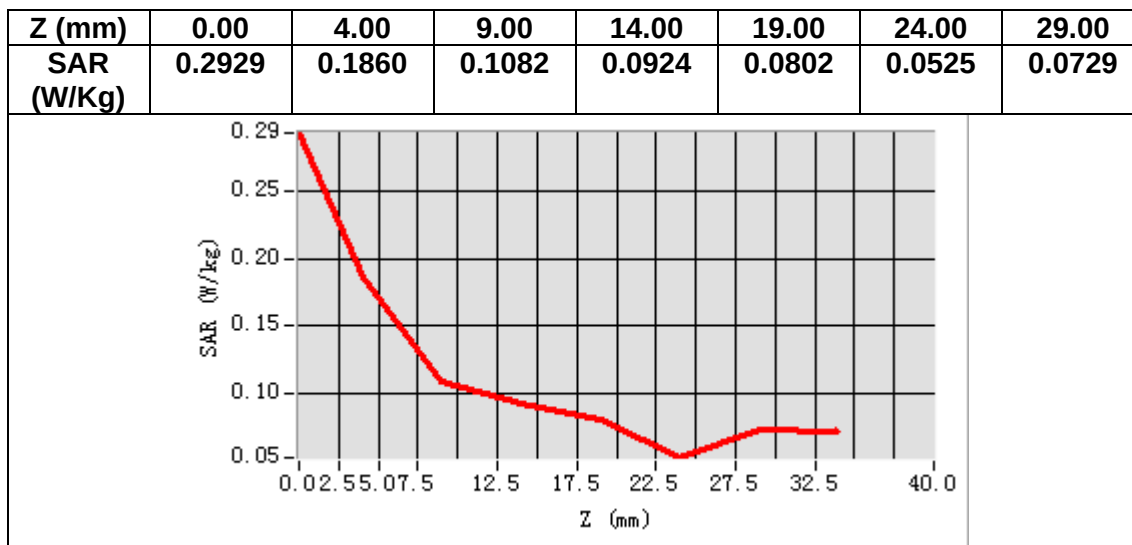
VOLUME SAR



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

SAR Peak: 0.30 W/kg

SAR 10g (W/Kg)	0.109551
SAR 1g (W/Kg)	0.159783



MEASUREMENT 28

Date of measurement: 10/5/2024

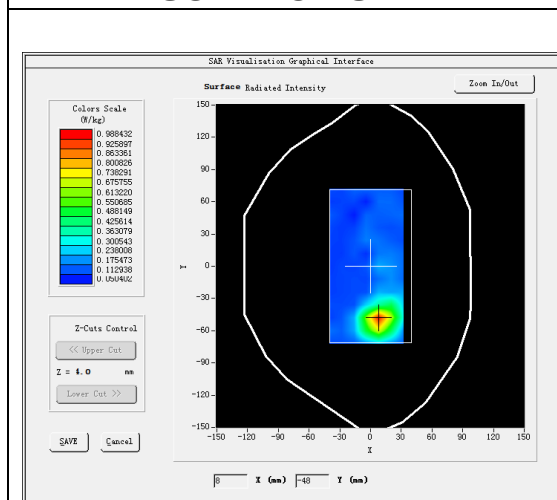
A. Experimental conditions.

<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>SA n7</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.65</u>

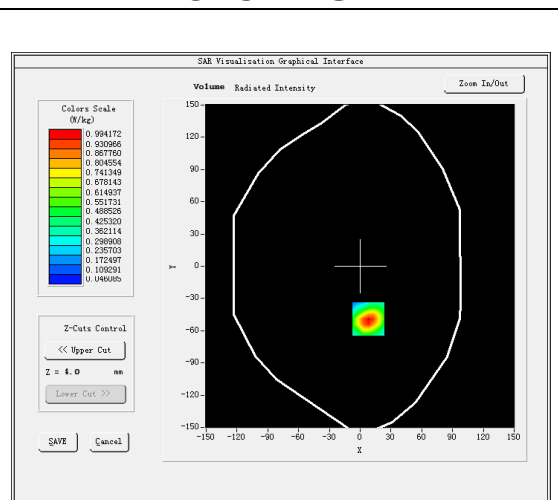
B. SAR Measurement Results

Frequency (MHz)	2535.000000
Relative permittivity (real part)	39.355064
Relative permittivity (imaginary part)	13.683290
Conductivity (S/m)	1.927063
Variation (%)	-3.090000

SURFACE SAR



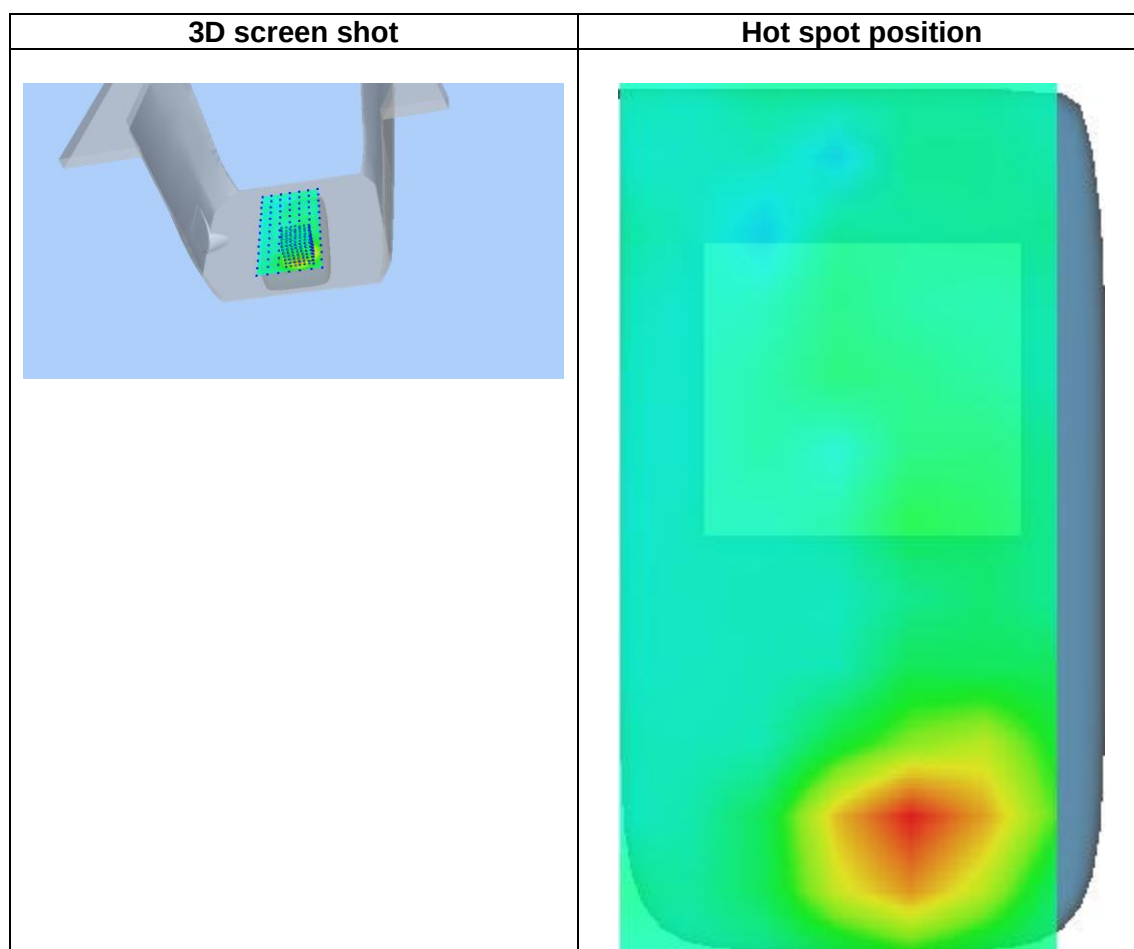
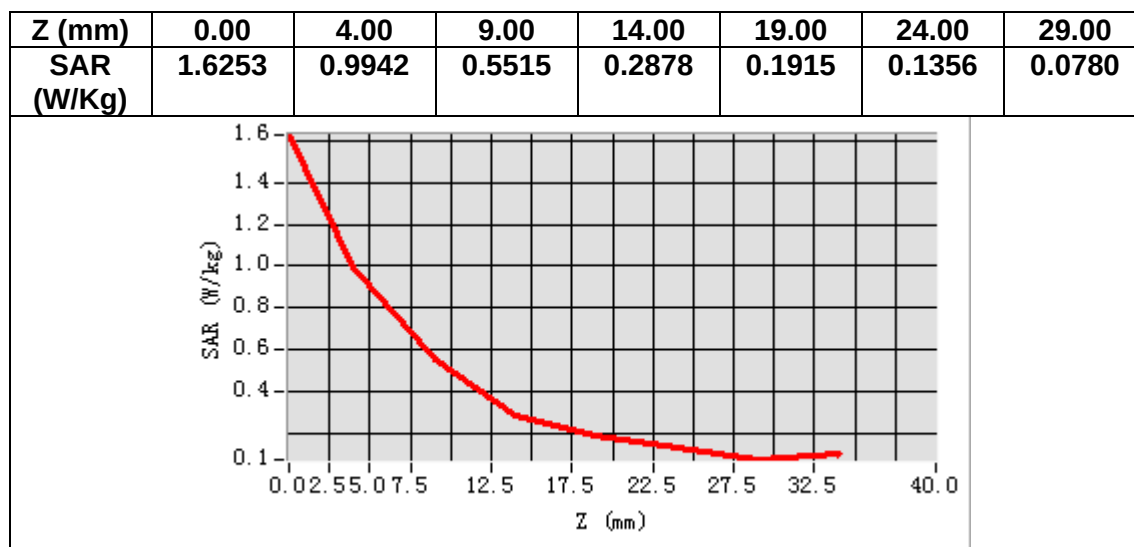
VOLUME SAR



Maximum location: X=8.00, Y=-49.00

SAR Peak: 1.61 W/kg

SAR 10g (W/Kg)	0.470333
SAR 1g (W/Kg)	0.929202



MEASUREMENT 29

Date of measurement: 25/4/2024

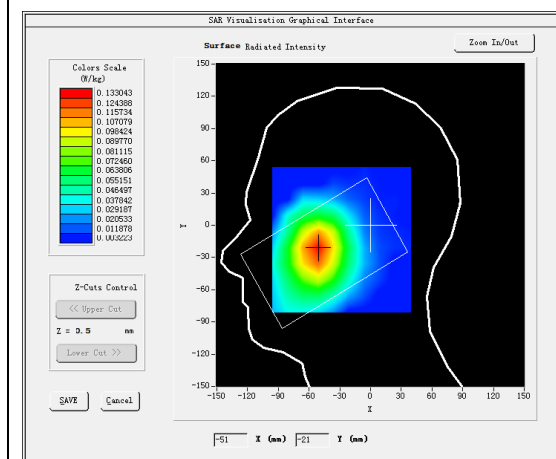
A. Experimental conditions.

<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>

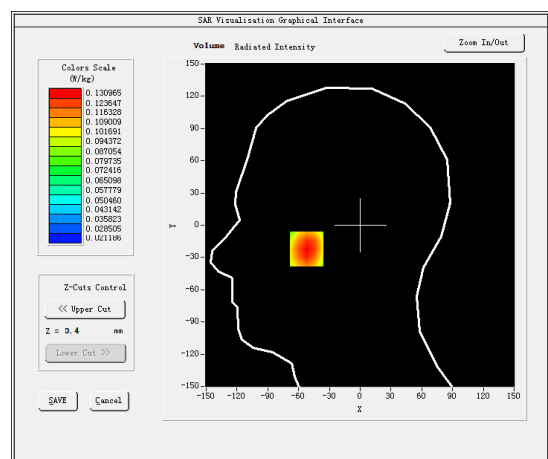
B. SAR Measurement Results

Frequency (MHz)	836.500000
Relative permittivity (real part)	41.406631
Relative permittivity (imaginary part)	19.409454
Conductivity (S/m)	0.902000
Variation (%)	-3.660000

SURFACE SAR



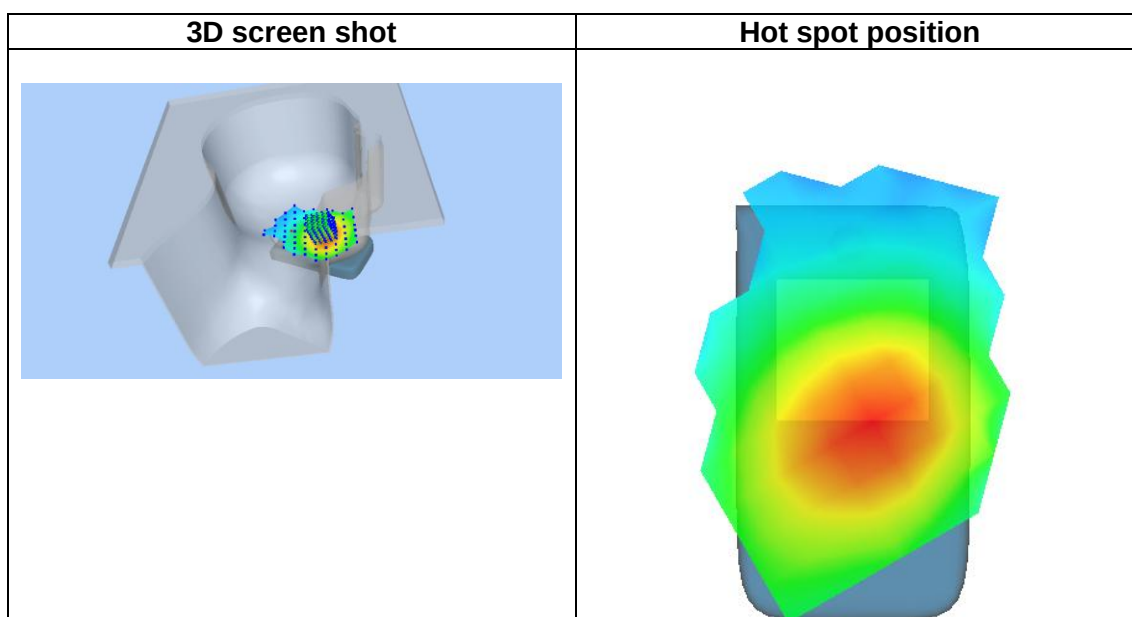
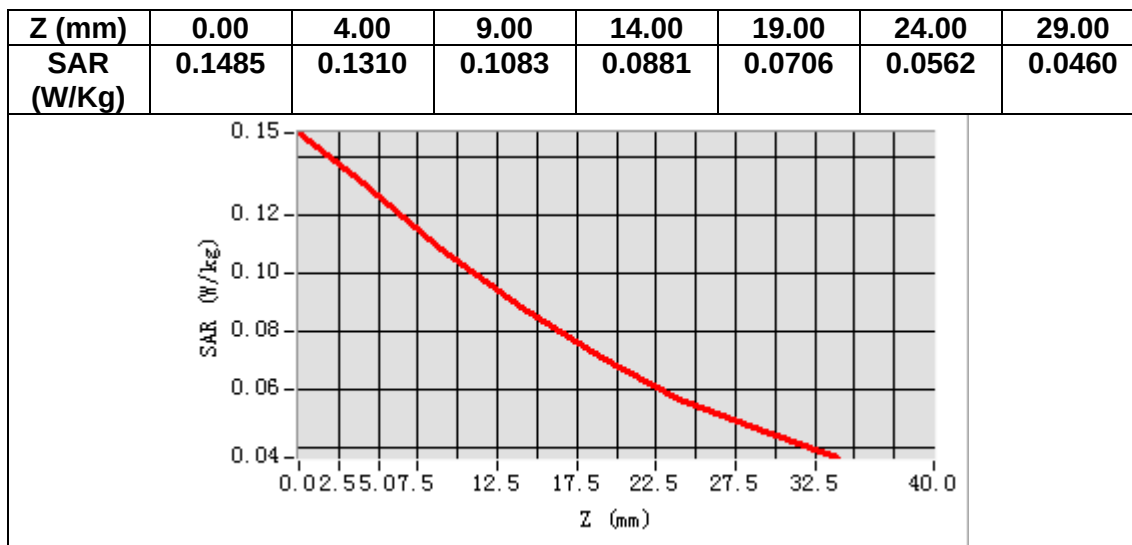
VOLUME SAR



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

SAR Peak: 0.15 W/kg

SAR 10g (W/Kg)	0.096611
SAR 1g (W/Kg)	0.126408



MEASUREMENT 30

Date of measurement: 25/4/2024

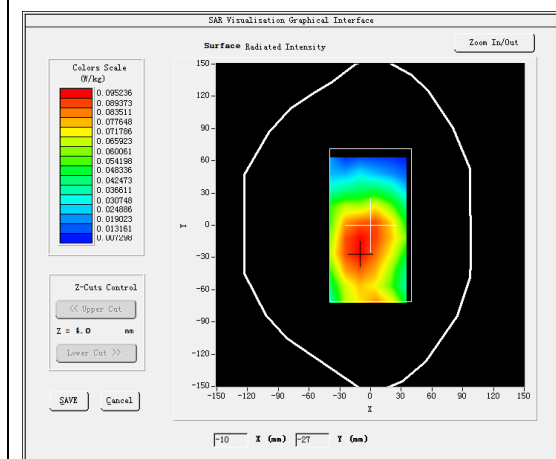
A. Experimental conditions.

<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>

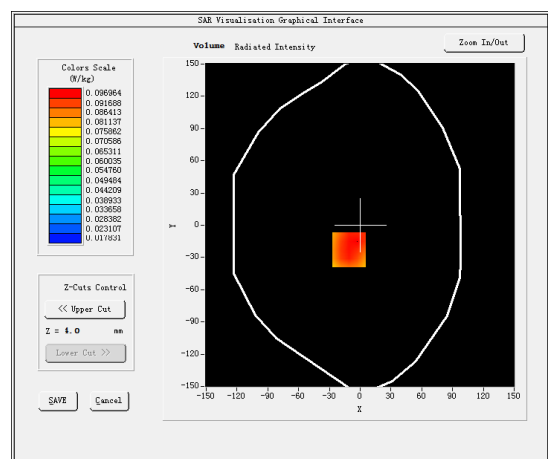
B. SAR Measurement Results

Frequency (MHz)	836.500000
Relative permittivity (real part)	41.406631
Relative permittivity (imaginary part)	19.409454
Conductivity (S/m)	0.902000
Variation (%)	-0.750000

SURFACE SAR



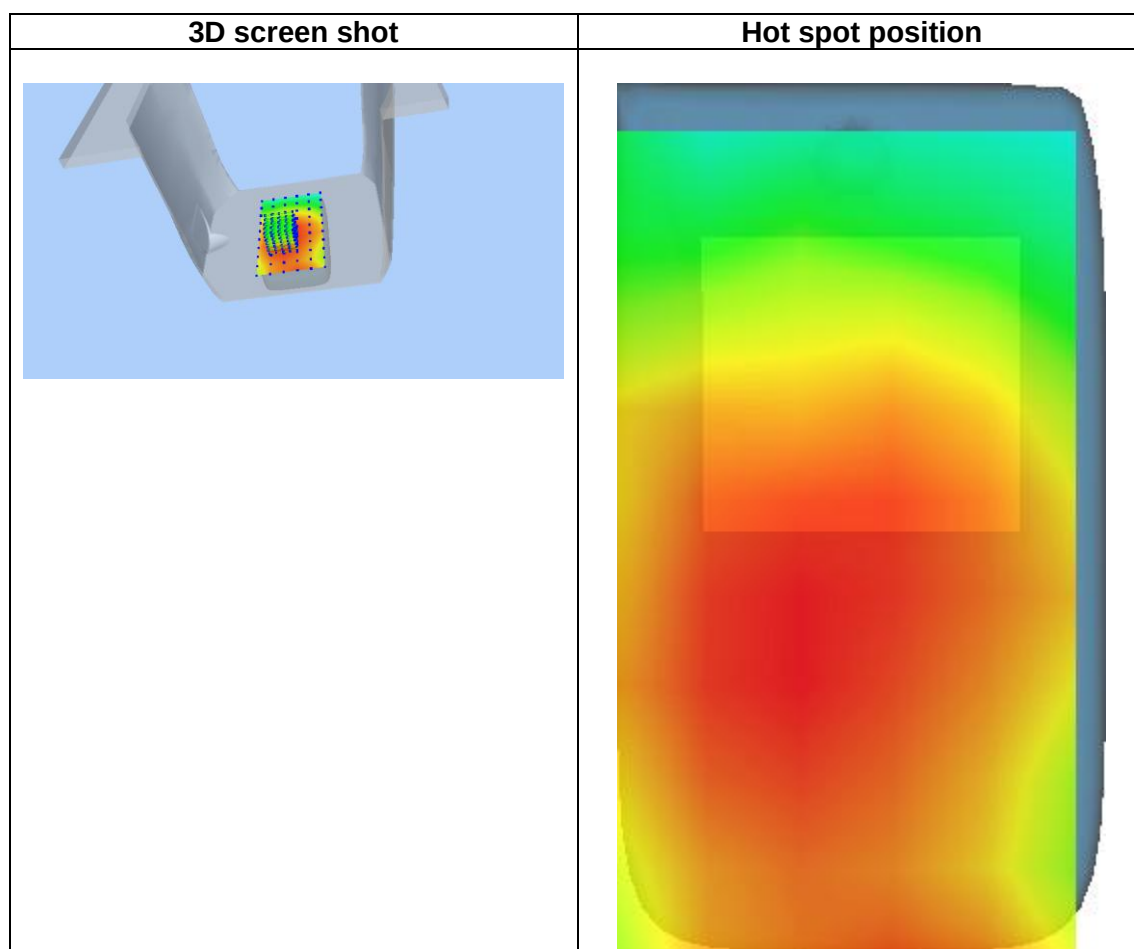
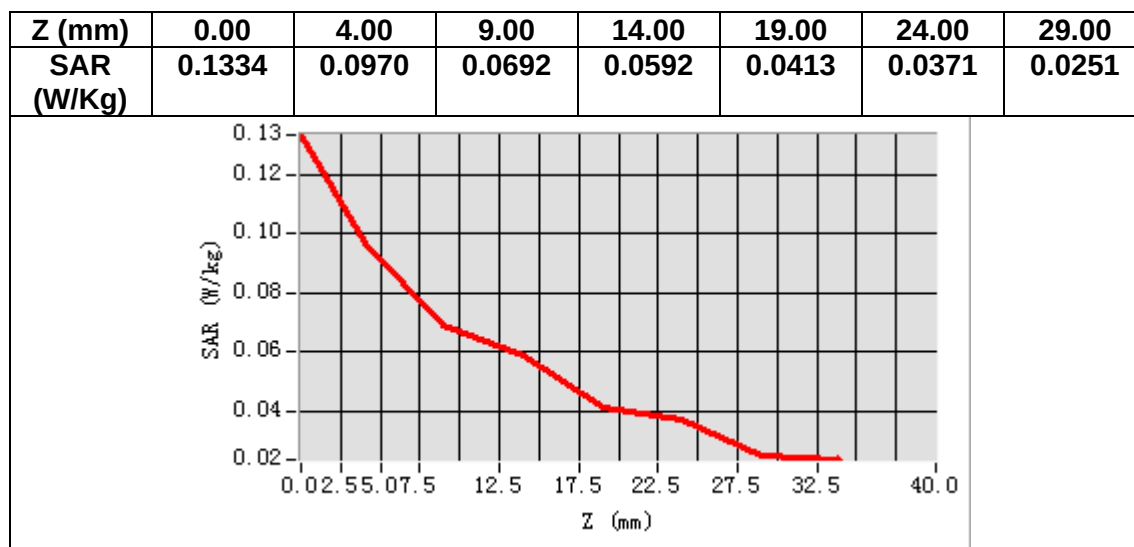
VOLUME SAR



Maximum location: X=-11.00, Y=-23.00

SAR Peak: 0.12 W/kg

SAR 10g (W/Kg)	0.071131
SAR 1g (W/Kg)	0.093842



MEASUREMENT 31

Date of measurement: 11/6/2024

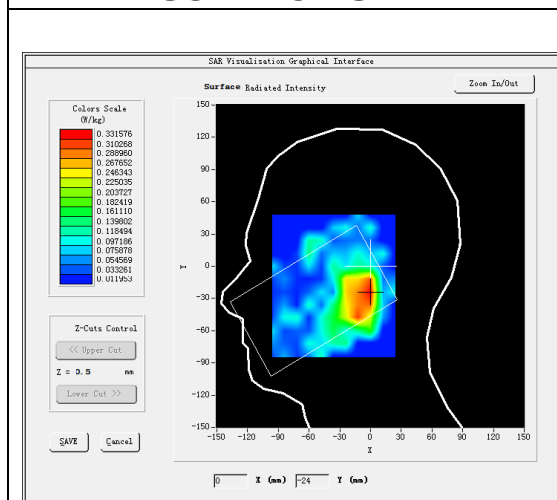
A. Experimental conditions.

<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>SA n78</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.20</u>

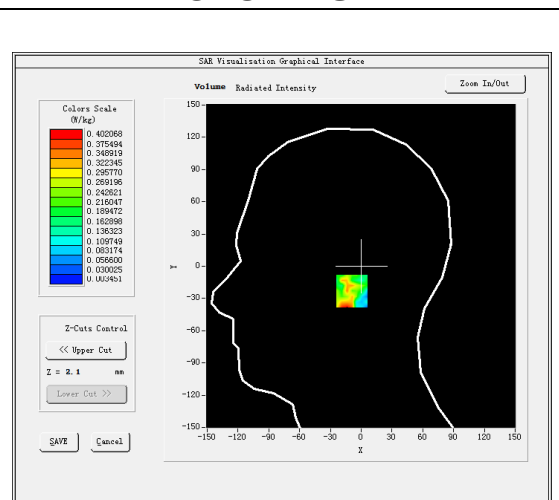
B. SAR Measurement Results

Frequency (MHz)	3500.010000
Relative permittivity (real part)	38.014514
Relative permittivity (imaginary part)	14.574846
Conductivity (S/m)	2.833998
Variation (%)	-4.990000

SURFACE SAR



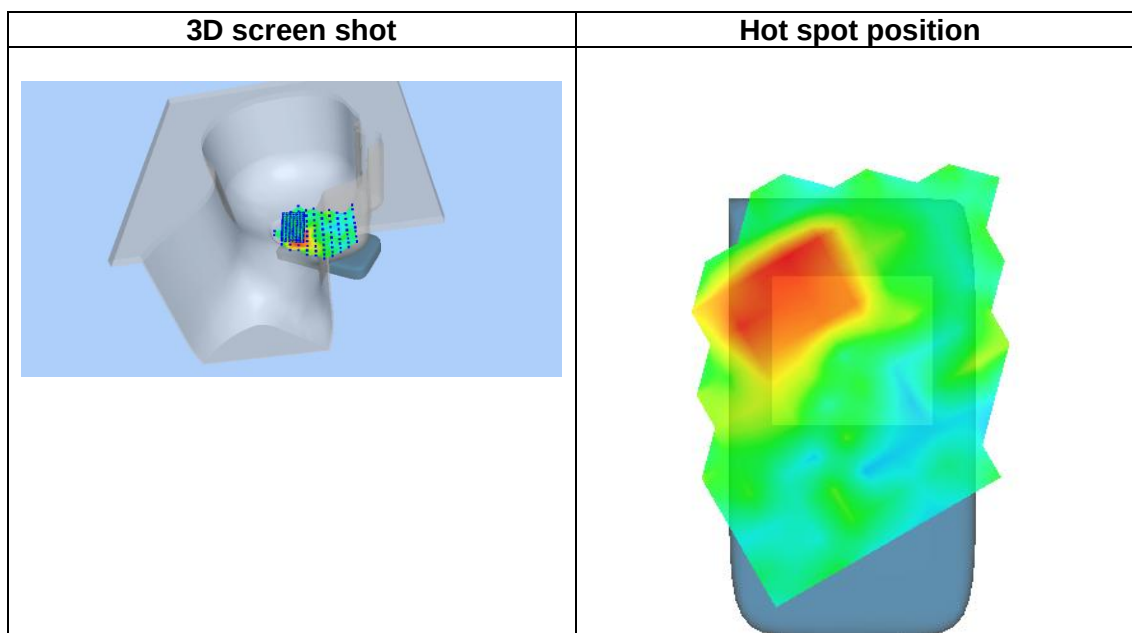
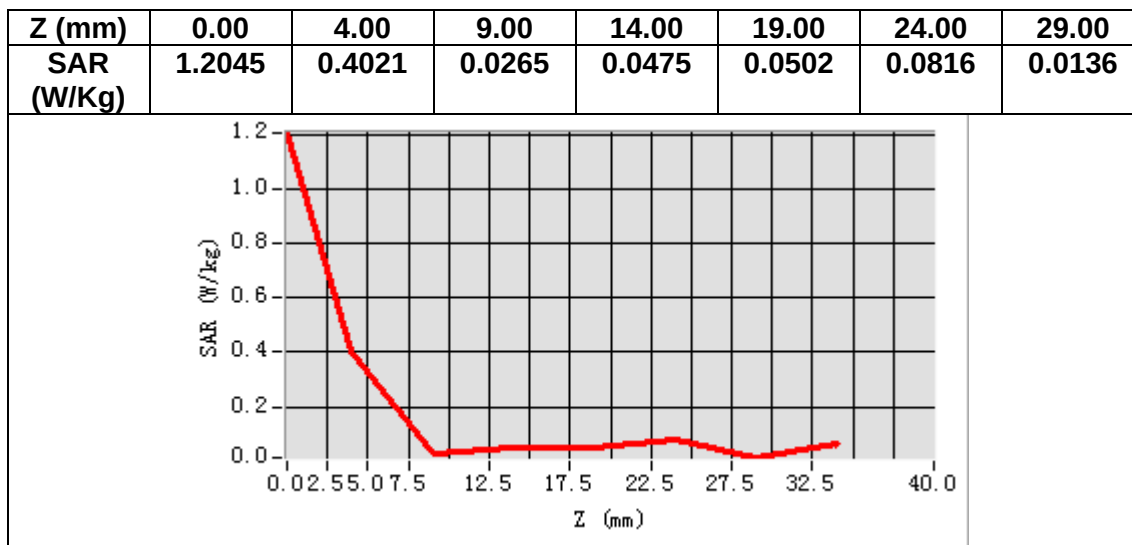
VOLUME SAR



Maximum location: X=-3.00, Y=-23.00

SAR Peak: 0.98 W/kg

SAR 10g (W/Kg)	0.163232
SAR 1g (W/Kg)	0.338661



MEASUREMENT 32

Date of measurement: 11/6/2024

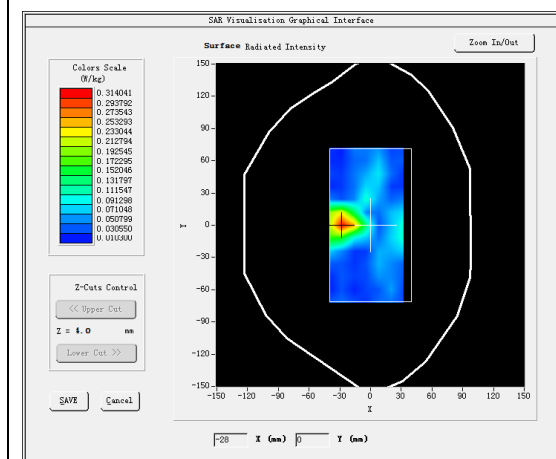
A. Experimental conditions.

<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>SA_n78</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.20</u>

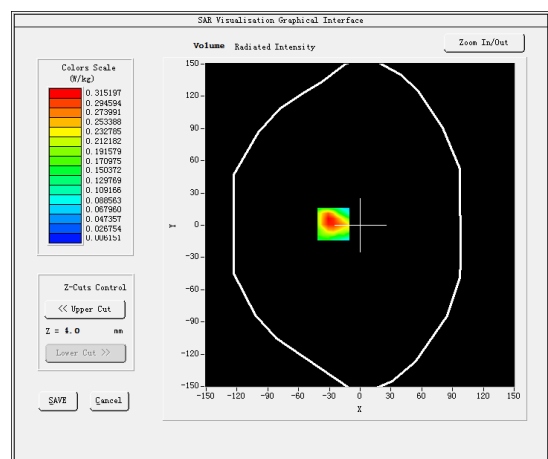
B. SAR Measurement Results

Frequency (MHz)	3500.010000
Relative permittivity (real part)	38.014514
Relative permittivity (imaginary part)	14.574846
Conductivity (S/m)	2.833998
Variation (%)	-2.600000

SURFACE SAR



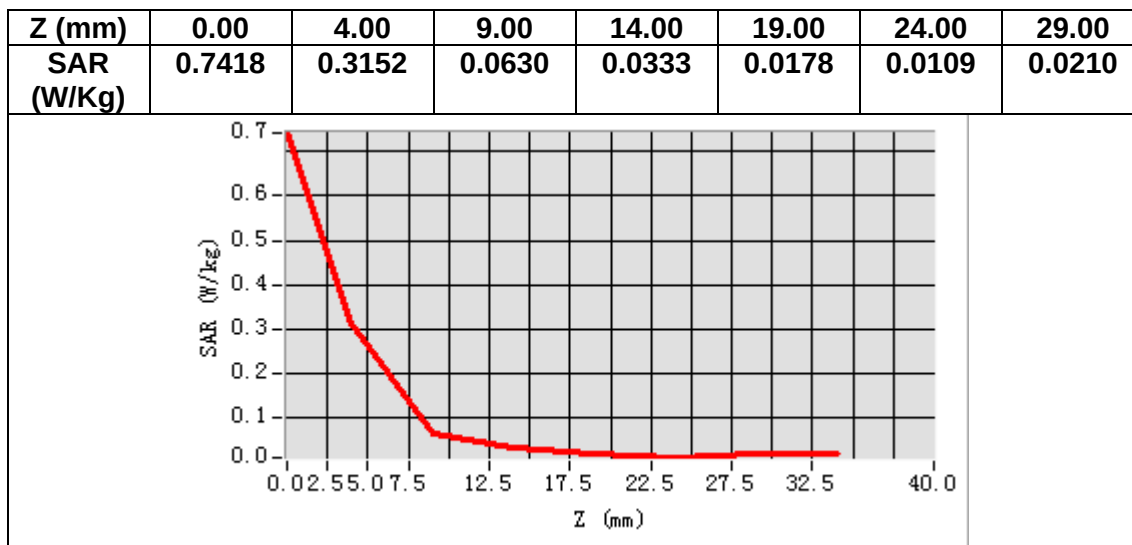
VOLUME SAR



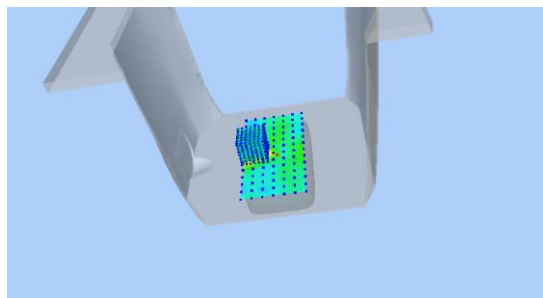
Maximum location: X=-26.00, Y=1.00

SAR Peak: 0.68 W/kg

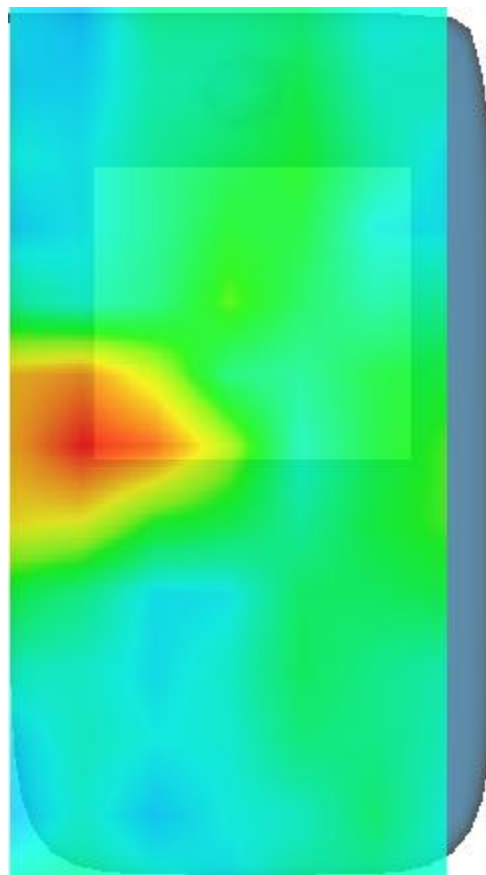
SAR 10g (W/Kg)	0.128717
SAR 1g (W/Kg)	0.314960



3D screen shot



Hot spot position



MEASUREMENT 33

Date of measurement: 25/4/2024

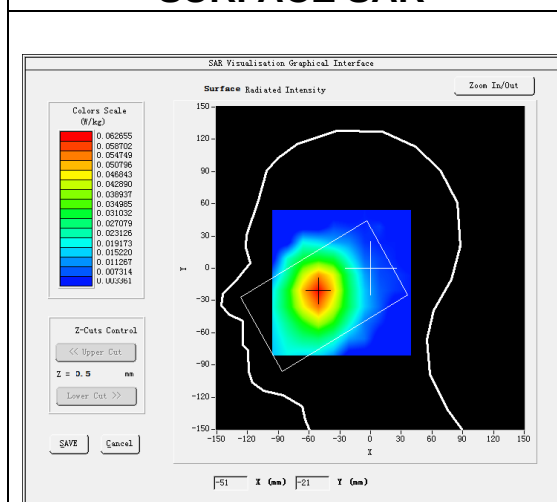
A. Experimental conditions.

<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>SA n5</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.32</u>

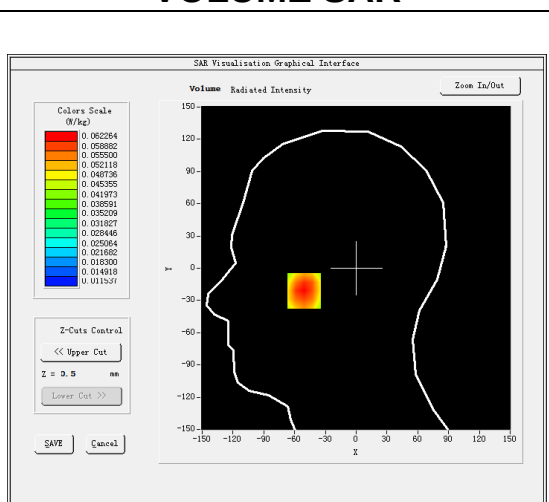
B. SAR Measurement Results

Frequency (MHz)	836.500000
Relative permittivity (real part)	41.406631
Relative permittivity (imaginary part)	19.409454
Conductivity (S/m)	0.902000
Variation (%)	-1.969999

SURFACE SAR



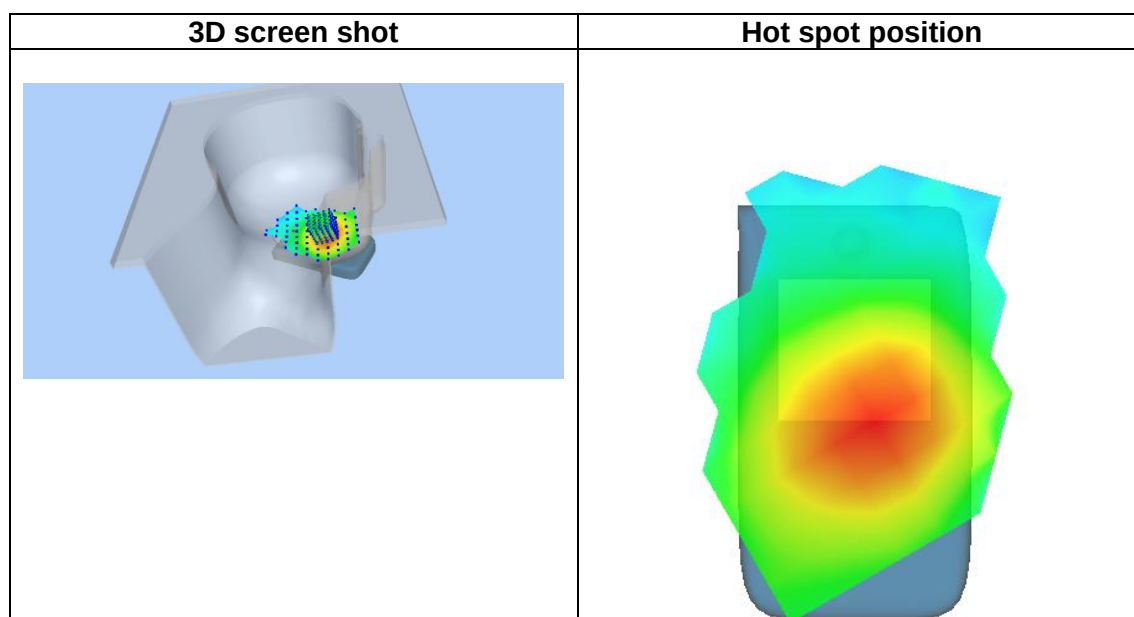
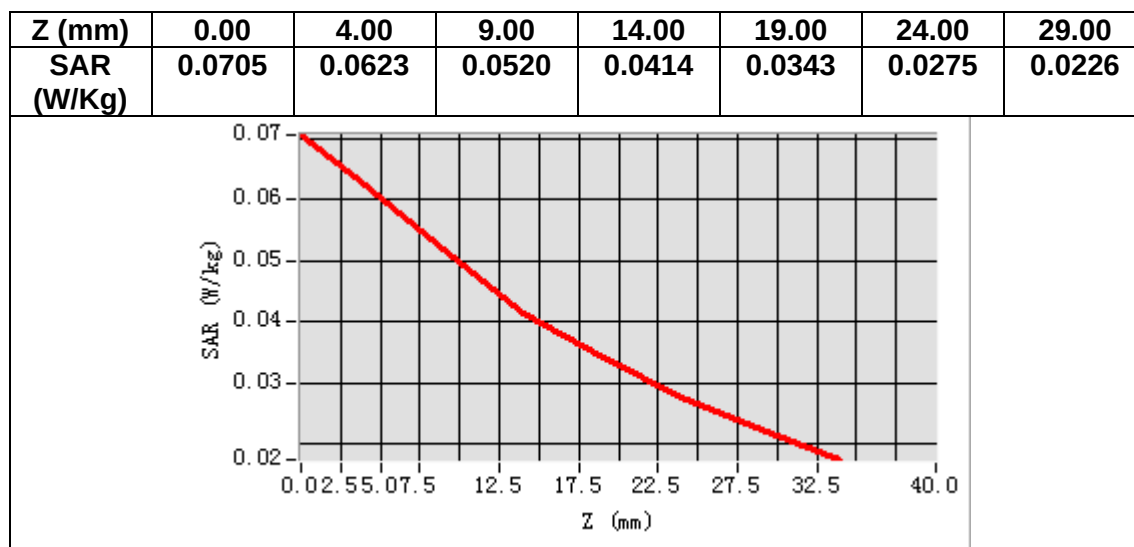
VOLUME SAR



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

SAR Peak: 0.07 W/kg

SAR 10g (W/Kg)	0.045939
SAR 1g (W/Kg)	0.059857



MEASUREMENT 34

Date of measurement: 25/4/2024

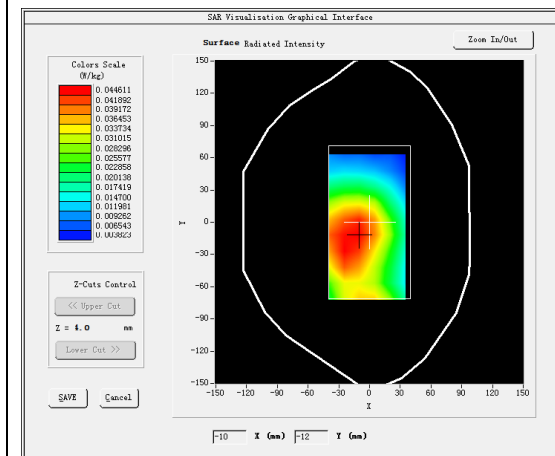
A. Experimental conditions.

<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>SA n5</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.32</u>

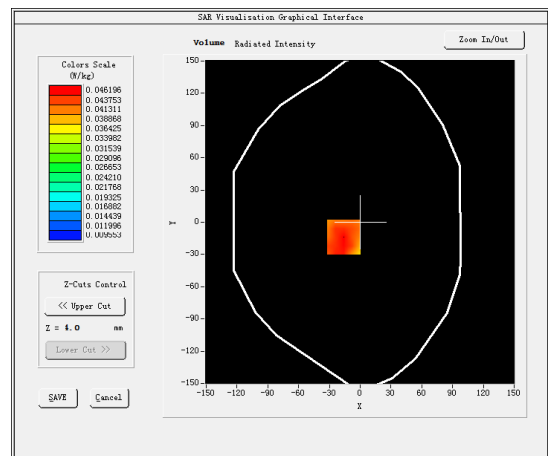
B. SAR Measurement Results

Frequency (MHz)	836.500000
Relative permittivity (real part)	41.406631
Relative permittivity (imaginary part)	19.409454
Conductivity (S/m)	0.902000
Variation (%)	-3.360000

SURFACE SAR



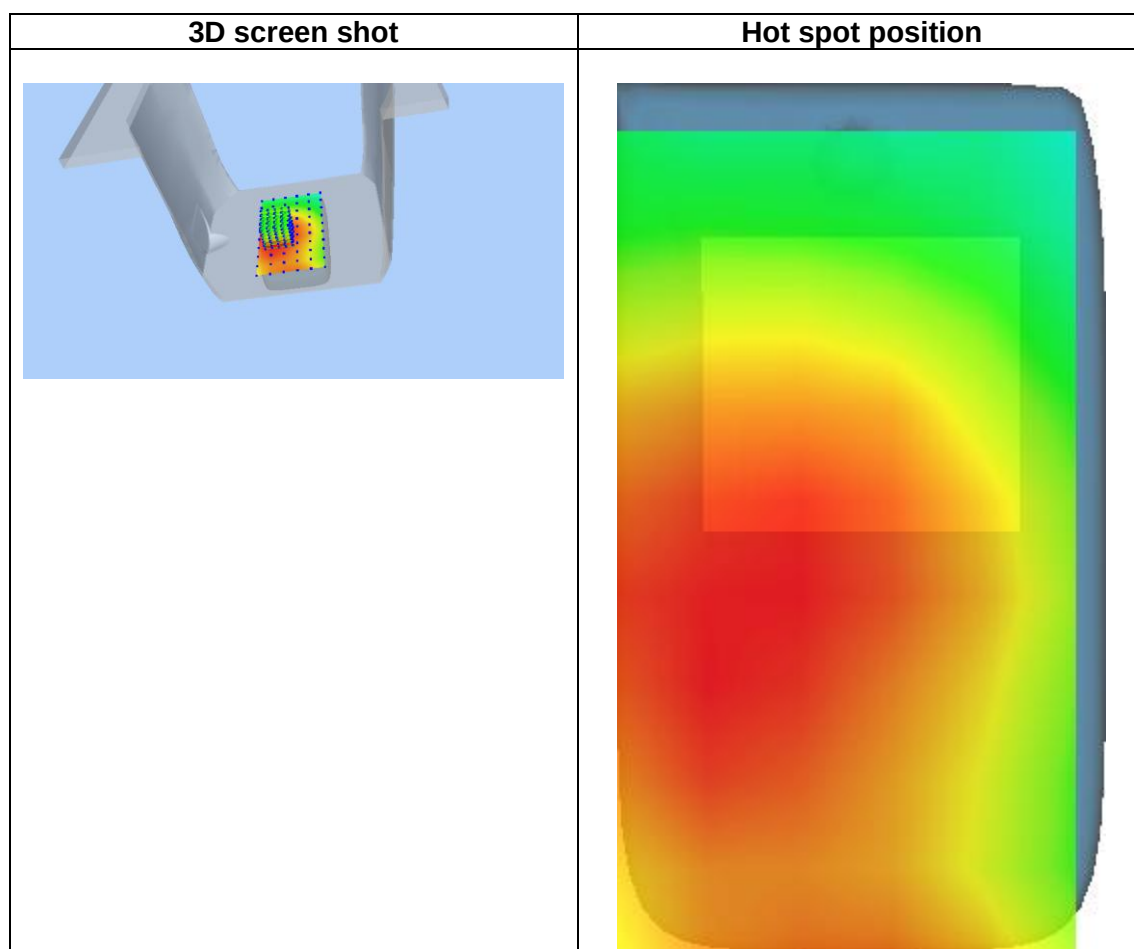
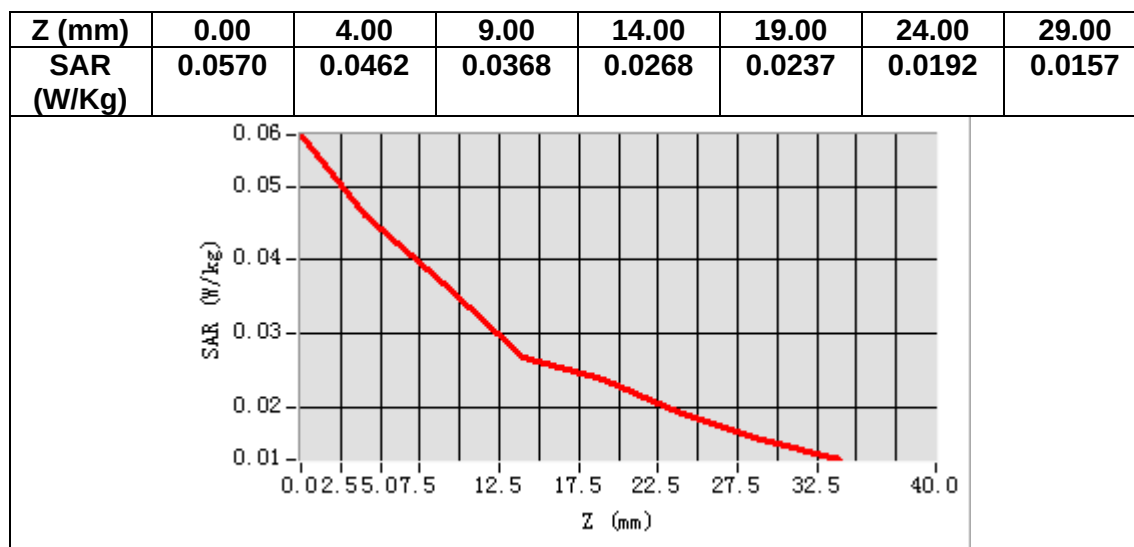
VOLUME SAR



Maximum location: X=-16.00, Y=-14.00

SAR Peak: 0.06 W/kg

SAR 10g (W/Kg)	0.033902
SAR 1g (W/Kg)	0.044769



14. Appendix D. Calibration Certificate

Table of contents
E Field Probe - 3423-EPGO-426
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
3500 MHz Dipole - SN 09/12 DIP 3G500-360
5000-6000 MHz Dipole - SN 13/14 WGA 33



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

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

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

	Customer Name
Distribution :	SHENZHEN NTEK TESTING TECHNOLOGY CO., LTD.

Issue	Name	Date	Modifications
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

Ref: ACR.261.11.23.BES.A

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 0.01 W/kg to 100 W/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%).



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.261.11.23.BES.A

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.

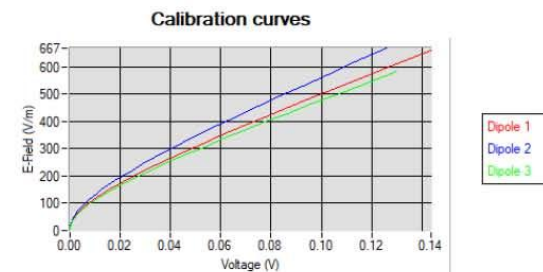
The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-14% for the frequency range 600-7500MHz.

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

Ref: ACR.261.11.23.BES.A

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