

MEASUREMENT 6

Date of measurement: 9/12/2024

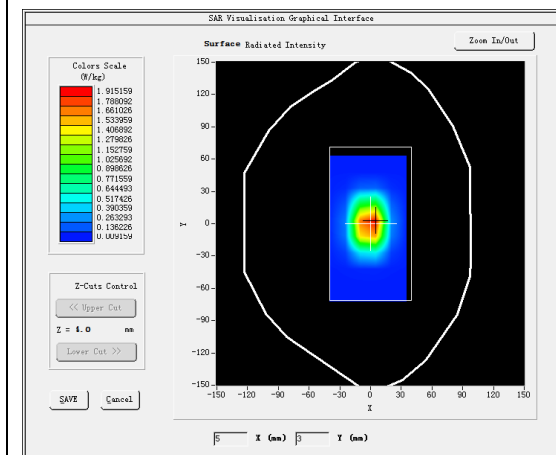
A. Experimental conditions.

<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>Dipole</u>
<u>Band</u>	<u>CW1900</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>CW (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.57</u>

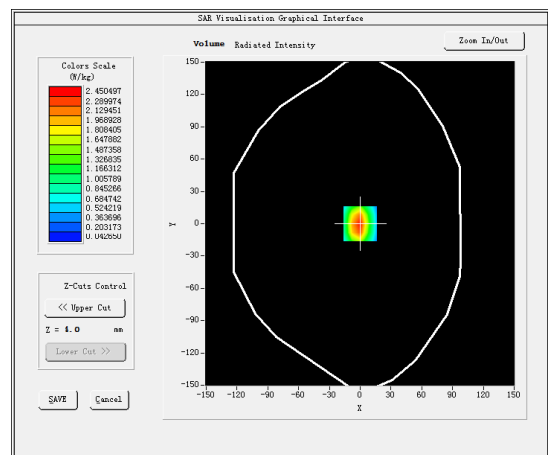
B. SAR Measurement Results

Frequency (MHz)	1900.000000
Relative permittivity (real part)	38.457178
Relative permittivity (imaginary part)	13.792131
Conductivity (S/m)	1.455836
Variation (%)	-0.210000

SURFACE SAR



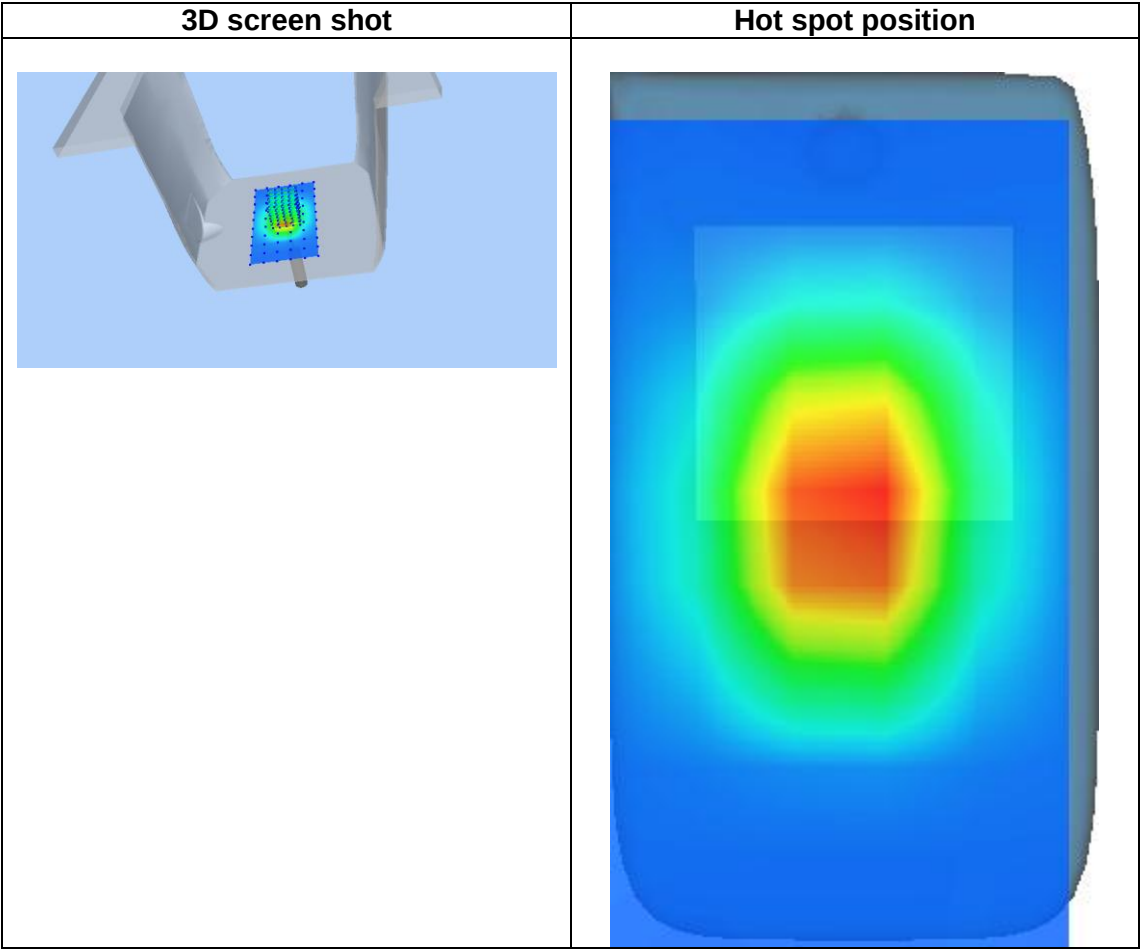
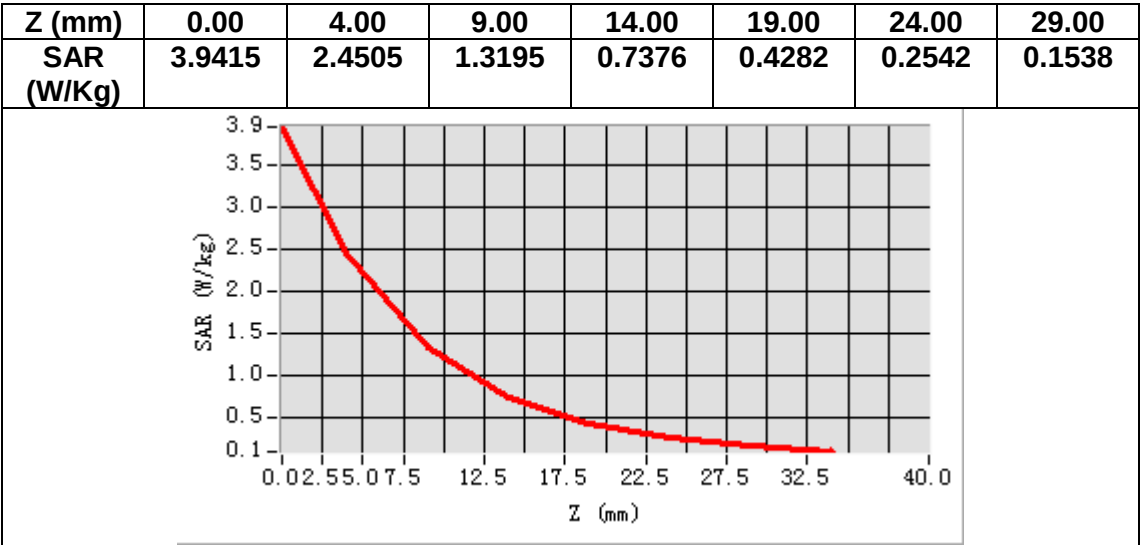
VOLUME SAR



Maximum location: X=0.00, Y=0.00

SAR Peak: 3.97 W/kg

SAR 10g (W/Kg)	1.181231
SAR 1g (W/Kg)	2.396499



MEASUREMENT 7

Date of measurement: 18/11/2024

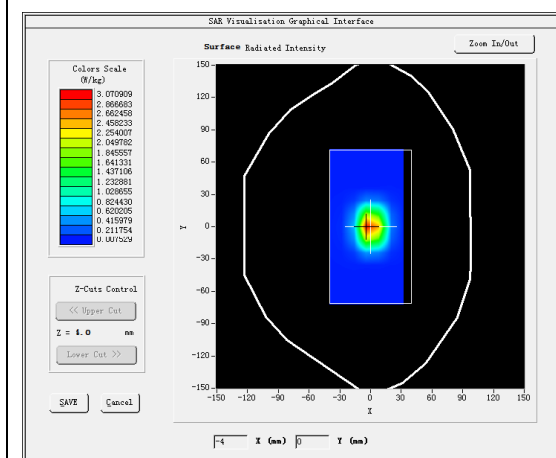
A. Experimental conditions.

<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>2.74</u>

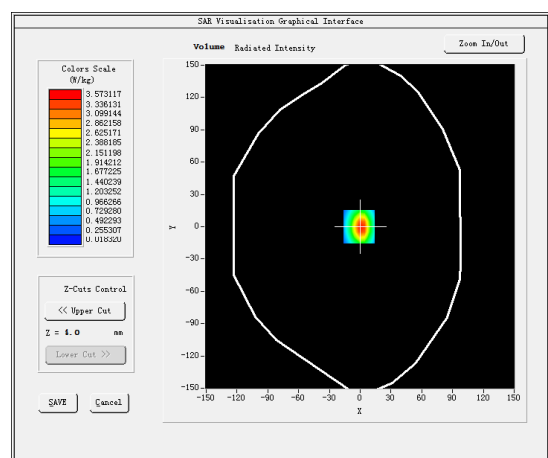
B. SAR Measurement Results

Frequency (MHz)	2450.000000
Relative permittivity (real part)	37.962009
Relative permittivity (imaginary part)	13.205487
Conductivity (S/m)	1.797414
Variation (%)	-0.130000

SURFACE SAR



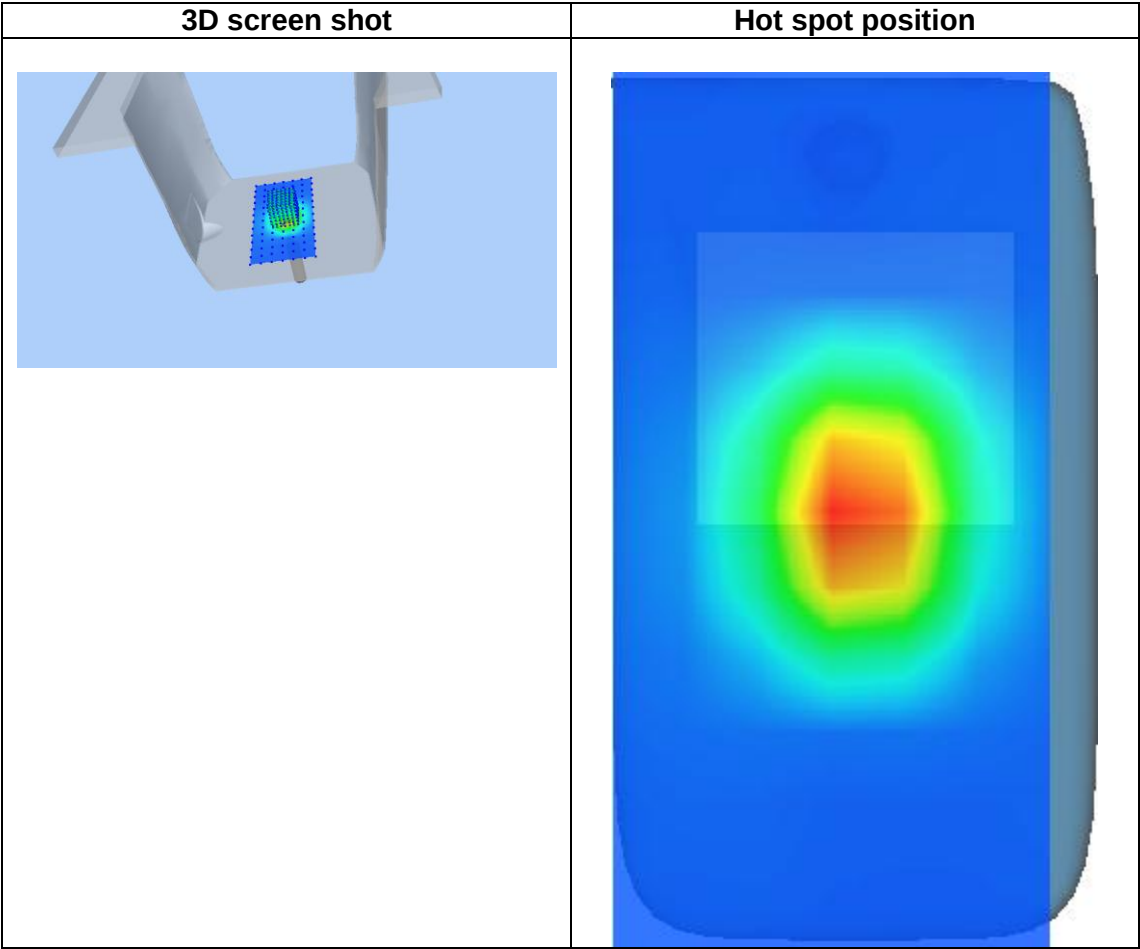
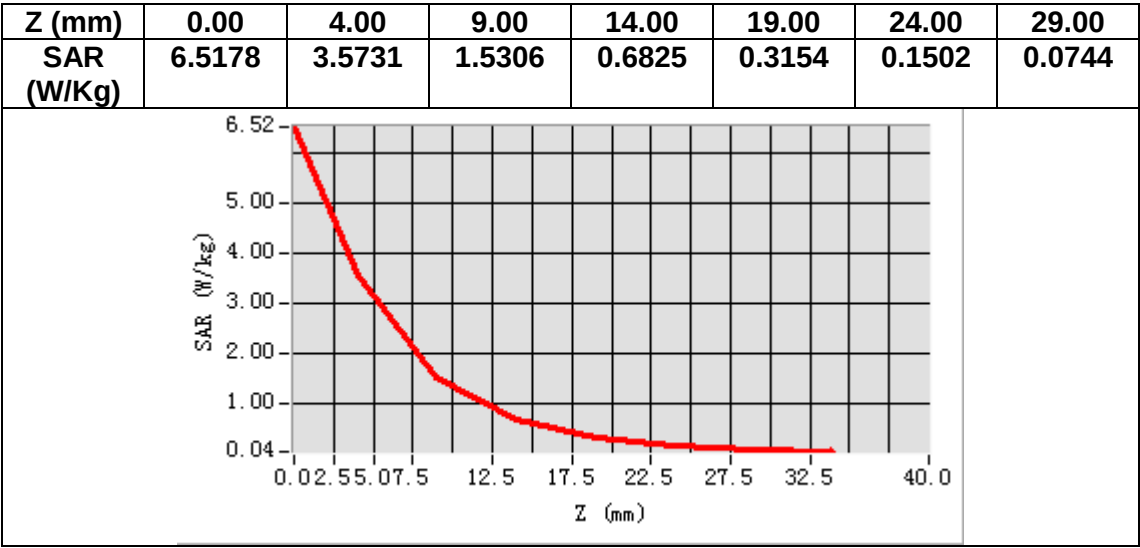
VOLUME SAR



Maximum location: X=-1.00, Y=0.00

SAR Peak: 6.57 W/kg

SAR 10g (W/Kg)	1.404082
SAR 1g (W/Kg)	3.347366



MEASUREMENT 8

Date of measurement: 25/11/2024

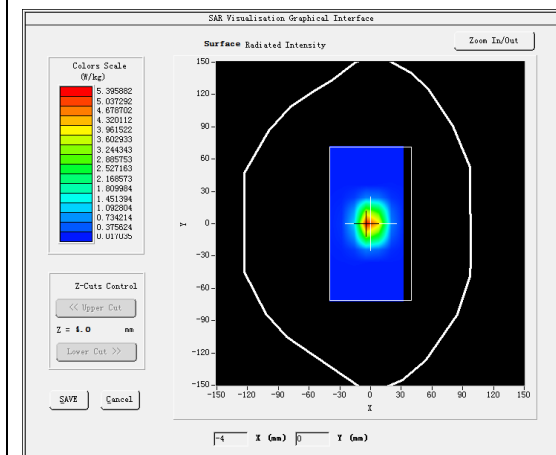
A. Experimental conditions.

<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>2.51</u>

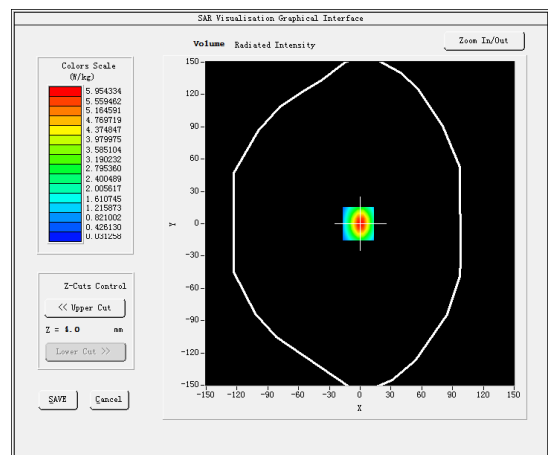
B. SAR Measurement Results

Frequency (MHz)	2600.000000
Relative permittivity (real part)	38.878441
Relative permittivity (imaginary part)	13.731472
Conductivity (S/m)	1.983435
Variation (%)	-0.680000

SURFACE SAR



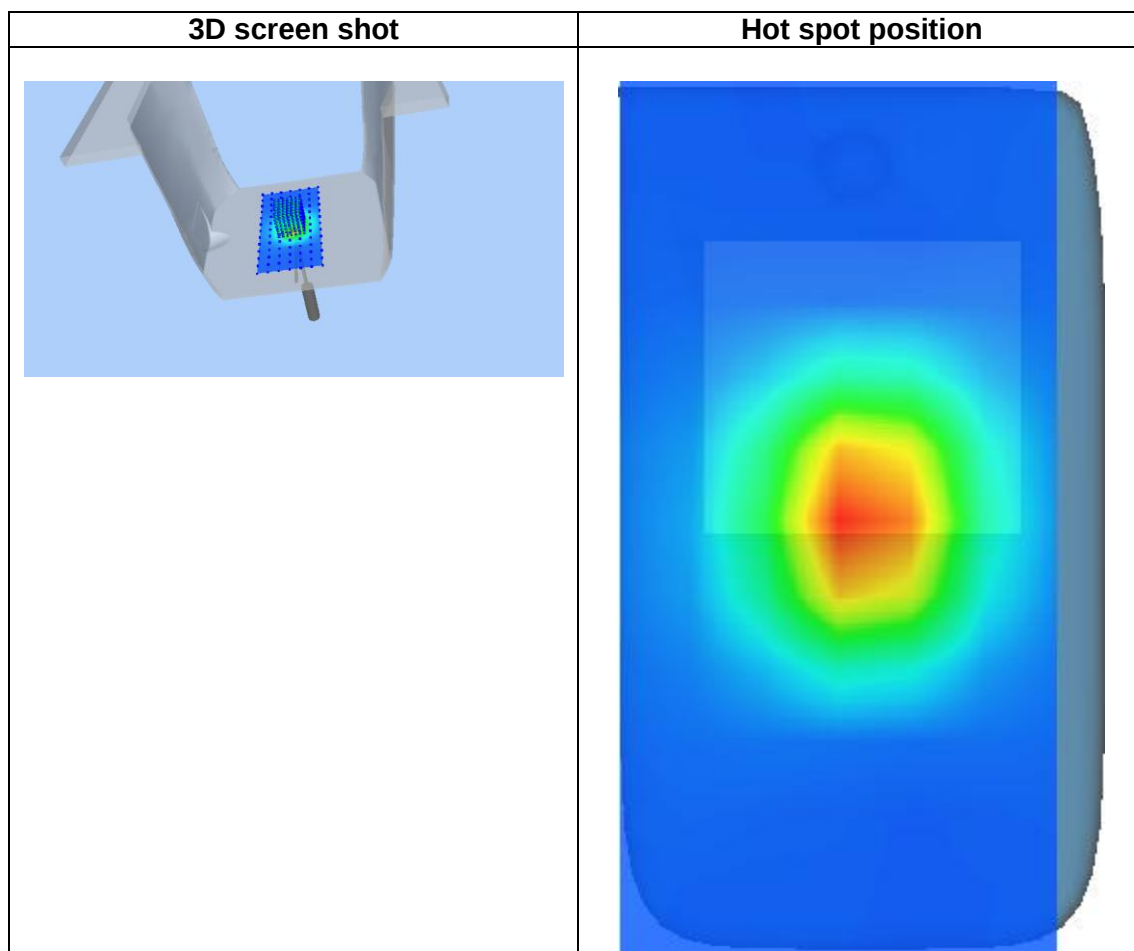
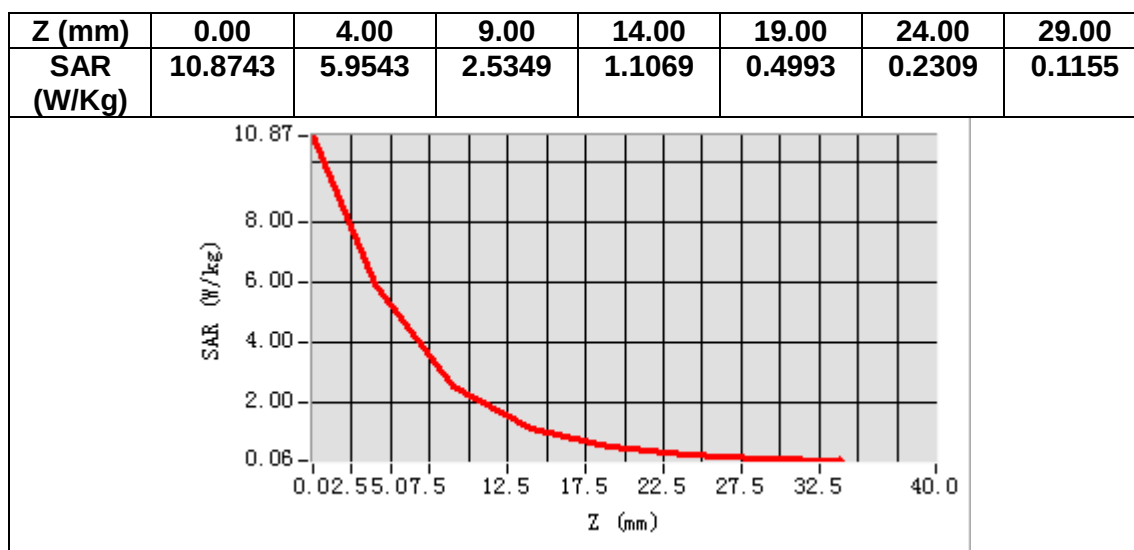
VOLUME SAR



Maximum location: X=-2.00, Y=0.00

SAR Peak: 11.17 W/kg

SAR 10g (W/Kg)	2.367676
SAR 1g (W/Kg)	5.709248



MEASUREMENT 9

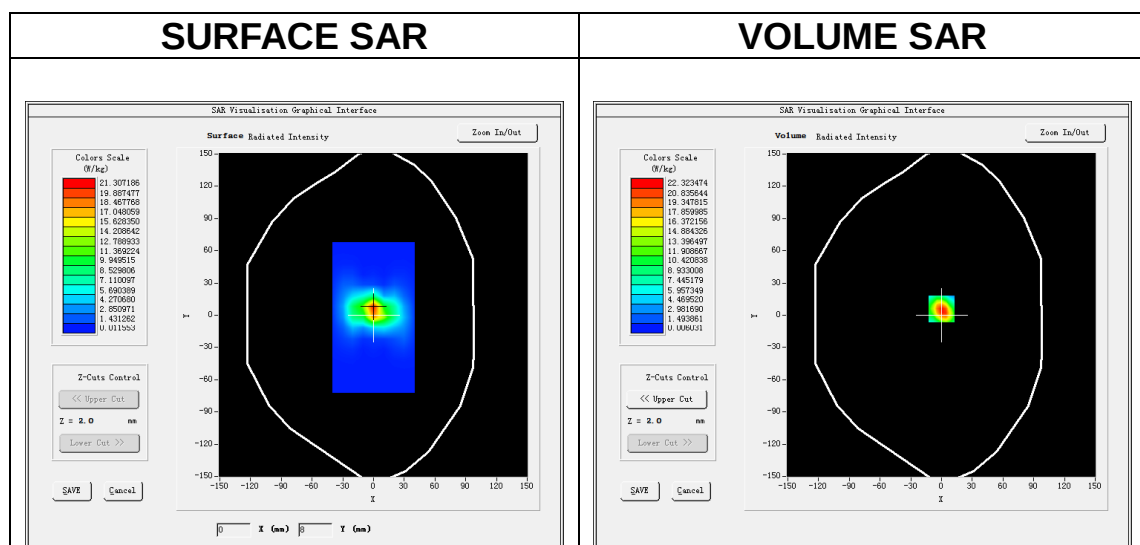
Date of measurement: 11/12/2024

A. Experimental conditions.

Area Scan	<u>dx=10mm dy=10mm, h= 2.00 mm</u>
ZoomScan	<u>7x7x12,dx=4mm dy=4mm dz=2mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Dipole</u>
Band	<u>CW5200</u>
Channels	<u>Middle</u>
Signal	<u>CW (Crest factor: 1.0)</u>
ConvF	<u>1.89</u>

B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative permittivity (real part)	34.652485
Relative permittivity (imaginary part)	15.561054
Conductivity (S/m)	4.4954156
Variation (%)	1.590000

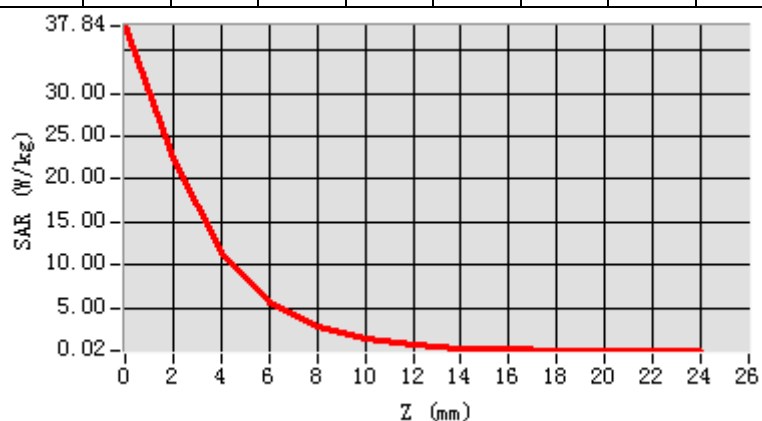


Maximum location: X=0.00, Y=6.00

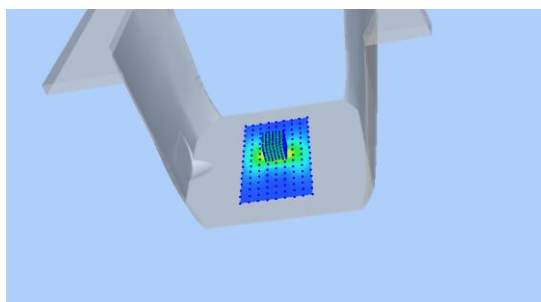
SAR Peak: 40.06 W/kg

SAR 10g (W/Kg)	5.450374
SAR 1g (W/Kg)	15.653564

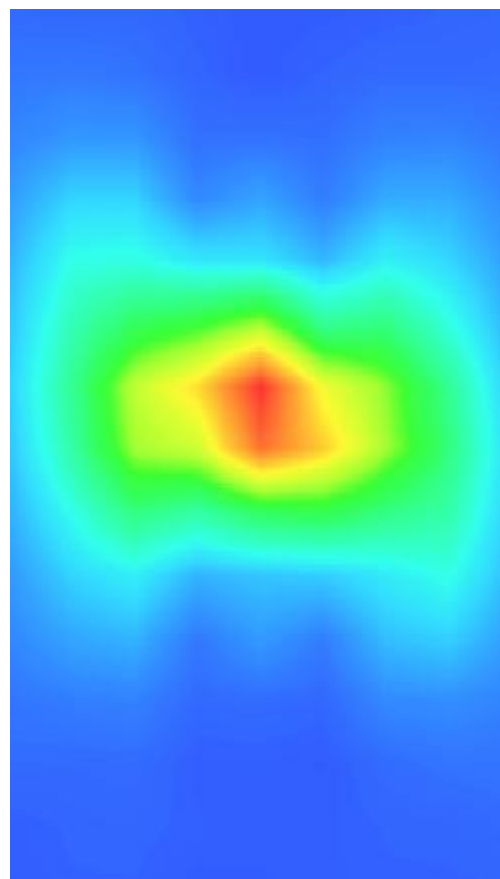
Z (m m)	0.00	2.00	4.00	6.00	8.00	10.0	12.0	14.0	16.0	18.0	20.0	22.0
SA R (W/ Kg)	37.8 356	22.3 278	11.3 730	5.66 18	2.82 55	1.40 93	0.71 24	0.36 60	0.18 08	0.10 12	0.05 13	0.03 23



3D screen shot



Hot spot position



MEASUREMENT 10

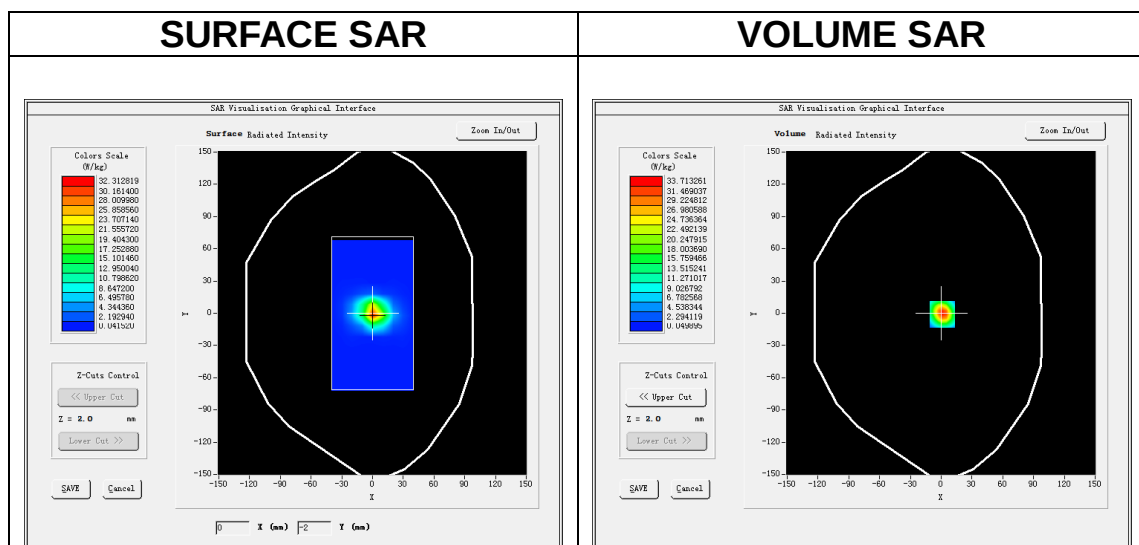
Date of measurement: 30/11/2024

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>1.90</u>

B. SAR Measurement Results

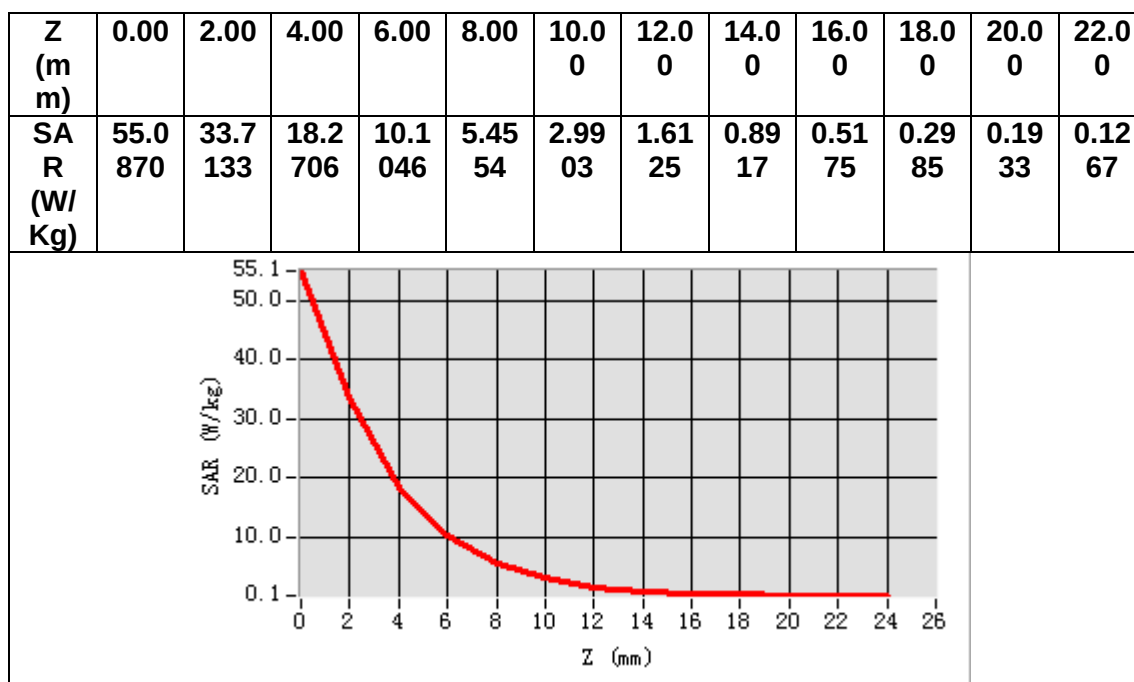
Frequency (MHz)	5800.000000
Relative permittivity (real part)	34.030204
Relative permittivity (imaginary part)	16.052683
Conductivity (S/m)	5.172531
Variation (%)	-0.760000



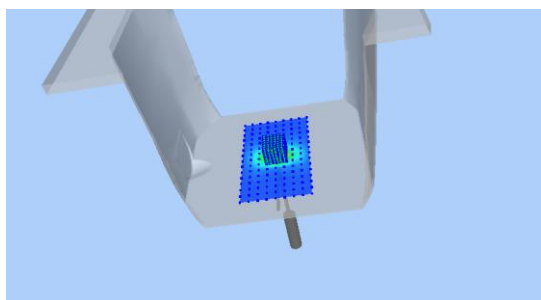
Maximum location: X=1.00, Y=-1.00

SAR Peak: 57.73 W/kg

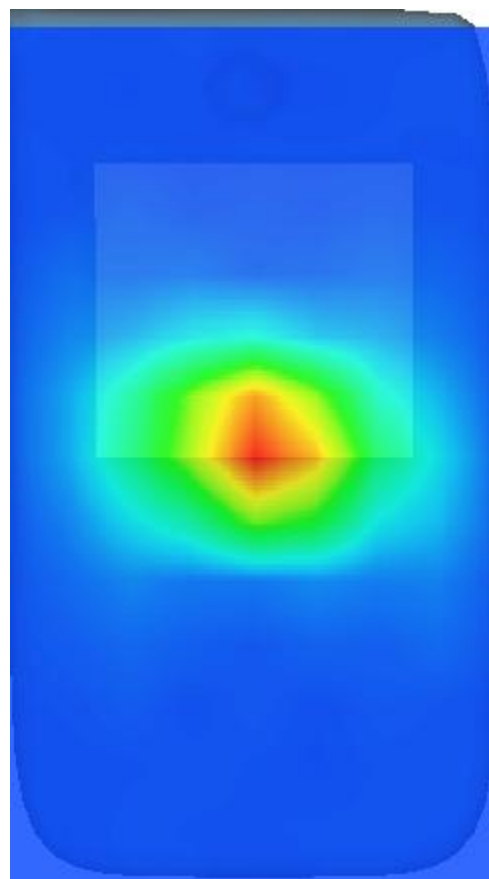
SAR 10g (W/Kg)	6.542945
SAR 1g (W/Kg)	19.246353



3D screen shot



Hot spot position



13. Appendix C. Plots of High SAR Measurement

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MEASUREMENT 1

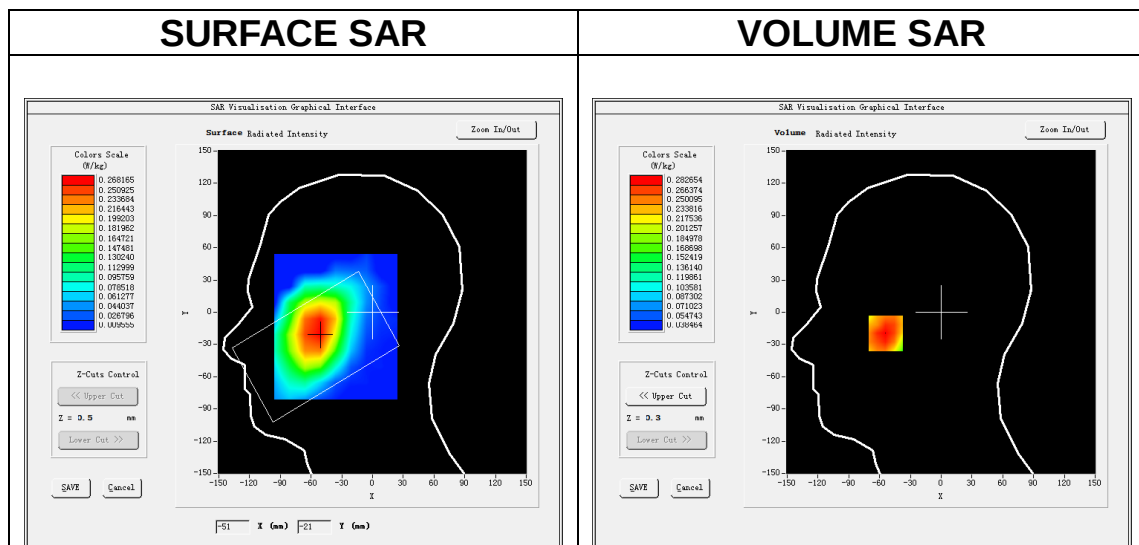
Date of measurement: 11/12/2024

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: 8.0)</u>
<u>ConvF</u>	<u>2.34</u>

B. SAR Measurement Results

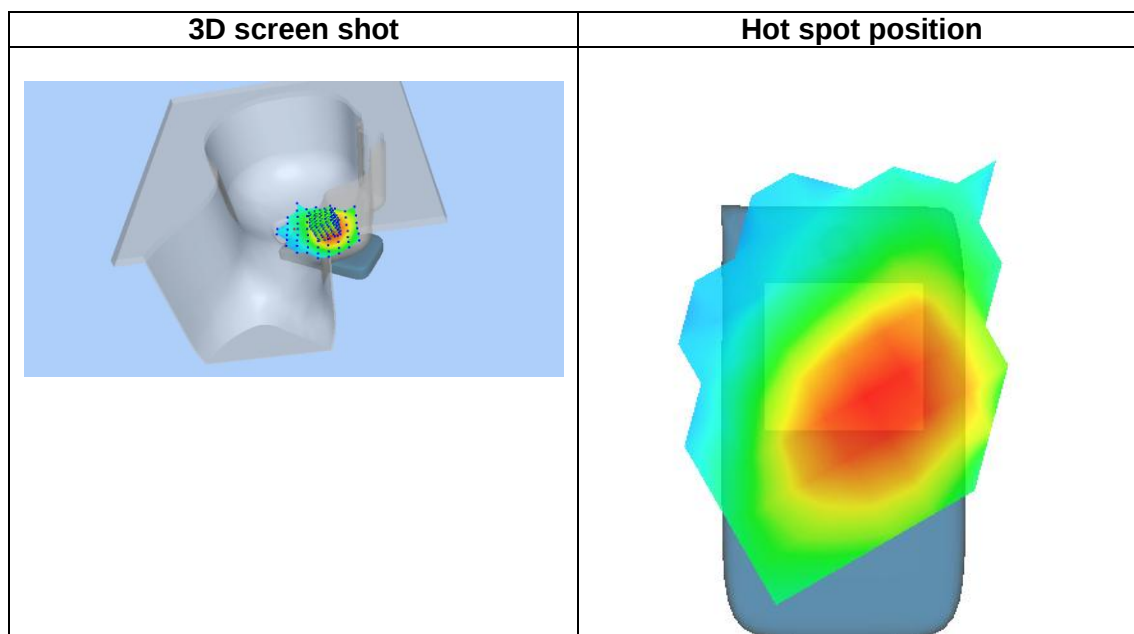
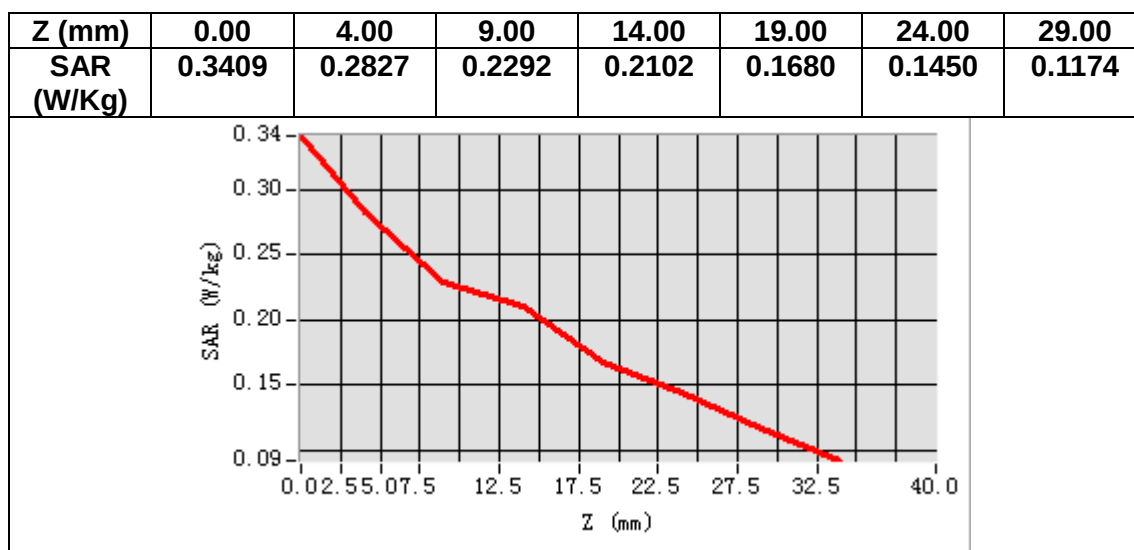
Frequency (MHz)	836.400000
Relative permittivity (real part)	41.742706
Relative permittivity (imaginary part)	19.618612
Conductivity (S/m)	0.911612
Variation (%)	1.520000



Maximum location: X=-54.00, Y=-19.00

SAR Peak: 0.35 W/kg

SAR 10g (W/Kg)	0.215316
SAR 1g (W/Kg)	0.278641



MEASUREMENT 2

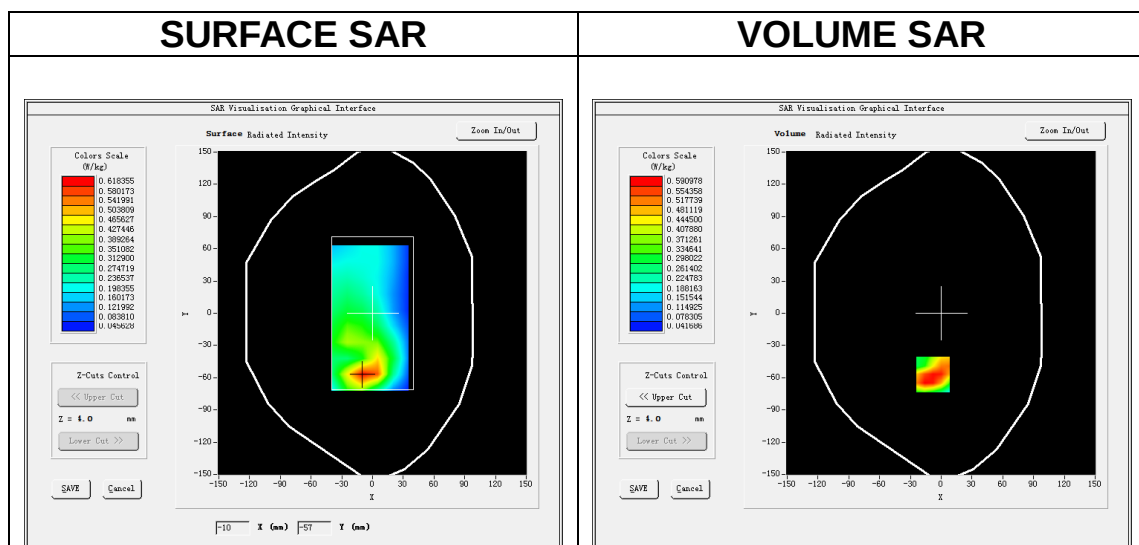
Date of measurement: 11/12/2024

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: 8.0)</u>
<u>ConvF</u>	<u>2.34</u>

B. SAR Measurement Results

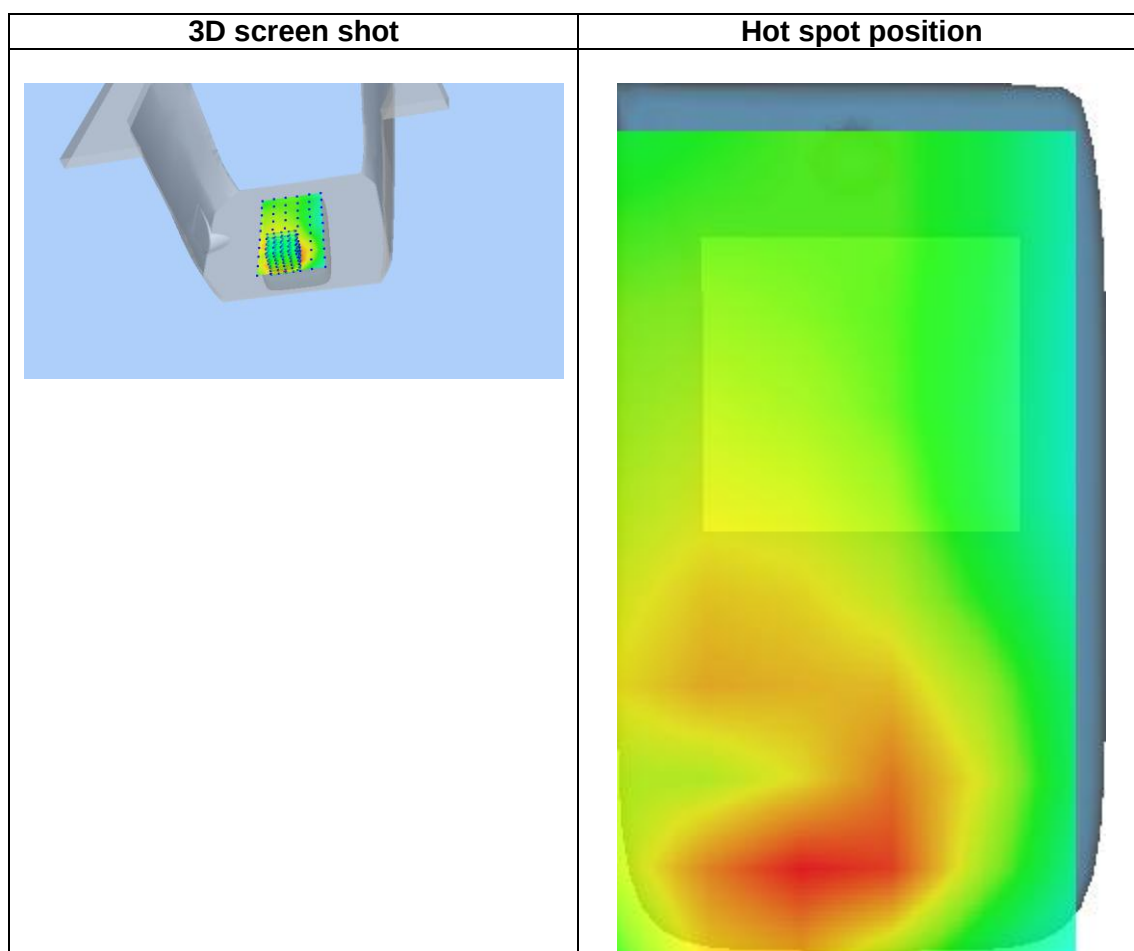
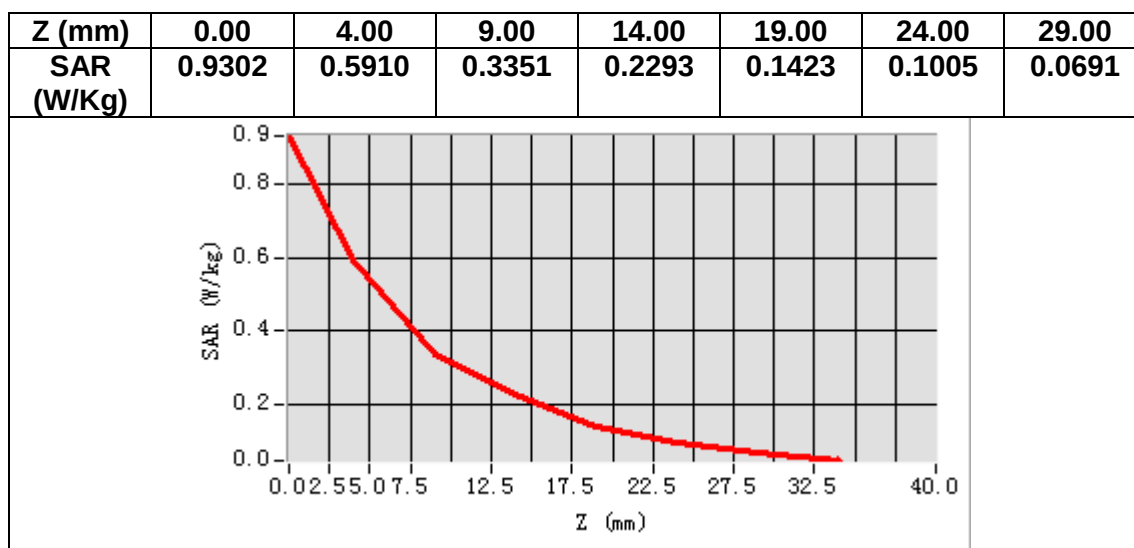
Frequency (MHz)	836.400000
Relative permittivity (real part)	41.742706
Relative permittivity (imaginary part)	19.618612
Conductivity (S/m)	0.911612
Variation (%)	1.750000



Maximum location: X=-8.00, Y=-57.00

SAR Peak: 0.96 W/kg

SAR 10g (W/Kg)	0.335473
SAR 1g (W/Kg)	0.599133



MEASUREMENT 3

Date of measurement: 24/11/2024

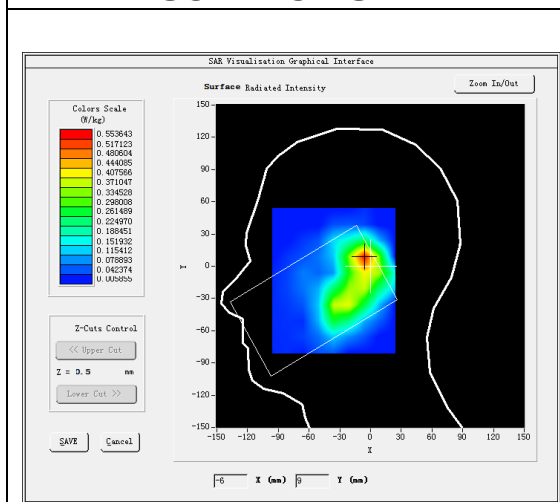
A. Experimental conditions.

<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: 8.0)</u>
<u>ConvF</u>	<u>2.57</u>

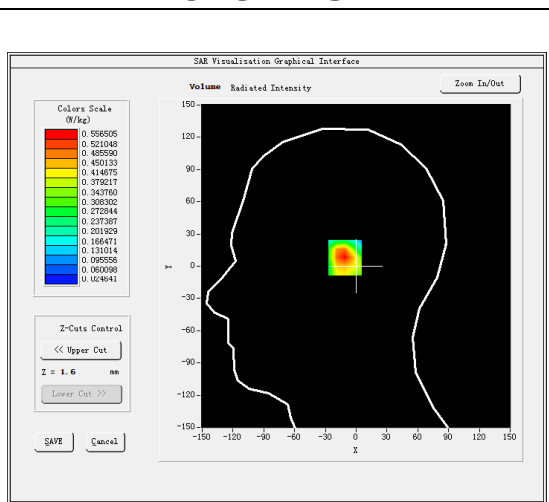
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.415112
Relative permittivity (imaginary part)	13.697431
Conductivity (S/m)	1.430621
Variation (%)	-0.900000

SURFACE SAR



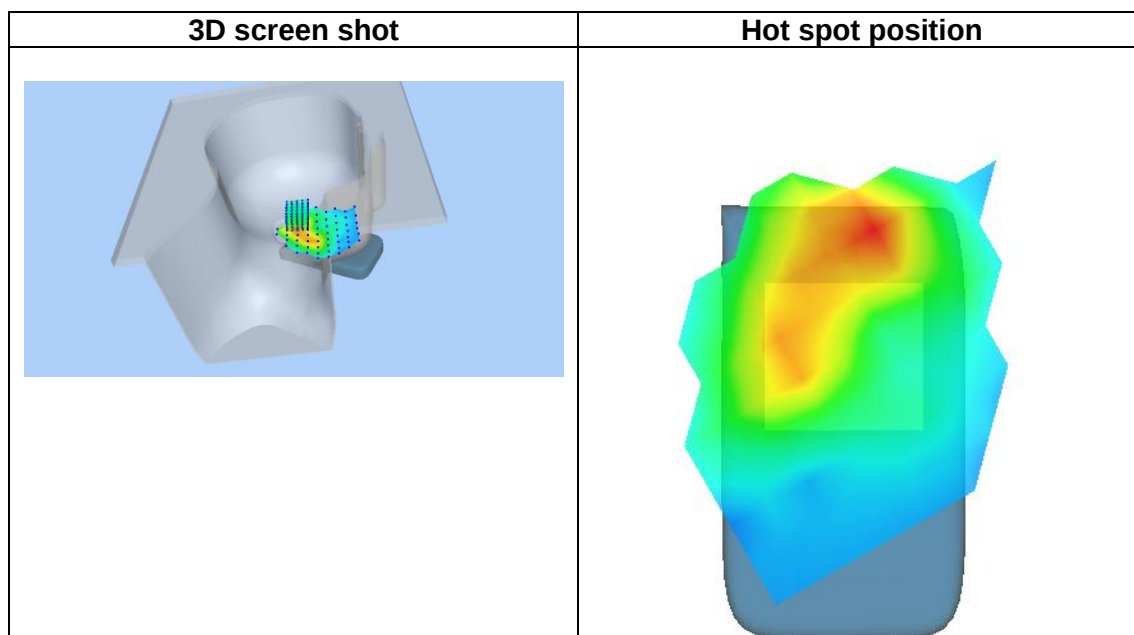
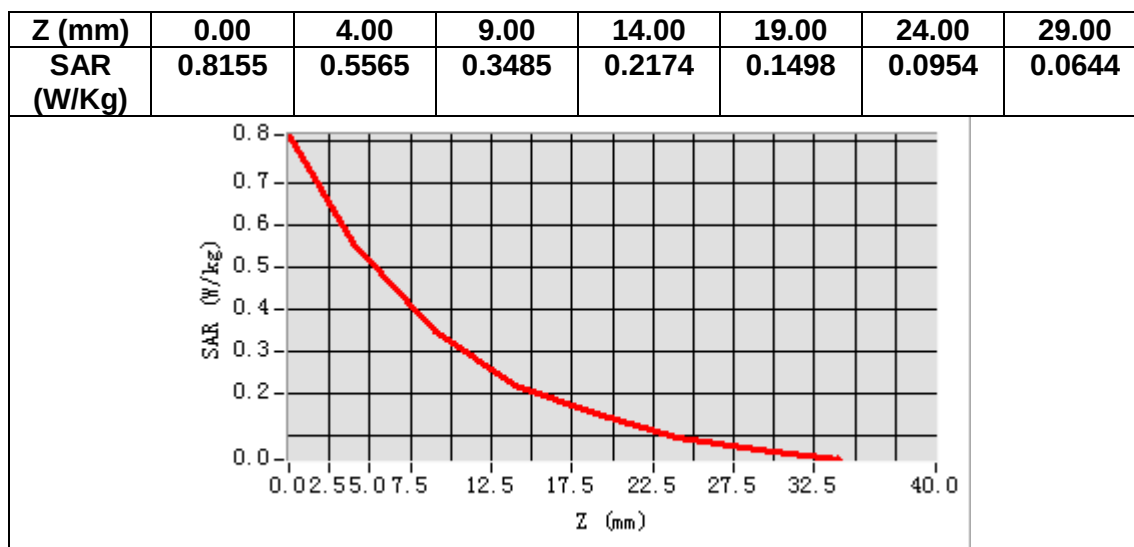
VOLUME SAR



Maximum location: X=-6.00, Y=8.00

SAR Peak: 0.82 W/kg

SAR 10g (W/Kg)	0.295140
SAR 1g (W/Kg)	0.543444



MEASUREMENT 4

Date of measurement: 24/11/2024

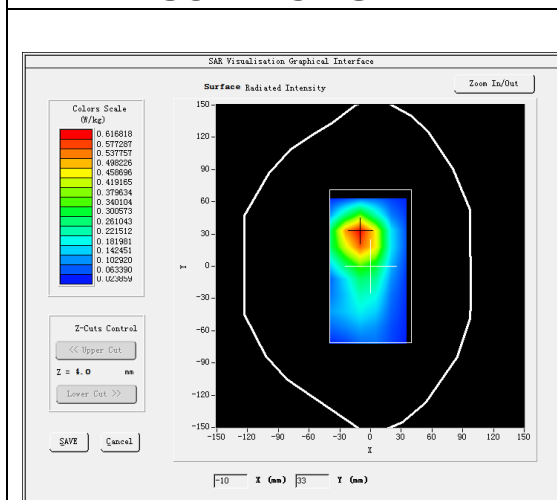
A. Experimental conditions.

<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: 8.0)</u>
<u>ConvF</u>	<u>2.57</u>

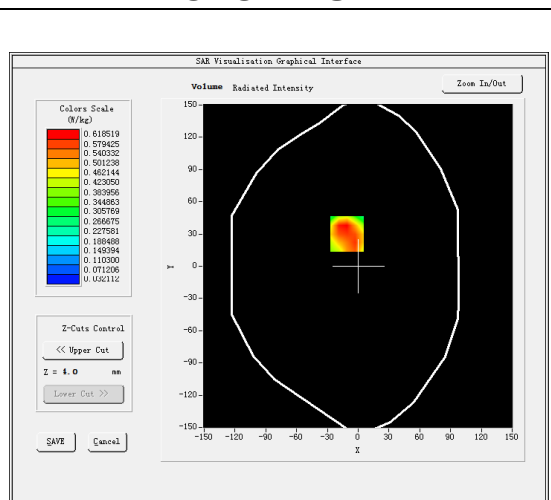
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.415112
Relative permittivity (imaginary part)	13.697431
Conductivity (S/m)	1.430621
Variation (%)	-1.230000

SURFACE SAR



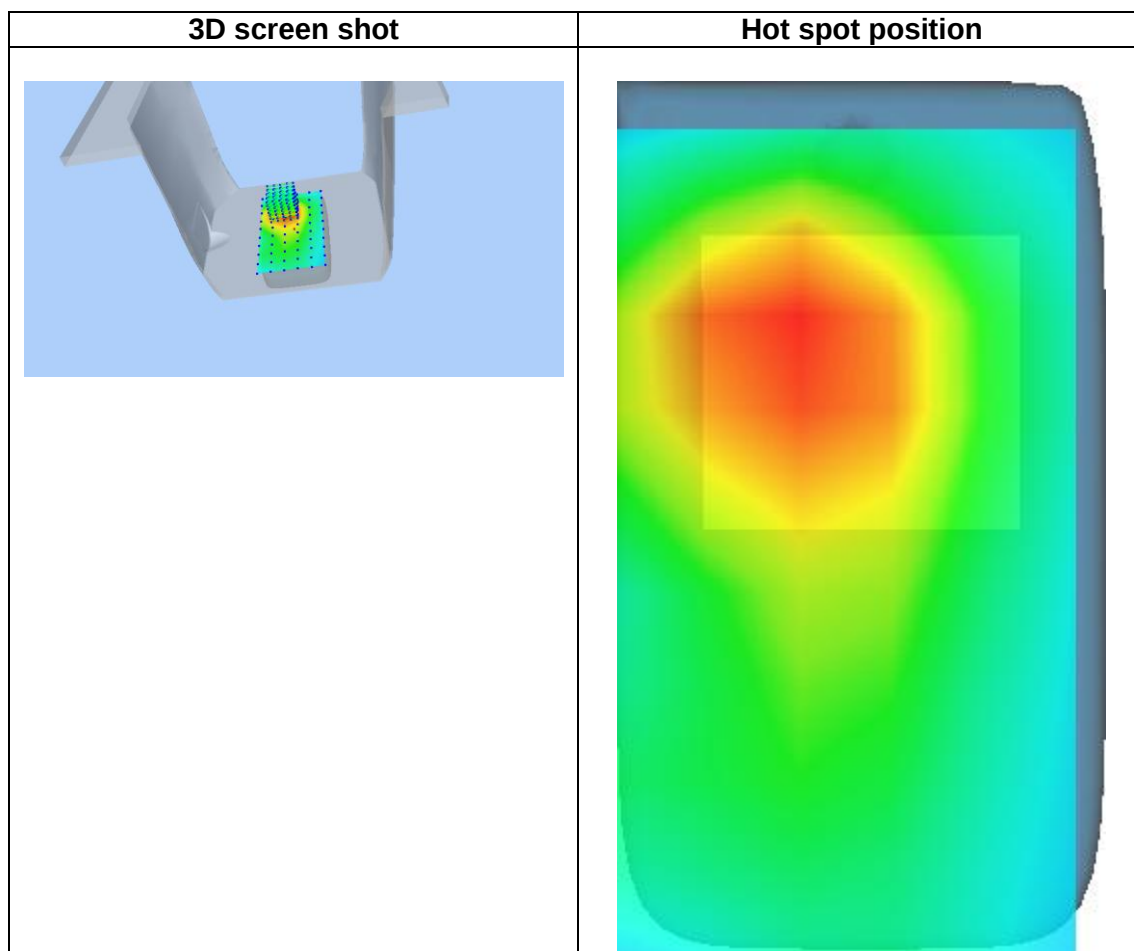
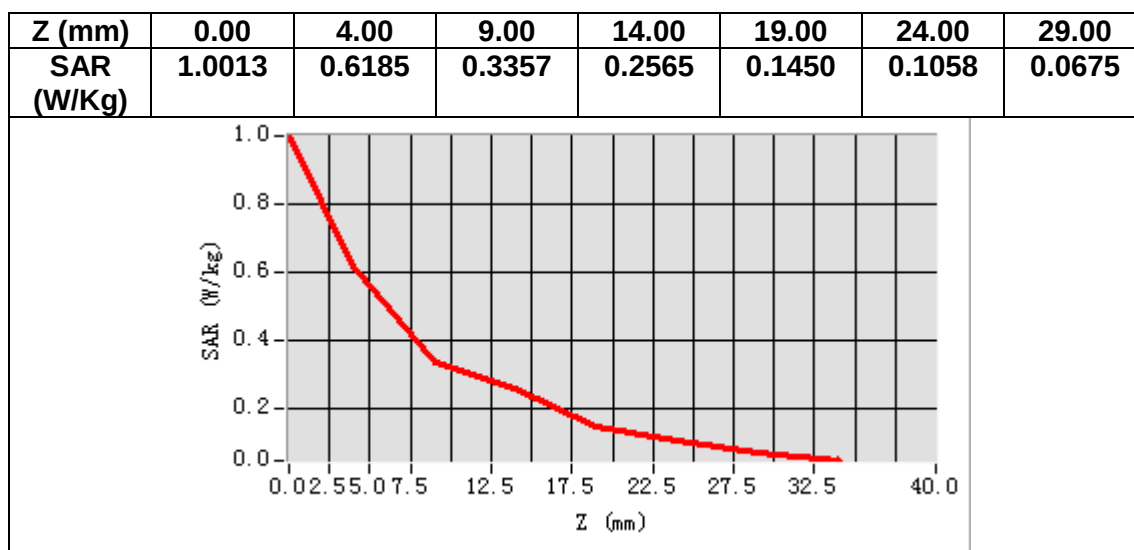
VOLUME SAR



Maximum location: X=-11.00, Y=30.00

SAR Peak: 0.94 W/kg

SAR 10g (W/Kg)	0.350893
SAR 1g (W/Kg)	0.609532



MEASUREMENT 5

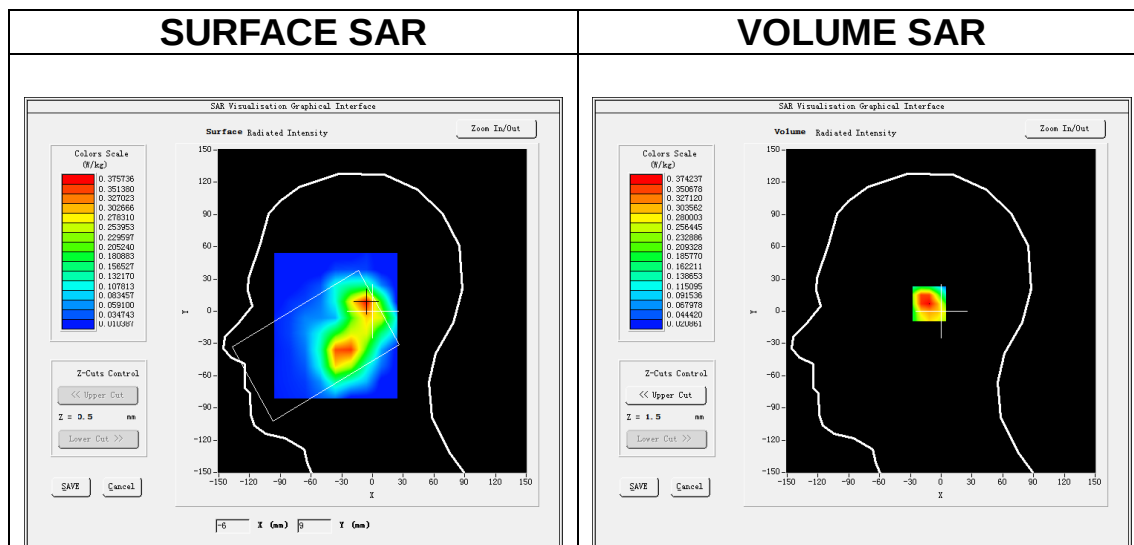
Date of measurement: 24/11/2024

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>2.57</u>

B. SAR Measurement Results

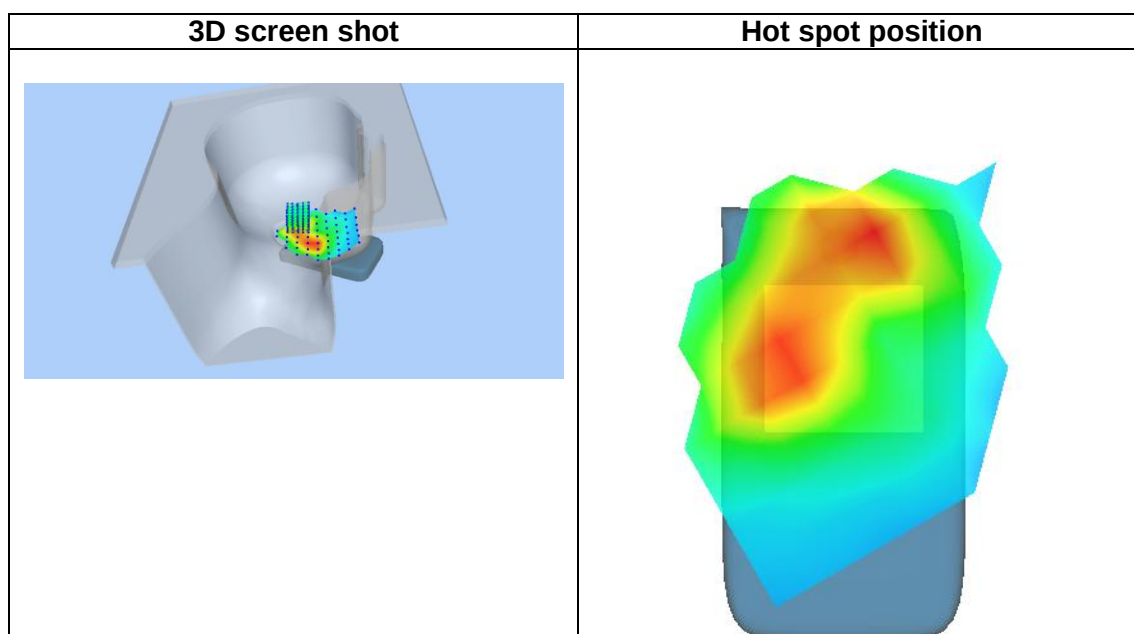
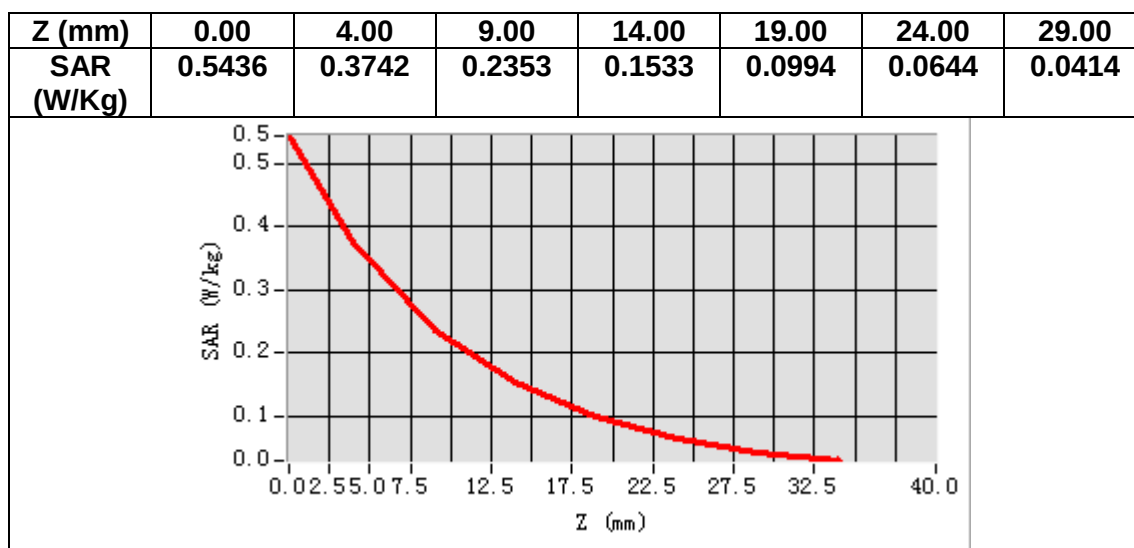
Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.415112
Relative permittivity (imaginary part)	13.697431
Conductivity (S/m)	1.430621
Variation (%)	0.160000



Maximum location: X=-7.00, Y=7.00

SAR Peak: 0.58 W/kg

SAR 10g (W/Kg)	0.203829
SAR 1g (W/Kg)	0.376367



MEASUREMENT 6

Date of measurement: 24/11/2024

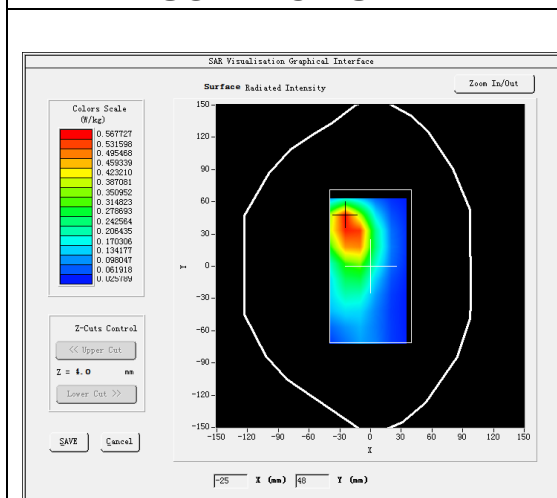
A. Experimental conditions.

<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>2.57</u>

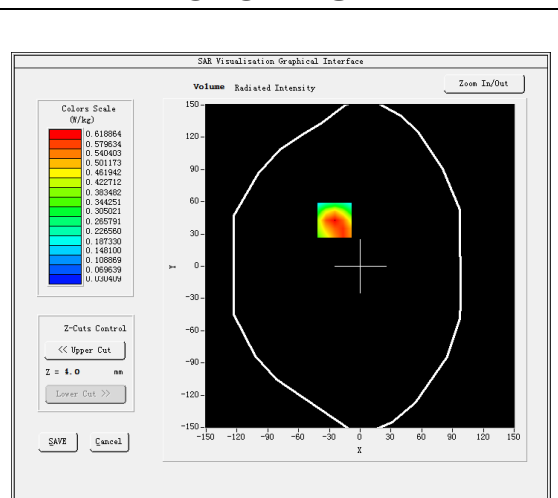
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.415112
Relative permittivity (imaginary part)	13.697431
Conductivity (S/m)	1.430621
Variation (%)	-0.060000

SURFACE SAR



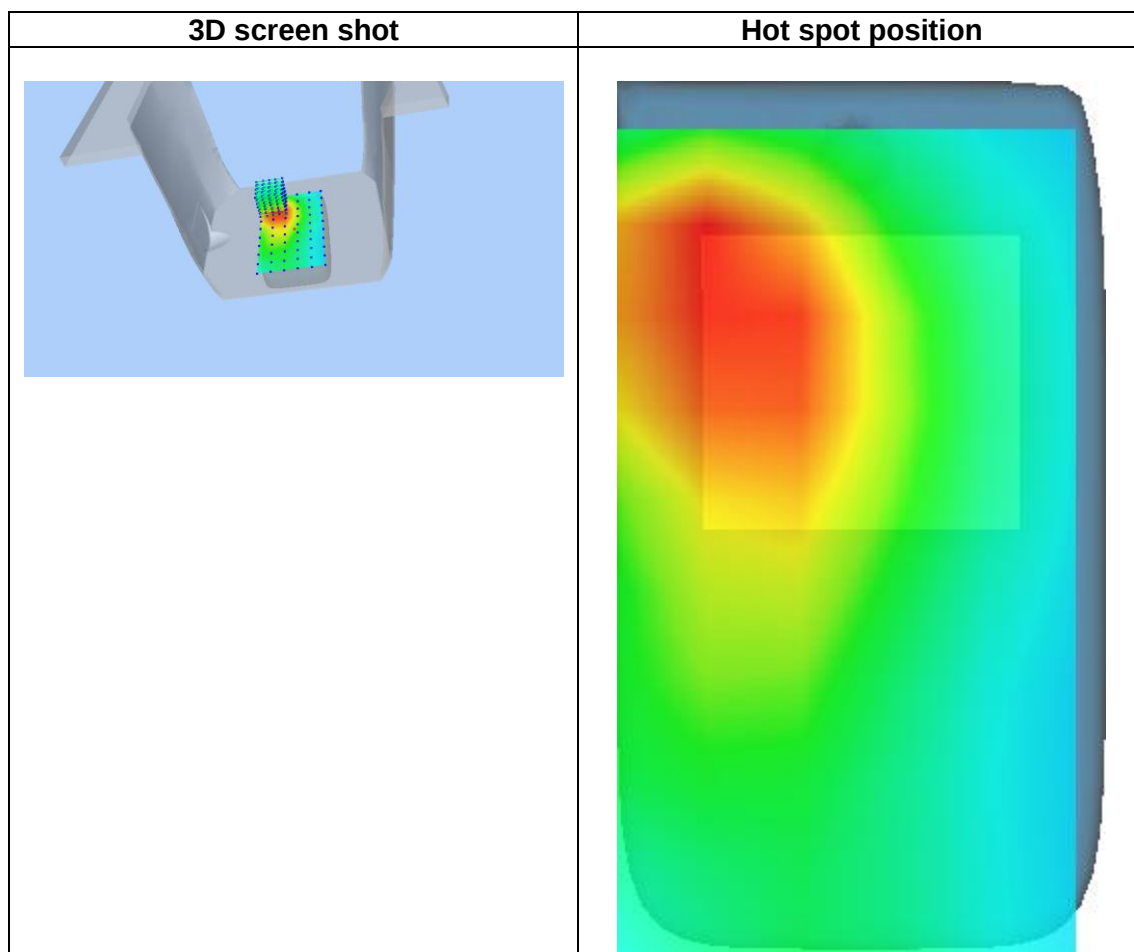
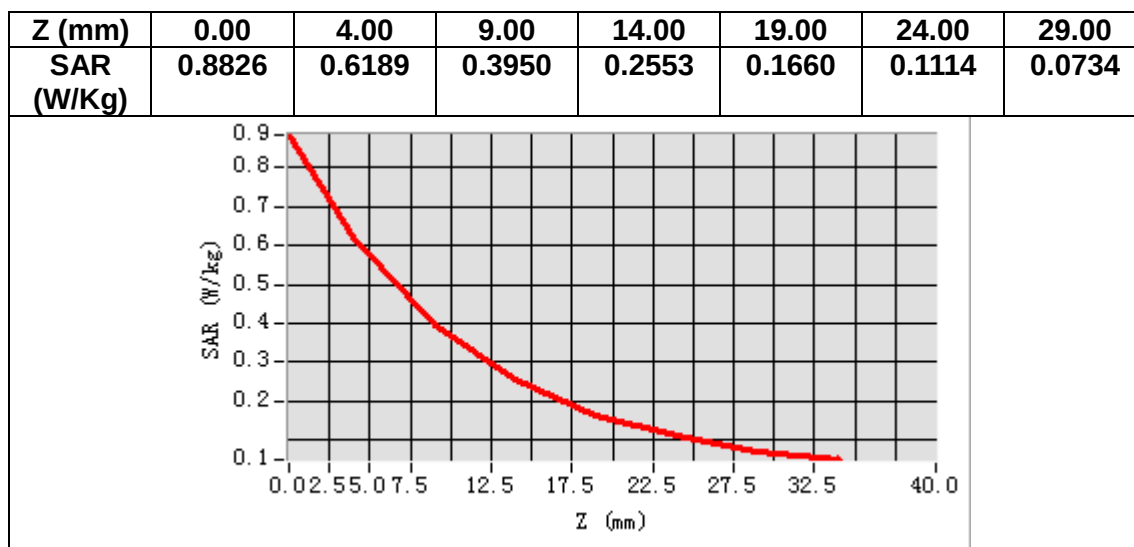
VOLUME SAR



Maximum location: X=-25.00, Y=43.00

SAR Peak: 0.88 W/kg

SAR 10g (W/Kg)	0.349591
SAR 1g (W/Kg)	0.595265



MEASUREMENT 7

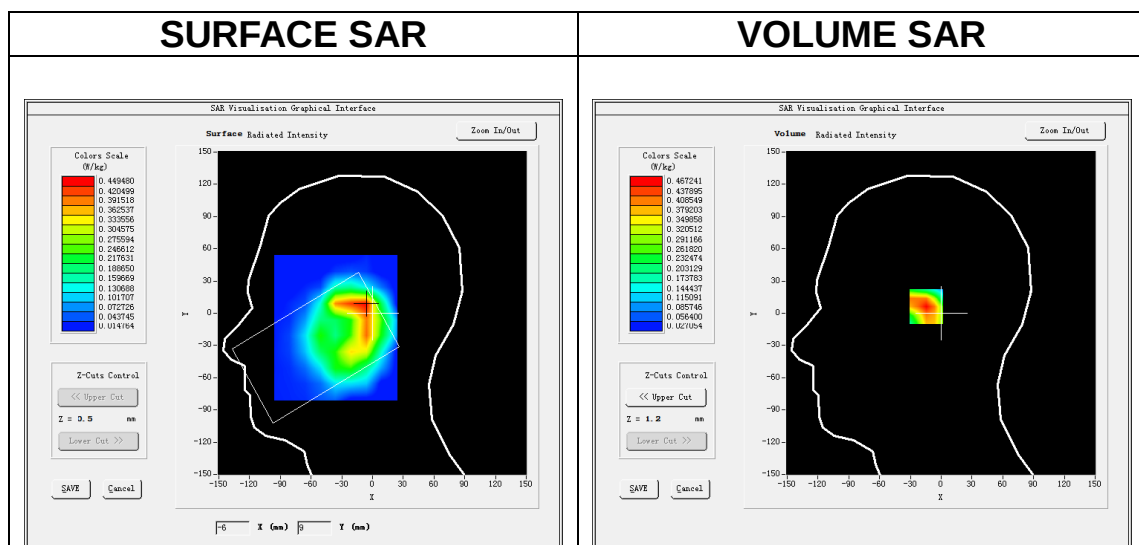
Date of measurement: 21/11/2024

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>2.51</u>

B. SAR Measurement Results

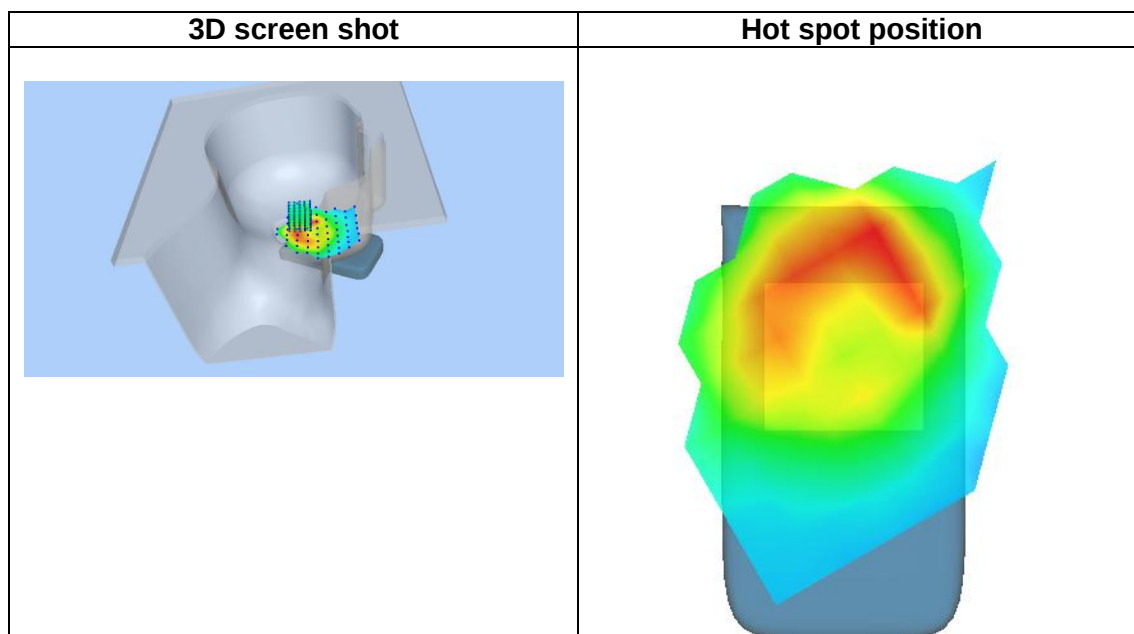
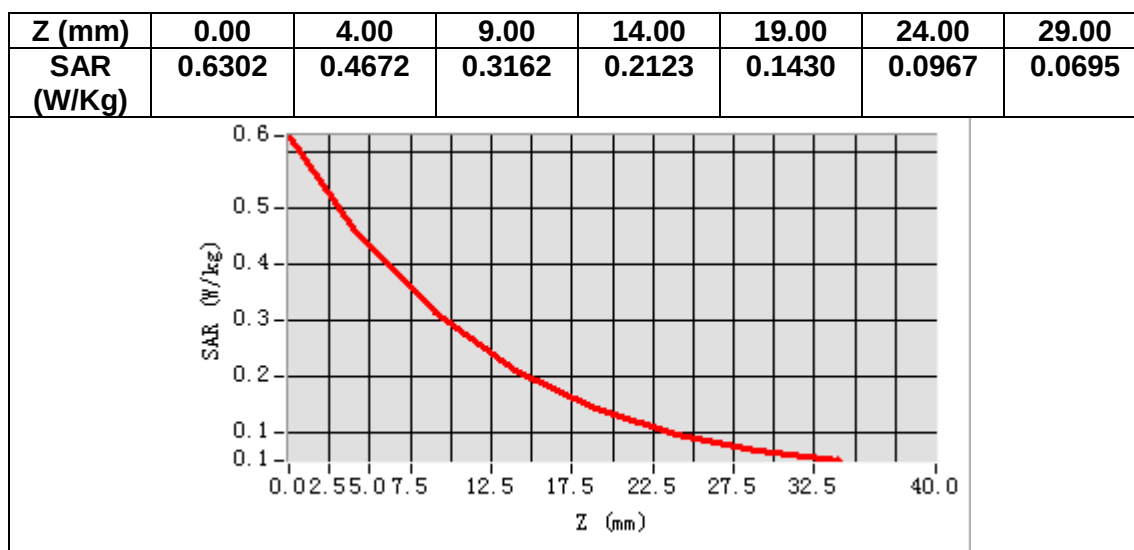
Frequency (MHz)	1732.600000
Relative permittivity (real part)	39.537403
Relative permittivity (imaginary part)	13.817305
Conductivity (S/m)	1.329532
Variation (%)	-0.450000



Maximum location: X=-10.00, Y=6.00

SAR Peak: 0.65 W/kg

SAR 10g (W/Kg)	0.267364
SAR 1g (W/Kg)	0.439029



MEASUREMENT 8

Date of measurement: 21/11/2024

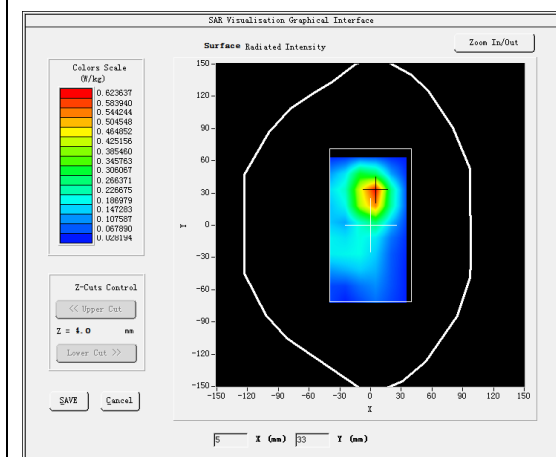
A. Experimental conditions.

<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>2.51</u>

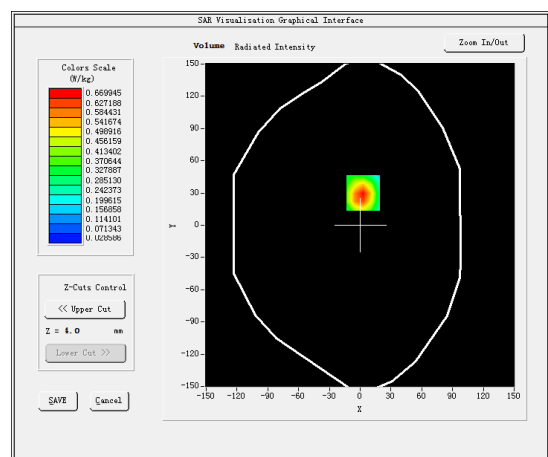
B. SAR Measurement Results

Frequency (MHz)	1732.600000
Relative permittivity (real part)	39.537403
Relative permittivity (imaginary part)	13.817305
Conductivity (S/m)	1.329532
Variation (%)	0.030000

SURFACE SAR



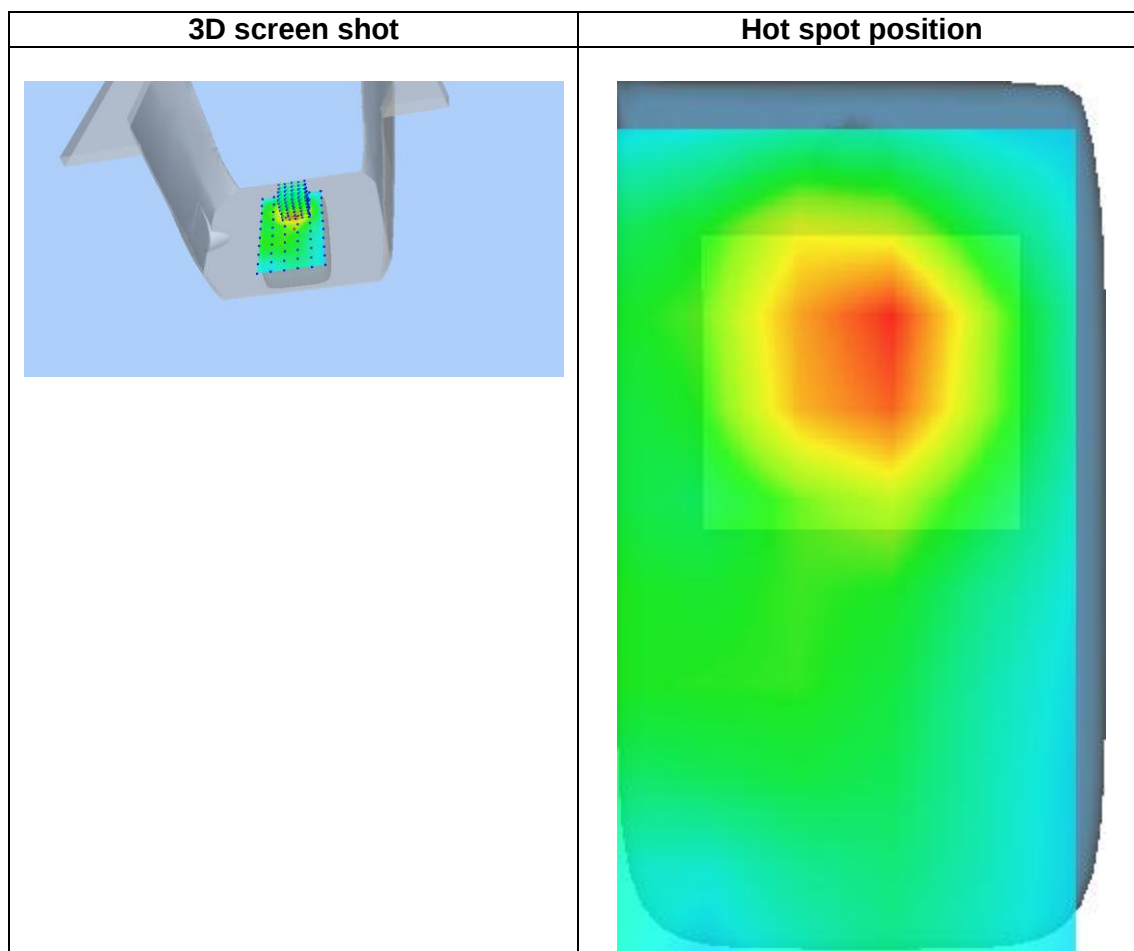
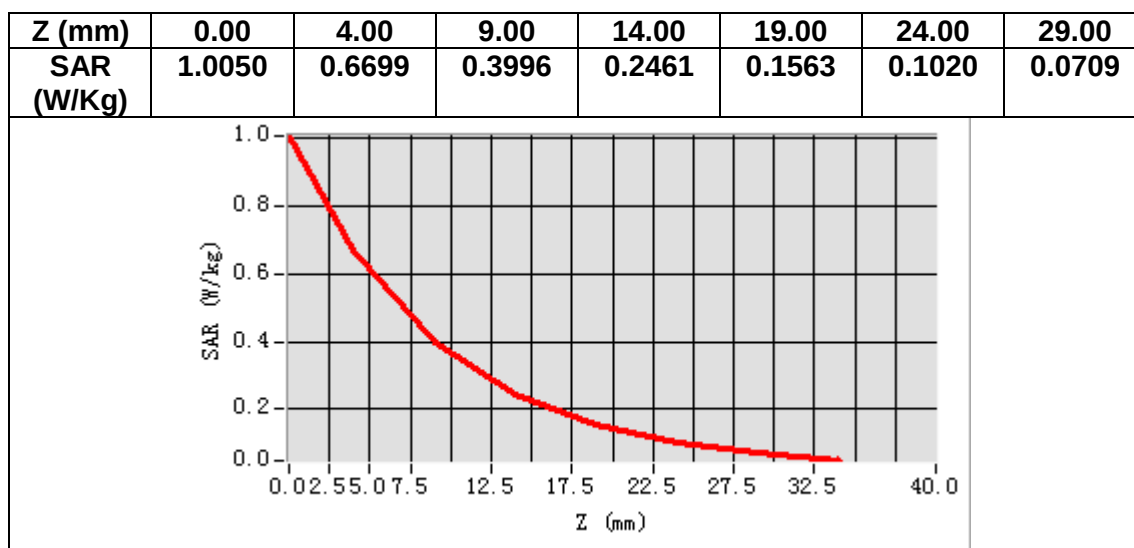
VOLUME SAR



Maximum location: X=3.00, Y=30.00

SAR Peak: 1.01 W/kg

SAR 10g (W/Kg)	0.360659
SAR 1g (W/Kg)	0.638564



MEASUREMENT 9

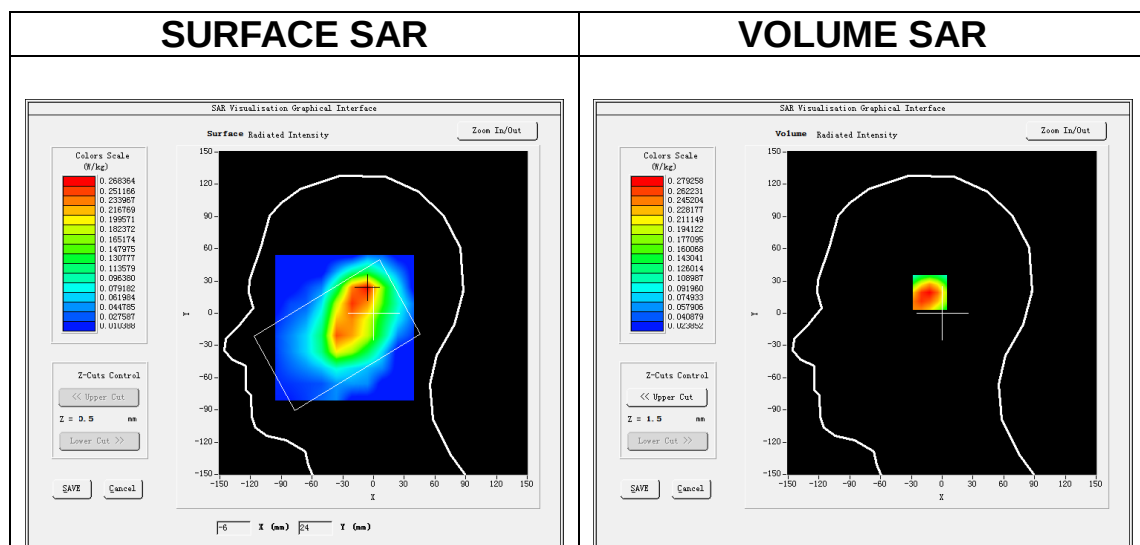
Date of measurement: 11/12/2024

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>2.34</u>

B. SAR Measurement Results

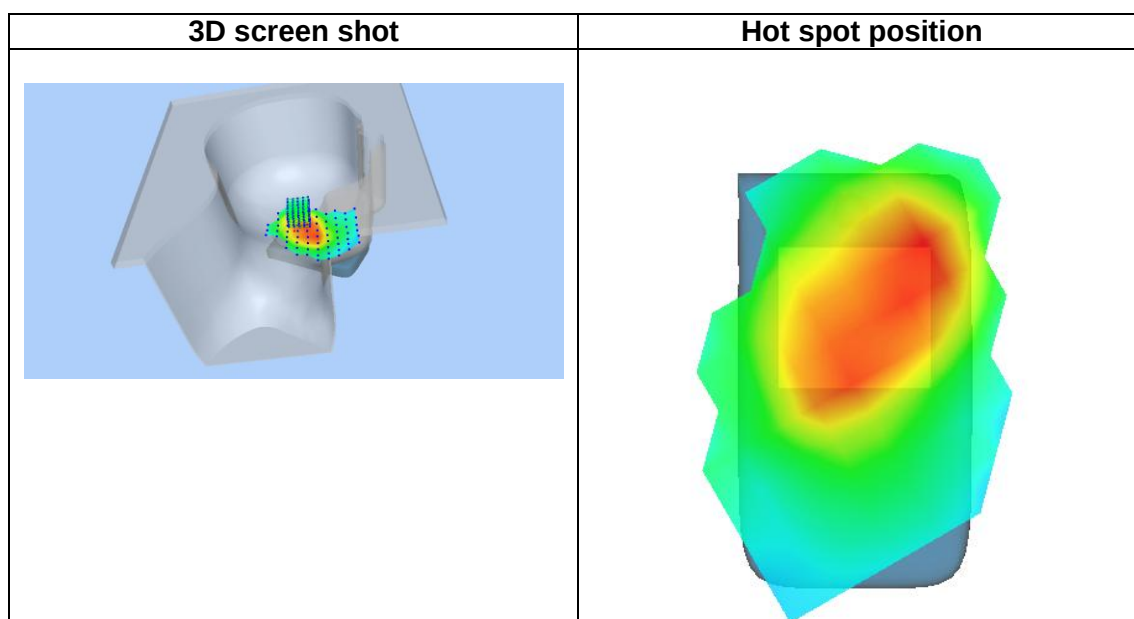
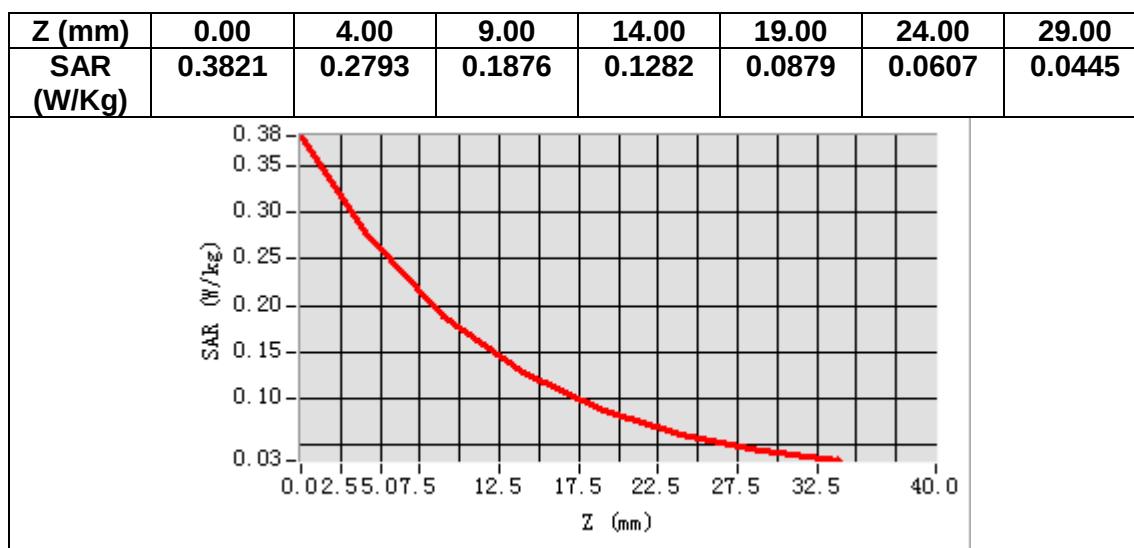
Frequency (MHz)	836.400000
Relative permittivity (real part)	41.742706
Relative permittivity (imaginary part)	19.618612
Conductivity (S/m)	0.911612
Variation (%)	0.240000



Maximum location: X=-9.00, Y=21.00

SAR Peak: 0.38 W/kg

SAR 10g (W/Kg)	0.176149
SAR 1g (W/Kg)	0.268267



MEASUREMENT 10

Date of measurement: 11/12/2024

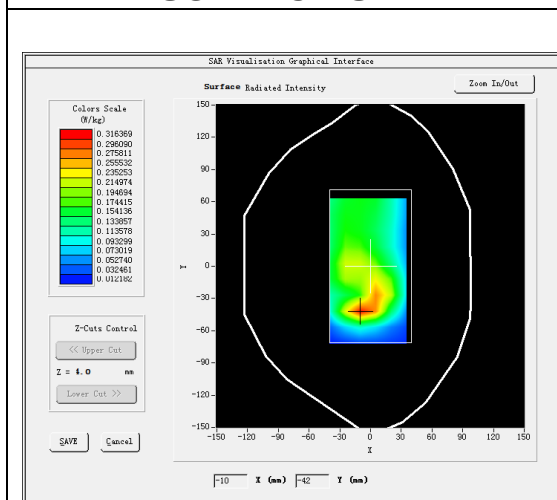
A. Experimental conditions.

<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>2.34</u>

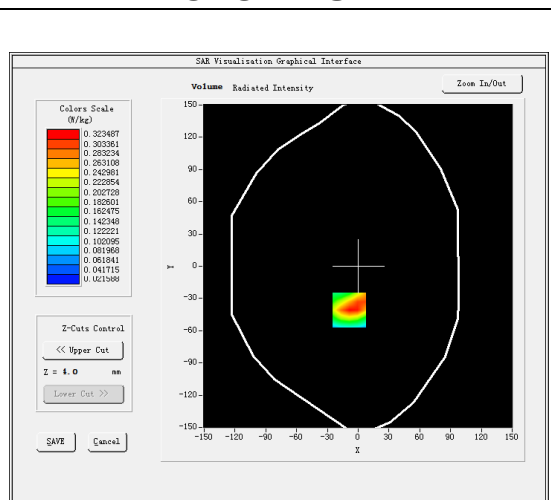
B. SAR Measurement Results

Frequency (MHz)	836.400000
Relative permittivity (real part)	41.742706
Relative permittivity (imaginary part)	19.618612
Conductivity (S/m)	0.911612
Variation (%)	0.050000

SURFACE SAR



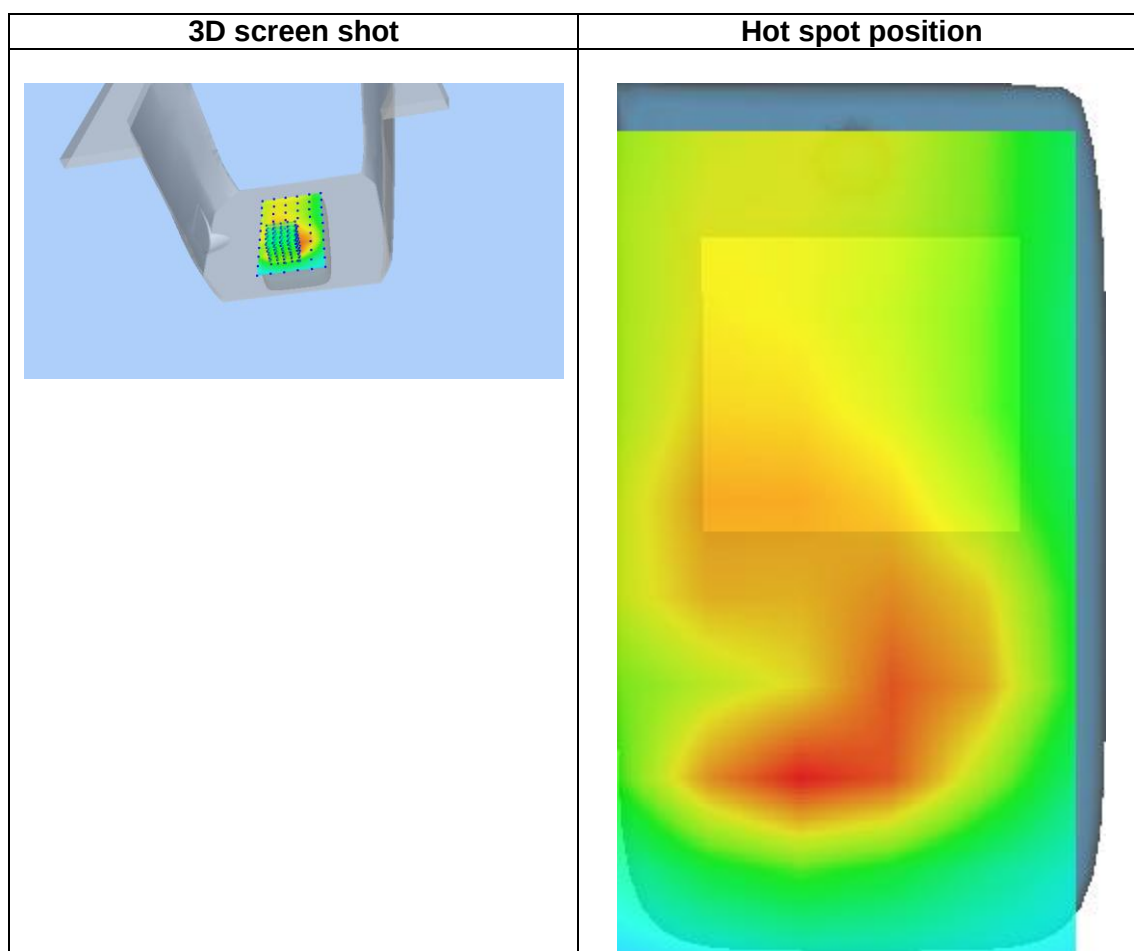
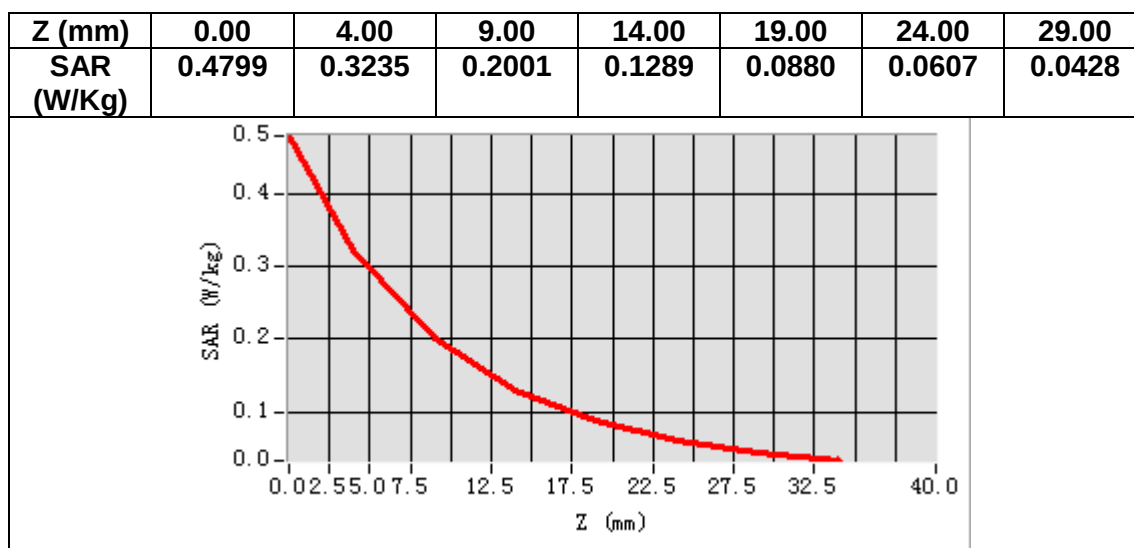
VOLUME SAR



Maximum location: X=-9.00, Y=-41.00

SAR Peak: 0.49 W/kg

SAR 10g (W/Kg)	0.182351
SAR 1g (W/Kg)	0.313081



MEASUREMENT 11

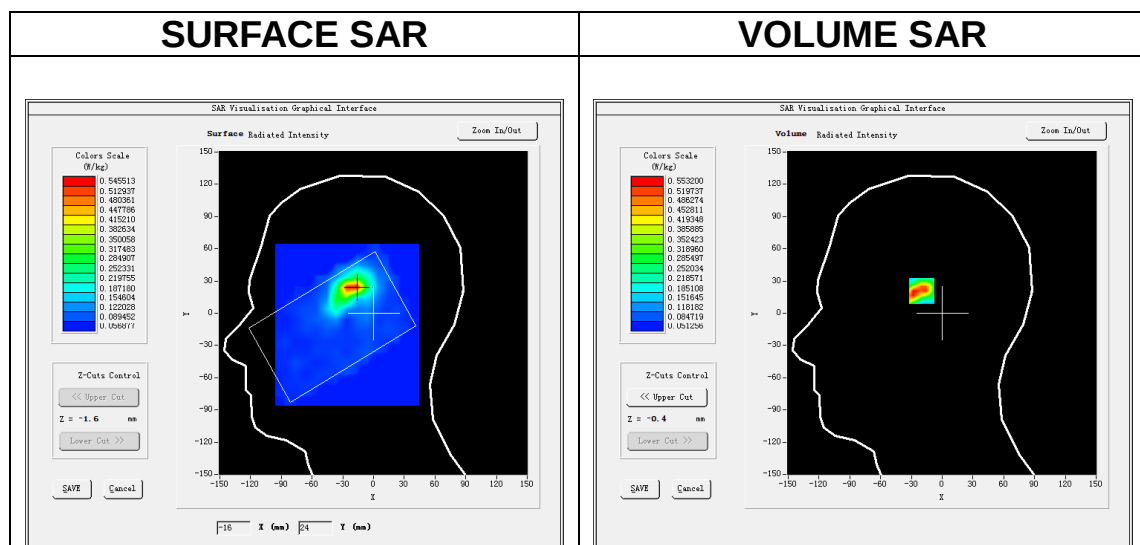
Date of measurement: 11/12/2024

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>1.89</u>

B. SAR Measurement Results

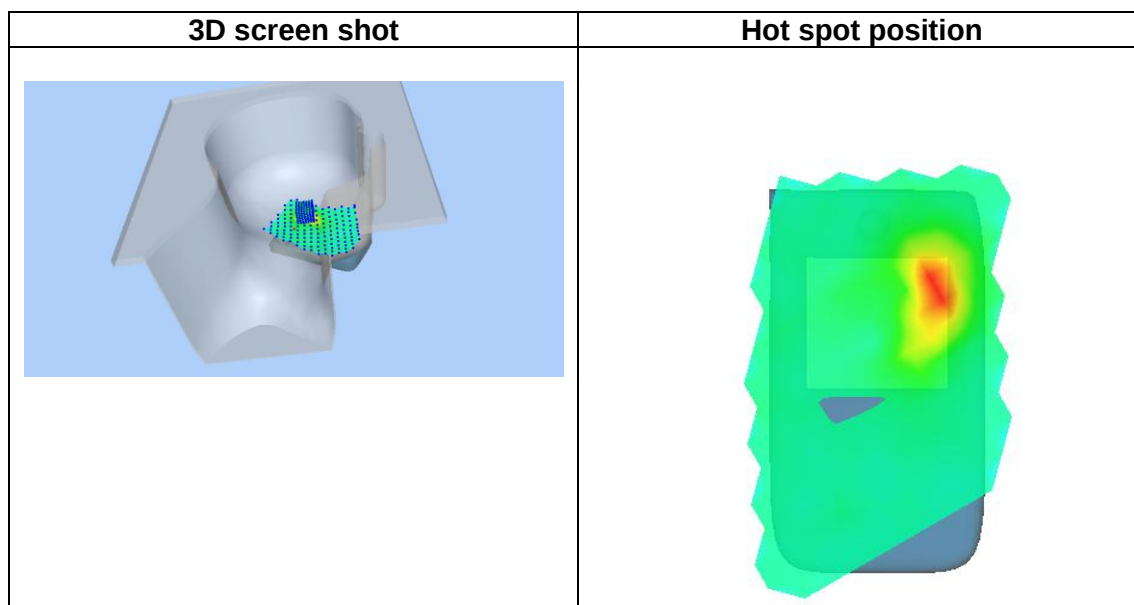
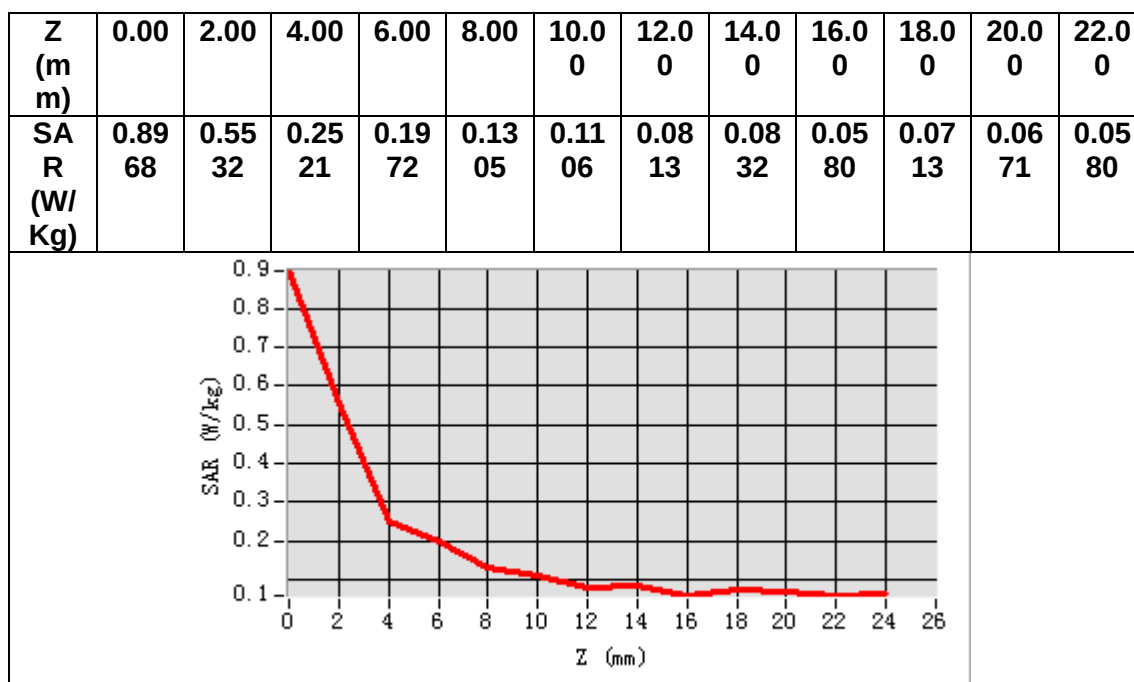
Frequency (MHz)	5180.000000
Relative permittivity (real part)	34.652485
Relative permittivity (imaginary part)	15.561054
Conductivity (S/m)	4.495416
Variation (%)	0.830000



Maximum location: X=-19.00, Y=24.00

SAR Peak: 1.43 W/kg

SAR 10g (W/Kg)	0.227908
SAR 1g (W/Kg)	0.522503



MEASUREMENT 12

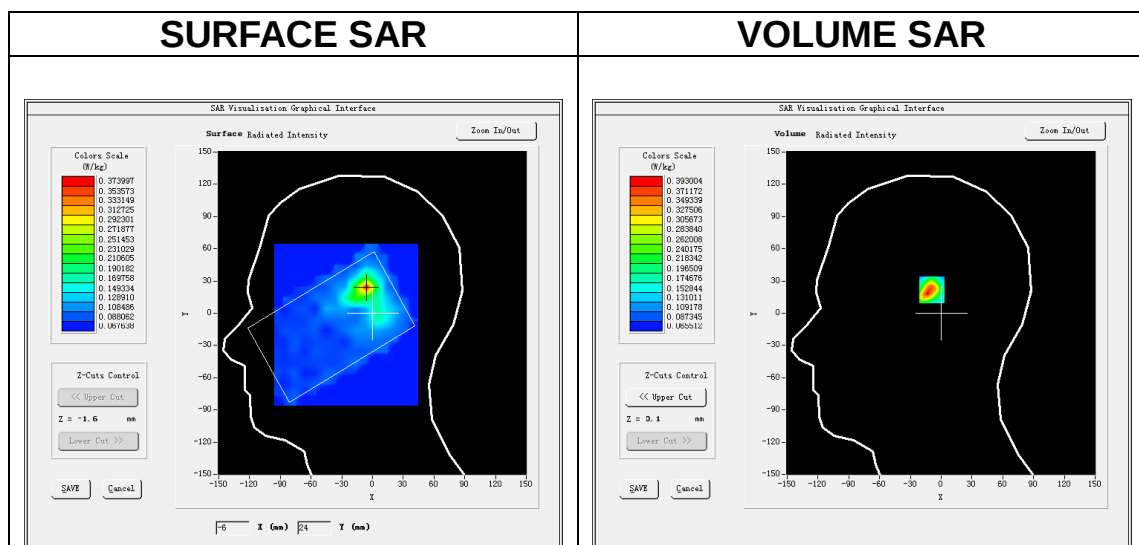
Date of measurement: 30/11/2024

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>1.90</u>

B. SAR Measurement Results

Frequency (MHz)	5745.000000
Relative permittivity (real part)	34.106155
Relative permittivity (imaginary part)	15.928240
Conductivity (S/m)	5.119159
Variation (%)	-1.190000

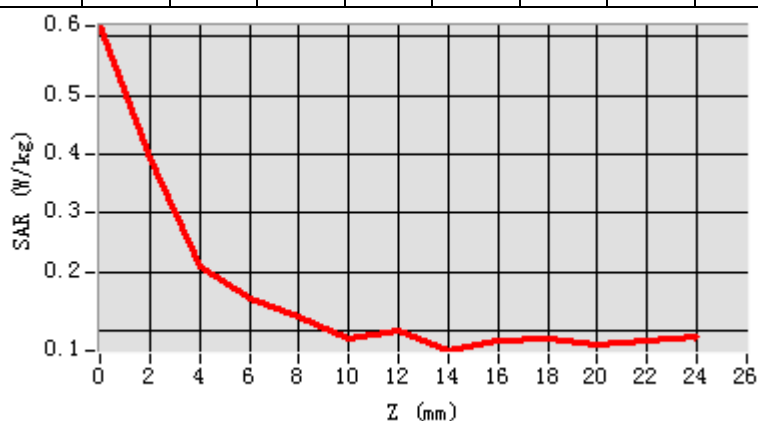


Maximum location: X=-6.00, Y=24.00

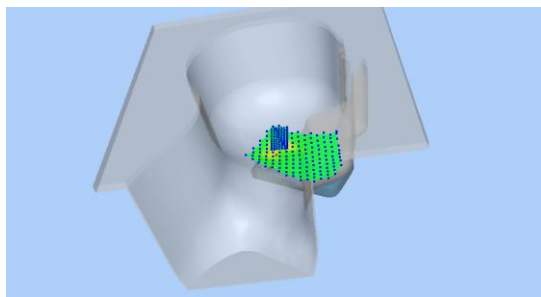
SAR Peak: 0.93 W/kg

SAR 10g (W/Kg)	0.180958
SAR 1g (W/Kg)	0.384451

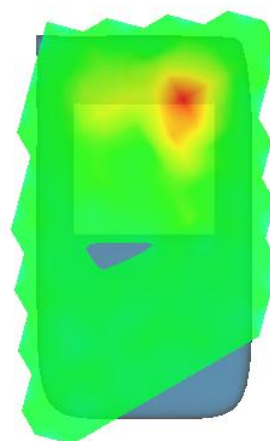
Z (m m)	0.00	2.00	4.00	6.00	8.00	10.0	12.0	14.0	16.0	18.0	20.0	22.0
SAR (W/ Kg)	0.61 84	0.39 30	0.20 95	0.15 43	0.12 31	0.08 77	0.09 87	0.06 55	0.08 34	0.08 71	0.07 43	0.08 16



3D screen shot



Hot spot position



MEASUREMENT 13

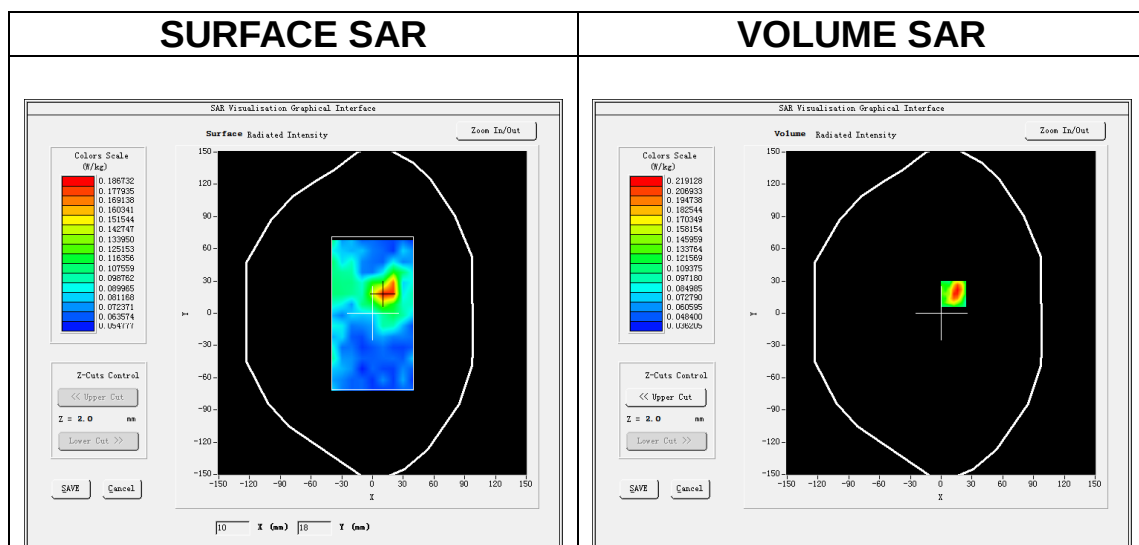
Date of measurement: 30/11/2024

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>1.90</u>

B. SAR Measurement Results

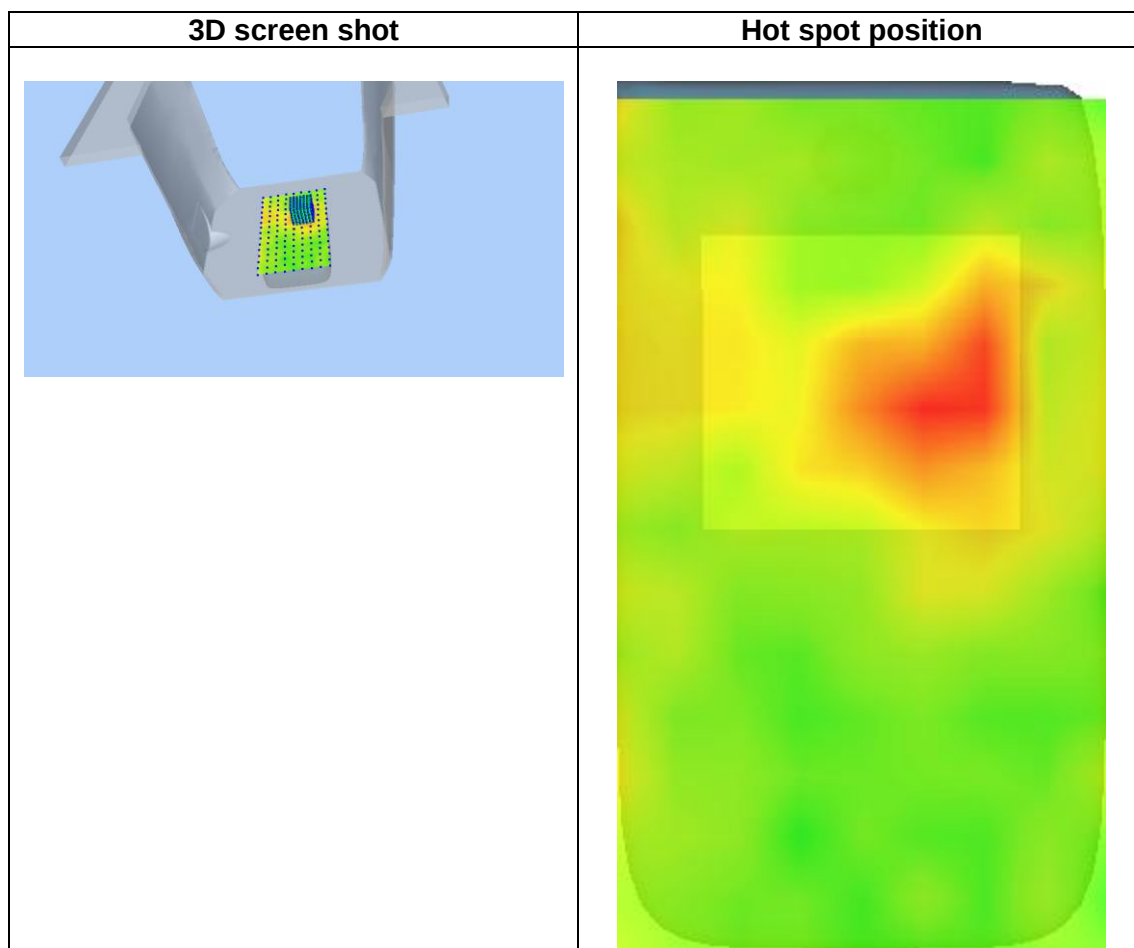
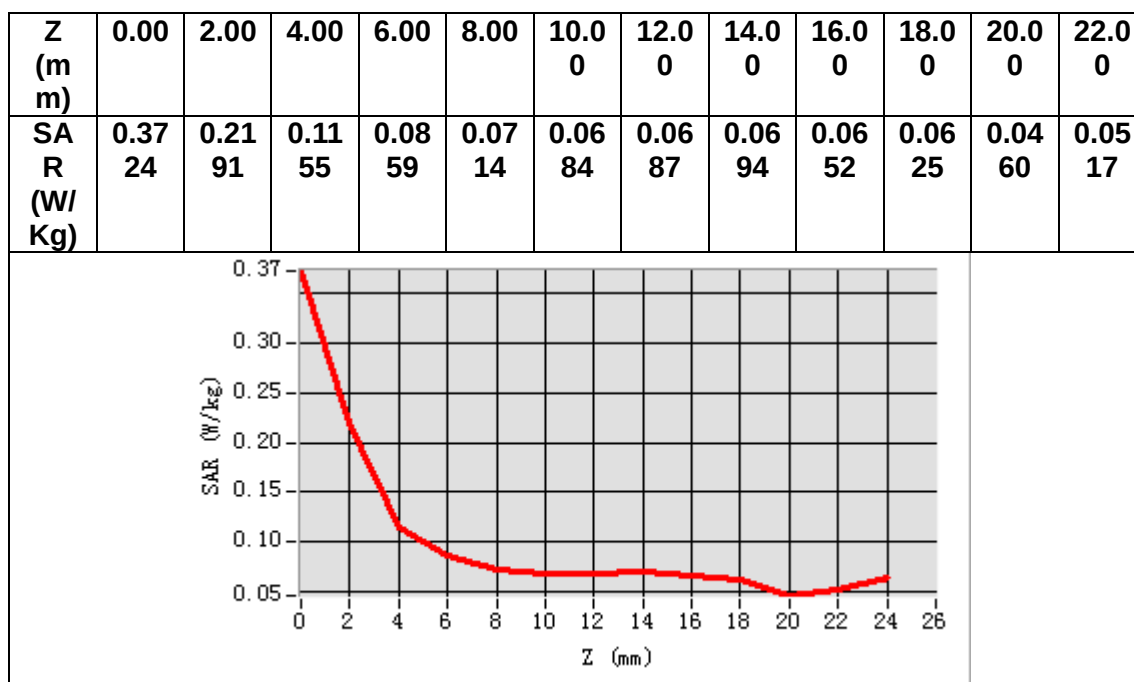
Frequency (MHz)	5745.000000
Relative permittivity (real part)	34.106155
Relative permittivity (imaginary part)	15.928240
Conductivity (S/m)	5.119159
Variation (%)	-3.790000



Maximum location: X=12.00, Y=18.00

SAR Peak: 0.37 W/kg

SAR 10g (W/Kg)	0.091108
SAR 1g (W/Kg)	0.148310



MEASUREMENT 14

Date of measurement: 11/12/2024

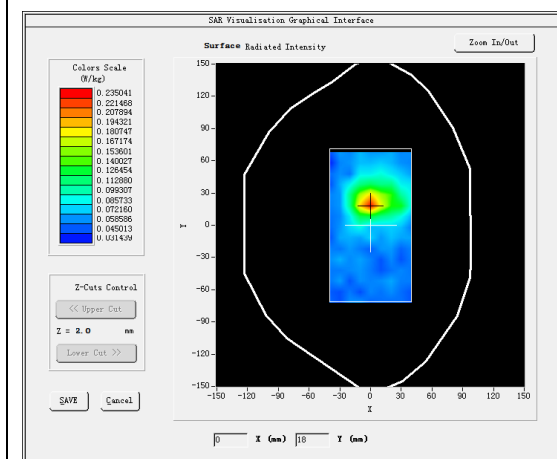
A. Experimental conditions.

<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>1.89</u>

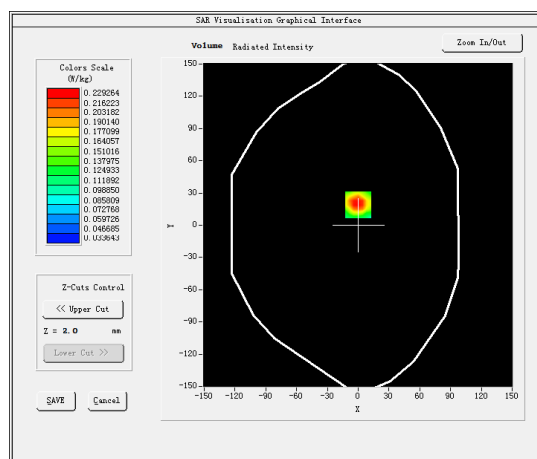
B. SAR Measurement Results

Frequency (MHz)	5180.000000
Relative permittivity (real part)	34.652485
Relative permittivity (imaginary part)	15.561054
Conductivity (S/m)	4.495416
Variation (%)	0.070000

SURFACE SAR



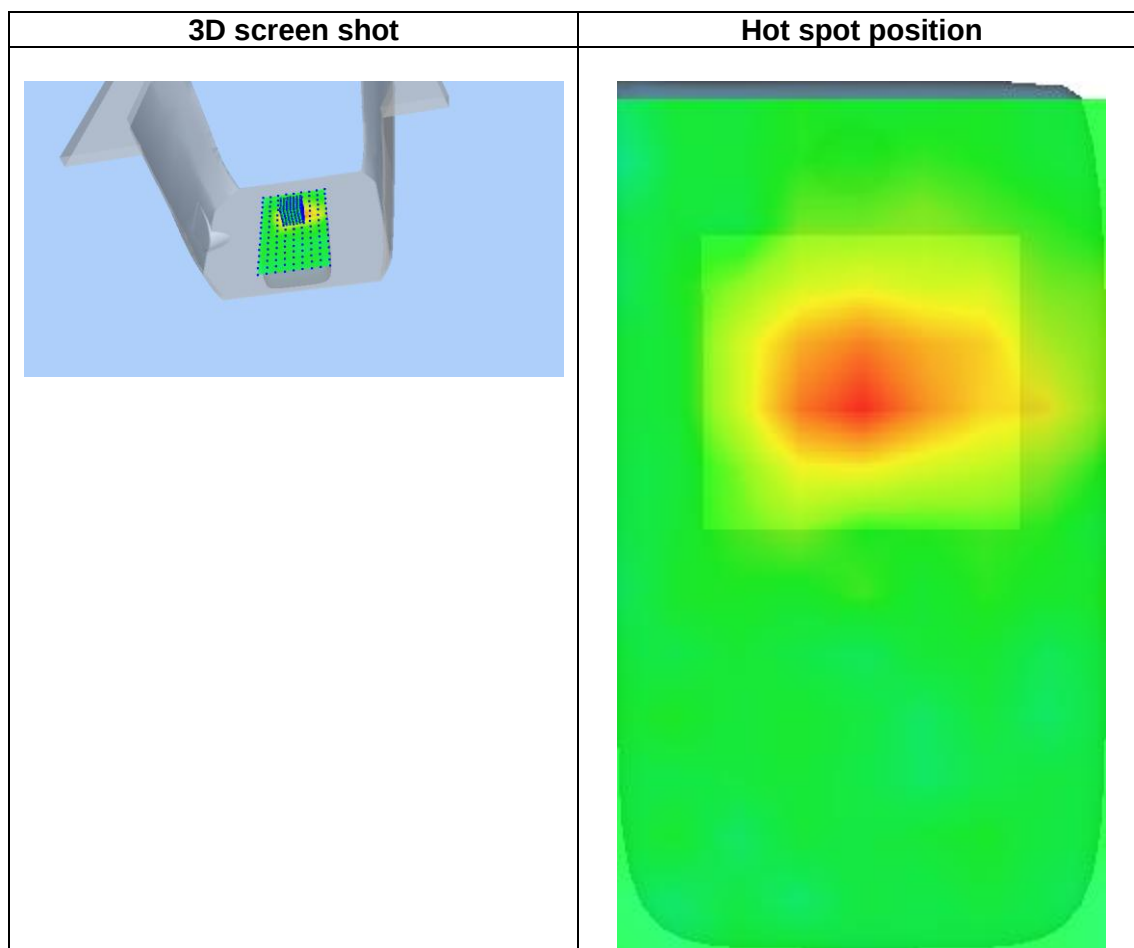
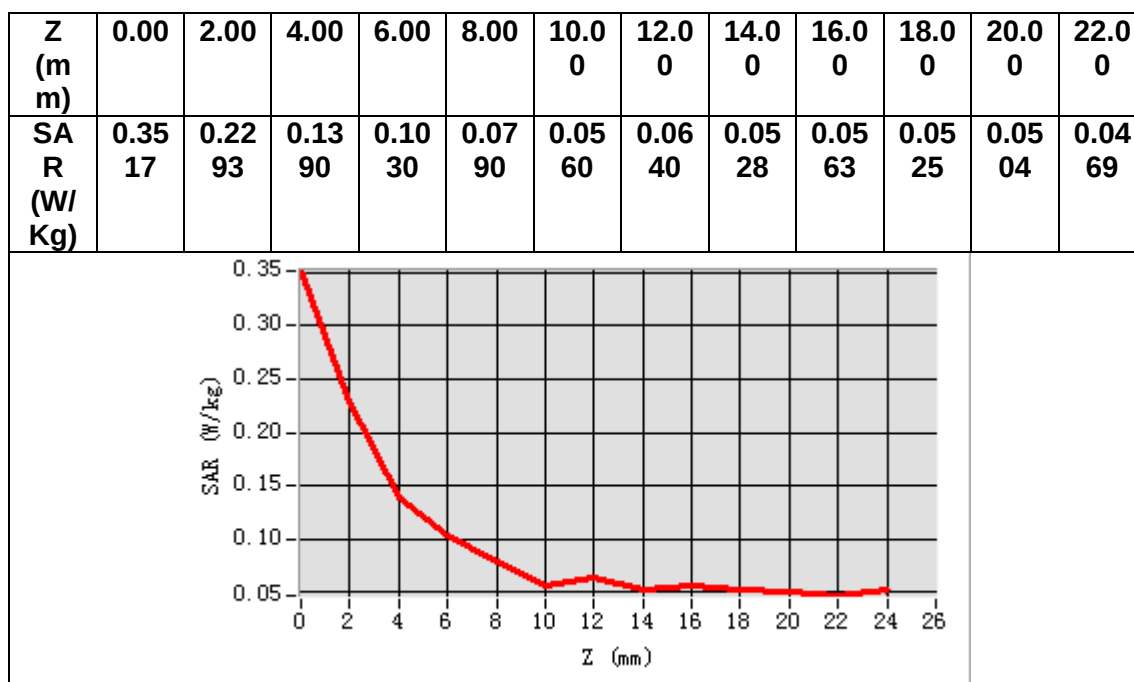
VOLUME SAR



Maximum location: X=0.00, Y=19.00

SAR Peak: 0.39 W/kg

SAR 10g (W/Kg)	0.091881
SAR 1g (W/Kg)	0.155588



MEASUREMENT 15

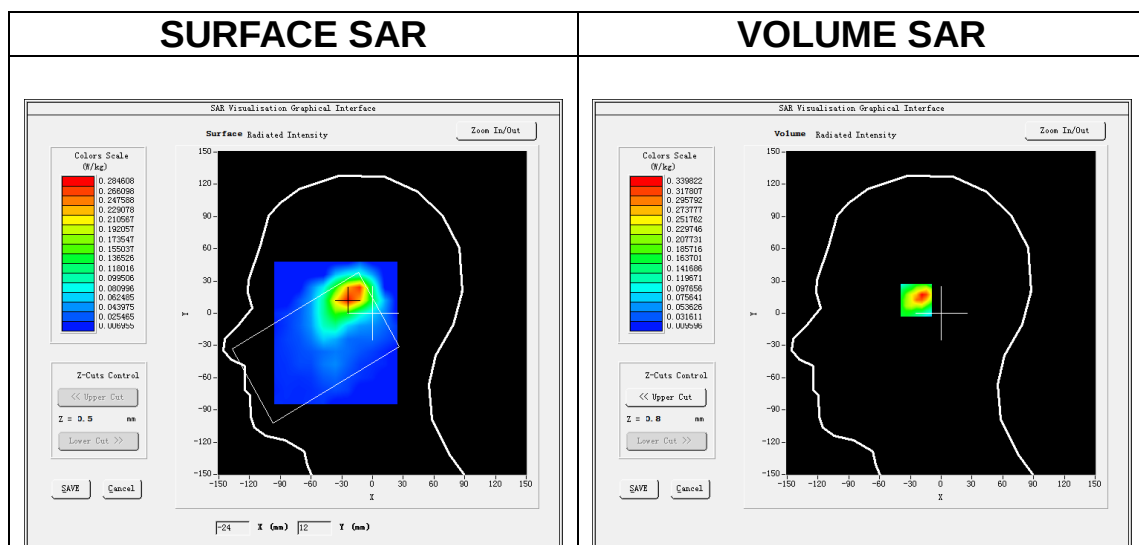
Date of measurement: 18/11/2024

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>Low</u>
<u>Signal</u>	<u>IEEE802.11b (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.74</u>

B. SAR Measurement Results

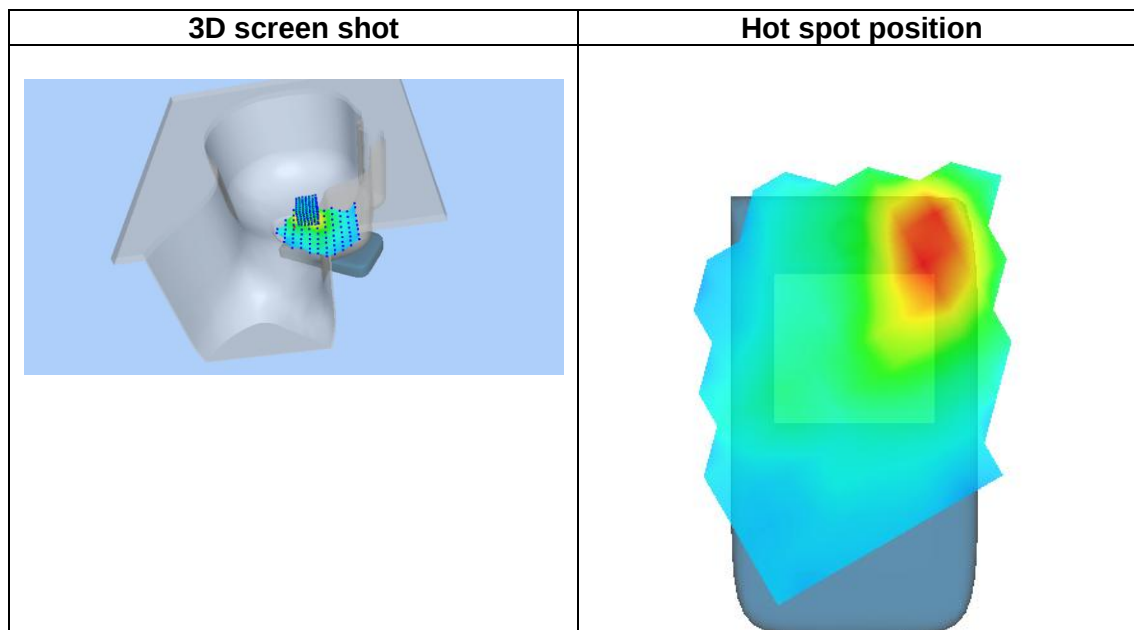
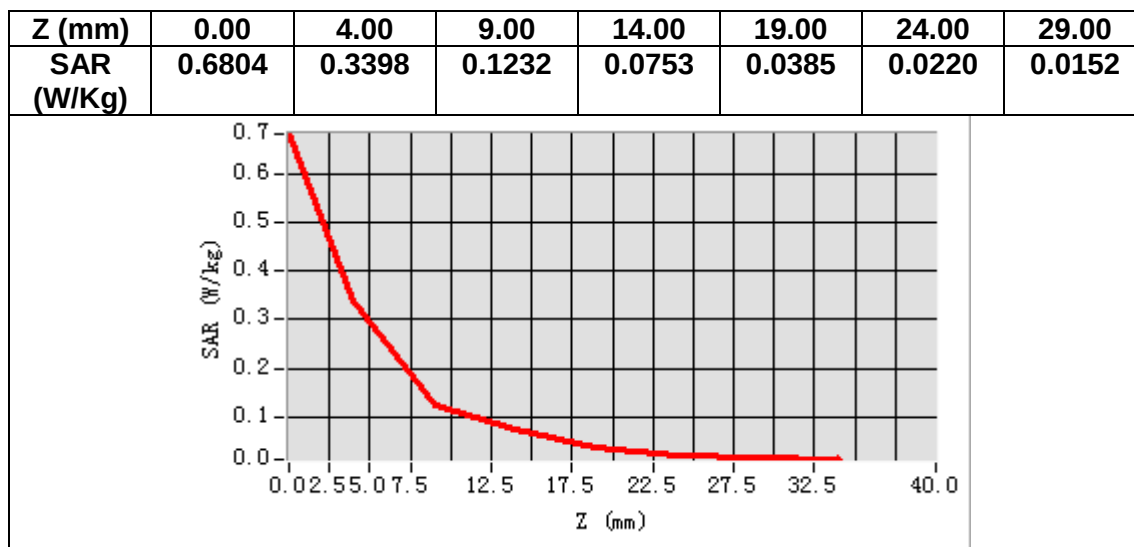
Frequency (MHz)	2412.000000
Relative permittivity (real part)	38.014111
Relative permittivity (imaginary part)	13.123987
Conductivity (S/m)	1.776842
Variation (%)	-0.020000



Maximum location: X=-23.00, Y=14.00

SAR Peak: 0.63 W/kg

SAR 10g (W/Kg)	0.141236
SAR 1g (W/Kg)	0.306511



MEASUREMENT 16

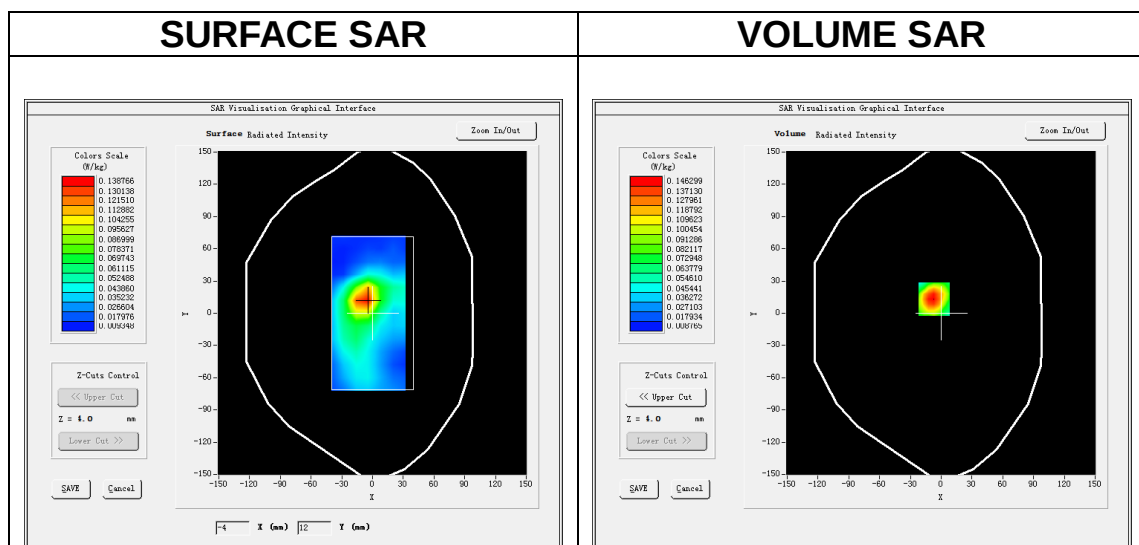
Date of measurement: 18/11/2024

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>Low</u>
<u>Signal</u>	<u>IEEE802.11b (Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.74</u>

B. SAR Measurement Results

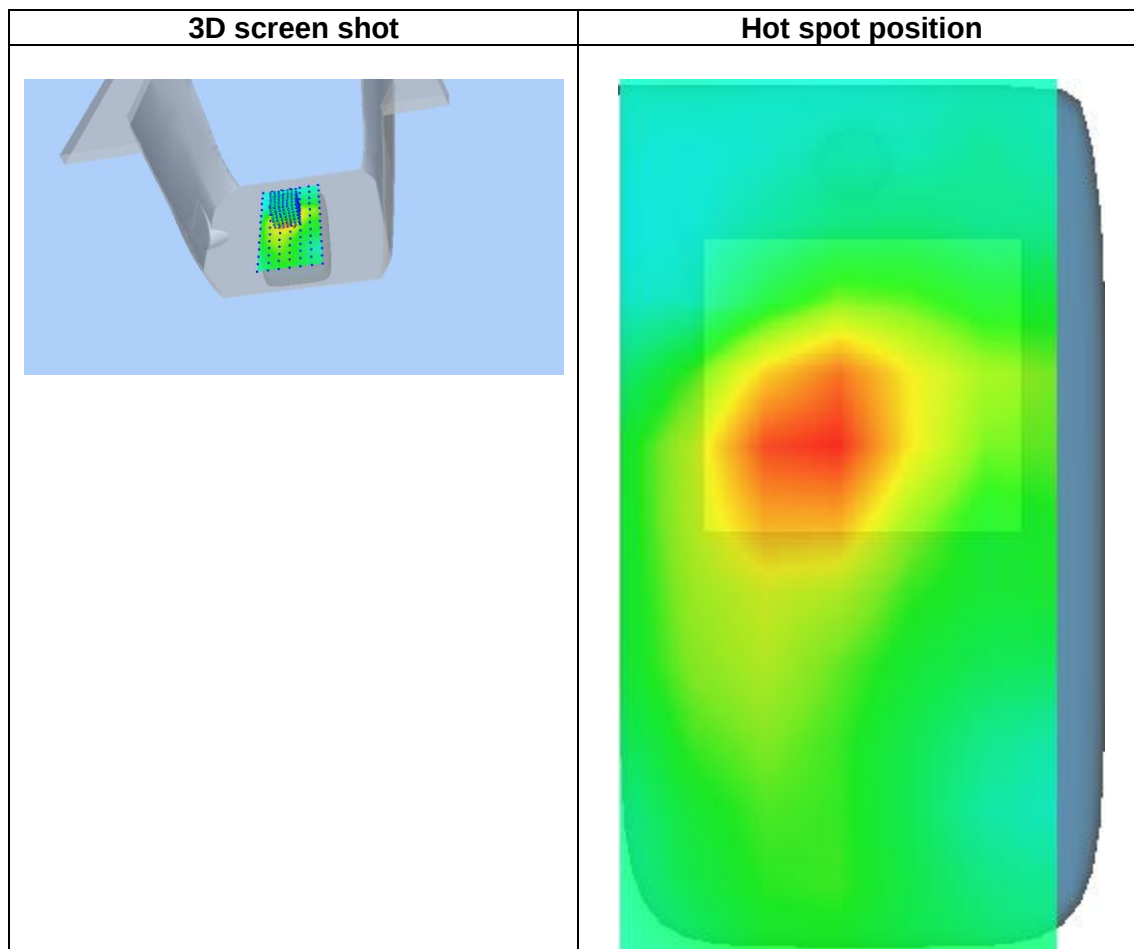
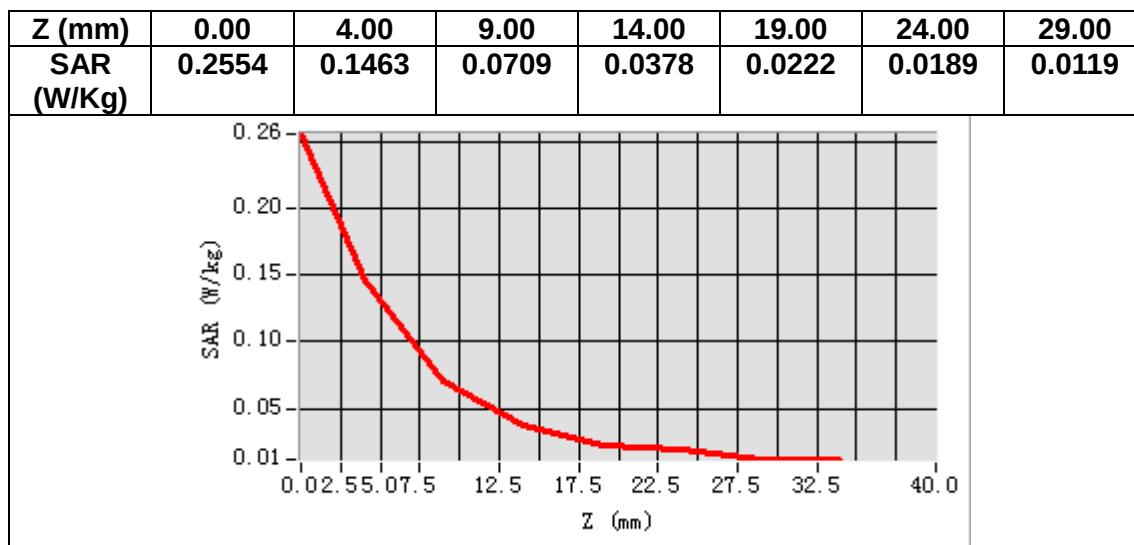
Frequency (MHz)	2412.000000
Relative permittivity (real part)	38.014111
Relative permittivity (imaginary part)	13.123987
Conductivity (S/m)	1.776842
Variation (%)	0.880000



Maximum location: X=-7.00, Y=13.00

SAR Peak: 0.26 W/kg

SAR 10g (W/Kg)	0.071261
SAR 1g (W/Kg)	0.140570



MEASUREMENT 17

Date of measurement: 9/12/2024

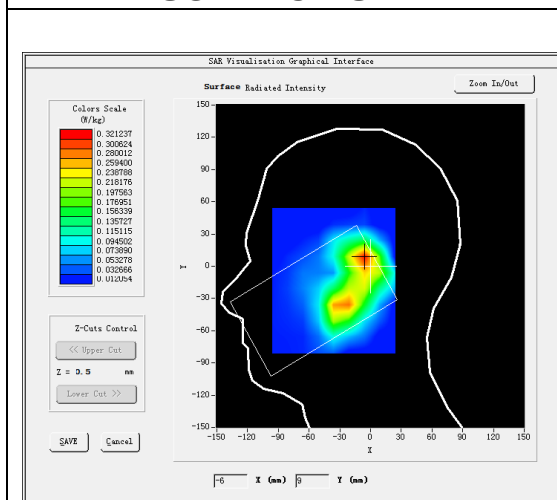
A. Experimental conditions.

<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>2.57</u>

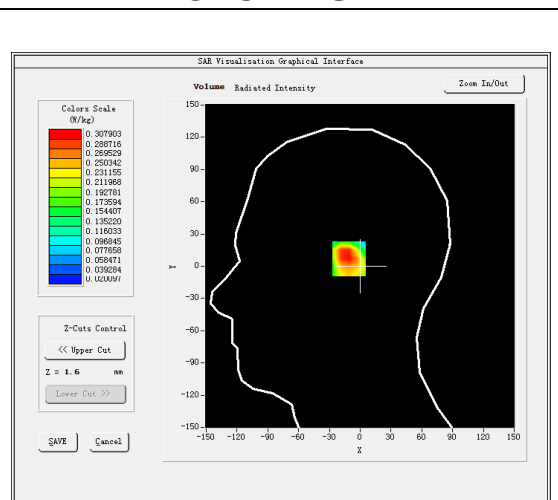
B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.543578
Relative permittivity (imaginary part)	13.809931
Conductivity (S/m)	1.442371
Variation (%)	-1.690000

SURFACE SAR



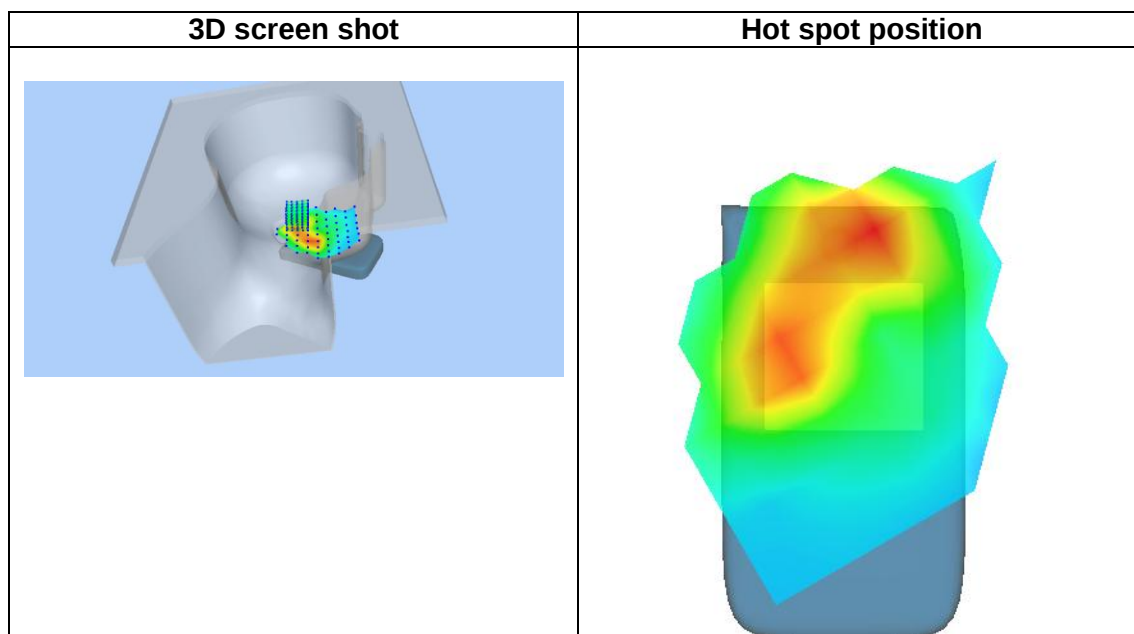
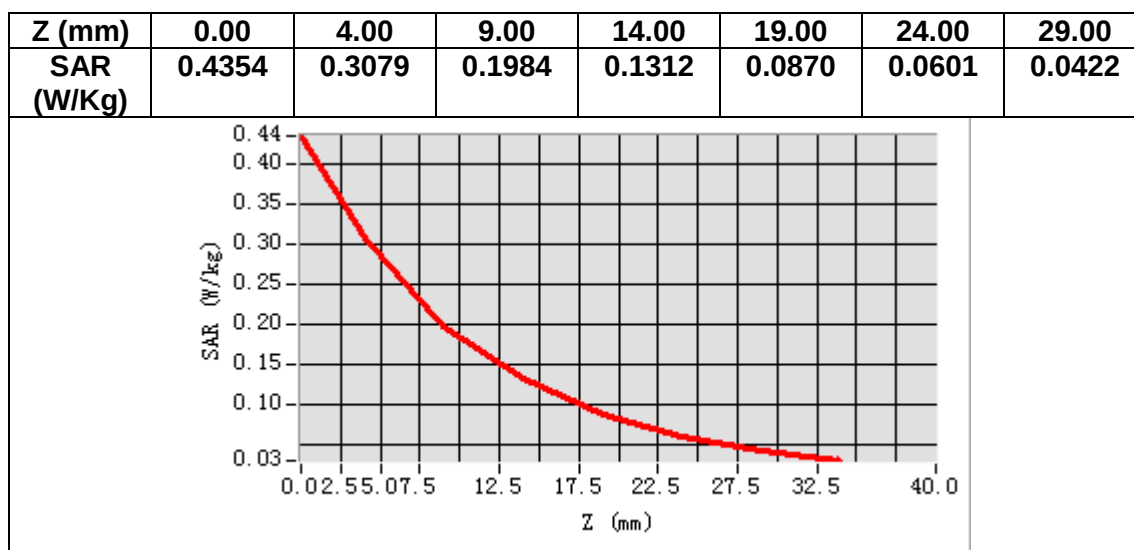
VOLUME SAR



Maximum location: X=-6.00, Y=7.00

SAR Peak: 0.46 W/kg

SAR 10g (W/Kg)	0.173823
SAR 1g (W/Kg)	0.310183



MEASUREMENT 18

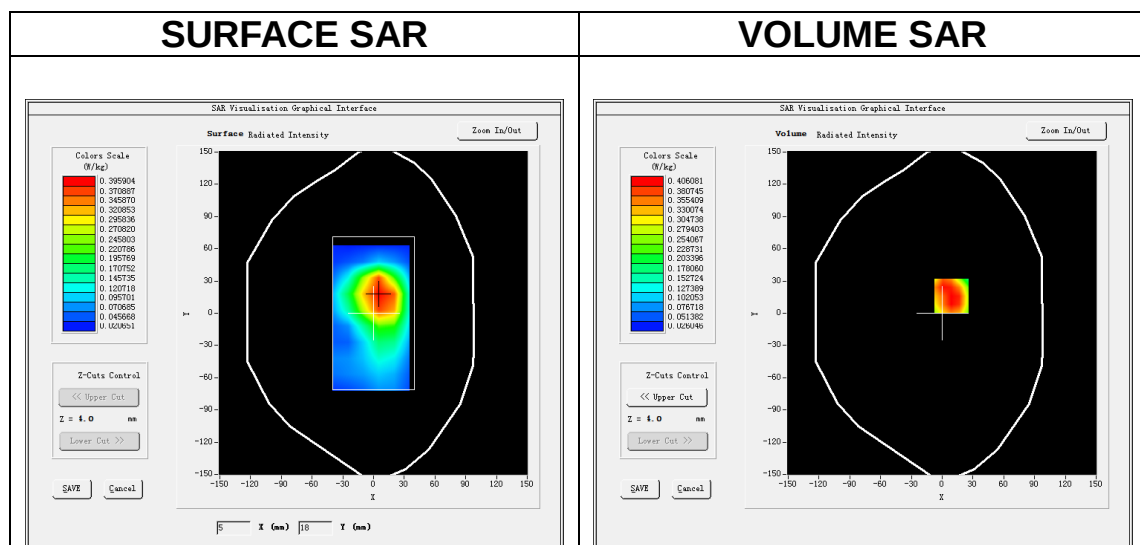
Date of measurement: 9/12/2024

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>2.57</u>

B. SAR Measurement Results

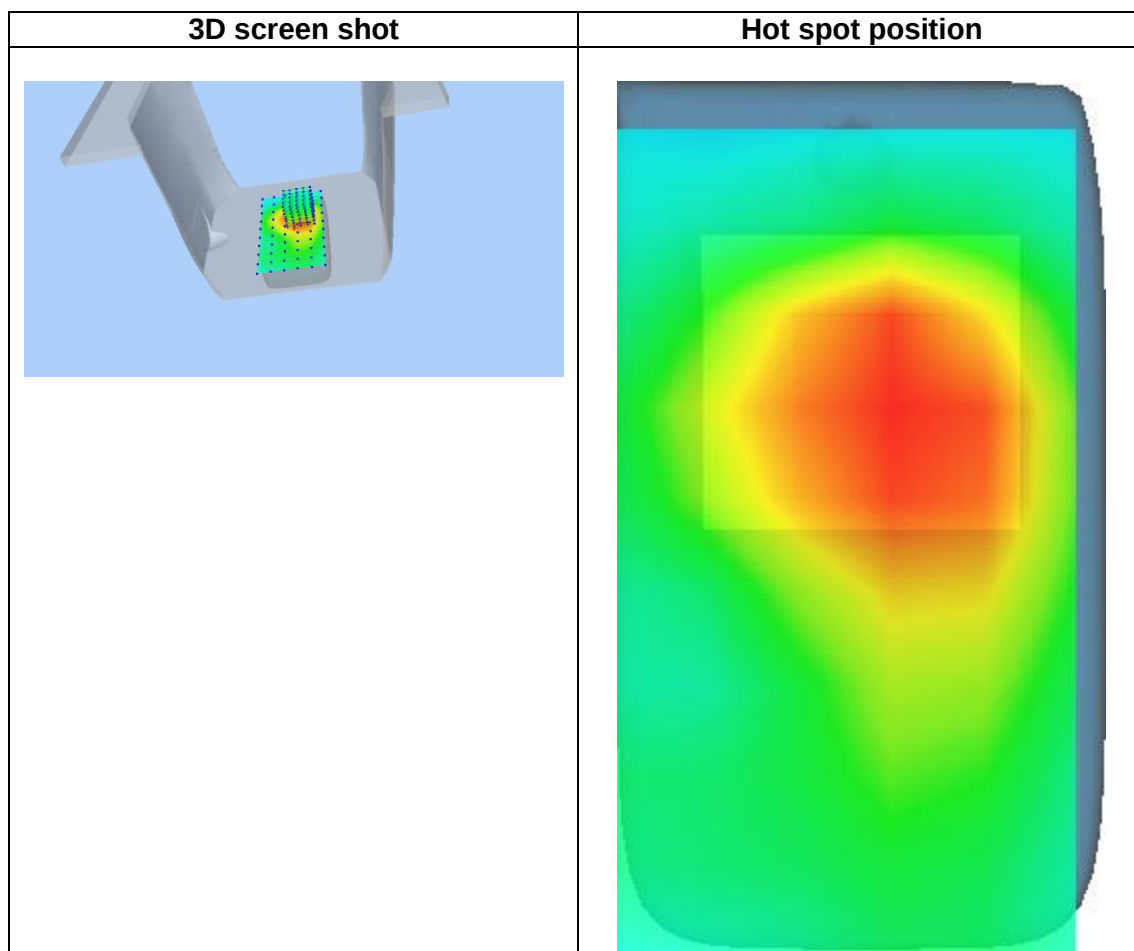
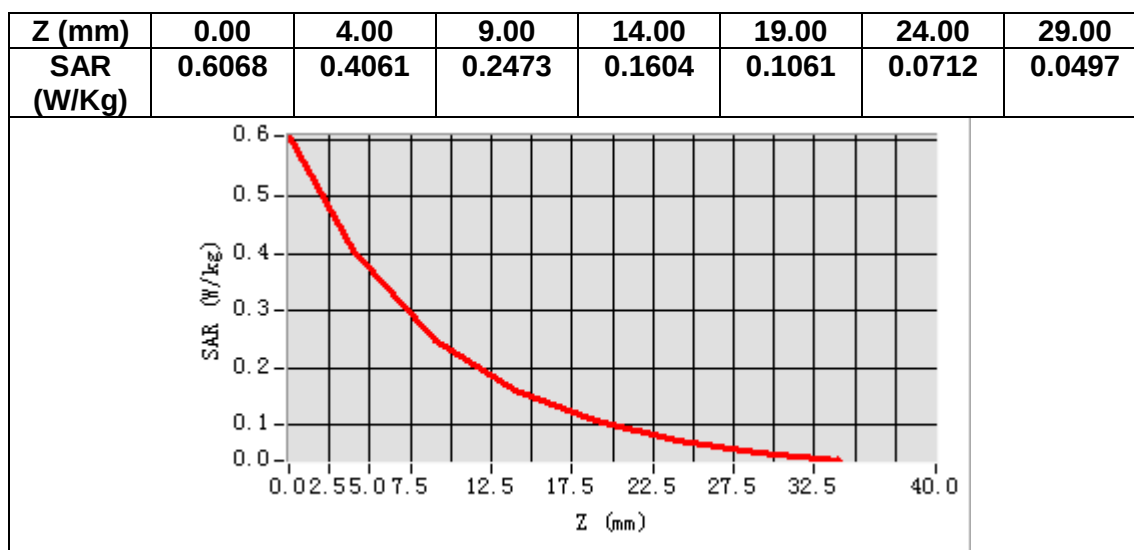
Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.543578
Relative permittivity (imaginary part)	13.809931
Conductivity (S/m)	1.442371
Variation (%)	-4.880000



Maximum location: X=9.00, Y=16.00

SAR Peak: 0.64 W/kg

SAR 10g (W/Kg)	0.247407
SAR 1g (W/Kg)	0.412443



MEASUREMENT 19

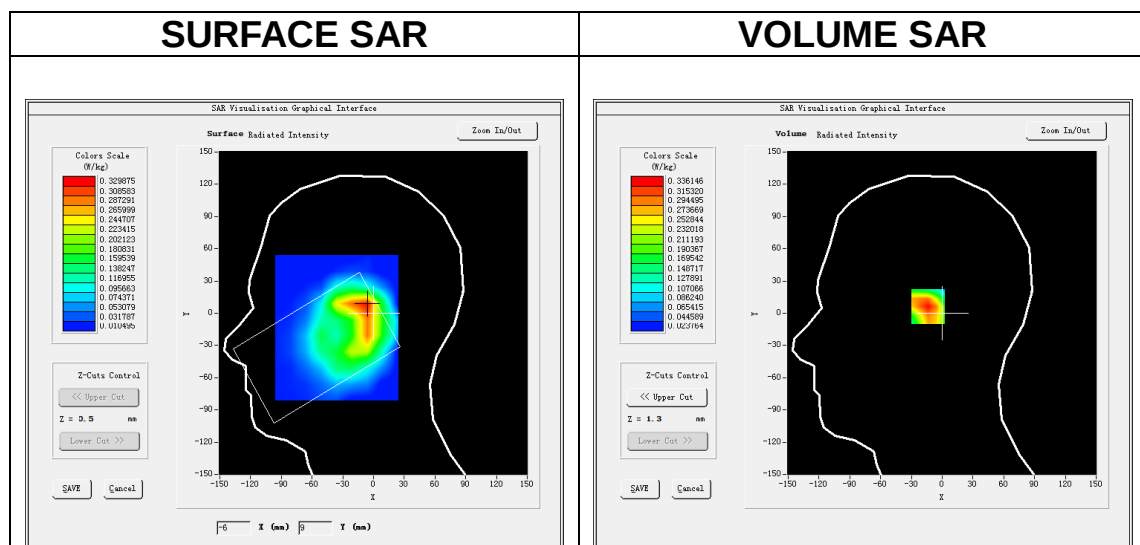
Date of measurement: 21/11/2024

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>2.51</u>

B. SAR Measurement Results

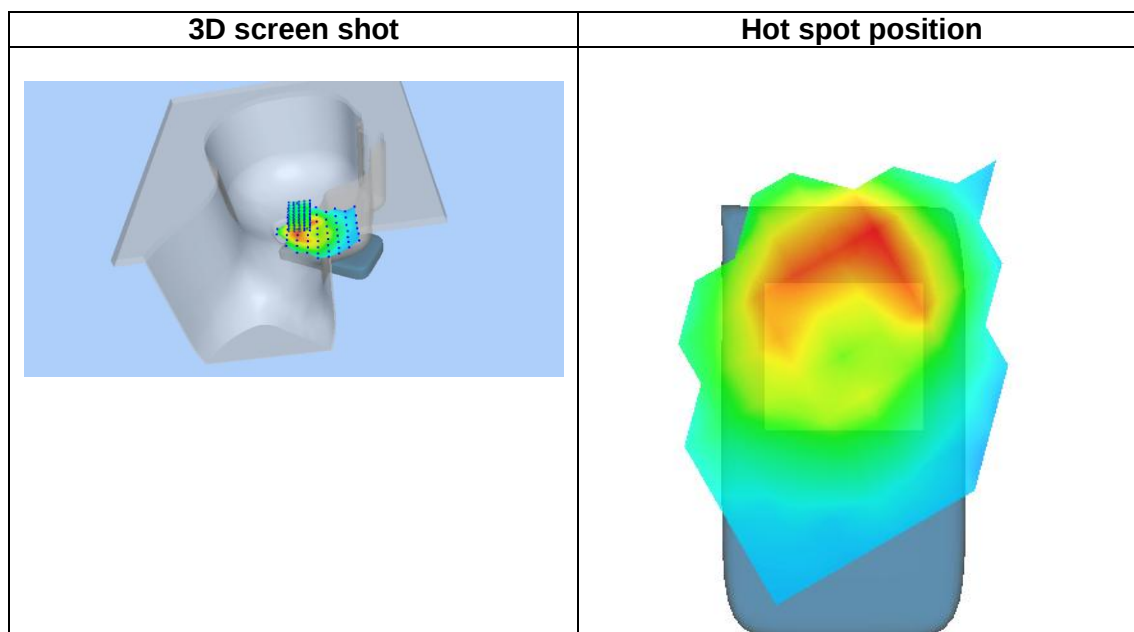
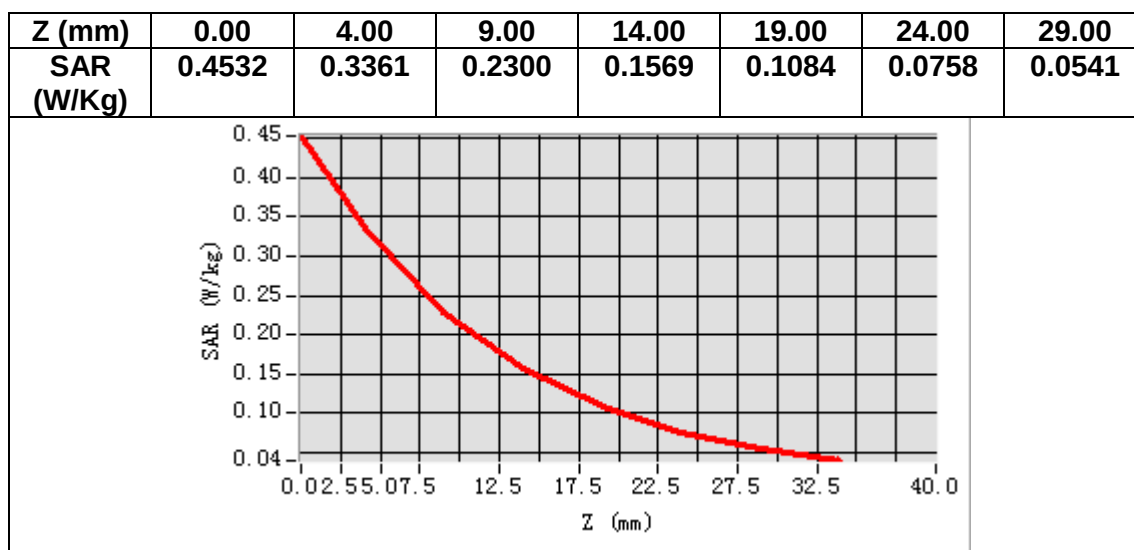
Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.545303
Relative permittivity (imaginary part)	13.802155
Conductivity (S/m)	1.328457
Variation (%)	-0.860000



Maximum location: X=-9.00, Y=6.00

SAR Peak: 0.47 W/kg

SAR 10g (W/Kg)	0.196243
SAR 1g (W/Kg)	0.317444



MEASUREMENT 20

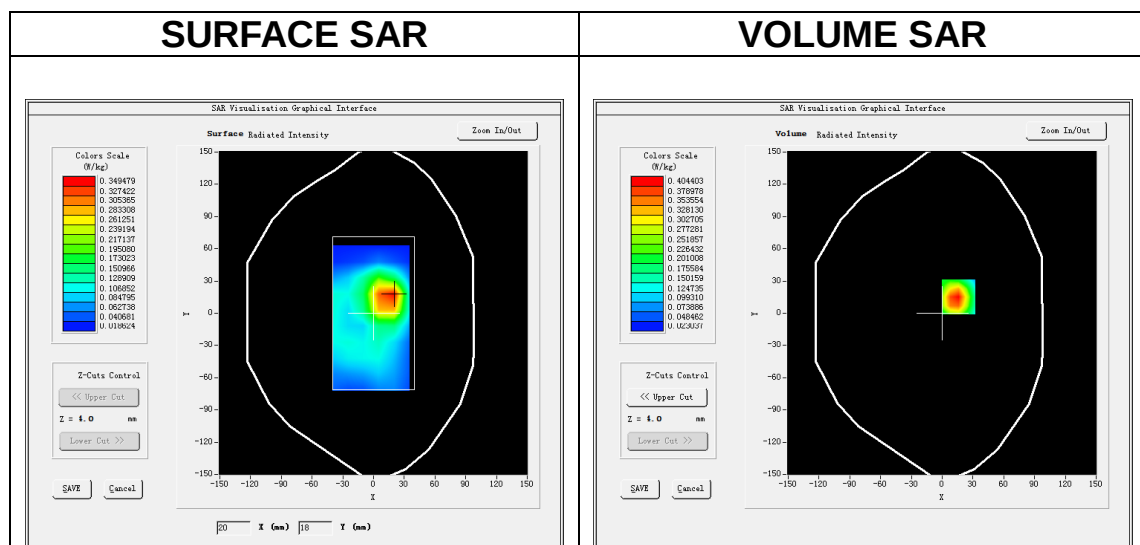
Date of measurement: 21/11/2024

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>2.51</u>

B. SAR Measurement Results

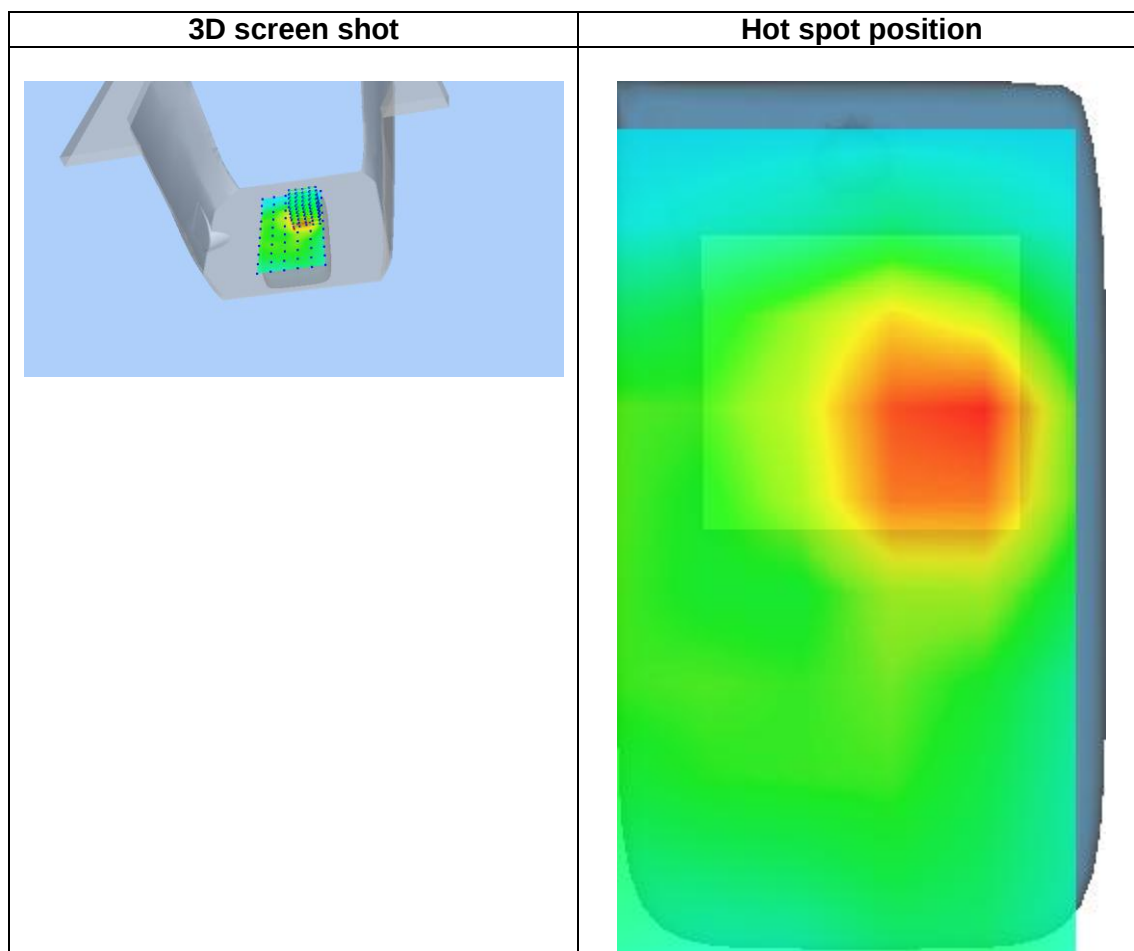
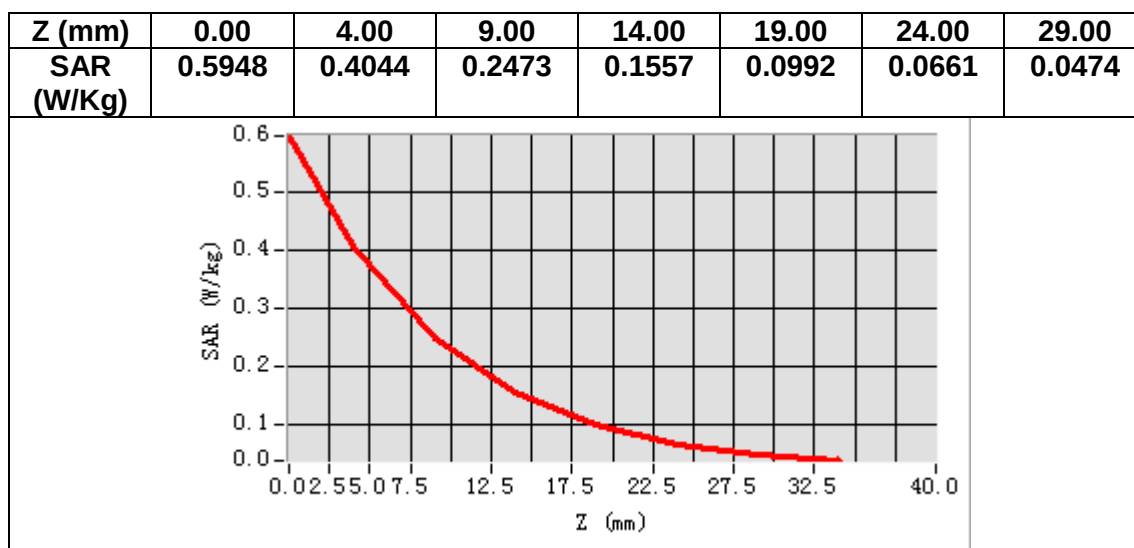
Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.545303
Relative permittivity (imaginary part)	13.802155
Conductivity (S/m)	1.328457
Variation (%)	-1.360000



Maximum location: X=16.00, Y=15.00

SAR Peak: 0.61 W/kg

SAR 10g (W/Kg)	0.219729
SAR 1g (W/Kg)	0.387895



MEASUREMENT 21

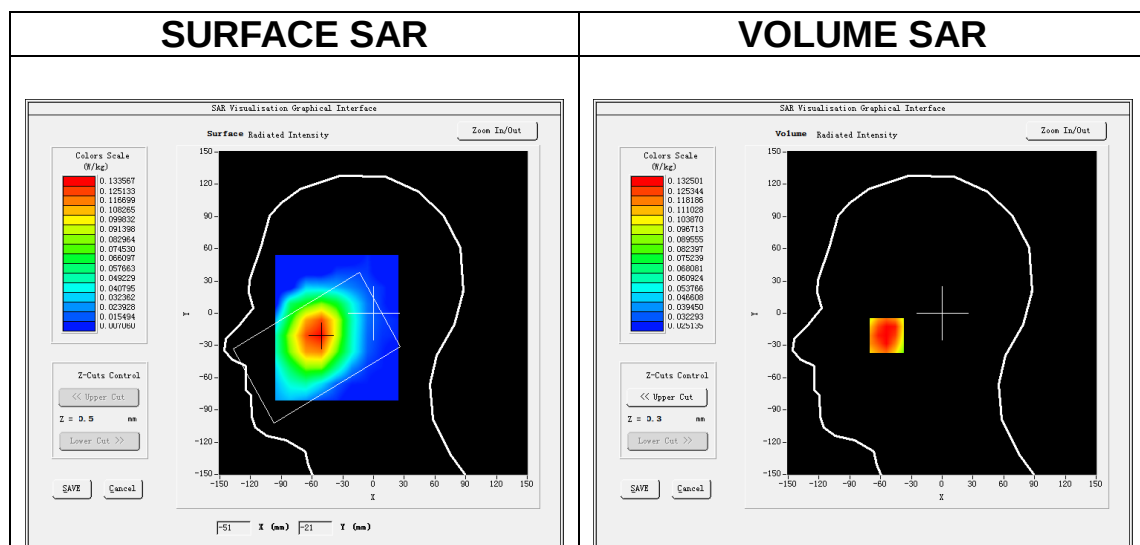
Date of measurement: 11/12/2024

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>2.34</u>

B. SAR Measurement Results

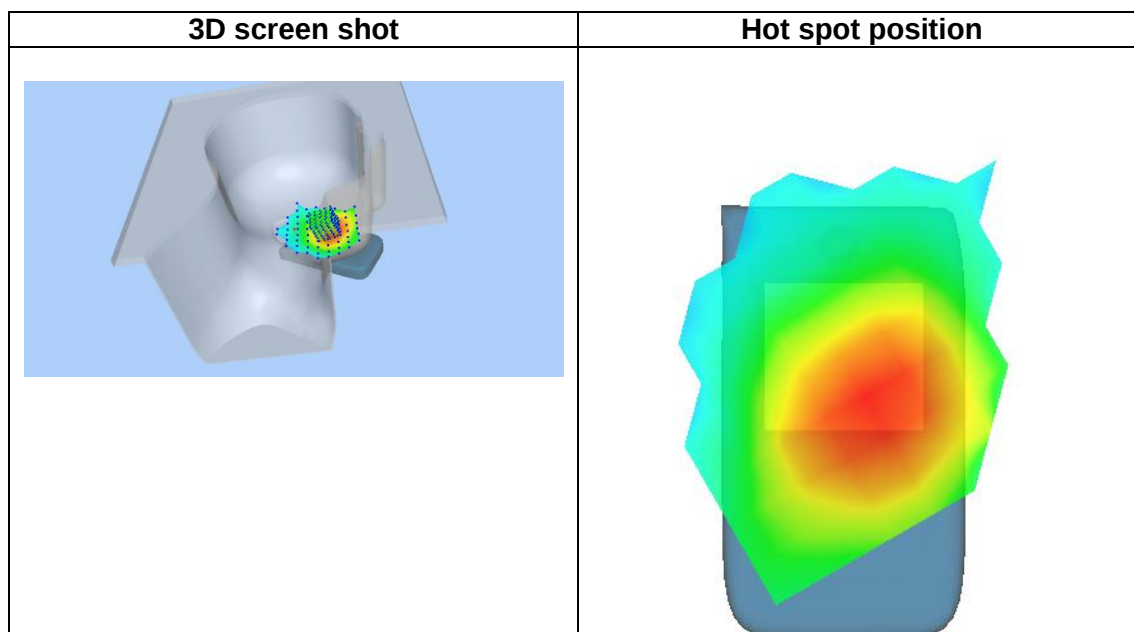
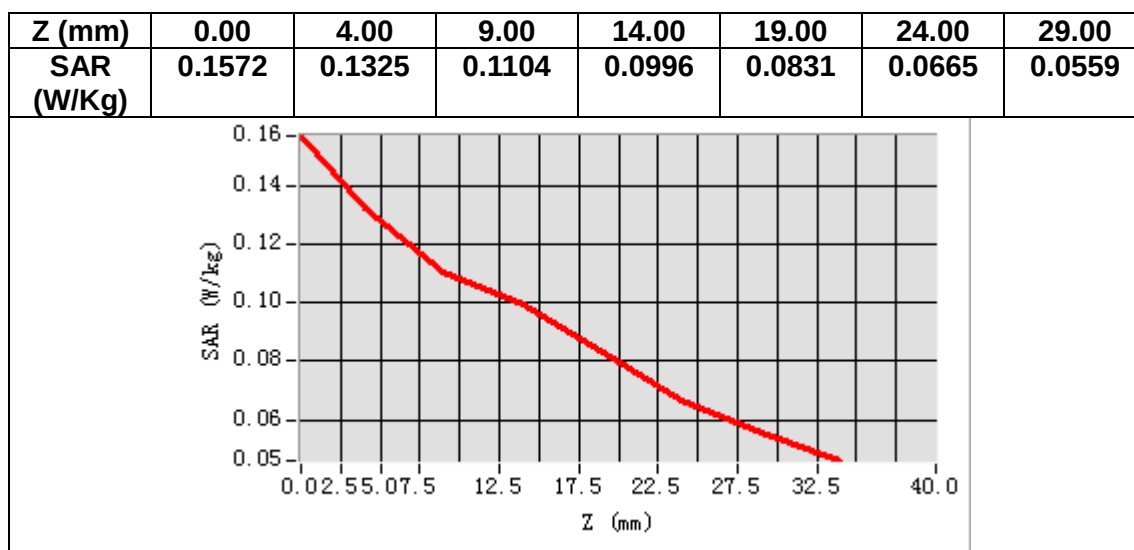
Frequency (MHz)	836.500000
Relative permittivity (real part)	41.745296
Relative permittivity (imaginary part)	19.617273
Conductivity (S/m)	0.911658
Variation (%)	2.430000



Maximum location: X=-54.00, Y=-20.00

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.103553
SAR 1g (W/Kg)	0.131686



MEASUREMENT 22

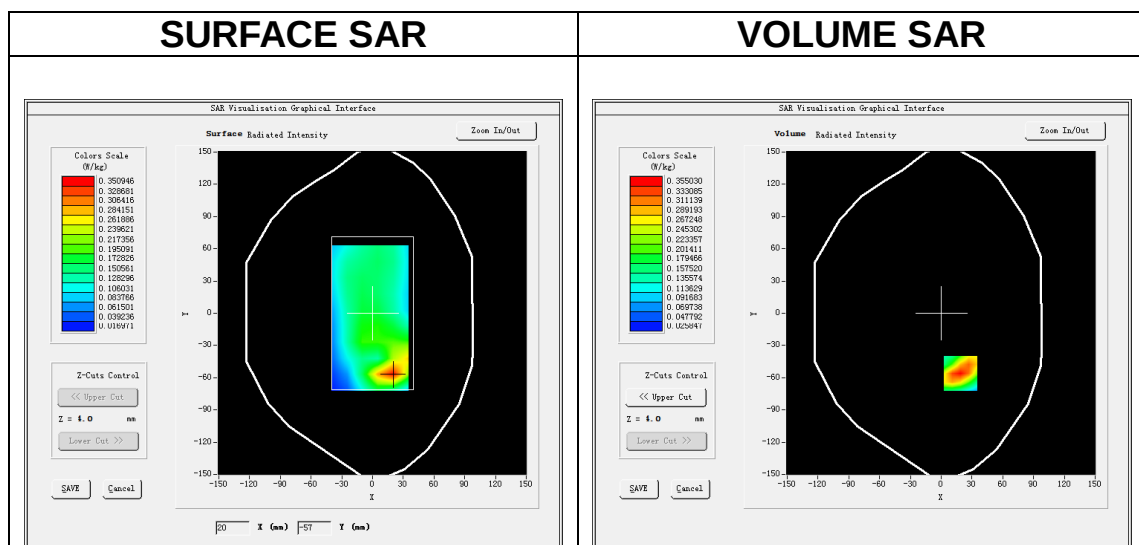
Date of measurement: 11/12/2024

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>2.34</u>

B. SAR Measurement Results

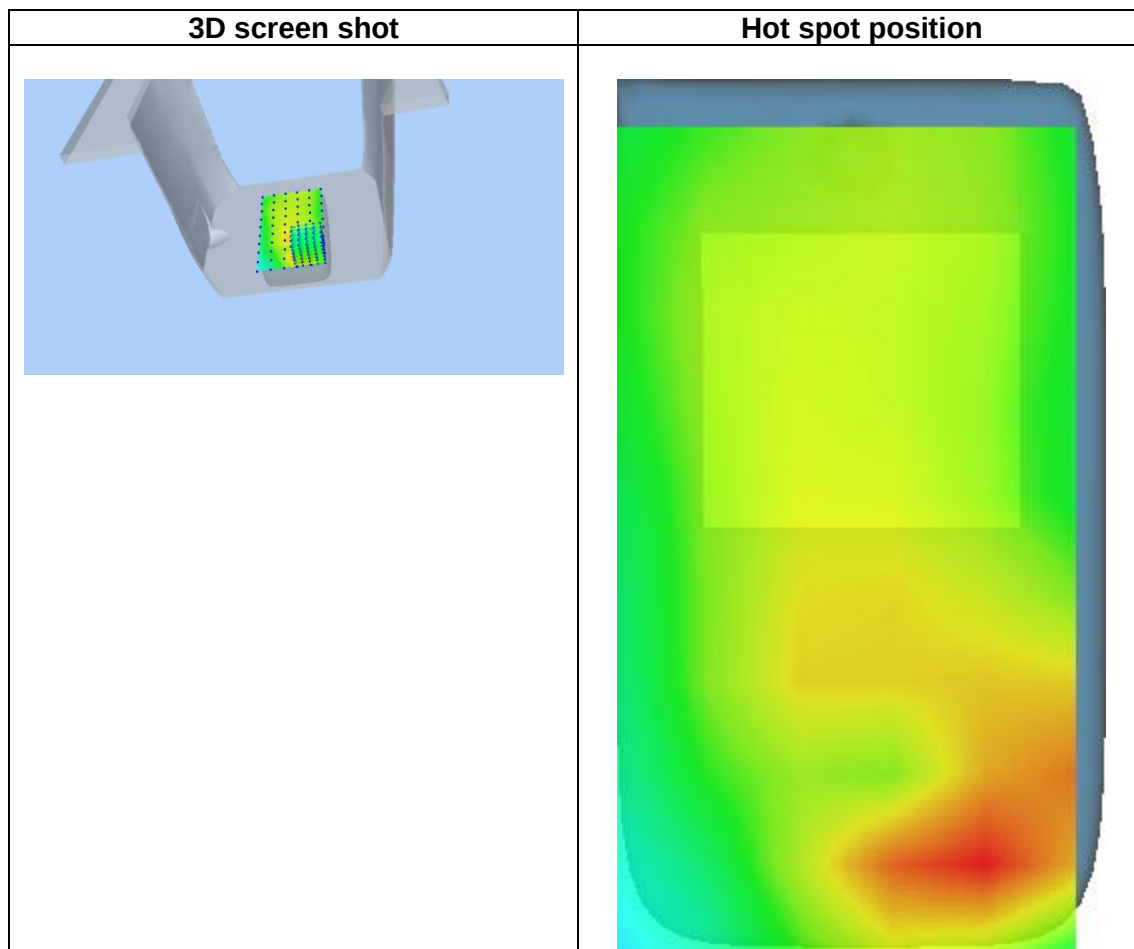
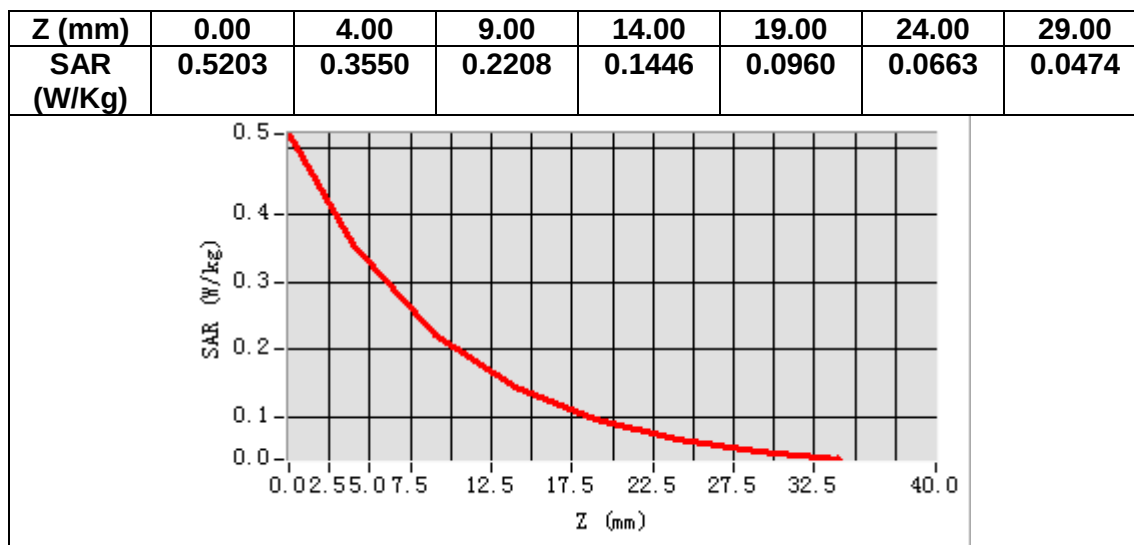
Frequency (MHz)	836.500000
Relative permittivity (real part)	41.745296
Relative permittivity (imaginary part)	19.617273
Conductivity (S/m)	0.911658
Variation (%)	-0.390000



Maximum location: X=19.00, Y=-56.00

SAR Peak: 0.52 W/kg

SAR 10g (W/Kg)	0.193662
SAR 1g (W/Kg)	0.335747



MEASUREMENT 23

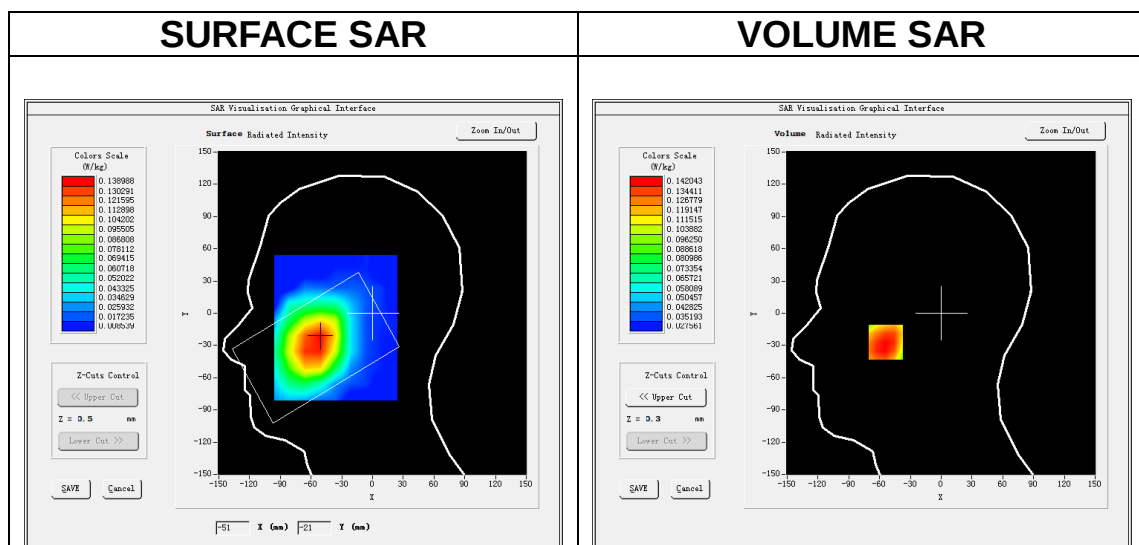
Date of measurement: 13/12/2024

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>2.42</u>

B. SAR Measurement Results

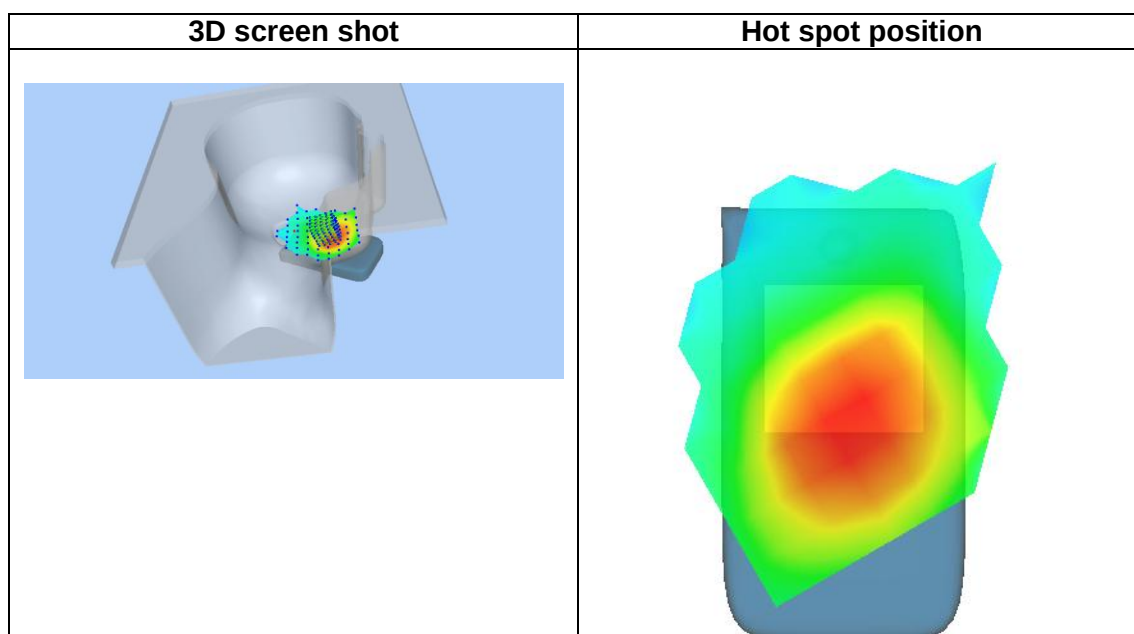
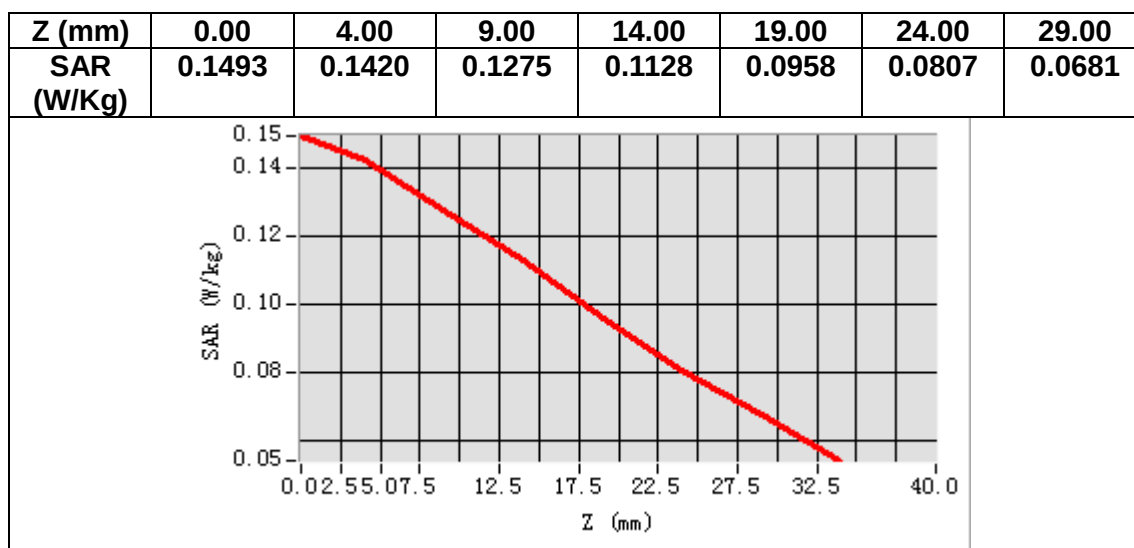
Frequency (MHz)	707.500000
Relative permittivity (real part)	41.314651
Relative permittivity (imaginary part)	21.860296
Conductivity (S/m)	0.859231
Variation (%)	4.760000



Maximum location: X=-54.00, Y=-27.00

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.114844
SAR 1g (W/Kg)	0.138967



MEASUREMENT 24

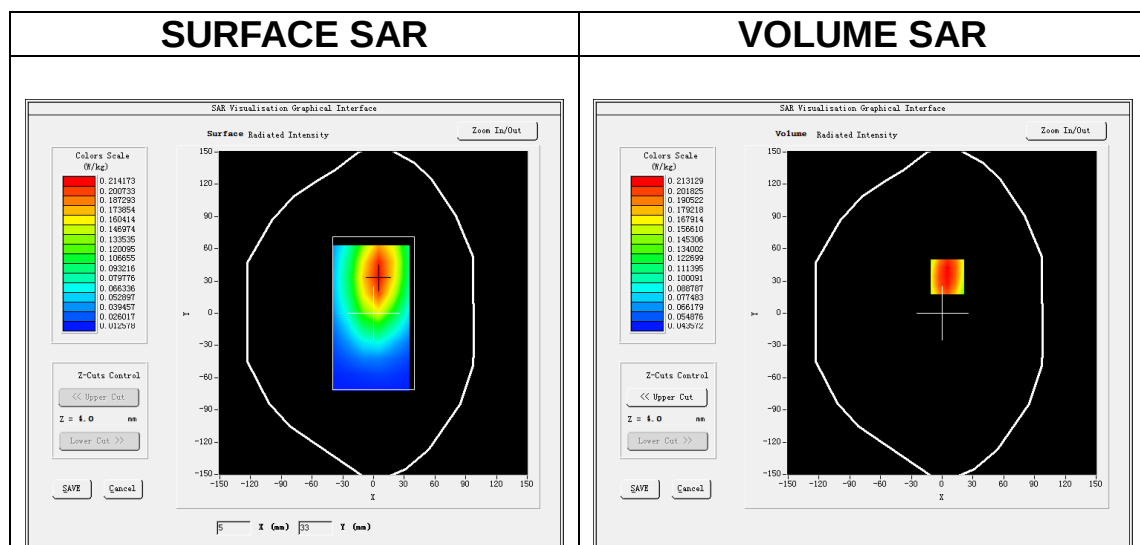
Date of measurement: 13/12/2024

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>2.42</u>

B. SAR Measurement Results

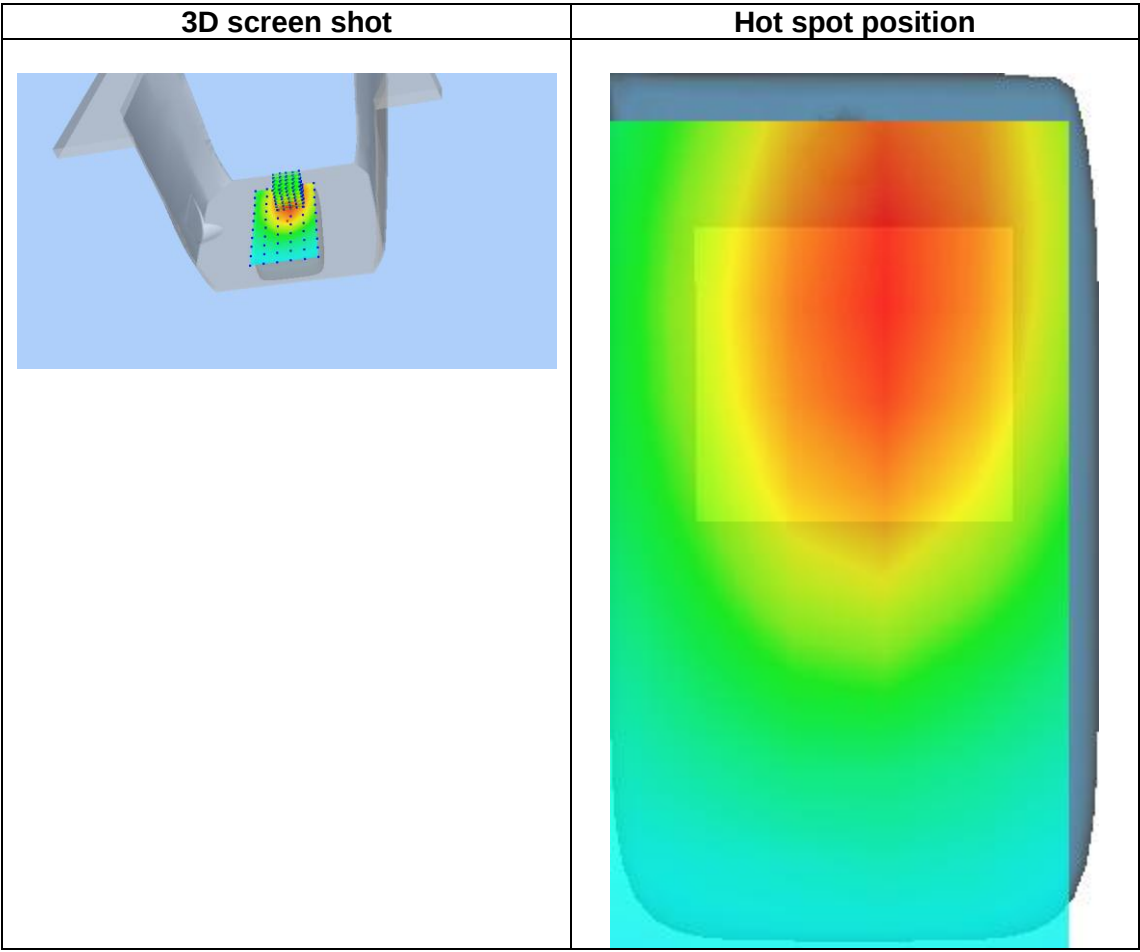
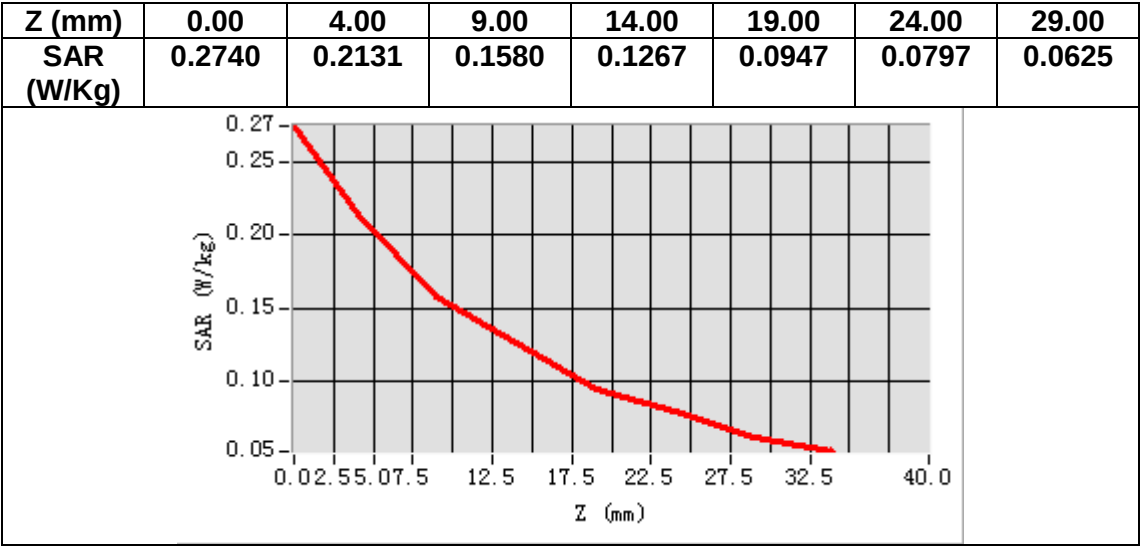
Frequency (MHz)	707.500000
Relative permittivity (real part)	41.314651
Relative permittivity (imaginary part)	21.860296
Conductivity (S/m)	0.859231
Variation (%)	-0.430000



Maximum location: X=5.00, Y=34.00

SAR Peak: 0.27 W/kg

SAR 10g (W/Kg)	0.151824
SAR 1g (W/Kg)	0.206321



MEASUREMENT 25

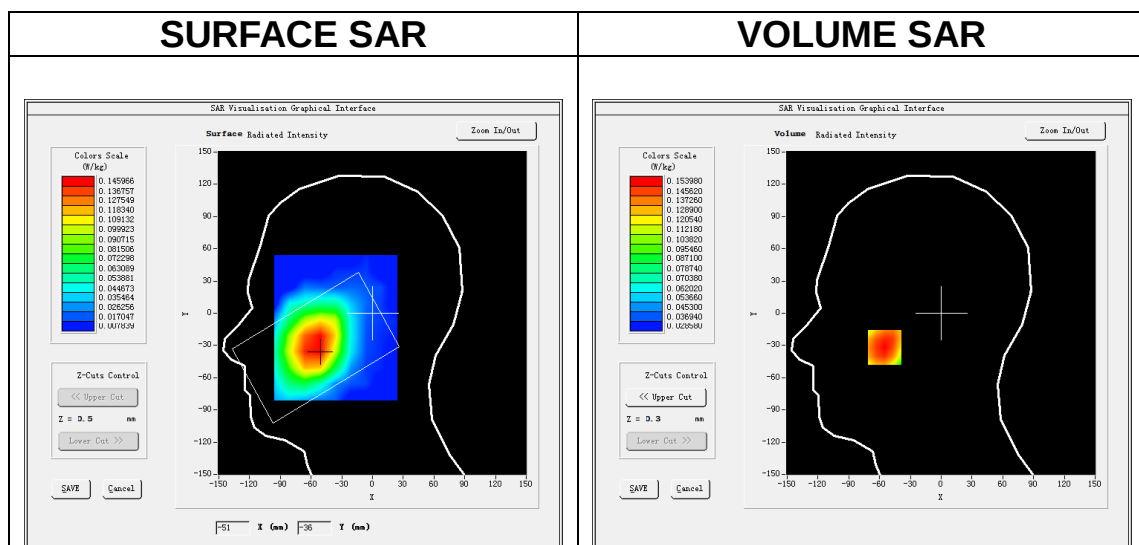
Date of measurement: 13/12/2024

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>2.42</u>

B. SAR Measurement Results

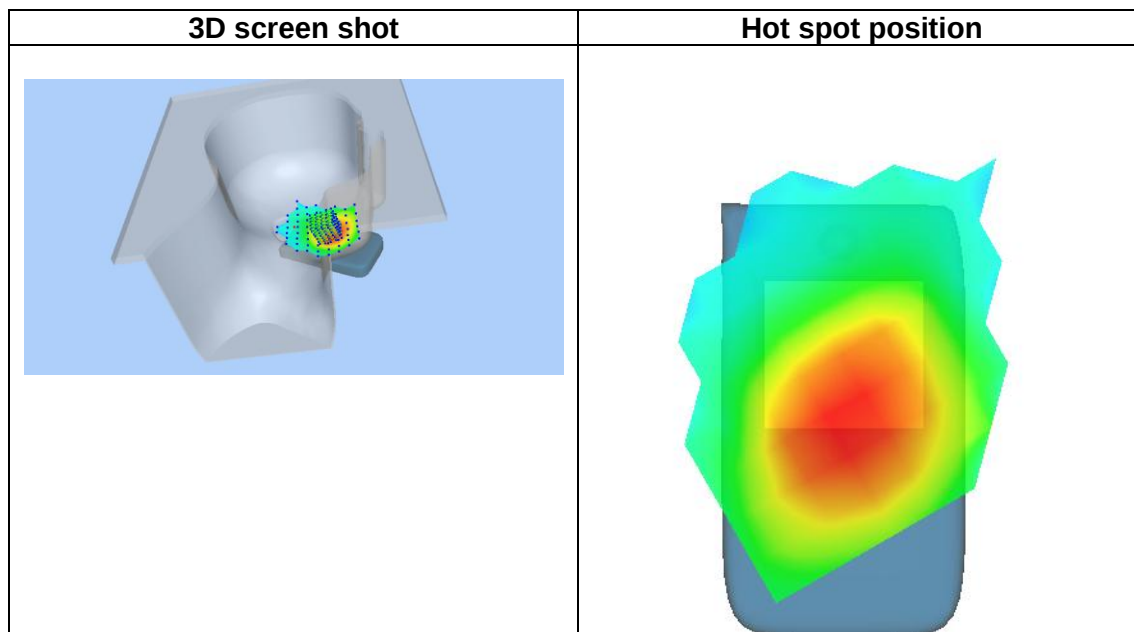
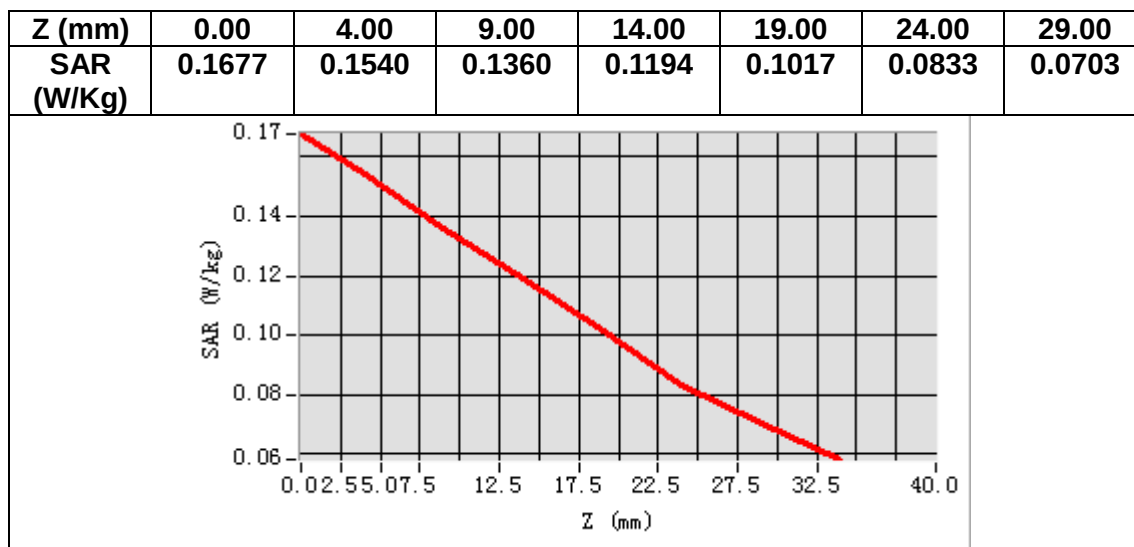
Frequency (MHz)	710.000000
Relative permittivity (real part)	41.299301
Relative permittivity (imaginary part)	21.800747
Conductivity (S/m)	0.859918
Variation (%)	0.450000



Maximum location: X=-55.00, Y=-32.00

SAR Peak: 0.17 W/kg

SAR 10g (W/Kg)	0.123645
SAR 1g (W/Kg)	0.150261



MEASUREMENT 26

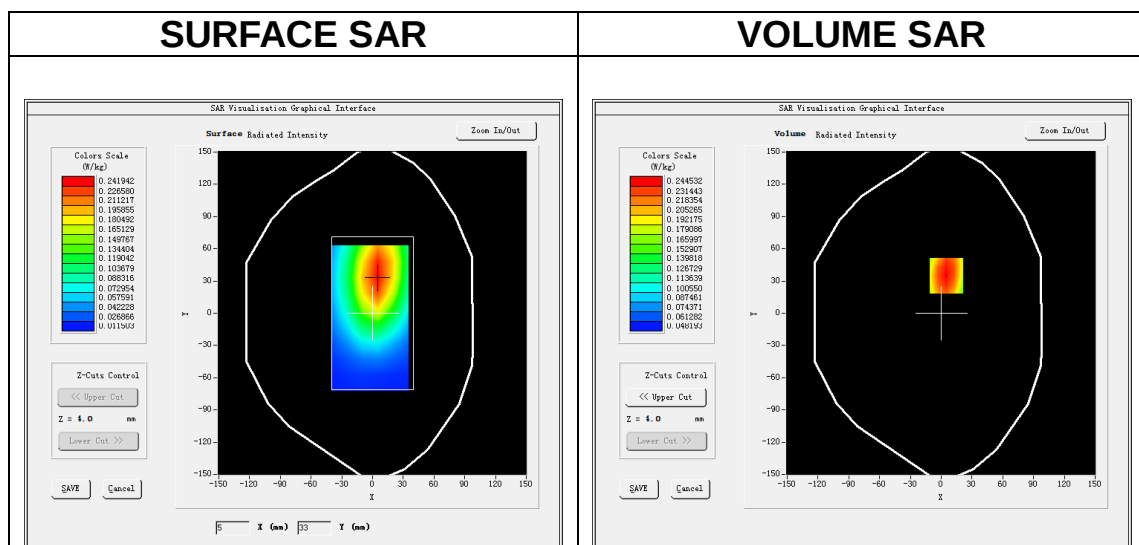
Date of measurement: 13/12/2024

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>2.42</u>

B. SAR Measurement Results

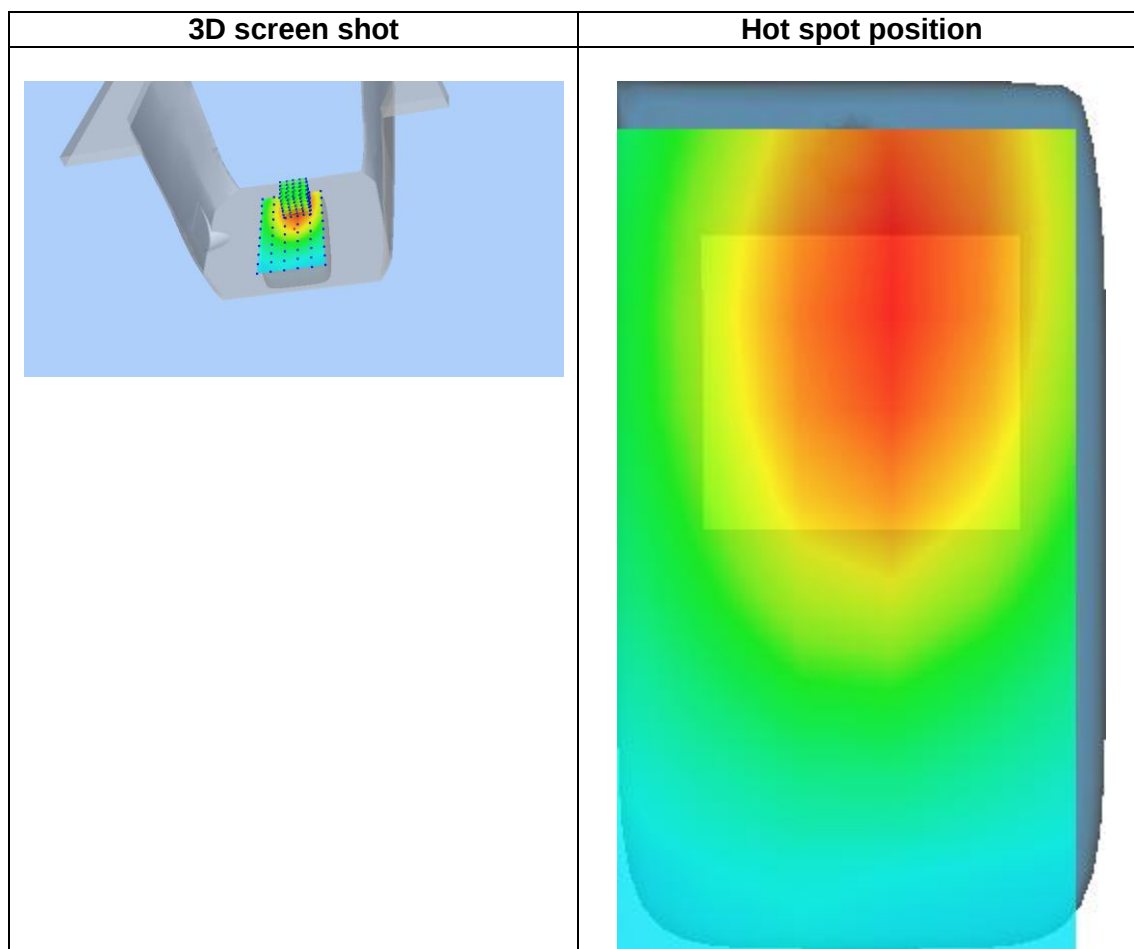
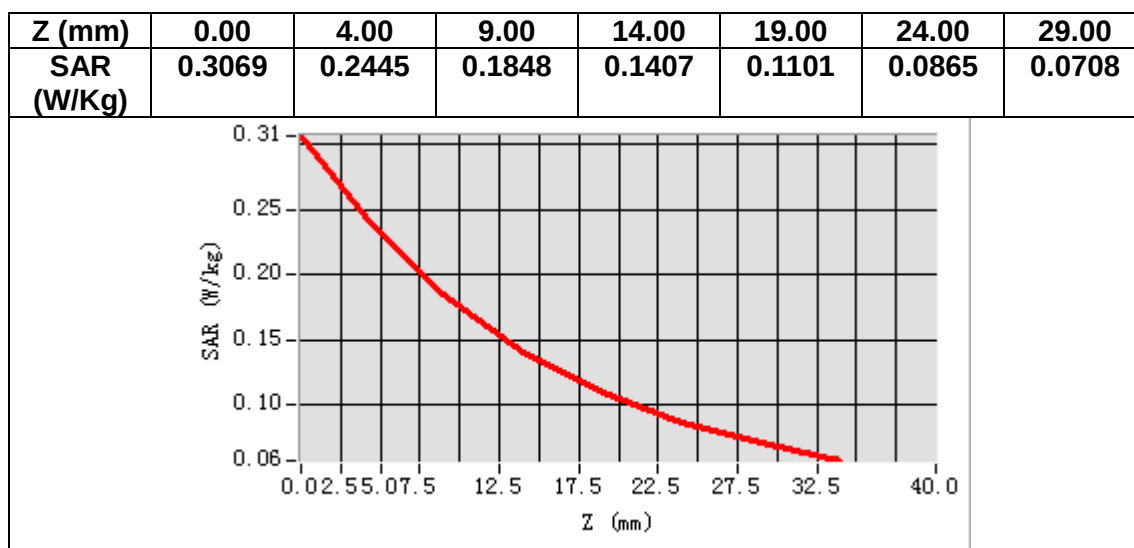
Frequency (MHz)	710.000000
Relative permittivity (real part)	41.299301
Relative permittivity (imaginary part)	21.800747
Conductivity (S/m)	0.859918
Variation (%)	-0.340000



Maximum location: X=5.00, Y=35.00

SAR Peak: 0.31 W/kg

SAR 10g (W/Kg)	0.172274
SAR 1g (W/Kg)	0.236221



MEASUREMENT 27

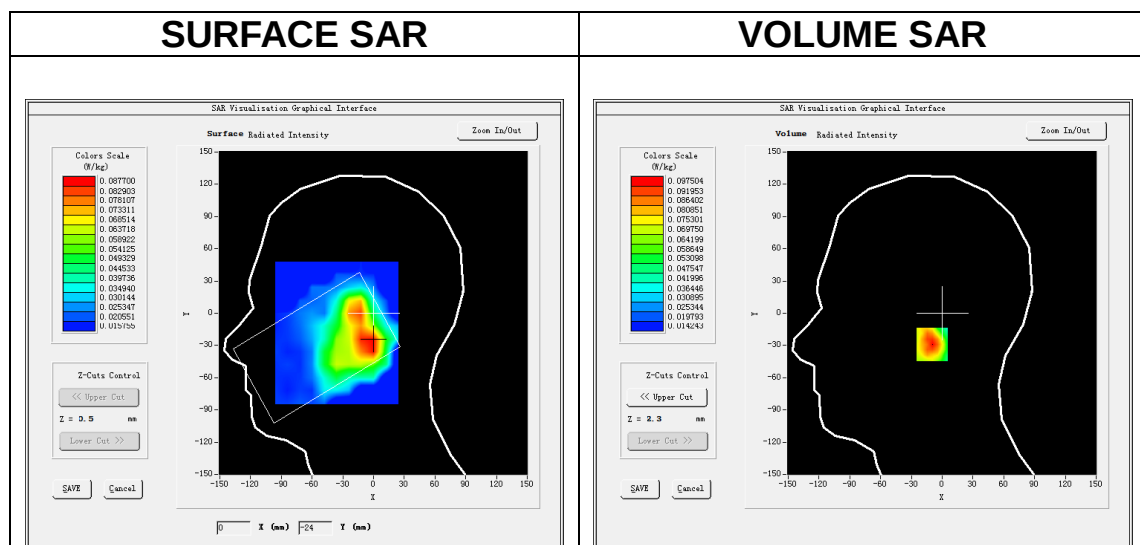
Date of measurement: 25/11/2024

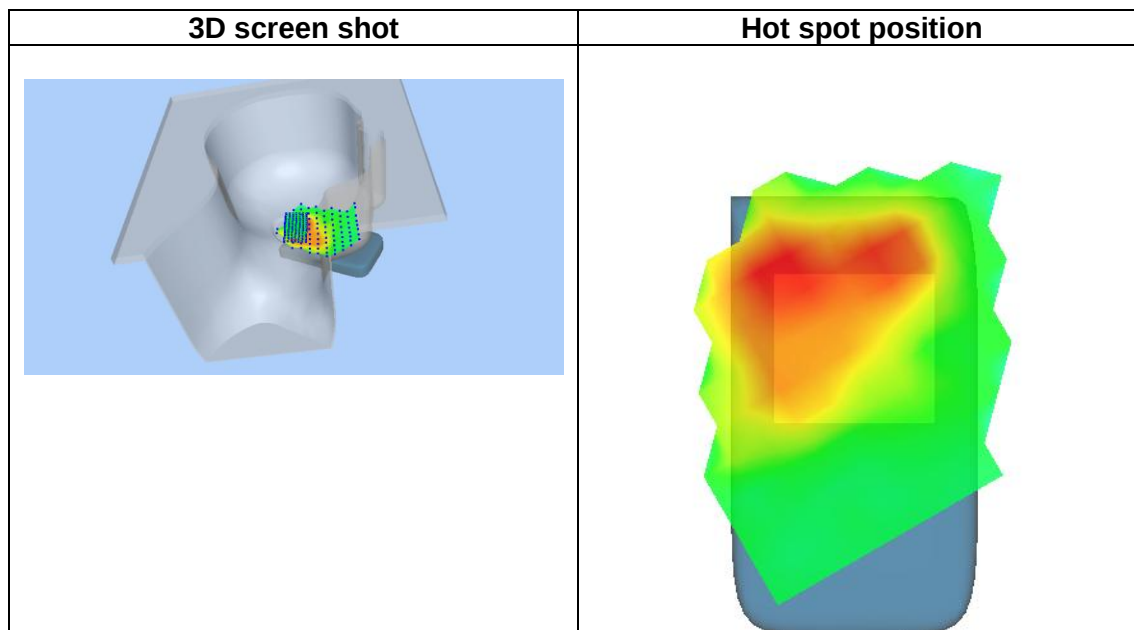
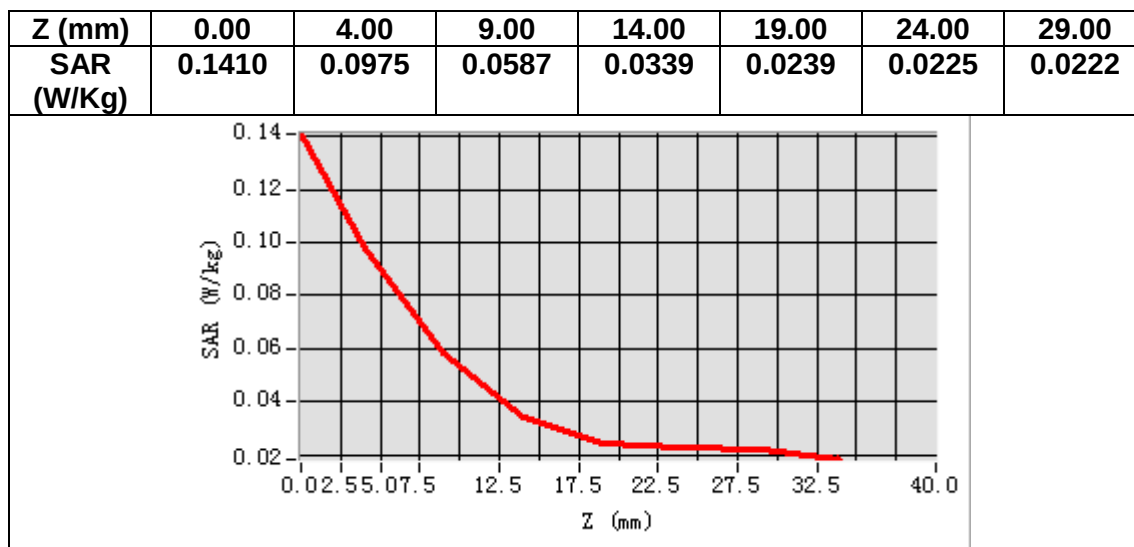
A. Experimental conditions.

<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 41</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.6)</u>
<u>ConvF</u>	<u>2.51</u>

B. SAR Measurement Results

Frequency (MHz)	2593.000000
Relative permittivity (real part)	38.932243
Relative permittivity (imaginary part)	13.762972
Conductivity (S/m)	1.982633
Variation (%)	2.880000





MEASUREMENT 28

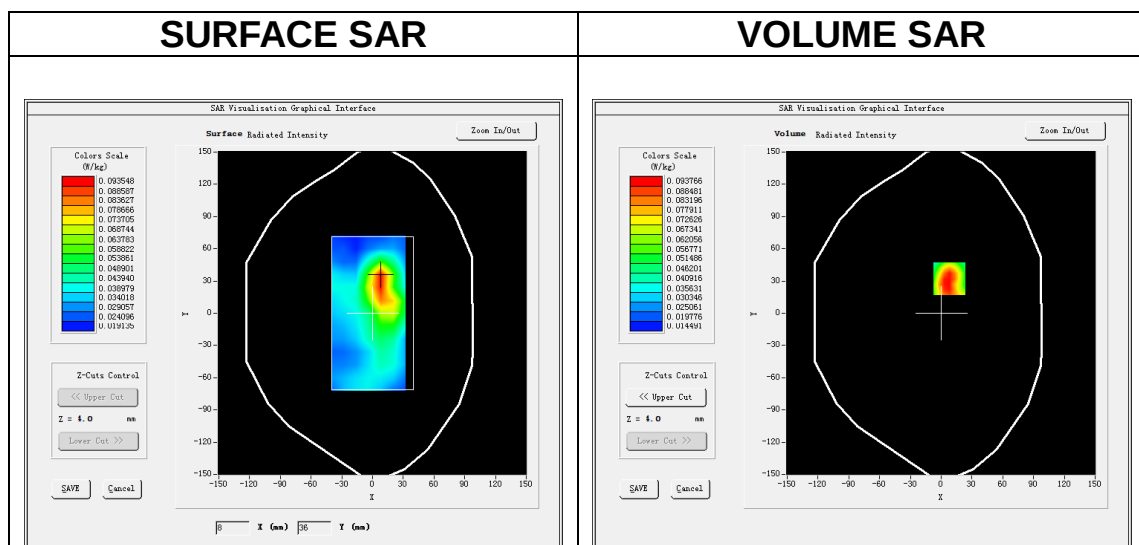
Date of measurement: 25/11/2024

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 41</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.6)</u>
<u>ConvF</u>	<u>2.51</u>

B. SAR Measurement Results

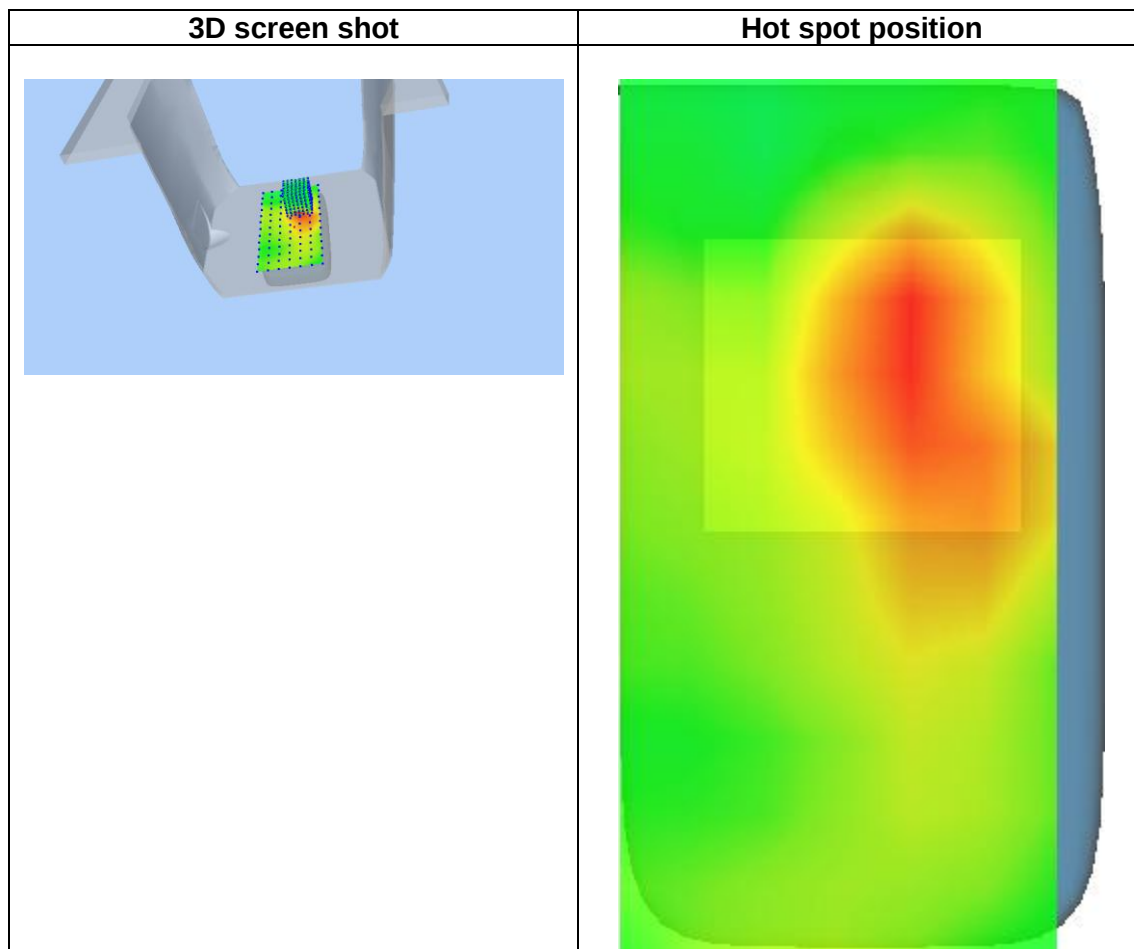
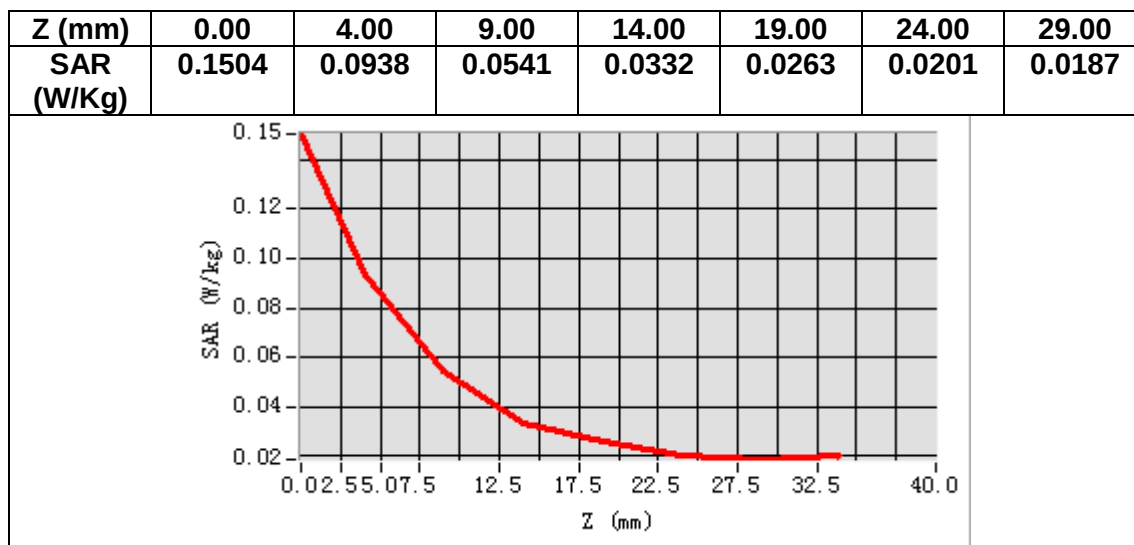
Frequency (MHz)	2593.000000
Relative permittivity (real part)	38.932243
Relative permittivity (imaginary part)	13.762972
Conductivity (S/m)	1.982633
Variation (%)	1.160000



Maximum location: X=8.00, Y=32.00

SAR Peak: 0.15 W/kg

SAR 10g (W/Kg)	0.054127
SAR 1g (W/Kg)	0.090785



MEASUREMENT 29

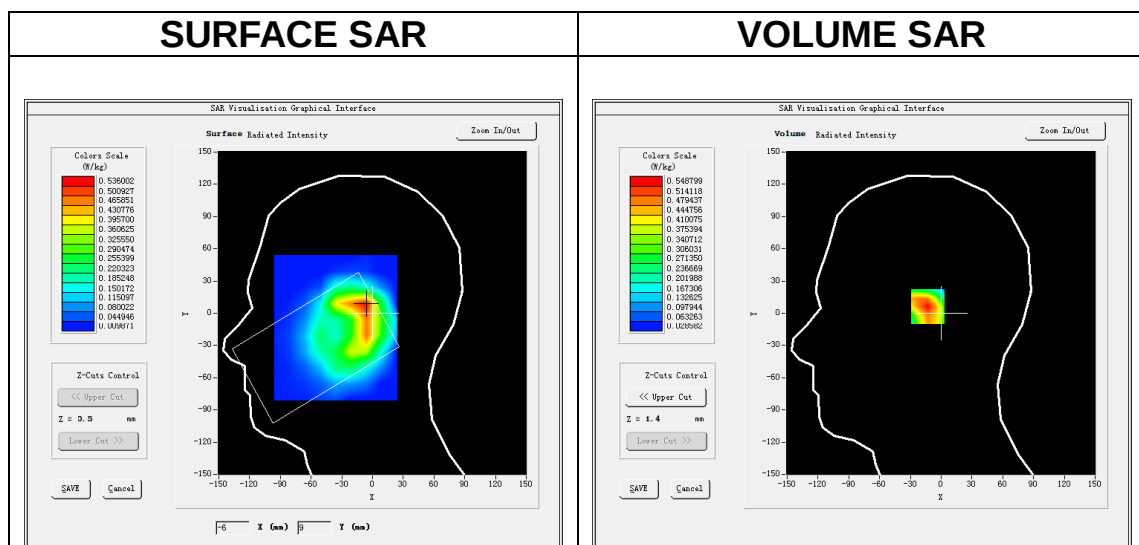
Date of measurement: 6/12/2024

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>2.51</u>

B. SAR Measurement Results

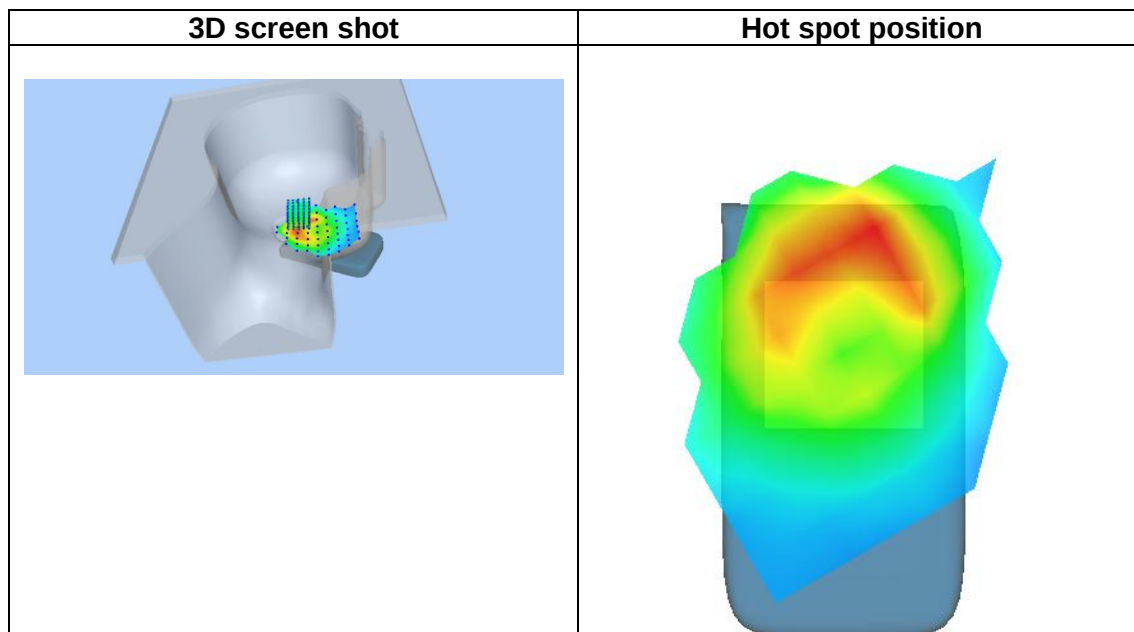
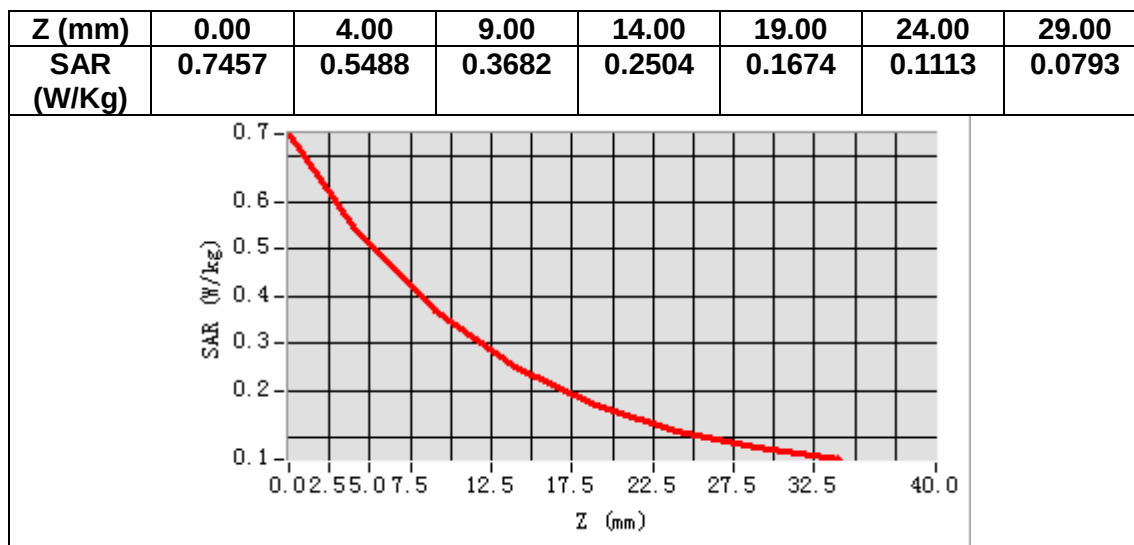
Frequency (MHz)	1745.000000
Relative permittivity (real part)	39.473503
Relative permittivity (imaginary part)	13.799705
Conductivity (S/m)	1.337805
Variation (%)	-0.310000



Maximum location: X=-8.00, Y=6.00

SAR Peak: 0.76 W/kg

SAR 10g (W/Kg)	0.313448
SAR 1g (W/Kg)	0.515512



MEASUREMENT 30

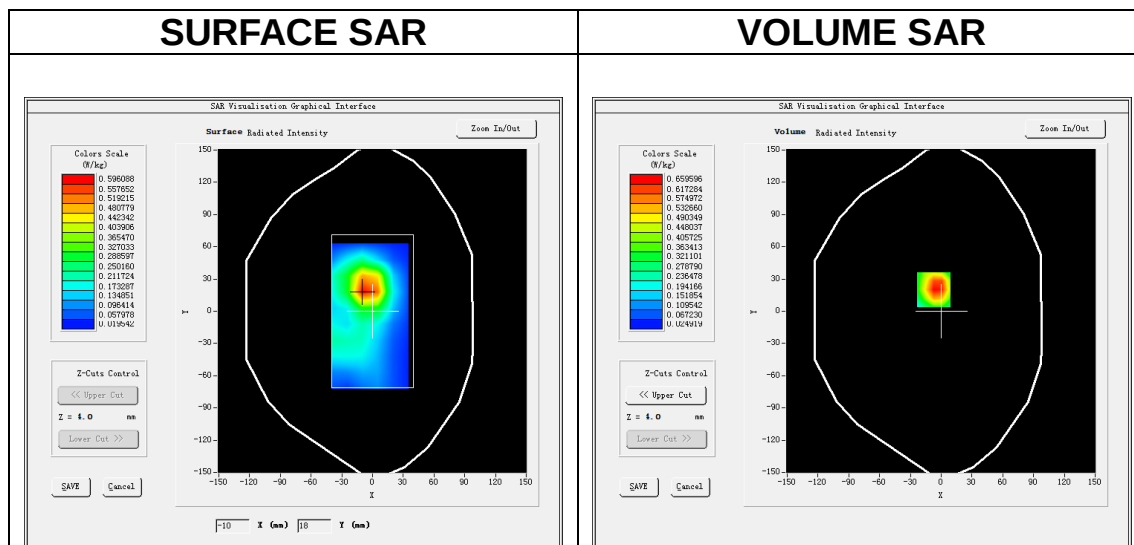
Date of measurement: 6/12/2024

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>2.51</u>

B. SAR Measurement Results

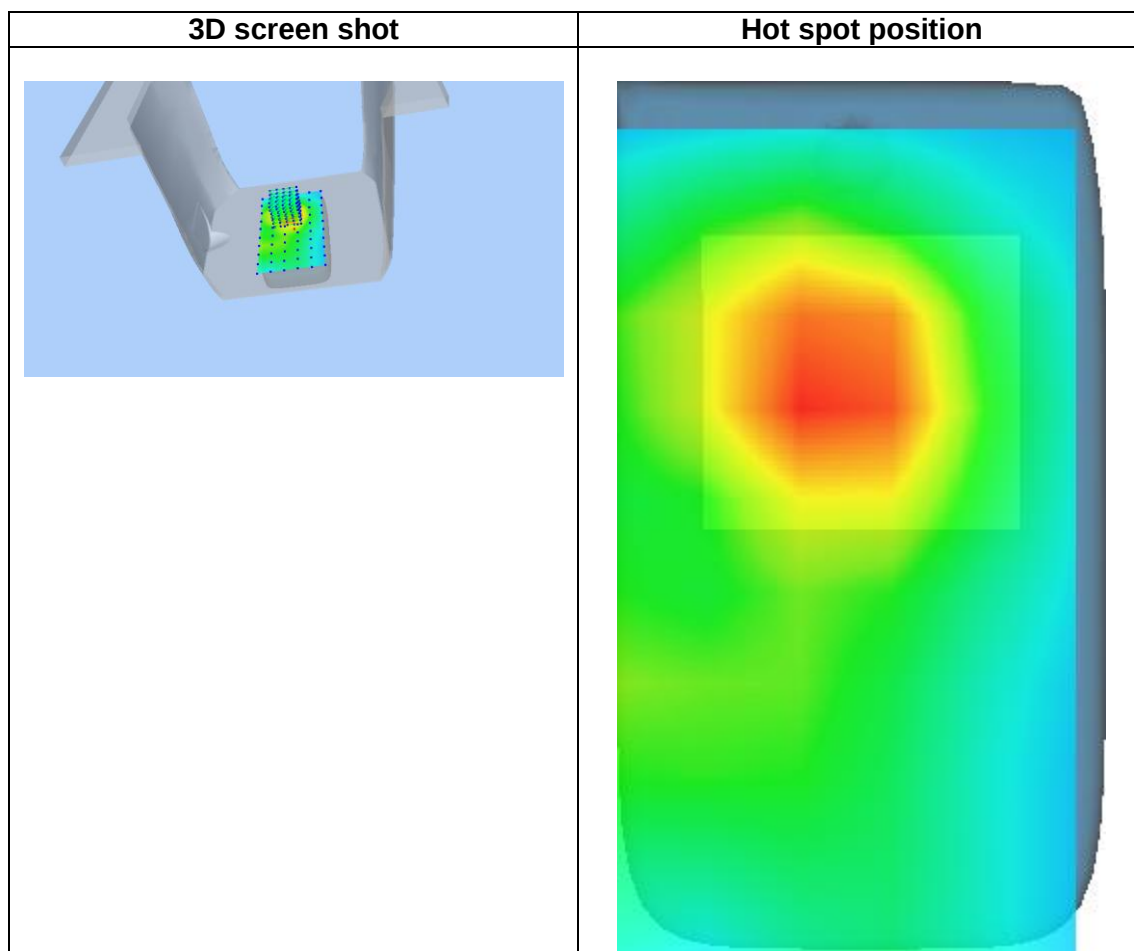
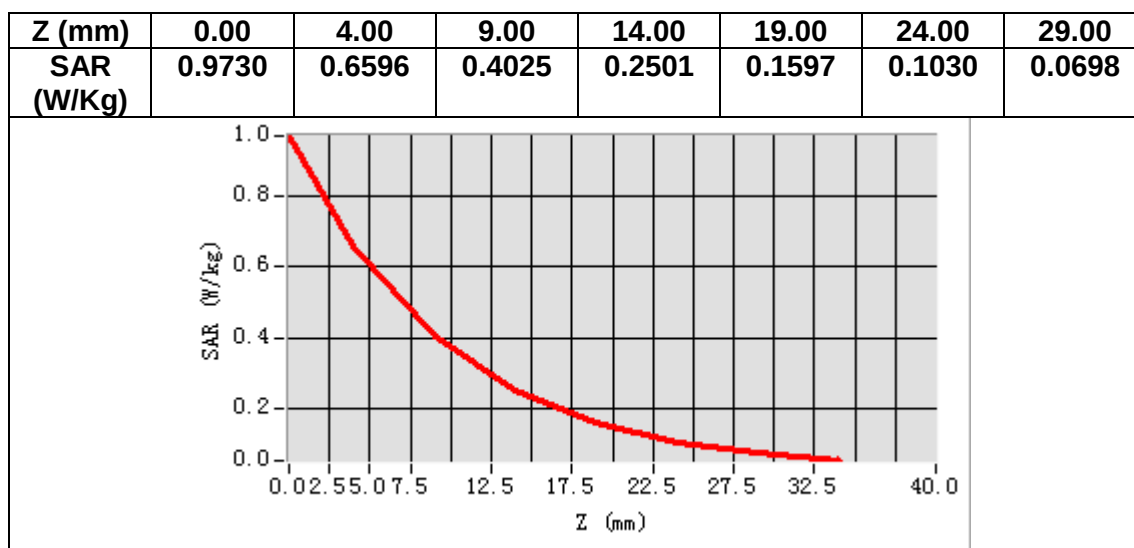
Frequency (MHz)	1745.000000
Relative permittivity (real part)	39.473503
Relative permittivity (imaginary part)	13.799705
Conductivity (S/m)	1.337805
Variation (%)	0.430000



Maximum location: X=-7.00, Y=20.00

SAR Peak: 1.04 W/kg

SAR 10g (W/Kg)	0.362121
SAR 1g (W/Kg)	0.644793



MEASUREMENT 31

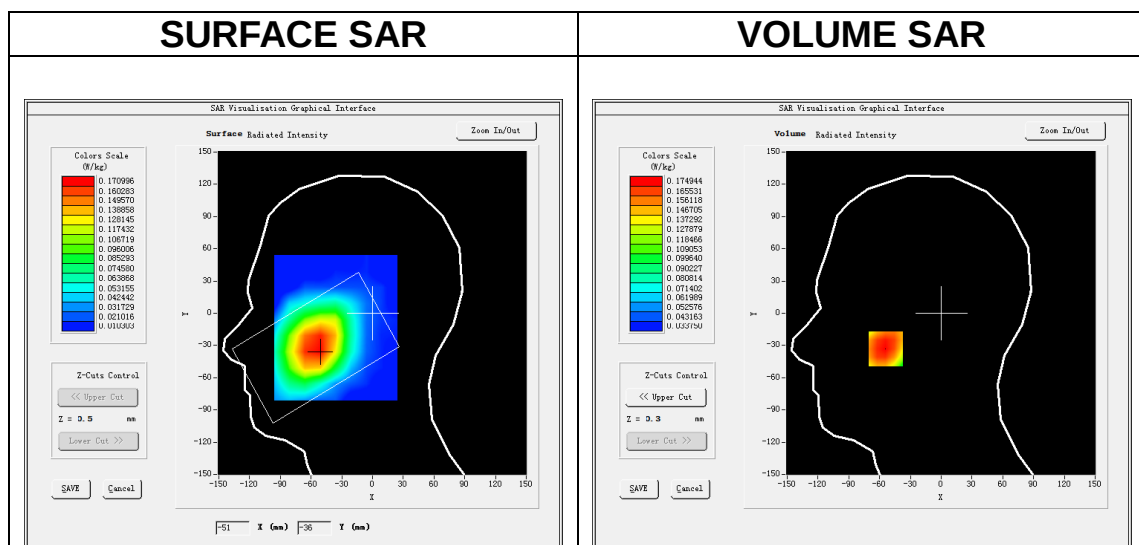
Date of measurement: 13/12/2024

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>FDDBand71</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.42</u>

B. SAR Measurement Results

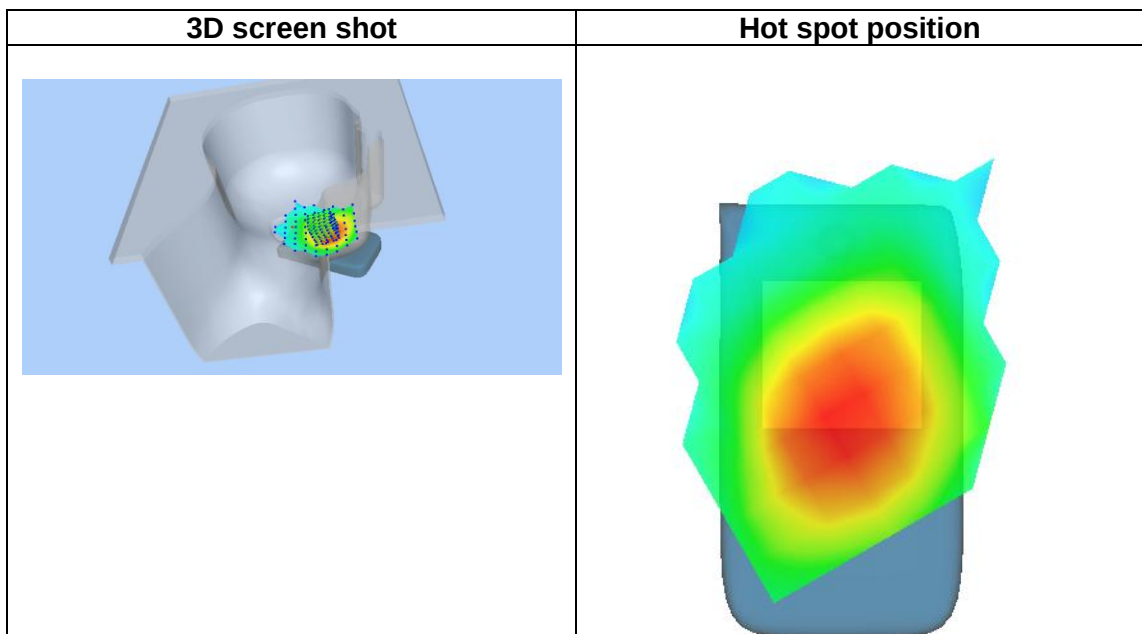
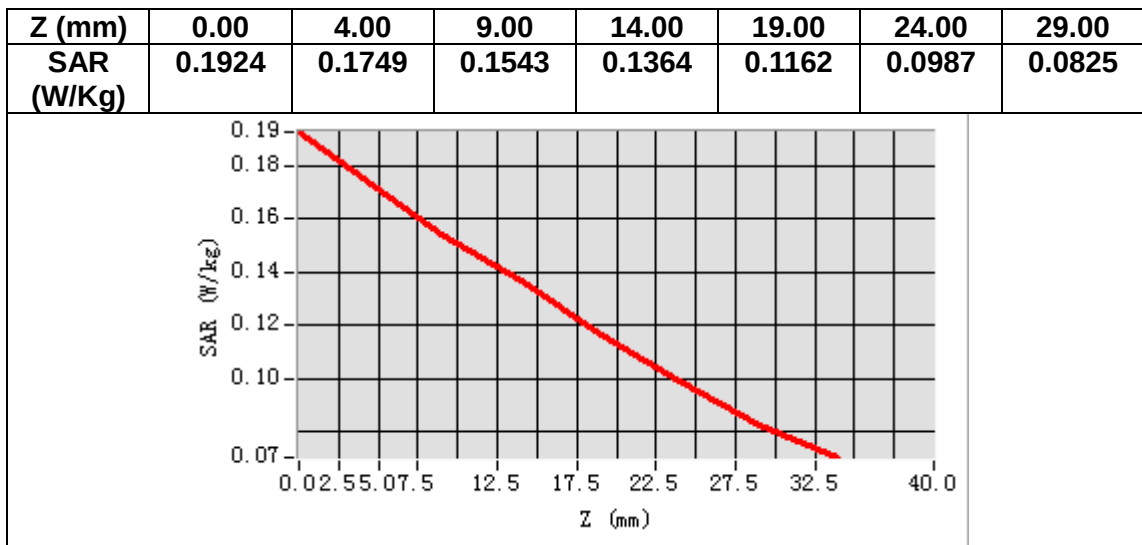
Frequency (MHz)	683.000000
Relative permittivity (real part)	41.612701
Relative permittivity (imaginary part)	22.603046
Conductivity (S/m)	0.857660
Variation (%)	-1.390000



Maximum location: X=-54.00, Y=-33.00

SAR Peak: 0.19 W/kg

SAR 10g (W/Kg)	0.142645
SAR 1g (W/Kg)	0.171904



MEASUREMENT 32

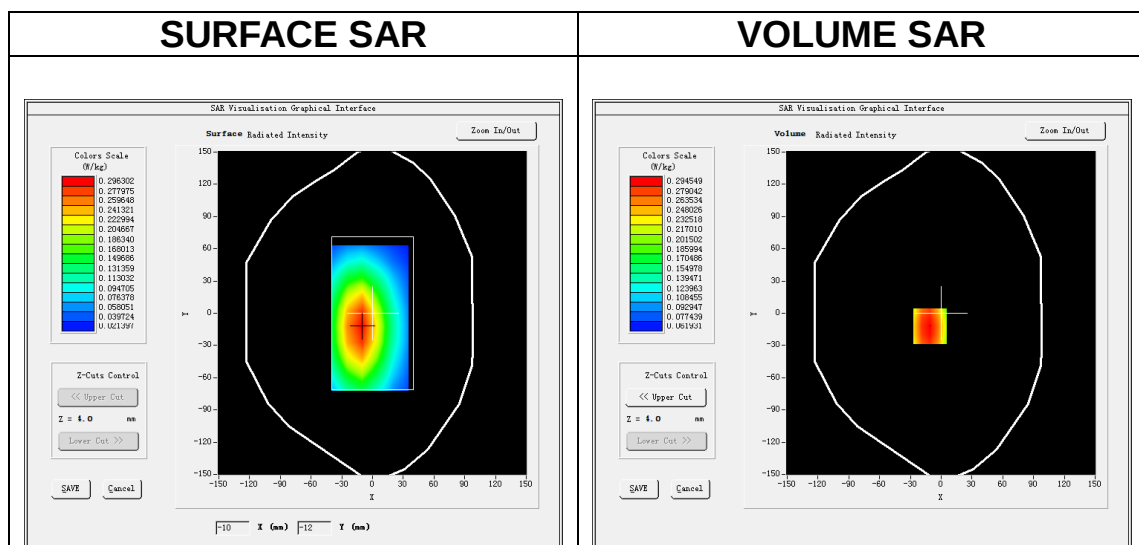
Date of measurement: 13/12/2024

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>FDDBand71</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>
<u>ConvF</u>	<u>2.42</u>

B. SAR Measurement Results

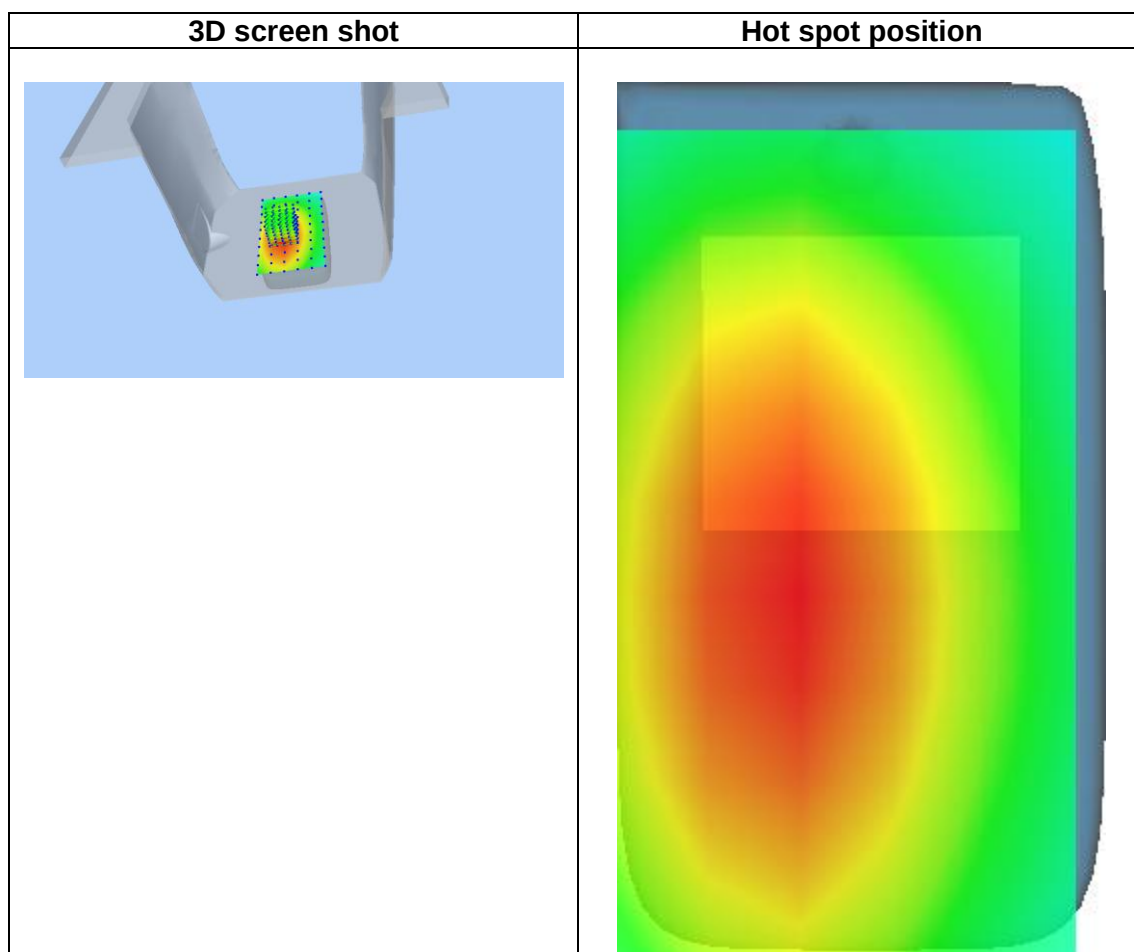
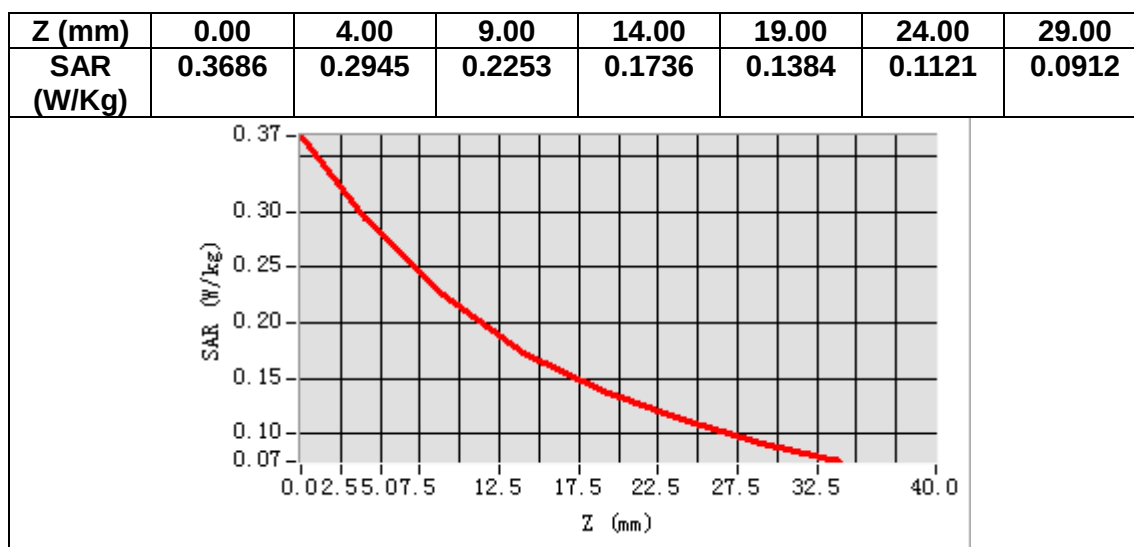
Frequency (MHz)	683.000000
Relative permittivity (real part)	41.612701
Relative permittivity (imaginary part)	22.603046
Conductivity (S/m)	0.857660
Variation (%)	-0.090000



Maximum location: X=-11.00, Y=-12.00

SAR Peak: 0.37 W/kg

SAR 10g (W/Kg)	0.210986
SAR 1g (W/Kg)	0.286188



MEASUREMENT 33

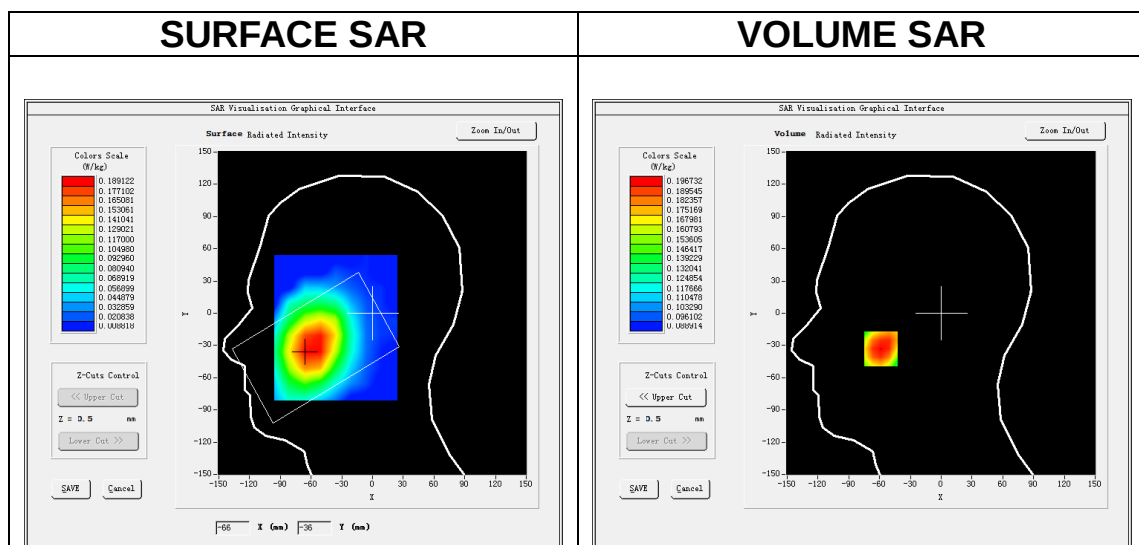
Date of measurement: 13/12/2024

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 n71</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 40.0)</u>
<u>ConvF</u>	<u>2.42</u>

B. SAR Measurement Results

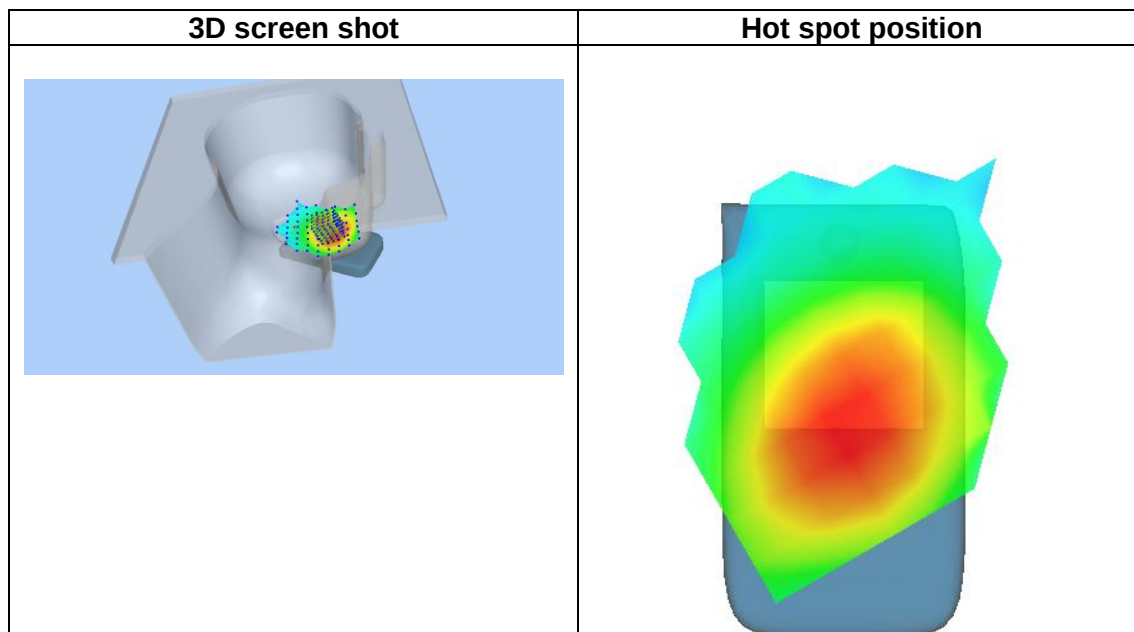
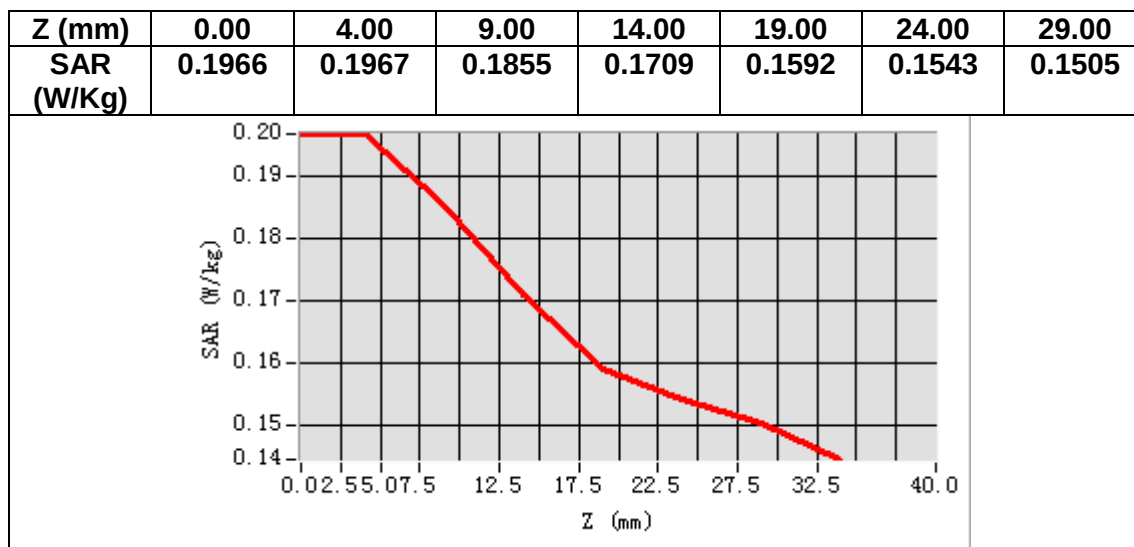
Frequency (MHz)	680.500000
Relative permittivity (real part)	41.656803
Relative permittivity (imaginary part)	22.597197
Conductivity (S/m)	0.854300
Variation (%)	0.850000



Maximum location: X=-59.00, Y=-33.00

SAR Peak: 0.21 W/kg

SAR 10g (W/Kg)	0.174929
SAR 1g (W/Kg)	0.192023



MEASUREMENT 34

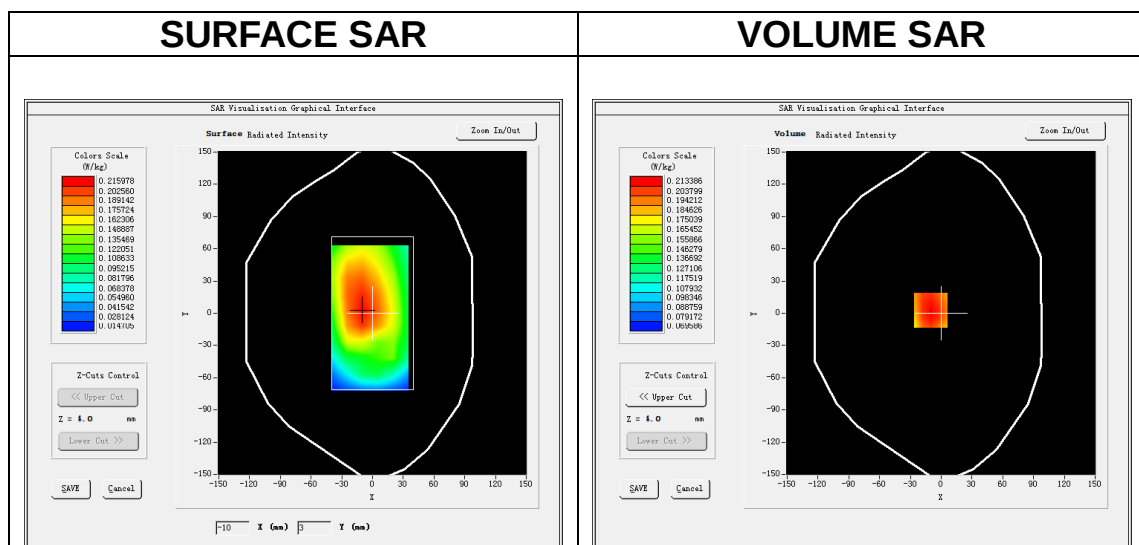
Date of measurement: 13/12/2024

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_n71</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 40.0)</u>
<u>ConvF</u>	<u>2.42</u>

B. SAR Measurement Results

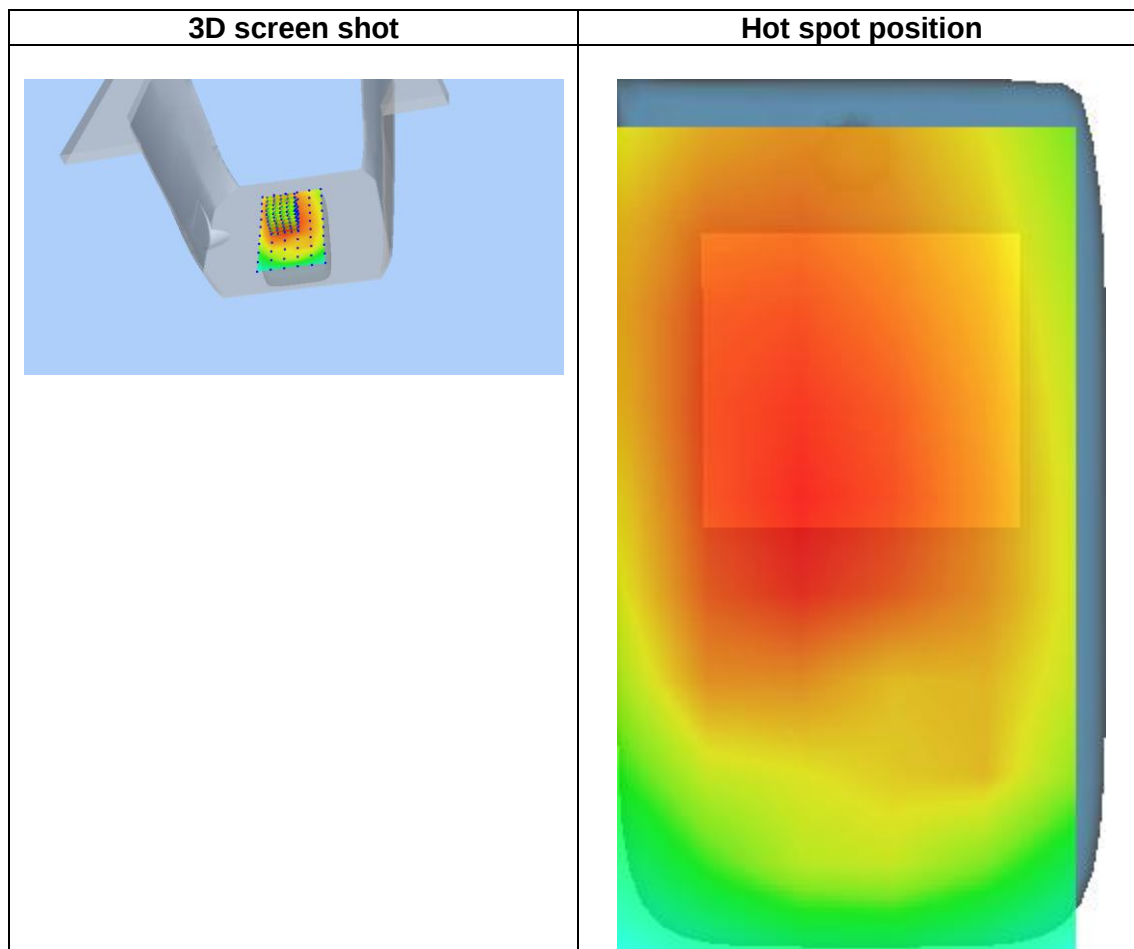
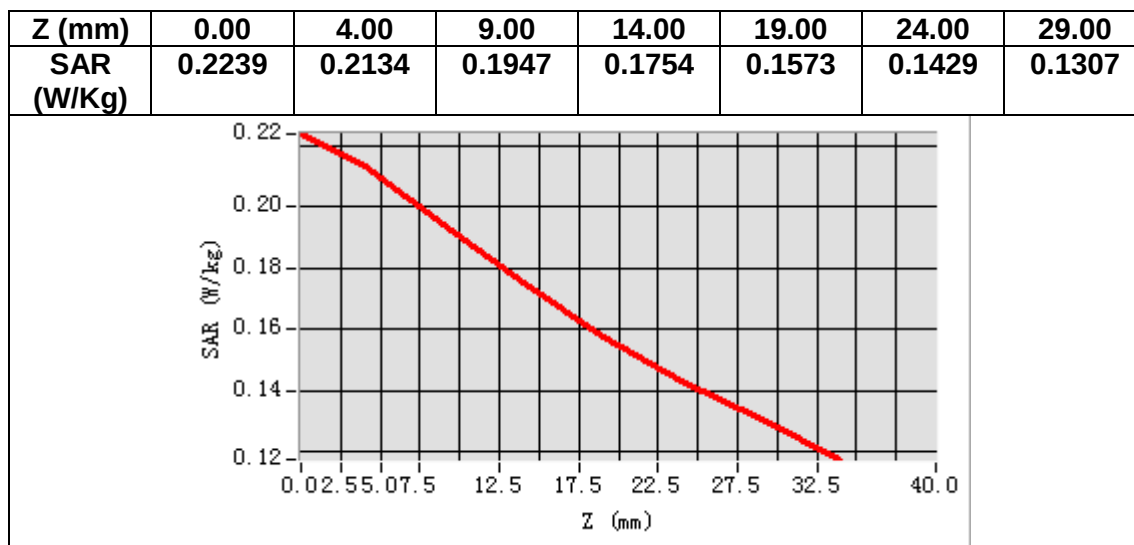
Frequency (MHz)	680.500000
Relative permittivity (real part)	41.656803
Relative permittivity (imaginary part)	22.597197
Conductivity (S/m)	0.854300
Variation (%)	-2.720000



Maximum location: X=-10.00, Y=3.00

SAR Peak: 0.23 W/kg

SAR 10g (W/Kg)	0.182931
SAR 1g (W/Kg)	0.208324



14. Appendix D. Calibration Certificate

Table of contents
E Field Probe - 4024-EPGO-442
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

DocuSign Envelope ID: 223C1A7C-4751-4B95-8502-1618DC0951E3



COMOSAR E-Field Probe Calibration Report

Ref : ACR.278.12.24.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.: 4024-EPGO-442

Calibrated at MVG

Z.I. de la pointe du diable

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

Calibration date: 10/04/2024



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).

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.278.12.24.BES.A

	Name	Function	Date	Signature
Prepared by :	Cyrille ONNEE	Measurement Responsible	10/4/2024	
Checked & approved by:	Pedro Ruiz	Technical Manager	10/4/2024	
Authorized by:	Pedro Ruiz	Laboratory Director	10/4/2024	

Assinado por:

Pedro RUIZ

29093B31C46F428...

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

Issue	Name	Date	Modifications
A	Cyrille ONNEE	10/4/2024	Initial release

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.278.12.24.BES.A

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.278.12.24.BES.A

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	4024-EPGO-442
Product Condition (new / used)	New
Frequency Range of Probe	0.15 GHz-7.5GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.206 MΩ Dipole 2: R2=0.223 MΩ Dipole 3: R3=0.235 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.

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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 0.01 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:

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

where

$SAR_{uncertainty}$ is the uncertainty in percent of the probe boundary effect

d_{be} is the distance between the surface and the closest *zoom-scan* 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 $SAR_{uncertainty}[\%]$ for scanning distances larger than 4mm is 1.0% Limit, 2%).

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3.5 PROBE MODULATION RESPONSE

MVG's probe were evaluated experimentally with various modulated signal and the deviation from CW response were found neglectable in the used power range of the probe. So the correction to taking into account the linearization parameters for different modulation is null, therefore the CW factor given in this report can be used whatever the measured modulation

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.

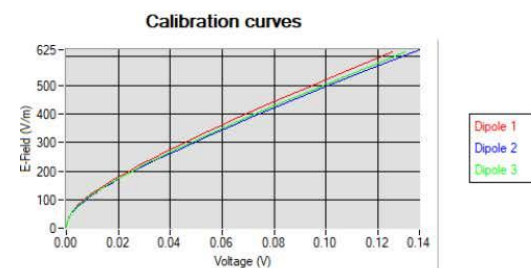
The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-14% for the frequency range 600-7500MHz.

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.

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

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where

V_i =voltage readings on the 3 channels of the probe

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

Normi=dipole sensitivity given below for the 3 channels of the probe

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 ($\mu\text{V}/(\text{V}/\text{m})^2$)
0.73	0.79	0.78

DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
105	109	103

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:

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

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