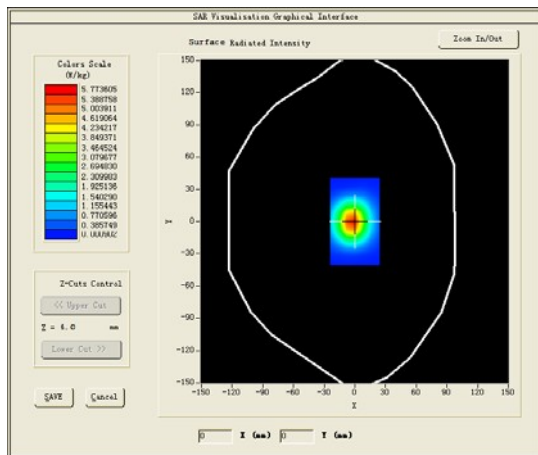
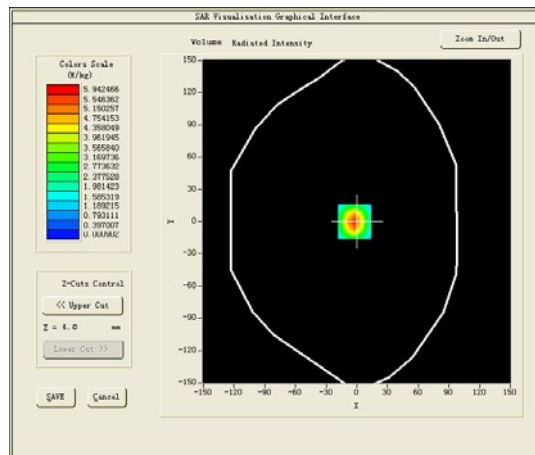


SURFACE SAR



VOLUME SAR

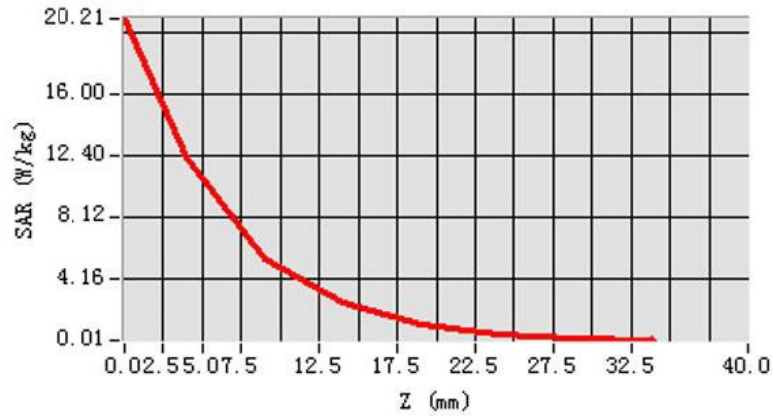


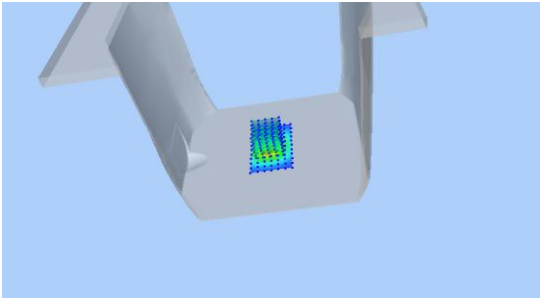
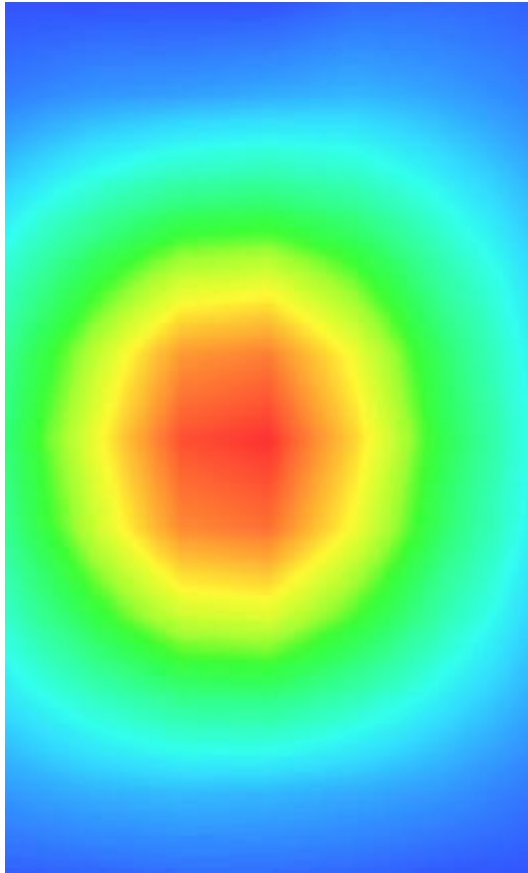
Maximum location: X=-2.00,Y=0.00

SAR Peak: 10.74 W/kg

SAR 10g (W/Kg)	2.559674
SAR 1g (W/Kg)	5.786435

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	10.4745	5.9425	2.6827	1.2126	0.5266	0.2069	0.0714



3D screen shot	Hot spot position
	

	Annex B: Measurement Results
	Tested Model : X1101B
	Report Number: WSCT-ANAB-R&E241100056A-SAR

MEASUREMENT 1

Front-side-middle

Type: Phone measurement (Complete)

Date of measurement: 11/10/2024

Measurement duration: 13 minutes 50 seconds

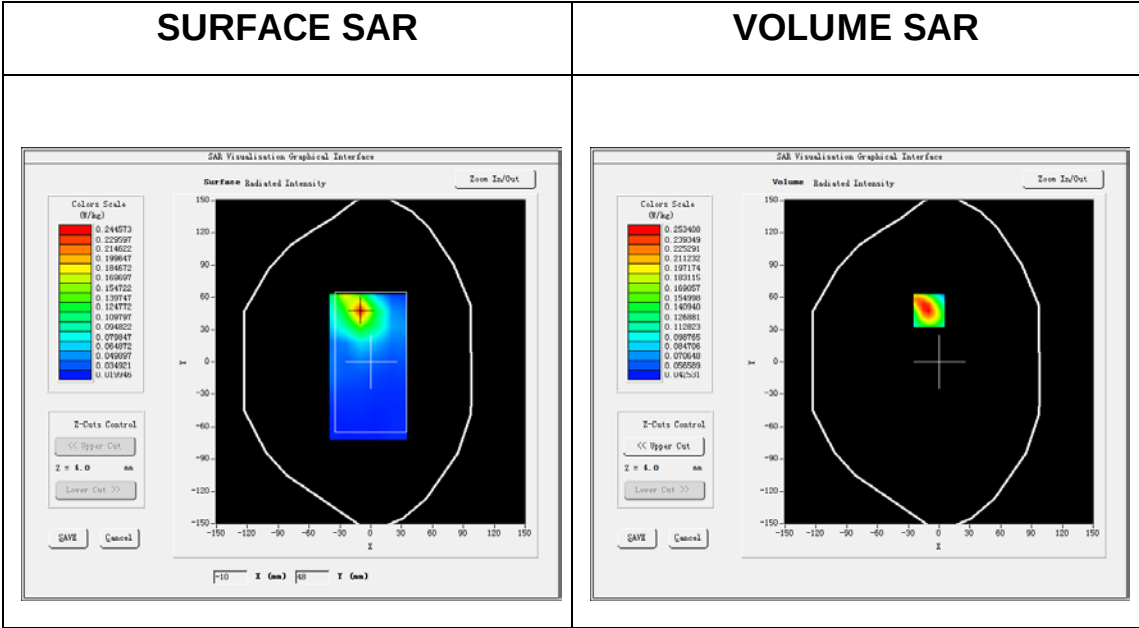
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	CUSTOM (GPRS1900_4Tx)
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>

B. SAR Measurement Results

Middle Band SAR (Channel 512):

Frequency (MHz)	1850.200000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	12.930000
Conductivity (S/m)	1.400750
Variation (%)	3.490000

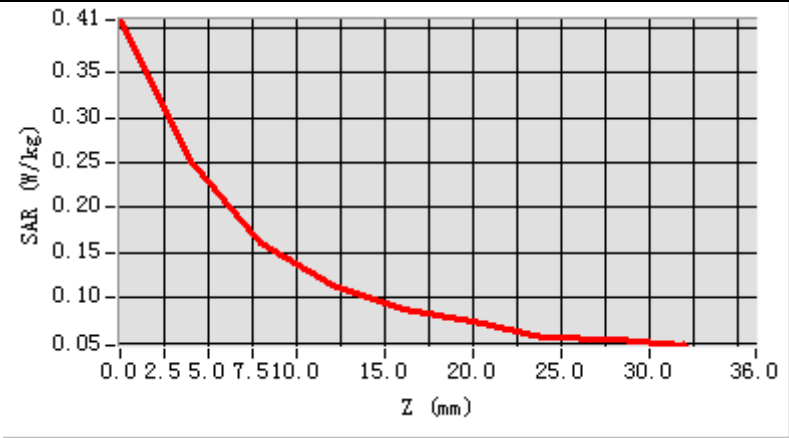


Maximum location: X= -10.00, Y=48.00

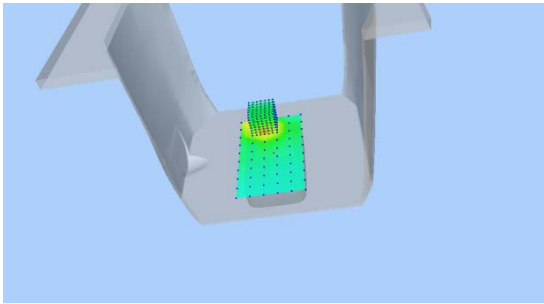
SAR Peak: 0.41 W/kg

SAR 10g (W/Kg)	0.336719
SAR 1g (W/Kg)	0.802205

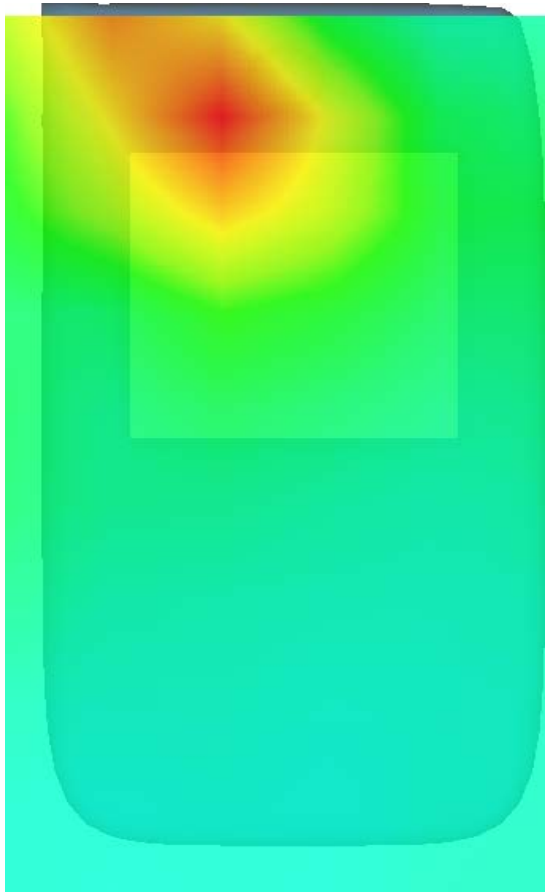
Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.40 90	0.253 4	0.160 8	0.114 1	0.087 2	0.073 2	0.055 7	0.053 6



3D screen shot



Hot spot position



MEASUREMENT 2

Front-side-middle

Type: Phone measurement (Complete)

Date of measurement: 11/10/2024

Measurement duration: 13 minutes 7 seconds

A. Experimental conditions.

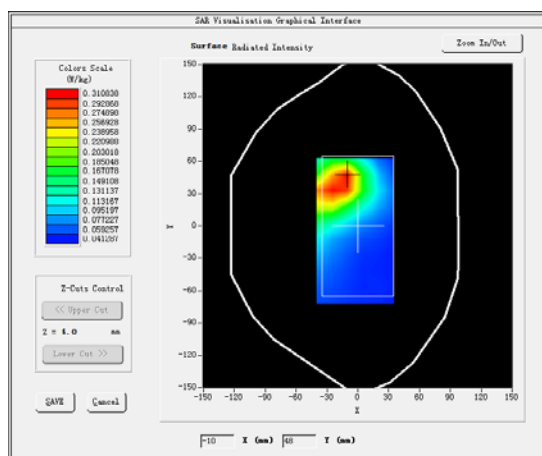
<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>Band2_UMTS</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>

B. SAR Measurement Results

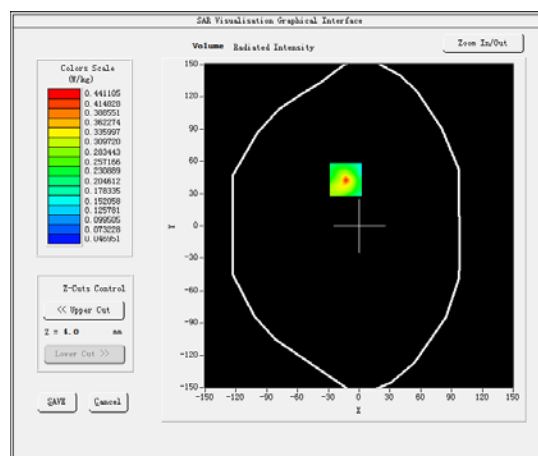
Middle Band SAR (Channel 9538):

Frequency (MHz)	1907.600000
Relative permittivity (real part)	38.332157
Relative permittivity (imaginary part)	19.839600
Conductivity (S/m)	0.921880
Variation (%)	4.740000

SURFACE SAR



VOLUME SAR

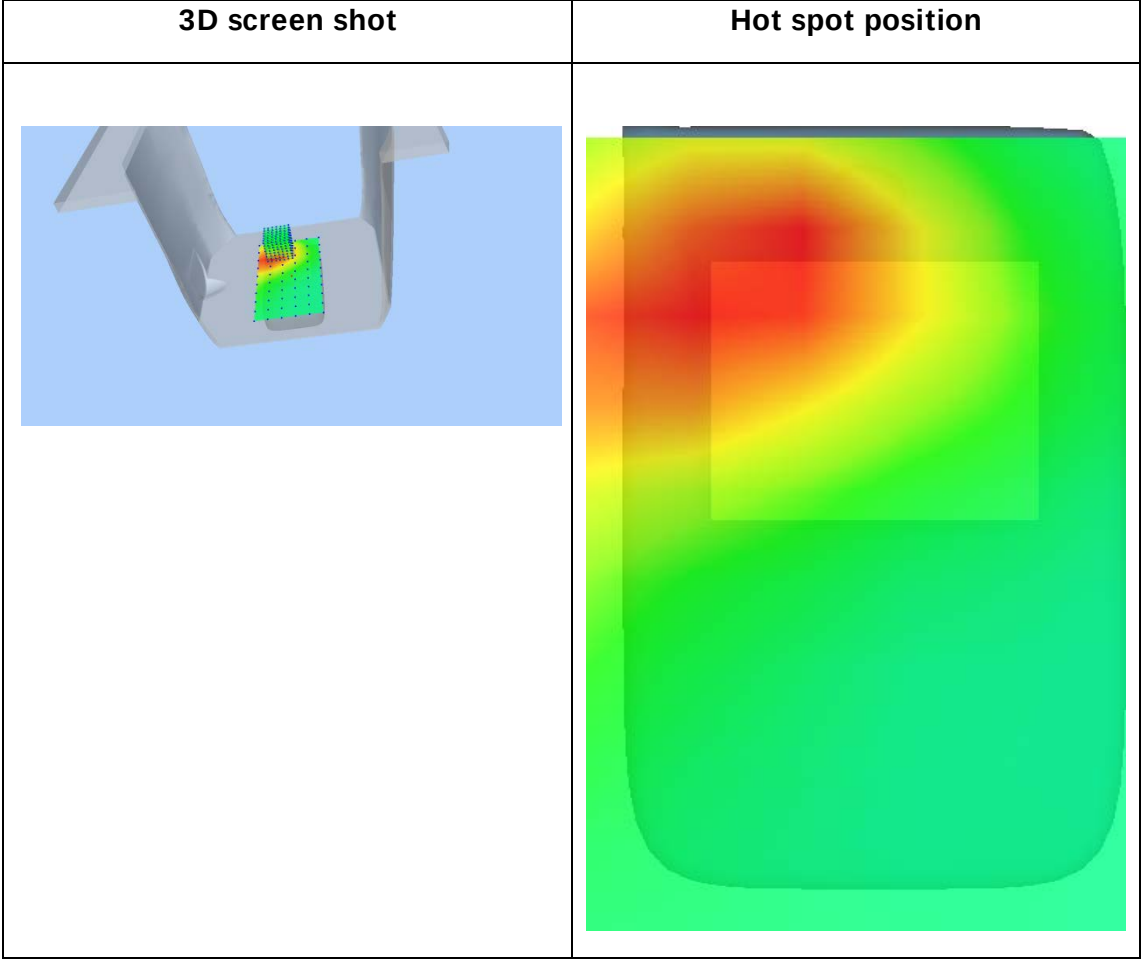
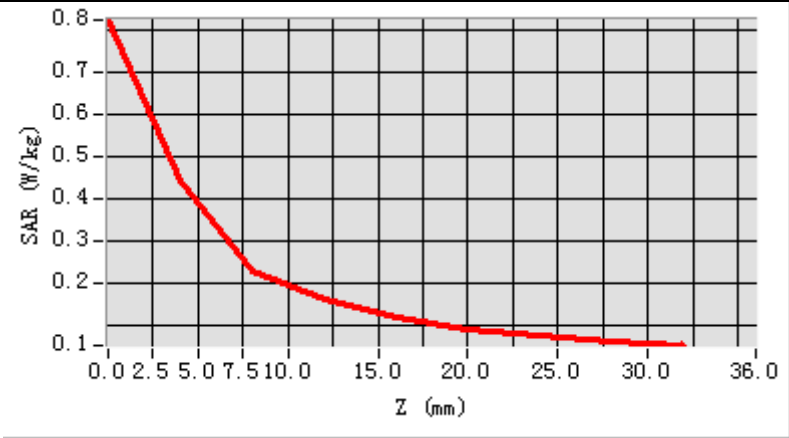


Maximum location: X=-13.00, Y=43.00

SAR Peak: 0.80 W/kg

SAR 10g (W/Kg)	0.314024
SAR 1g (W/Kg)	0.672845

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.8231	0.4411	0.2286	0.1636	0.1172	0.0914	0.0758	0.0603



MEASUREMENT 3

Front-side-middle

Type: Phone measurement (Complete)

Date of measurement:08/10/2024

Measurement duration: 13 minutes 16 seconds

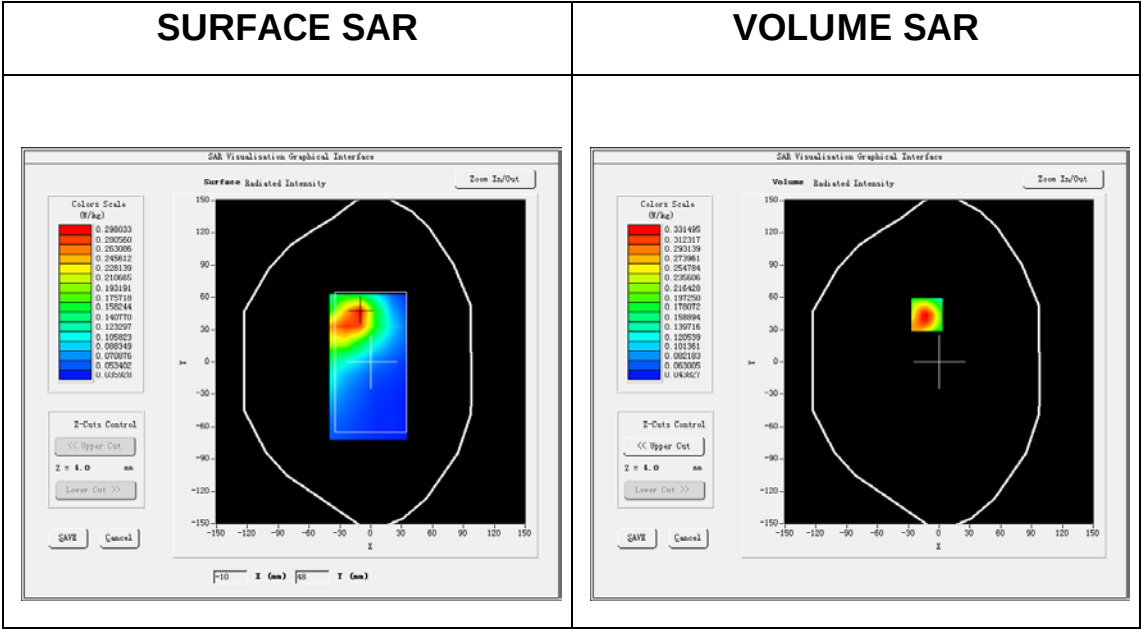
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>Band4_UMTS</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>

B. SAR Measurement Results

Middle Band SAR (Channel 1712.4):

Frequency (MHz)	1312.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.966767
Variation (%)	-1.460000

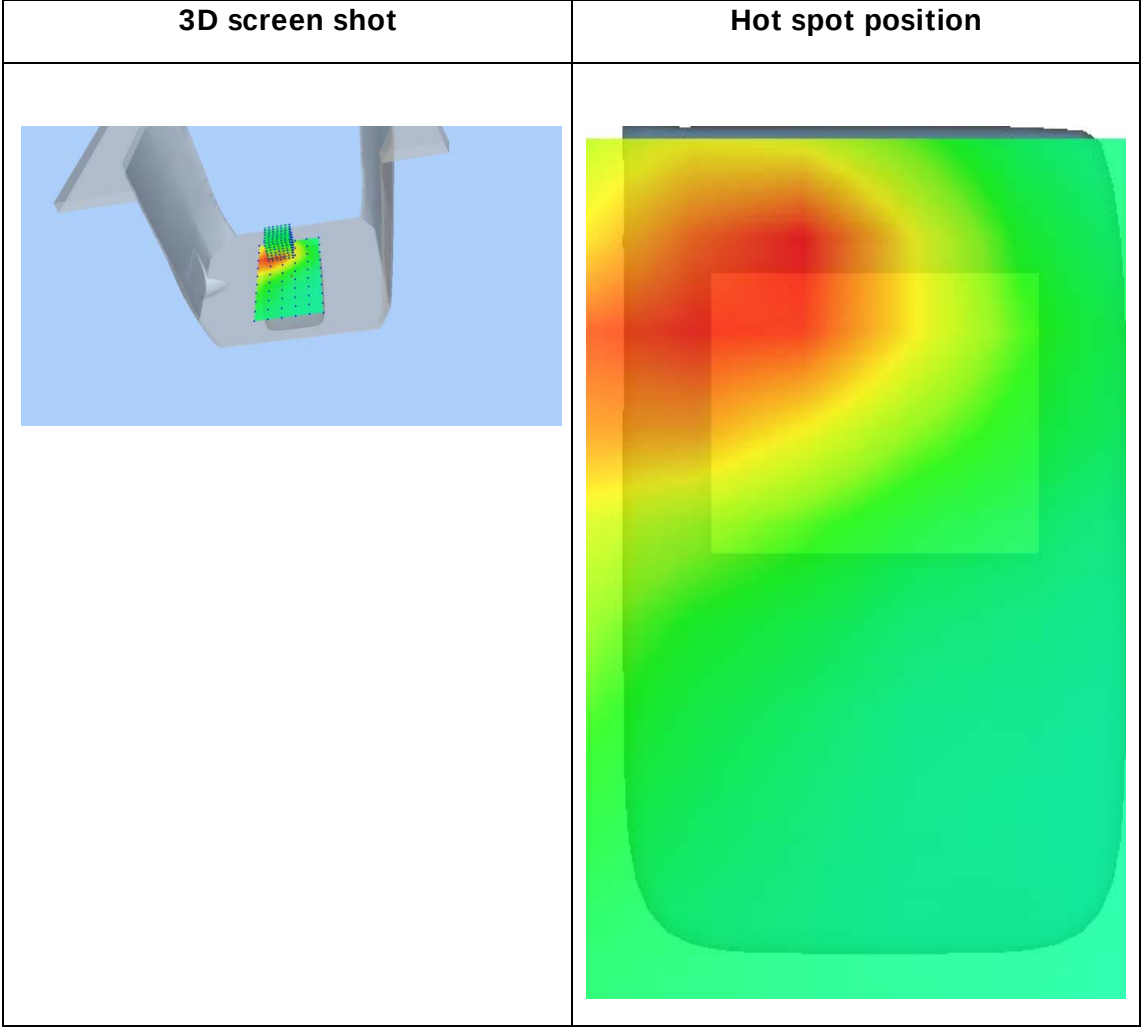
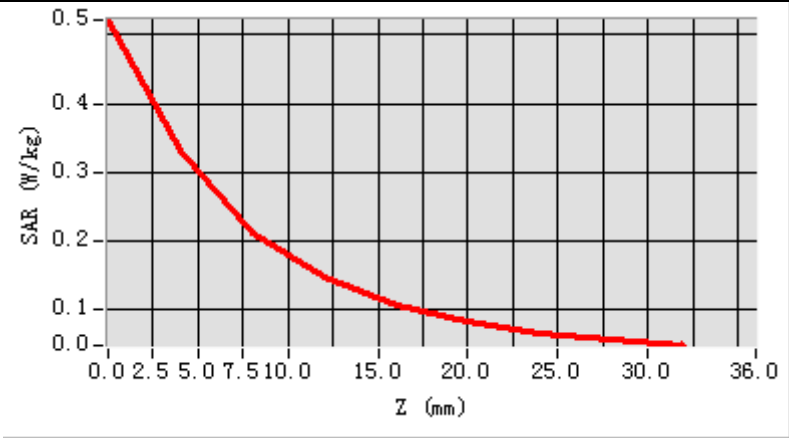


Maximum location: X=-12.00, Y=44.00

SAR Peak: 0.52 W/kg

SAR 10g (W/Kg)	0.360543
SAR 1g (W/Kg)	0.776899

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.5216	0.3315	0.2127	0.1491	0.1082	0.0847	0.0656	0.0562



MEASUREMENT 4

Front-side-20M-1RB#99-middle

Type: Phone measurement (Complete)

Date of measurement: 11/10/2024

Measurement duration: 14 minutes 32 seconds

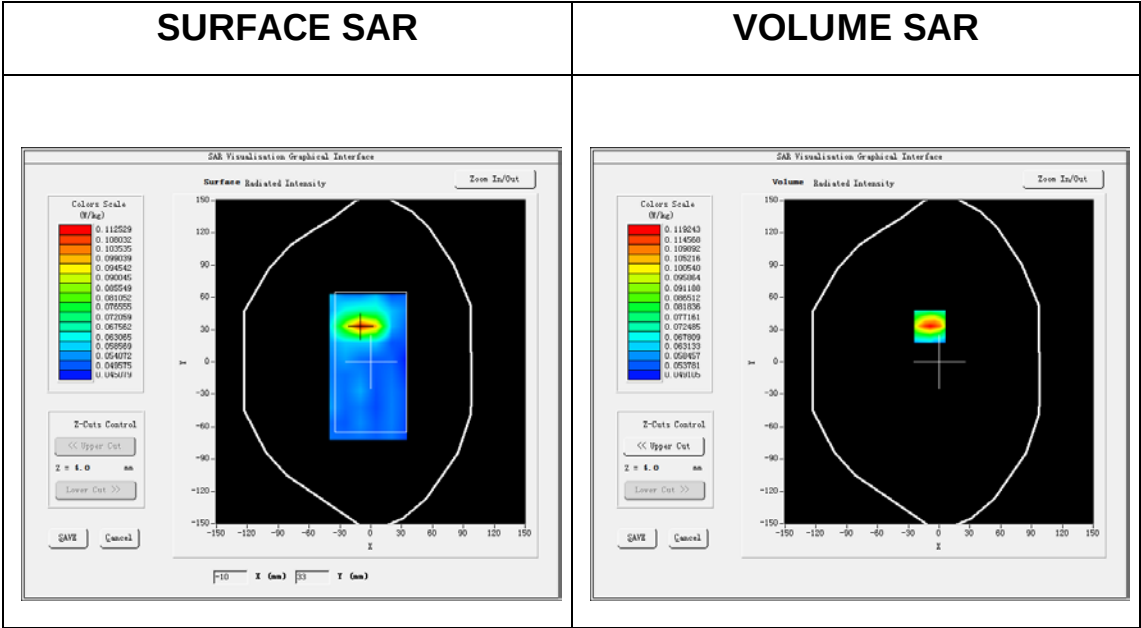
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE Band 2</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

Middle Band SAR (Channel 18700):

Frequency (MHz)	1860.000000
Relative permittivity (real part)	39.216000
Relative permittivity (imaginary part)	13.212000
Conductivity (S/m)	1.792428
Variation (%)	1.830000

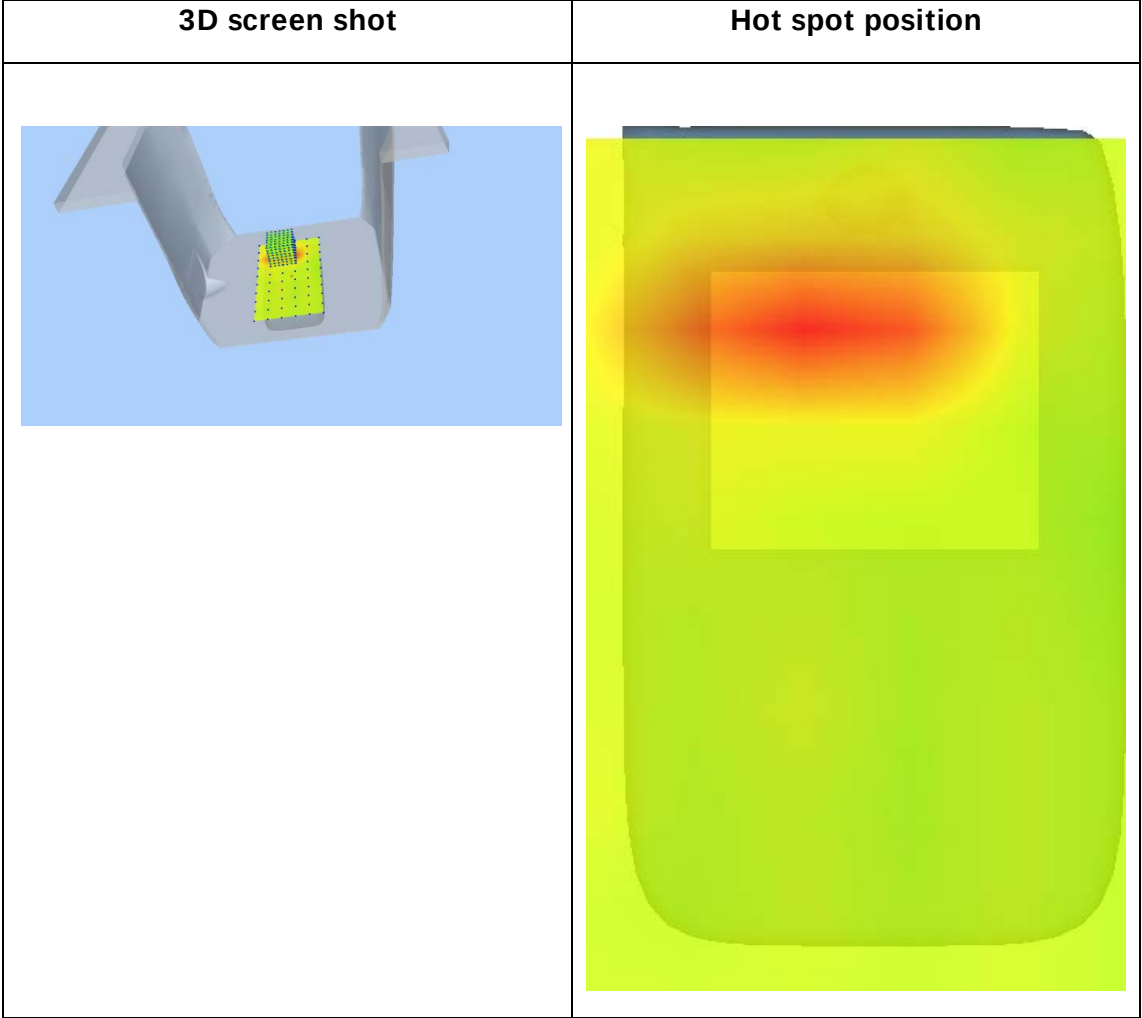
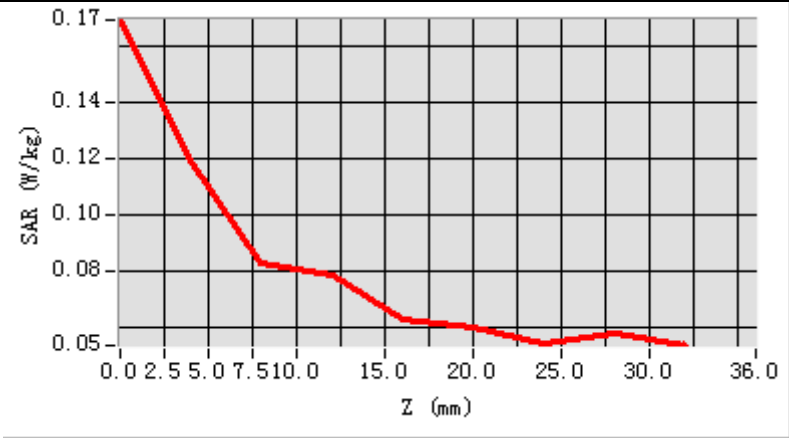


Maximum location: X=-9.00, Y=33.00

SAR Peak: 0.17 W/kg

SAR 10g (W/Kg)	0.305178
SAR 1g (W/Kg)	0.633029

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.1693	0.1192	0.0832	0.0784	0.0628	0.0599	0.0540	0.0580



MEASUREMENT 5

Rear-side-middle

Type: Phone measurement (Complete)

Date of measurement: 17/10/2024

Measurement duration: 18 minutes 39 seconds

A. Experimental conditions.

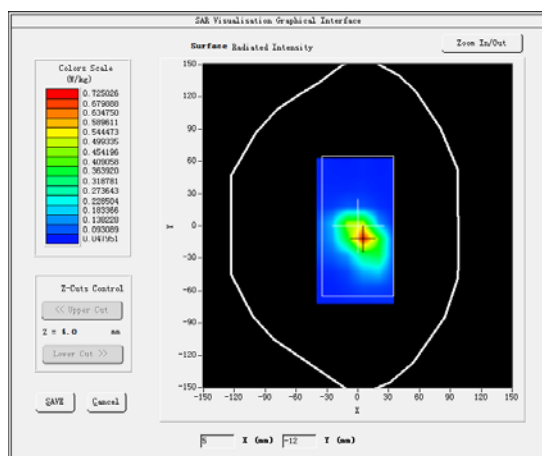
<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>IEEE 802.11b ISM</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>IEEE802.b (Crest factor: 1.0)</u>

B. SAR Measurement Results

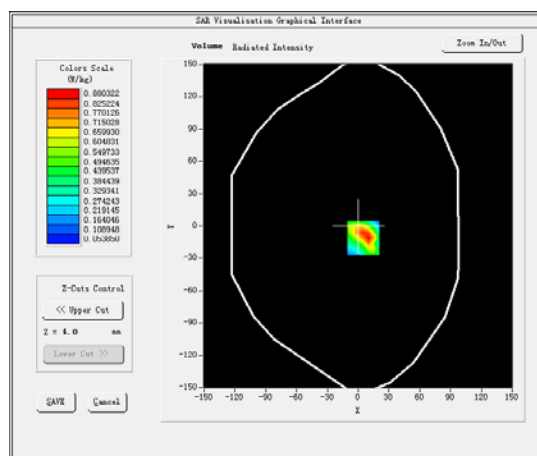
Middle Band SAR (Channel 6):

Frequency (MHz)	2437.000000
Relative permittivity (real part)	39.216000
Relative permittivity (imaginary part)	13.212000
Conductivity (S/m)	1.792428
Variation (%)	4.610000

SURFACE SAR



VOLUME SAR

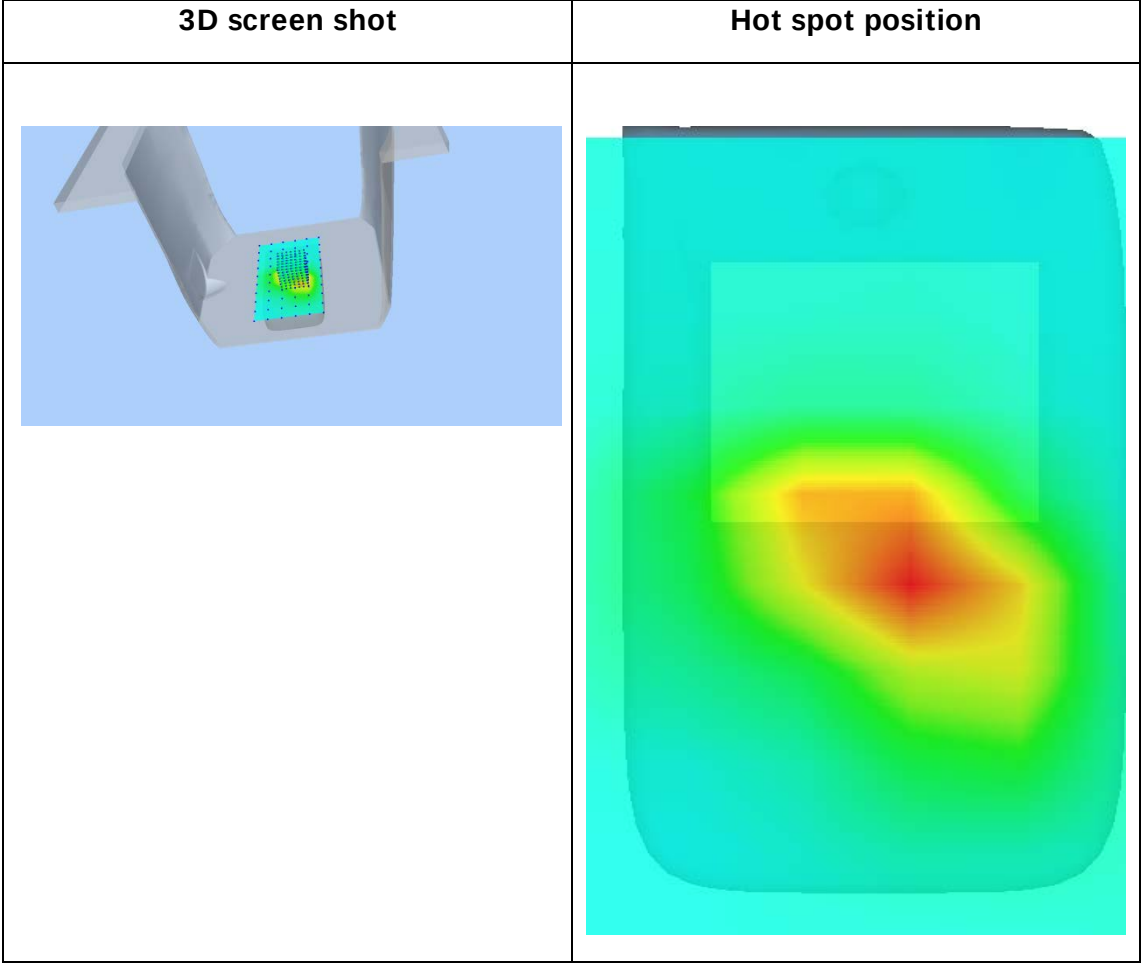
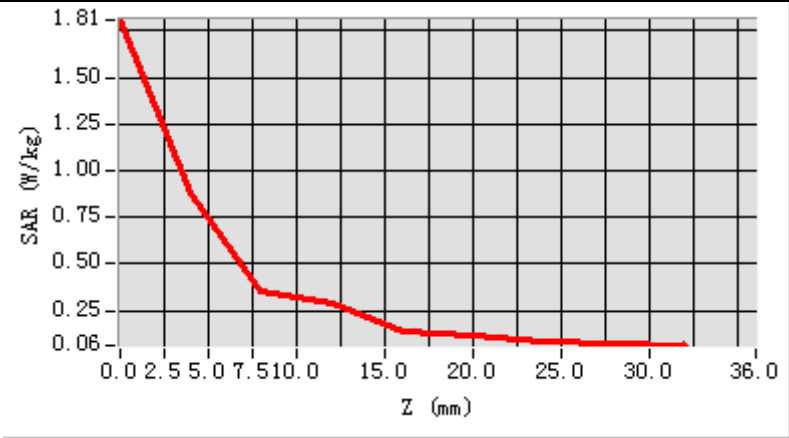


Maximum location: X=5.00, Y=-11.00

SAR Peak: 1.55 W/kg

SAR 10g (W/Kg)	0.216684
SAR 1g (W/Kg)	0.597066

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	1.8073	0.8803	0.3490	0.2884	0.1411	0.1201	0.0808	0.0742



MEASUREMENT 6

Front-side-20M-1RB#99-middle

Type: Phone measurement (Complete)

Date of measurement: 08/10/2024

Measurement duration: 18 minutes 47 seconds

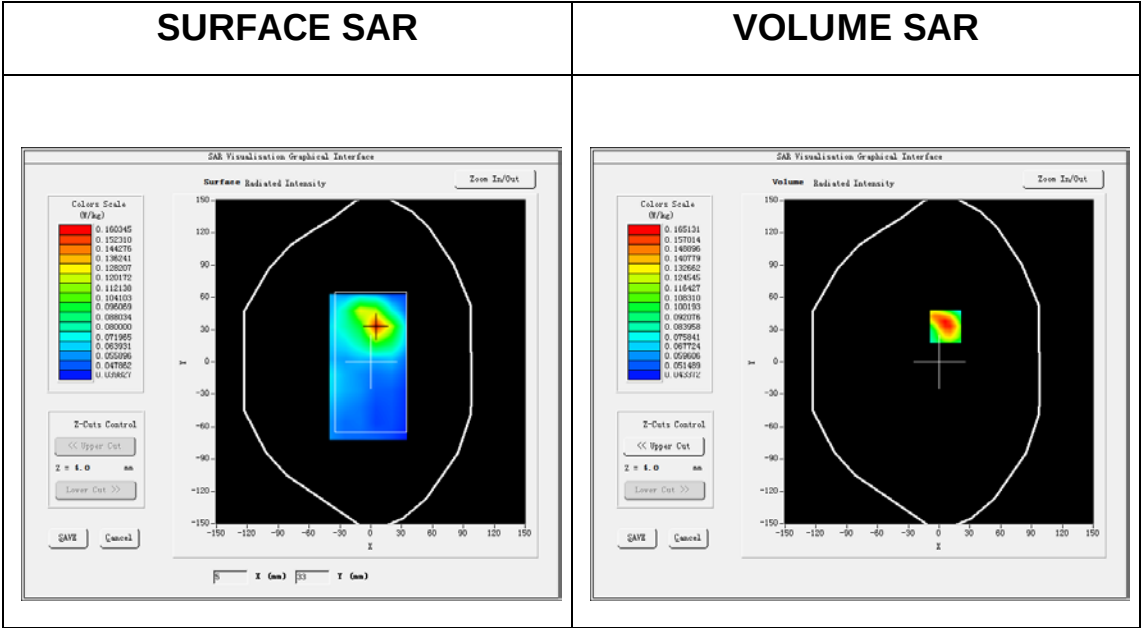
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</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>

B. SAR Measurement Results

Middle Band SAR (Channel 20325:

Frequency (MHz)	1747.500000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	12.930000
Conductivity (S/m)	1.400750
Variation (%)	-0.950000

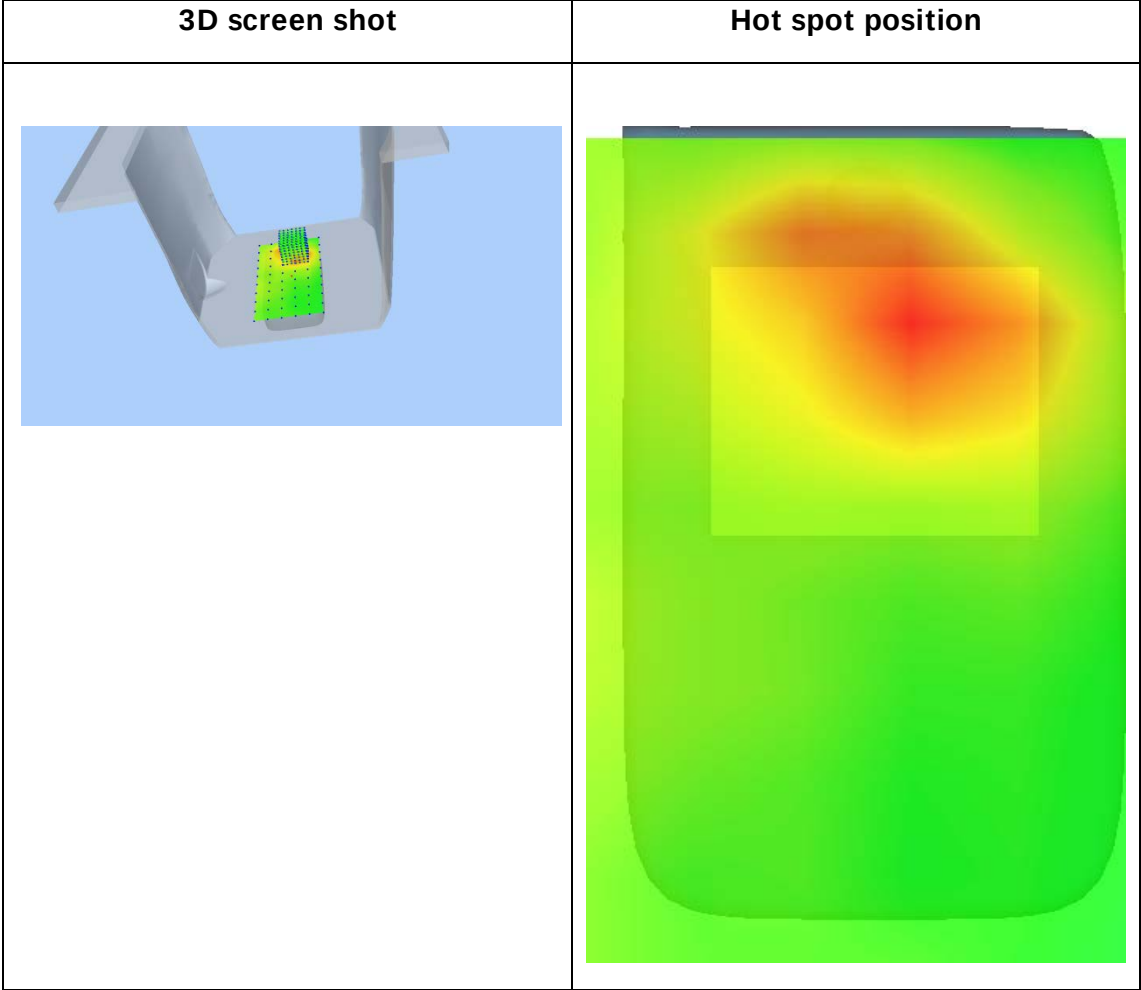
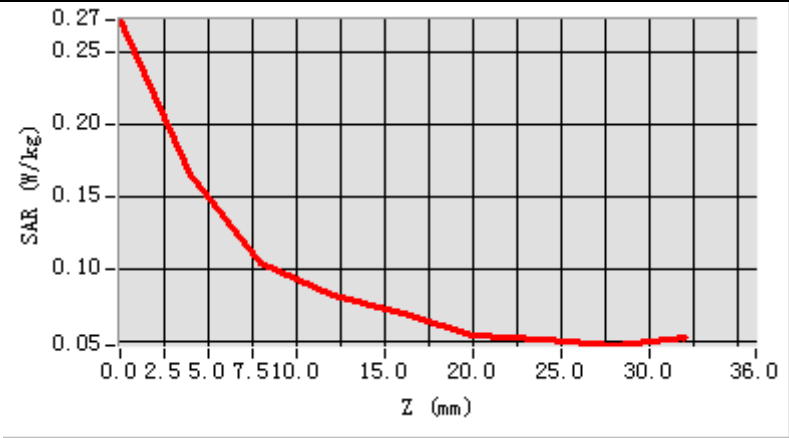


Maximum location: X=6.00, Y=33.00

SAR Peak: 0.25 W/kg

SAR 10g (W/Kg)	0.434756
SAR 1g (W/Kg)	0.841300

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.27	0.165	0.104	0.081	0.070	0.054	0.052	0.047
	27	1	8	7	4	0	4	7



MEASUREMENT 7

Rear-side-10M-1RB#49-middle

Type: Phone measurement (Complete)

Date of measurement: 30/09/2024

Measurement duration: 18 minutes 36 seconds

A. Experimental conditions.

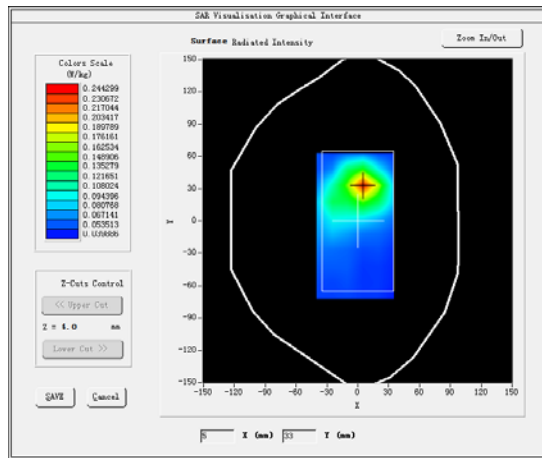
<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 5</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

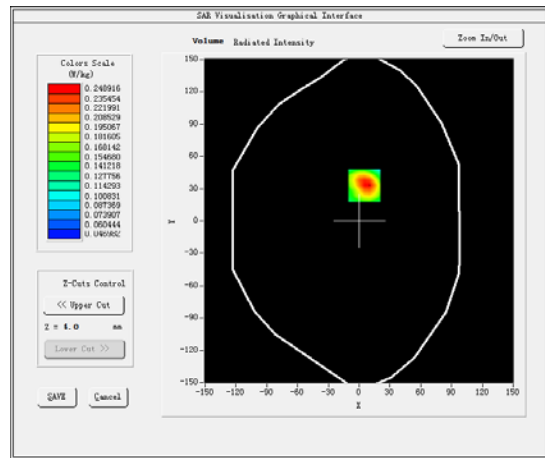
Middle Band SAR (Channel 20450:

Frequency (MHz)	829.000000
Relative permittivity (real part)	40.102726
Relative permittivity (imaginary part)	14.097909
Conductivity (S/m)	1.368280
Variation (%)	-1.590000

SURFACE SAR



VOLUME SAR

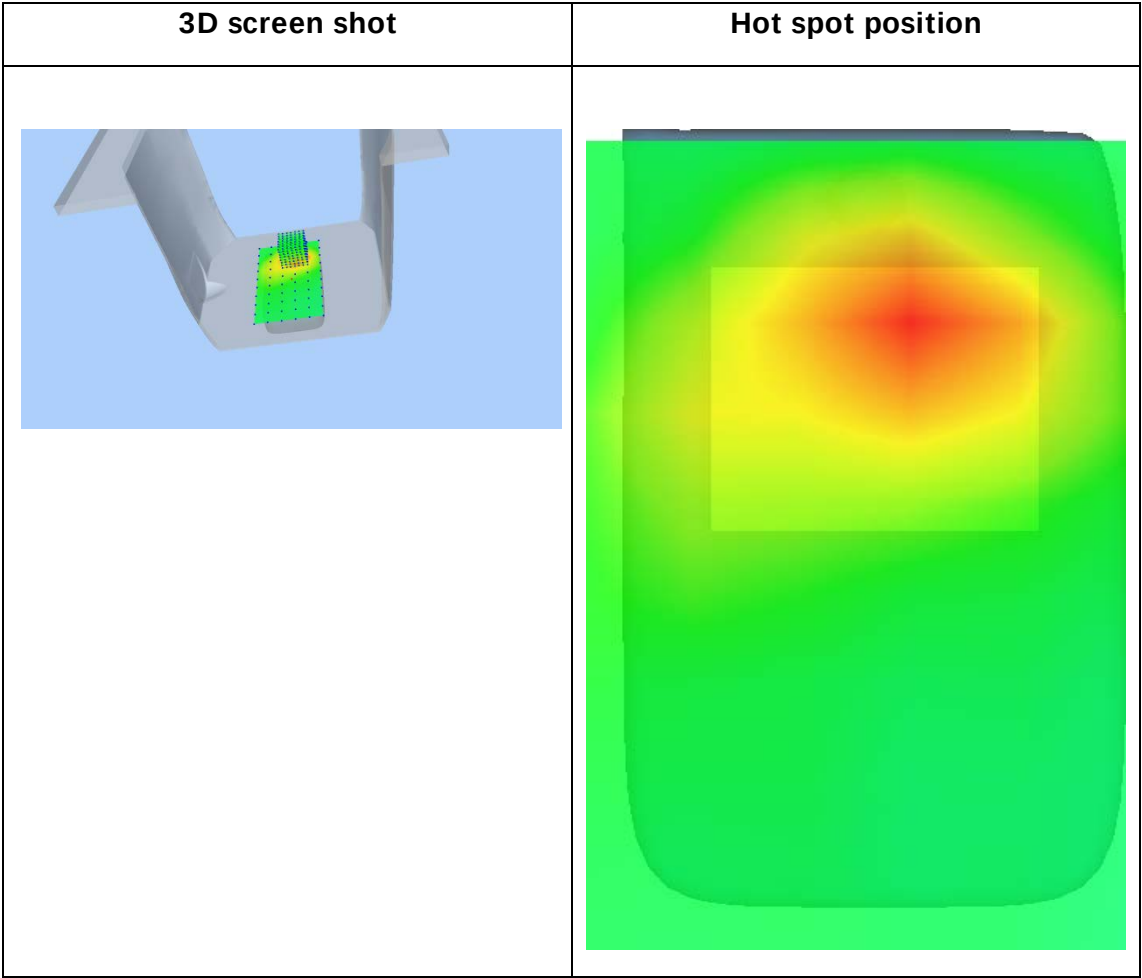
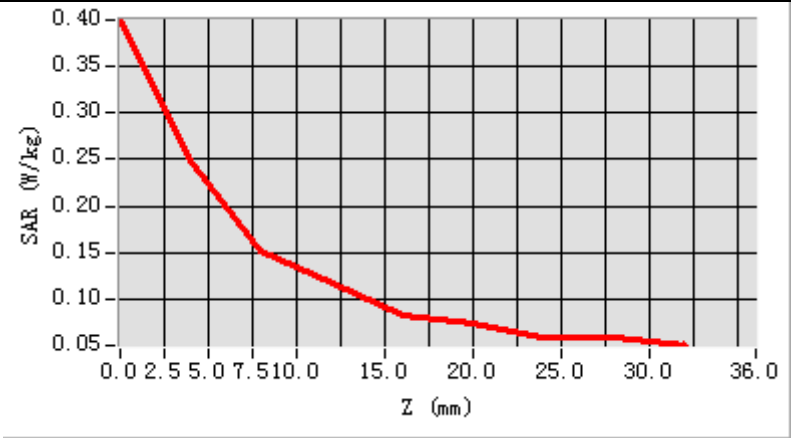


Maximum location: X=5.00, Y=33.00

SAR Peak: 0.39 W/kg

SAR 10g (W/Kg)	0.310899
SAR 1g (W/Kg)	0.670230

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.4005	0.2489	0.1522	0.1177	0.0810	0.0733	0.0590	0.0575



MEASUREMENT 8

Front-side-20M-1RB#99-middle

Type: Phone measurement (Complete)

Date of measurement: 24/10/2024

Measurement duration: 18 minutes 18 seconds

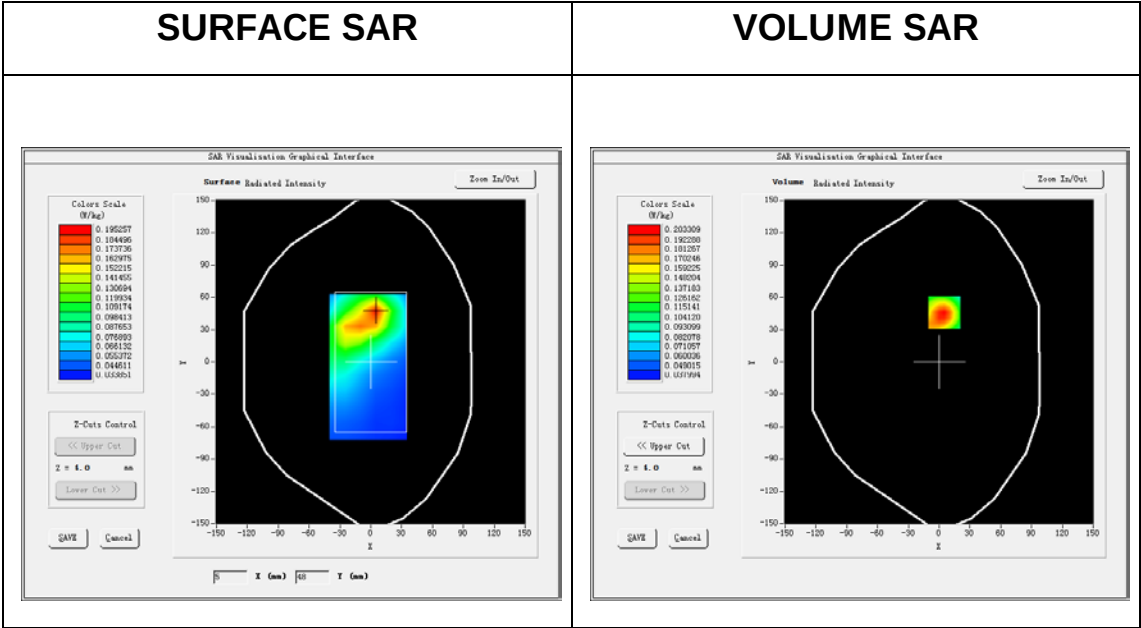
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 7</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

Middle Band SAR (Channel 21100):

Frequency (MHz)	2535.00000
Relative permittivity (real part)	38.332512
Relative permittivity (imaginary part)	19.837900
Conductivity (S/m)	0.520000
Variation (%)	1.460000

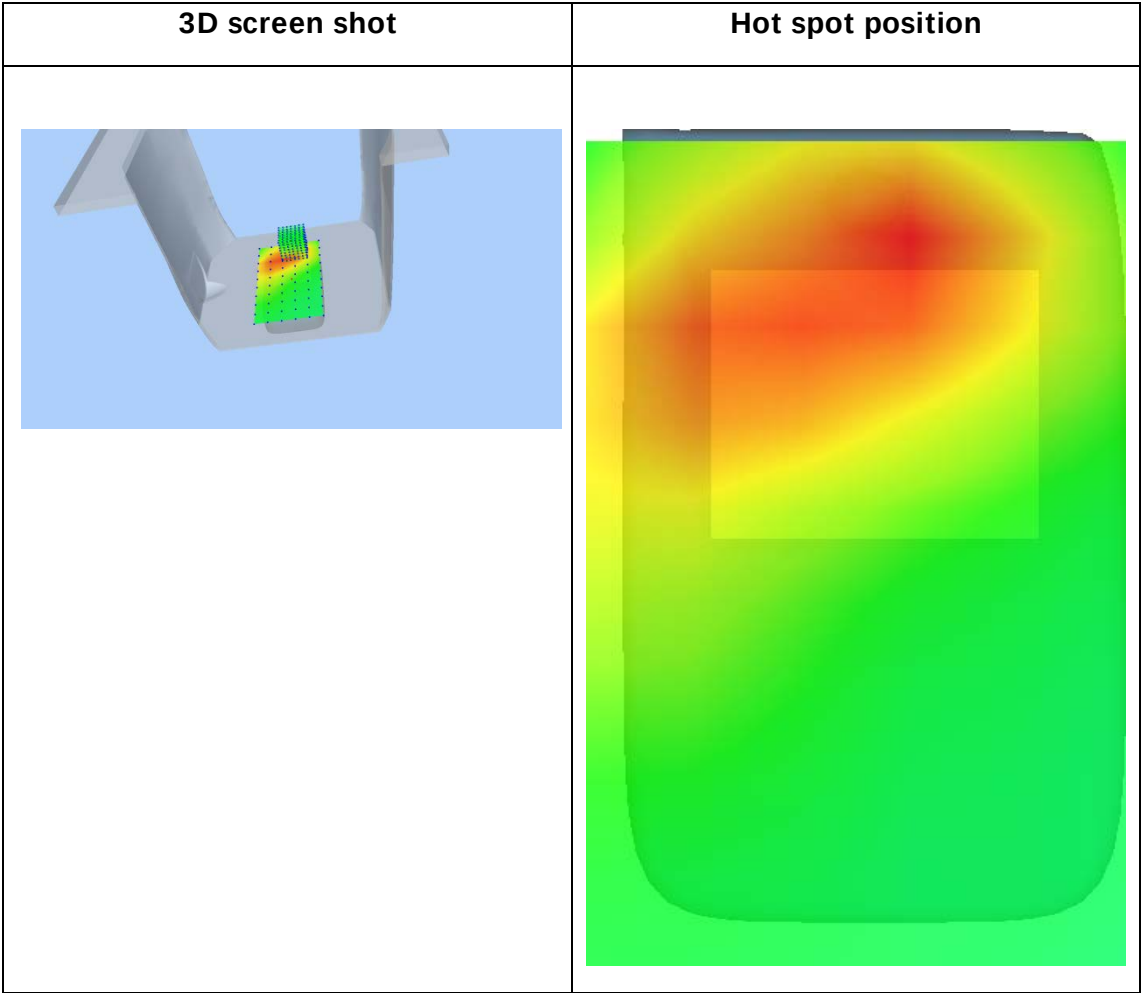
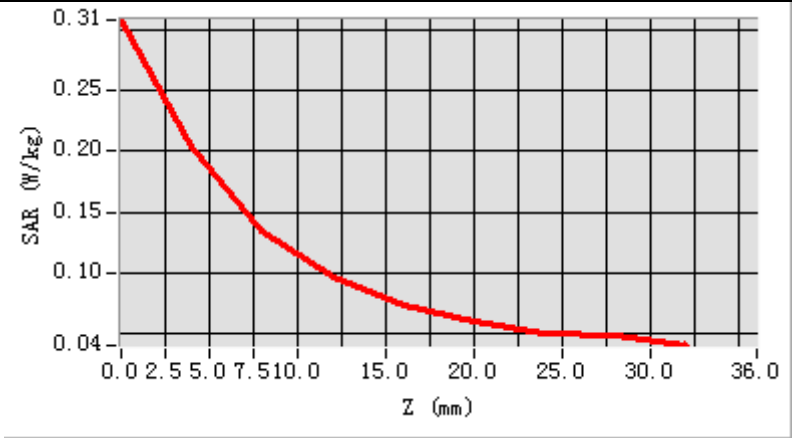


Maximum location: X=5.00, Y=46.00

SAR Peak: 0.31 W/kg

SAR 10g (W/Kg)	0.237587
SAR 1g (W/Kg)	0.479730

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.3081	0.2033	0.1337	0.0964	0.0729	0.0596	0.0502	0.0488



MEASUREMENT 9

Rear-side-20M-1RB#49-middle

Type: Phone measurement (Complete)

Date of measurement: 30/09/2024

Measurement duration: 16 minutes 2 seconds

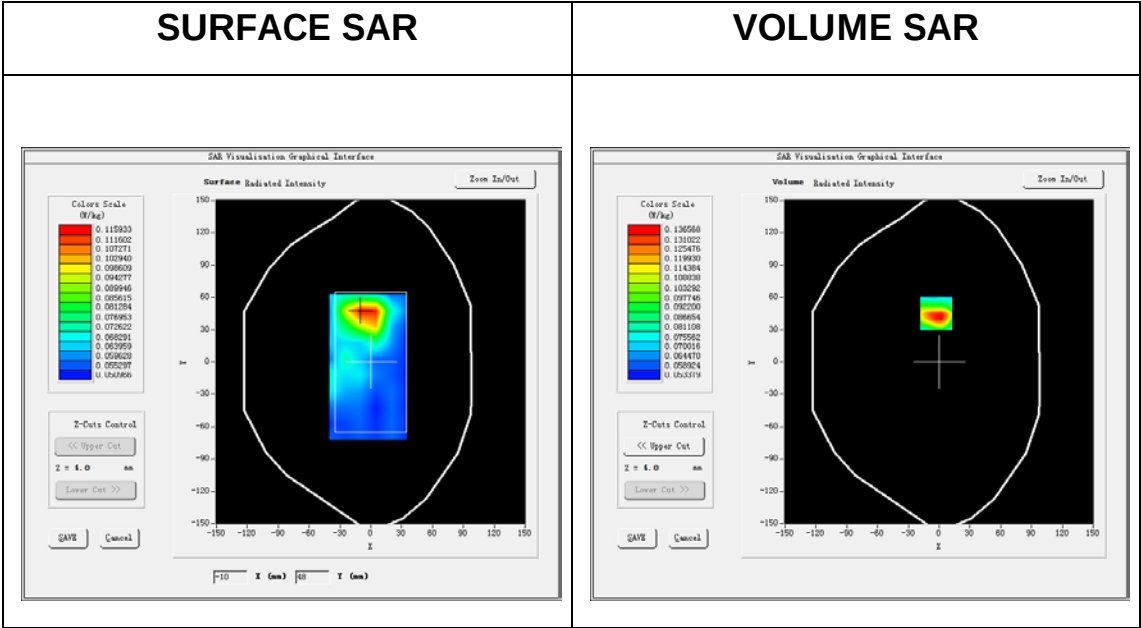
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 12</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

Middle Band SAR (Channel 23095):

Frequency (MHz)	707.500000
Relative permittivity (real part)	39.086666
Relative permittivity (imaginary part)	13.418333
Conductivity (S/m)	1.889749
Variation (%)	2.240000

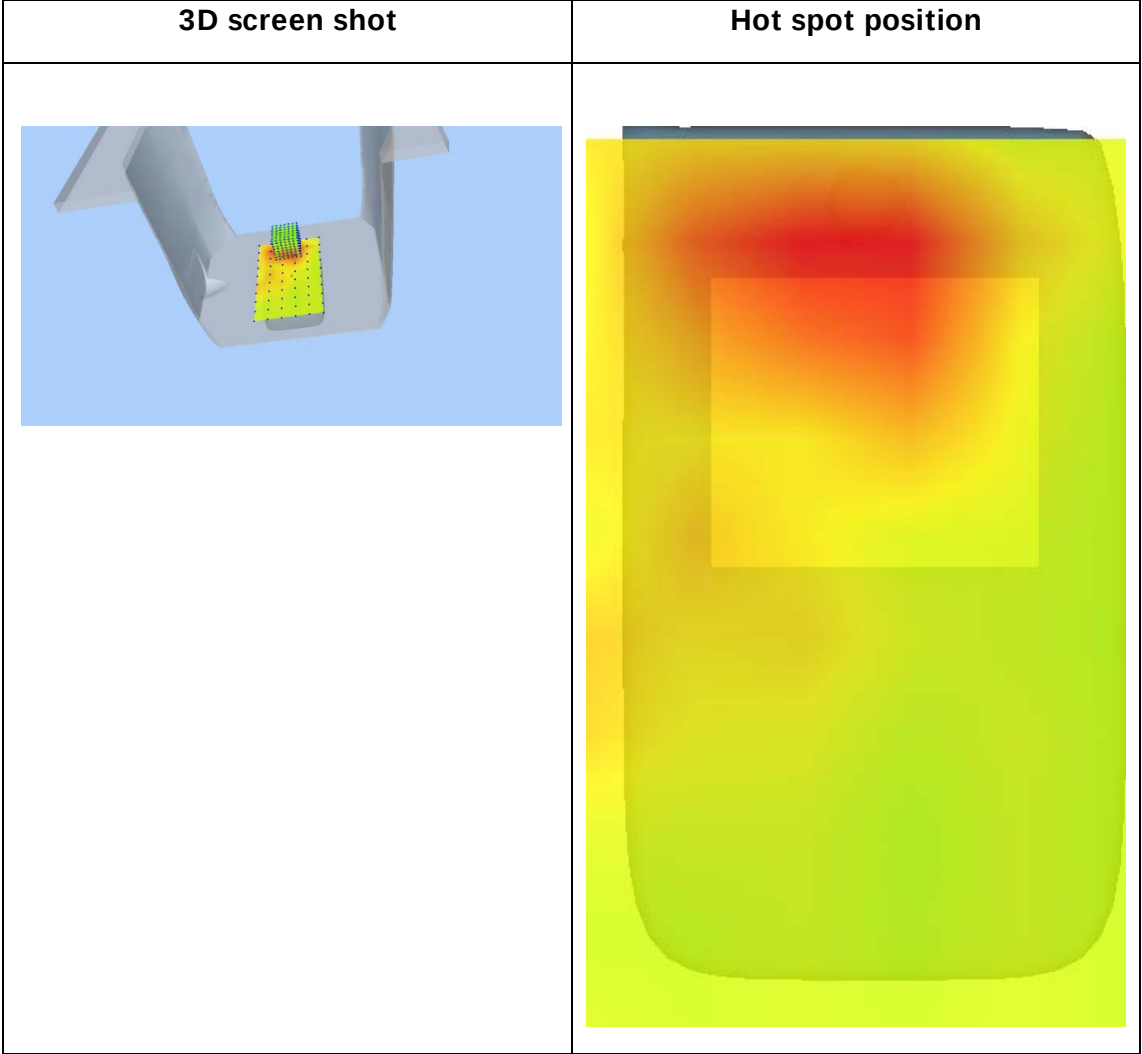
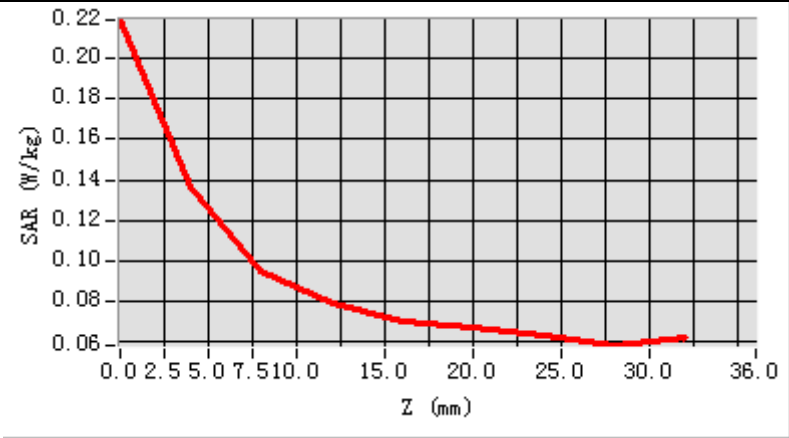


Maximum location: X=-3.00, Y=45.00

SAR Peak: 0.20 W/kg

SAR 10g (W/Kg)	0.435062
SAR 1g (W/Kg)	0.805624

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.2189	0.1366	0.0948	0.0788	0.0701	0.0669	0.0632	0.0582



MEASUREMENT 10

Rear-side-10M-1RB#49-middle

Type: Phone measurement (Complete)

Date of measurement:08/10/2024

Measurement duration: 18 minutes 31 seconds

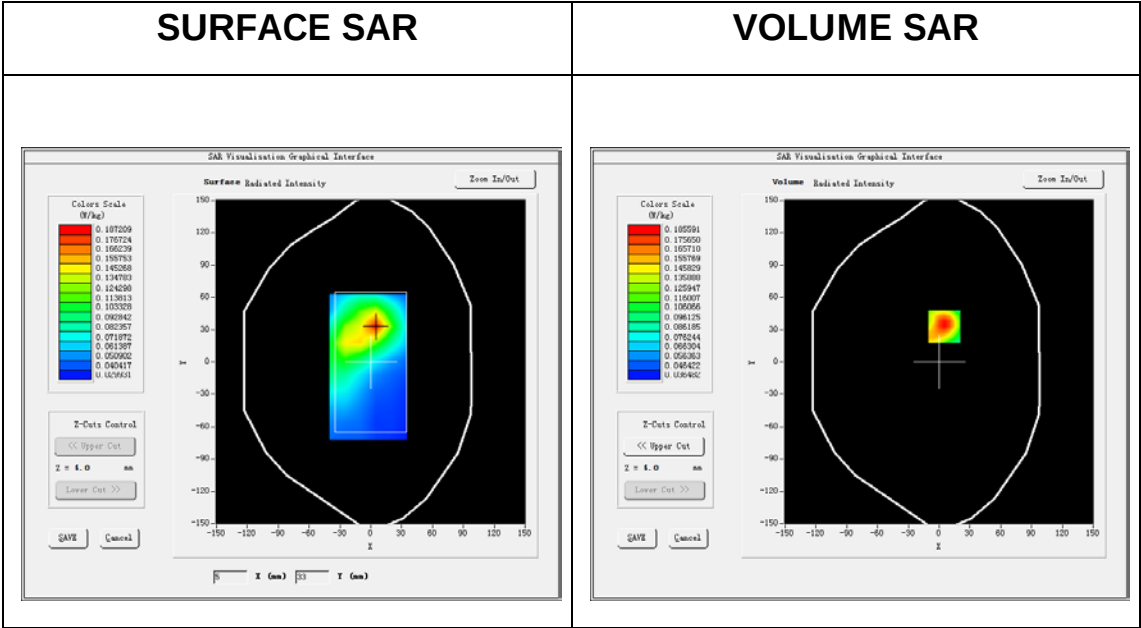
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 13</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

Middle Band SAR (Channel 23230:

Frequency (MHz)	782.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.966767
Variation (%)	0.440000

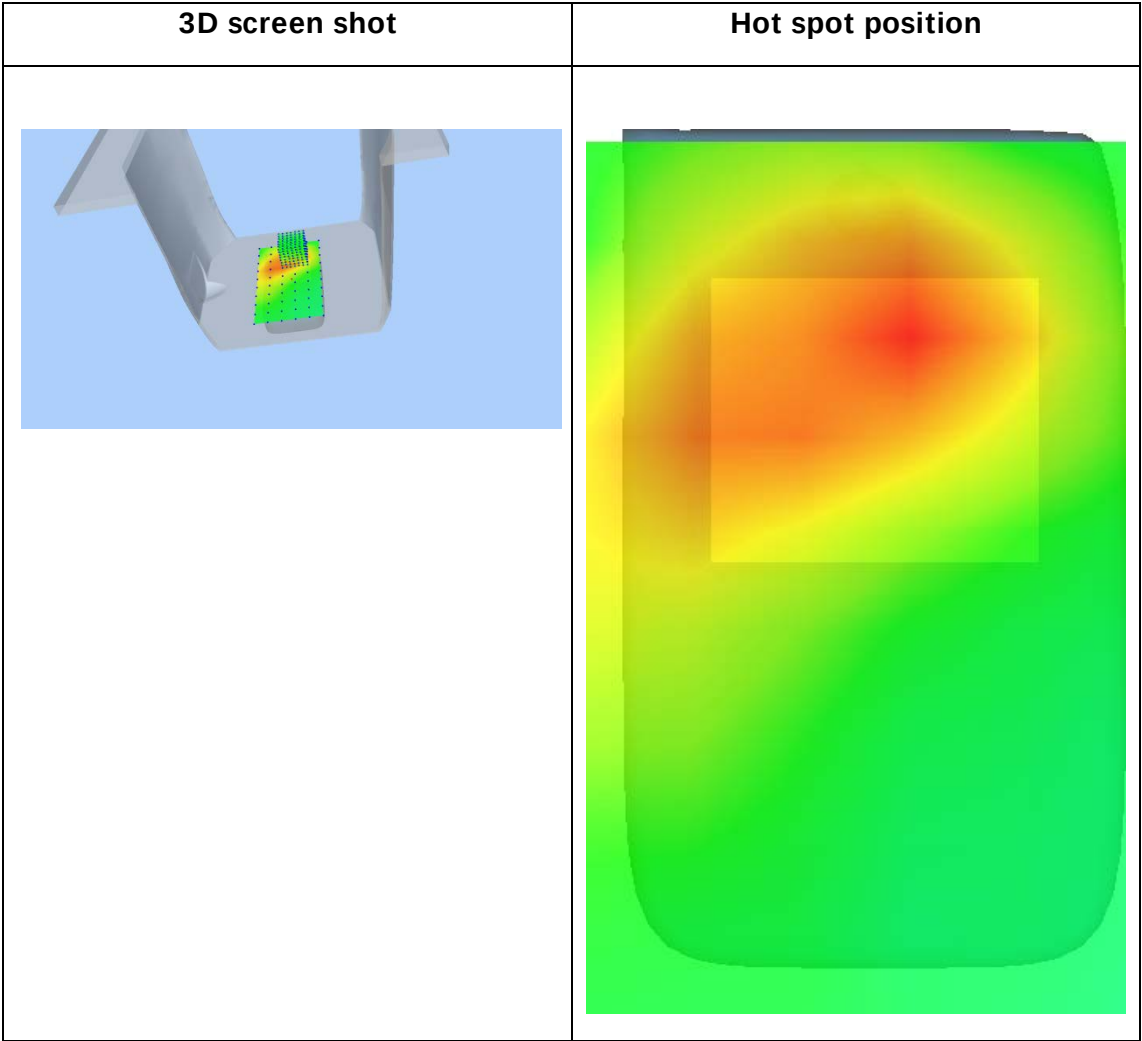
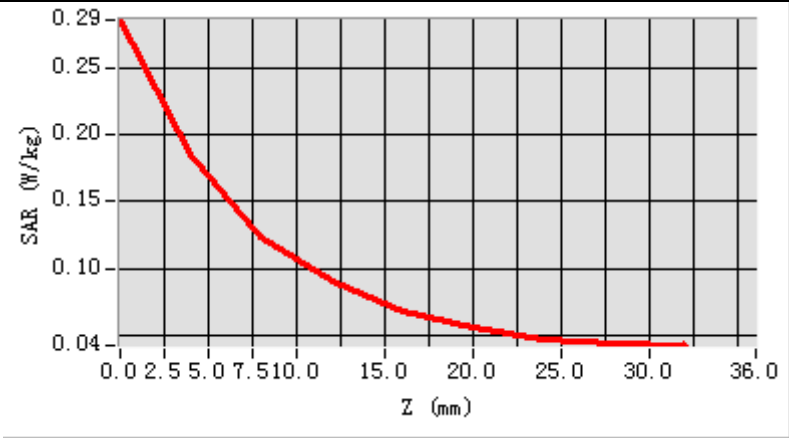


Maximum location: X=5.00, Y=33.00

SAR Peak: 0.28 W/kg

SAR 10g (W/Kg)	0.376985
SAR 1g (W/Kg)	0.730554

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.28 60	0.185 6	0.122 8	0.089 9	0.067 5	0.056 6	0.046 2	0.043 5



MEASUREMENT 11

Rear-side-10M-1RB#49-middle

Type: Phone measurement (Complete)

Date of measurement: 30/09/2024

Measurement duration: 17 minutes 13 seconds

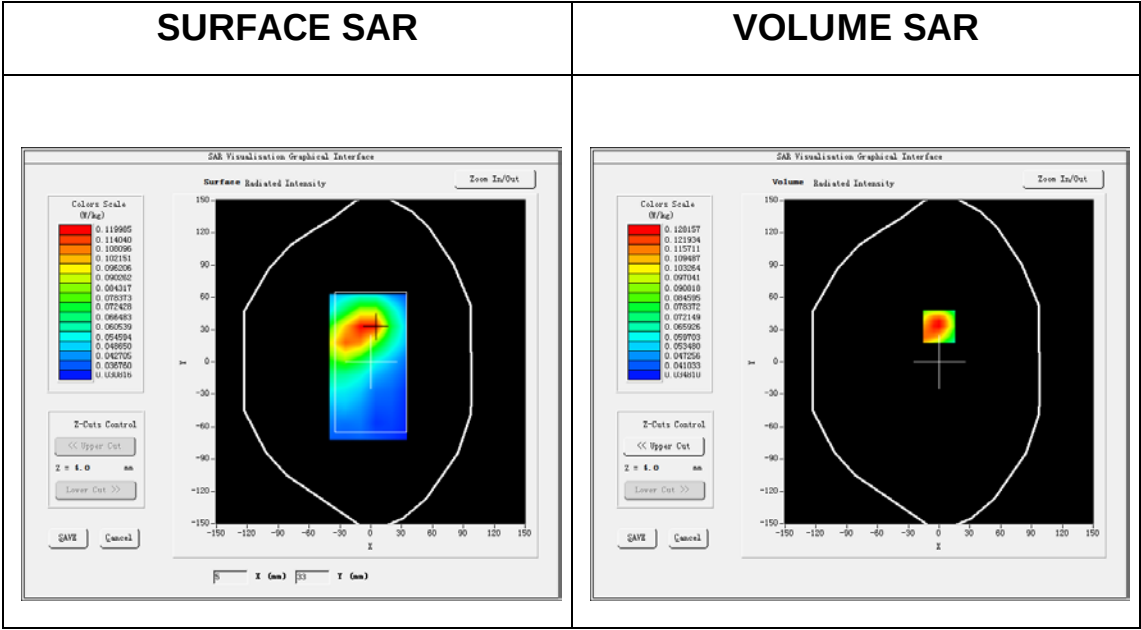
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 17</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

Middle Band SAR (Channel 23780):

Frequency (MHz)	709.000000
Relative permittivity (real part)	42.113335
Relative permittivity (imaginary part)	23.152000
Conductivity (S/m)	0.913218
Variation (%)	3.330000

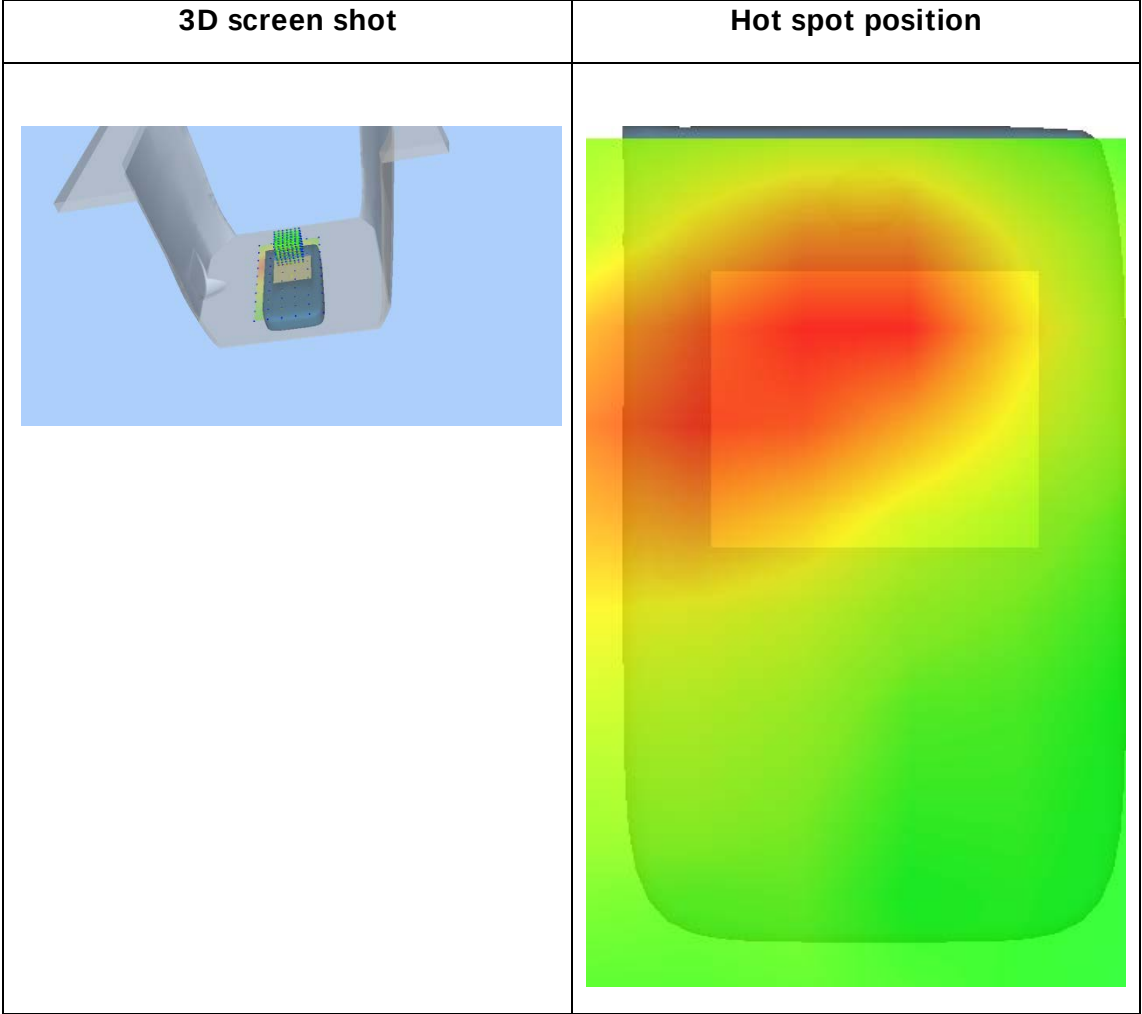
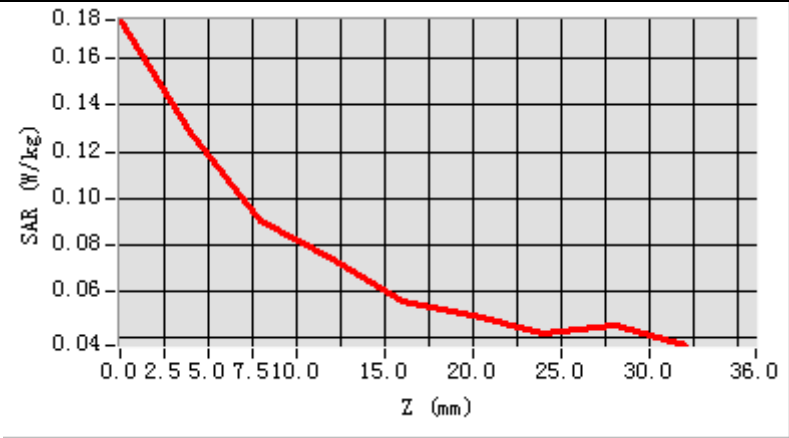


Maximum location: X=0.00, Y=33.00

SAR Peak: 0.19 W/kg

SAR 10g (W/Kg)	0.384677
SAR 1g (W/Kg)	0.797210

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.1764	0.1282	0.0902	0.0736	0.0558	0.0503	0.0417	0.0452



MEASUREMENT 12

Front-side-10M-1RB#49-middle

Type: Phone measurement (Complete)

Date of measurement: 24/10/2024

Measurement duration: 17 minutes 47 seconds

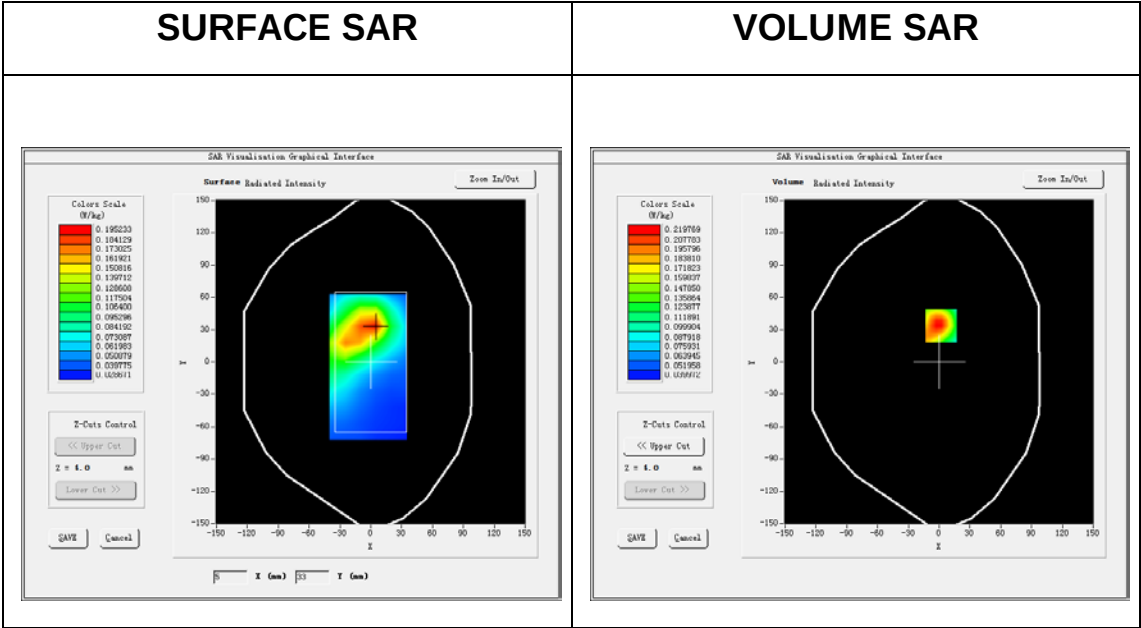
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 25</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

Middle Band SAR (Channel 26140):

Frequency (MHz)	1860.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.912878
Variation (%)	0.790000

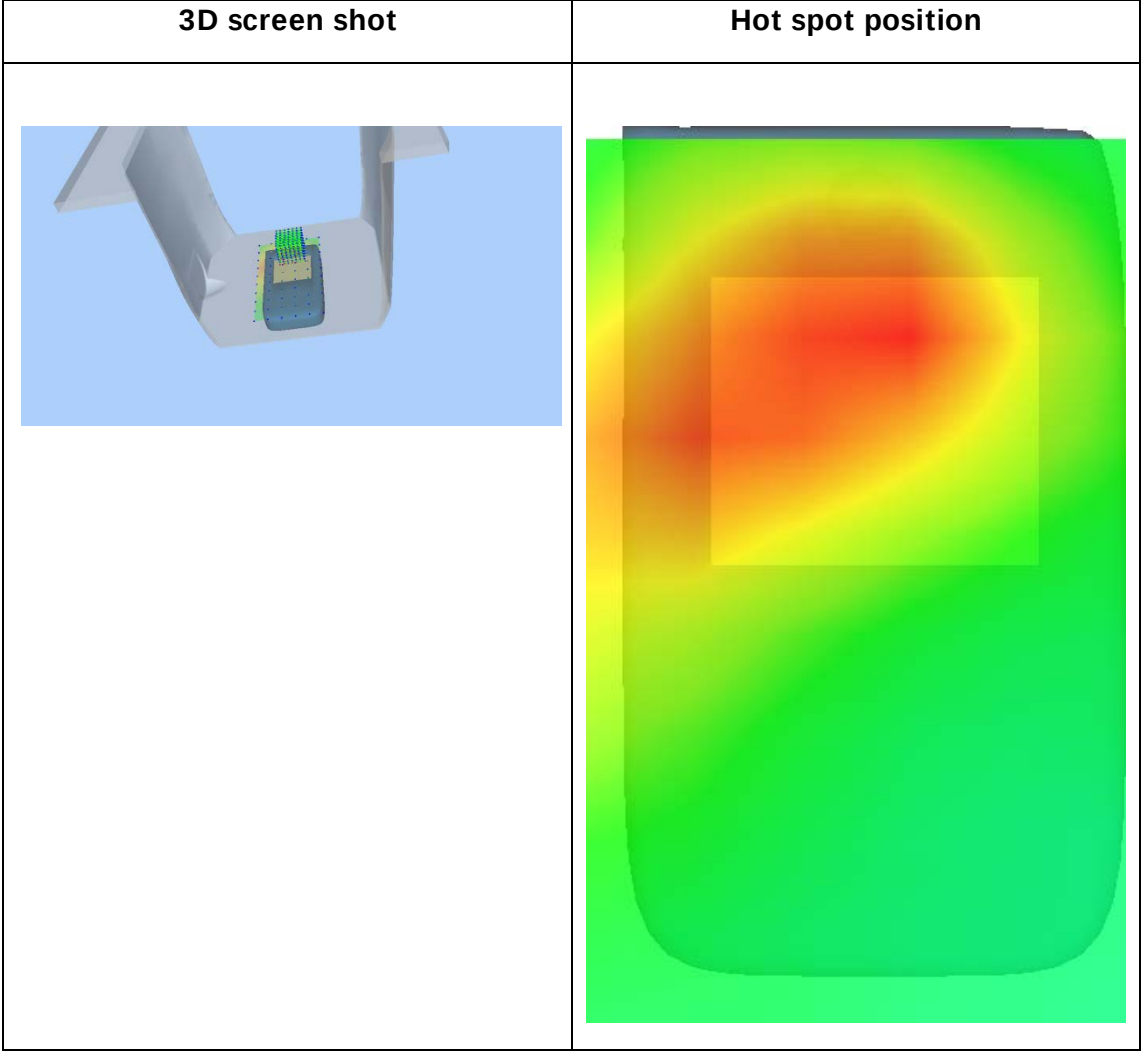
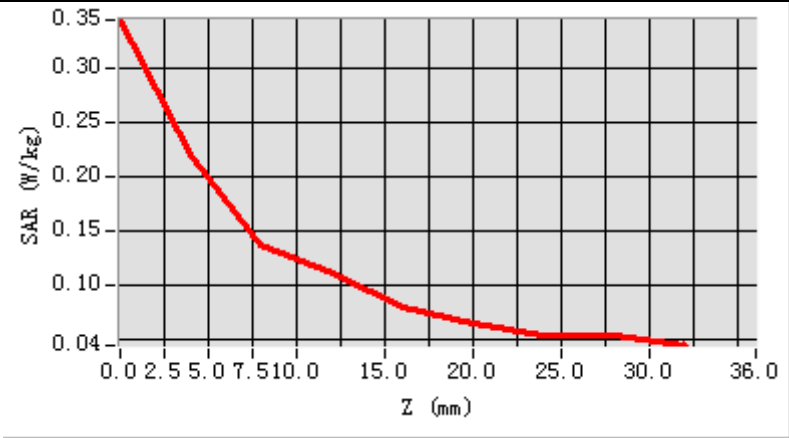


Maximum location: X=2.00, Y=34.00

SAR Peak: 0.33 W/kg

SAR 10g (W/Kg)	0.327441
SAR 1g (W/Kg)	0.684002

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.3450	0.2198	0.1365	0.1103	0.0802	0.0647	0.0536	0.0524



MEASUREMENT 13

Rear-side-15M-1RB#99-middle

Type: Phone measurement (Complete)

Date of measurement: 24/10/2024

Measurement duration: 17 minutes 47 seconds

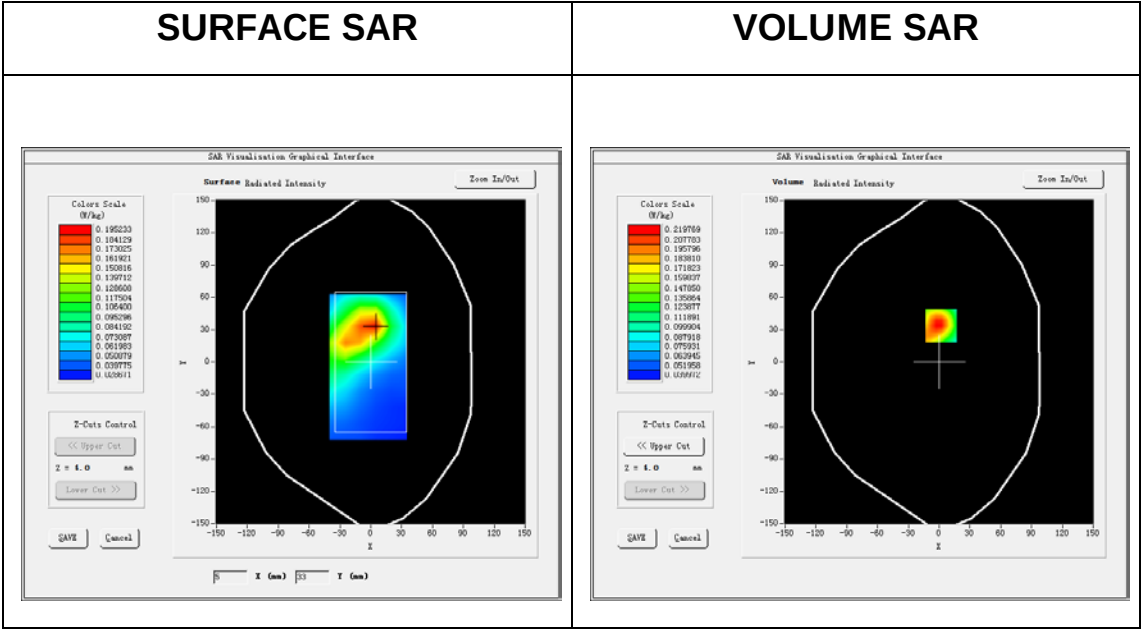
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 26</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

Middle Band SAR (Channel 26915):

Frequency (MHz)	836.500000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.912878
Variation (%)	-0.280000

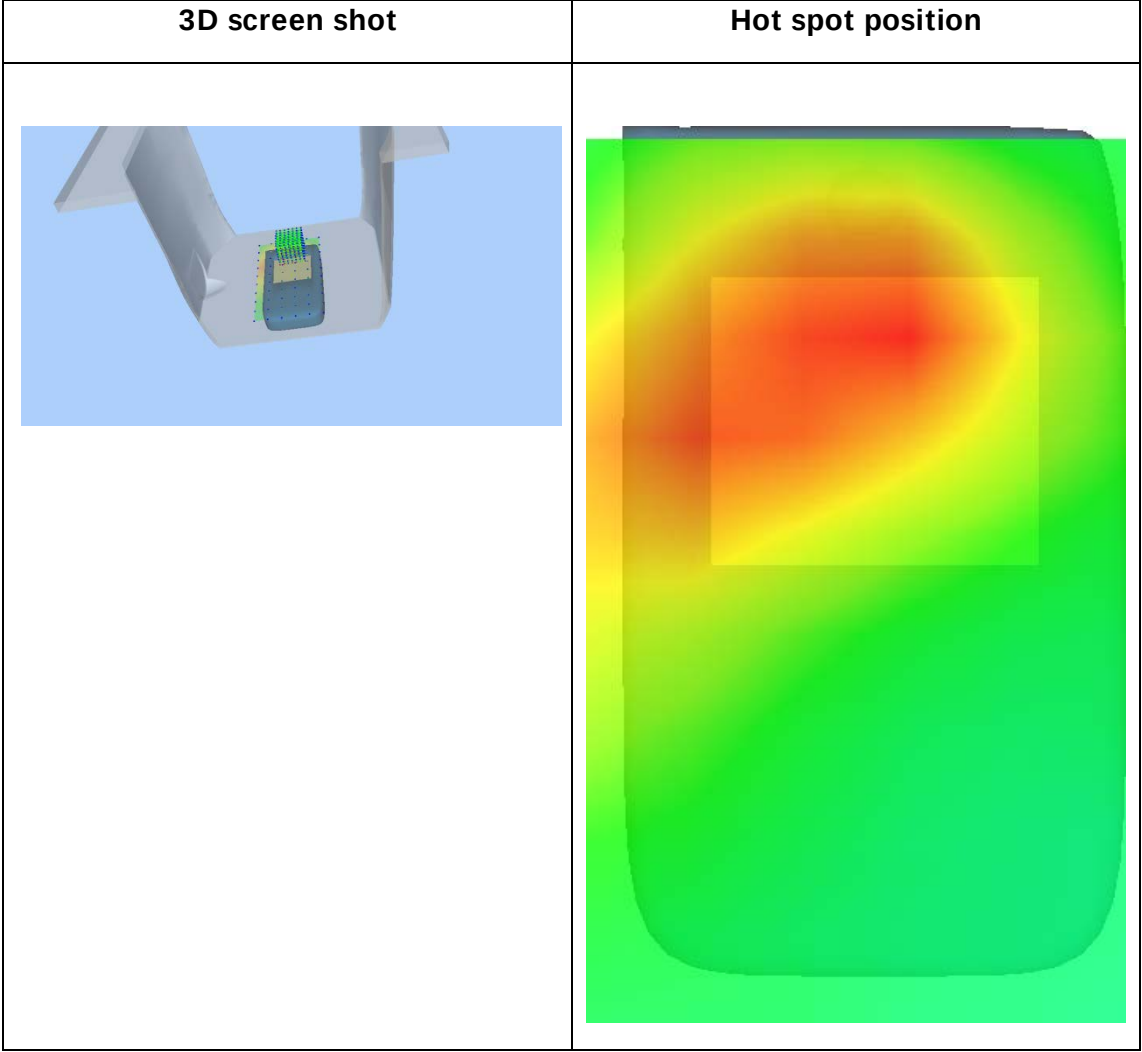
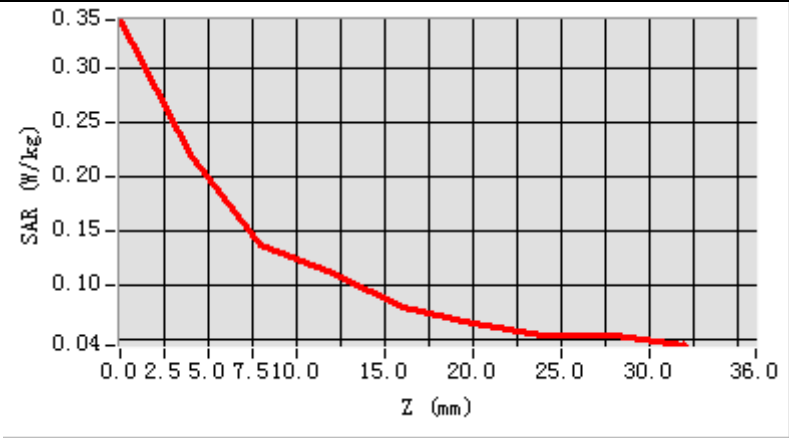


Maximum location: X=2.00, Y=34.00

SAR Peak: 0.33 W/kg

SAR 10g (W/Kg)	0.321565
SAR 1g (W/Kg)	0.660233

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.3450	0.2198	0.1365	0.1103	0.0802	0.0647	0.0536	0.0524



MEASUREMENT 14

Rear-side-20M-1RB#50-middle

Type: Phone measurement (Complete)

Date of measurement: 30/09/2024

Measurement duration: 17 minutes 2 seconds

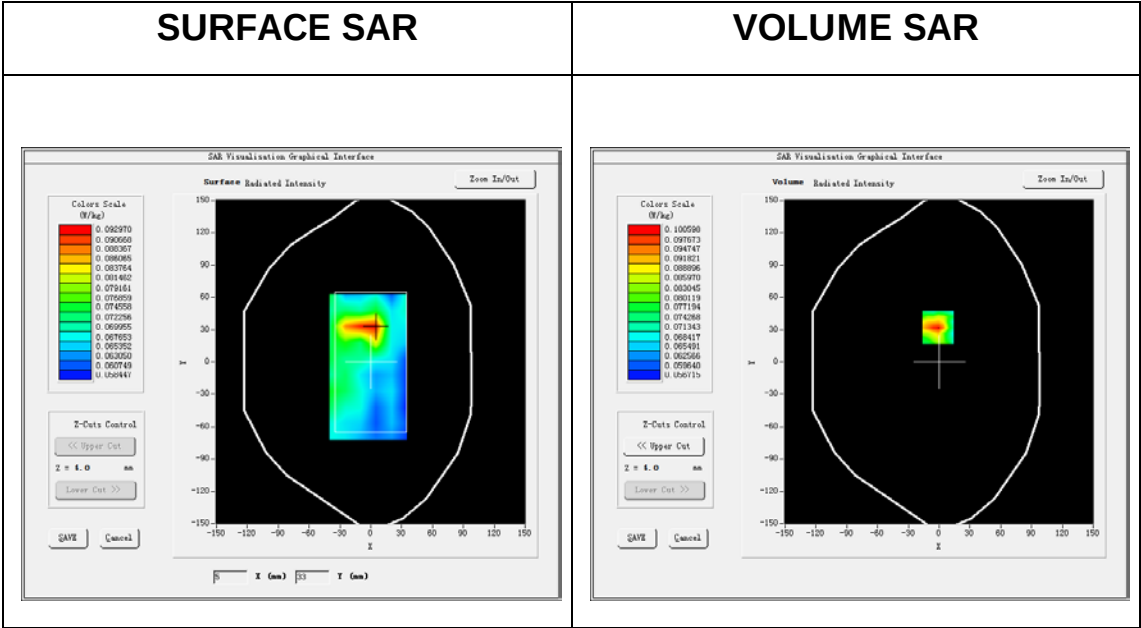
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 38</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

Middle Band SAR (Channel 37825):

Frequency (MHz)	2577.500000
Relative permittivity (real part)	39.006668
Relative permittivity (imaginary part)	13.558333
Conductivity (S/m)	1.954660
Variation (%)	-3.400000

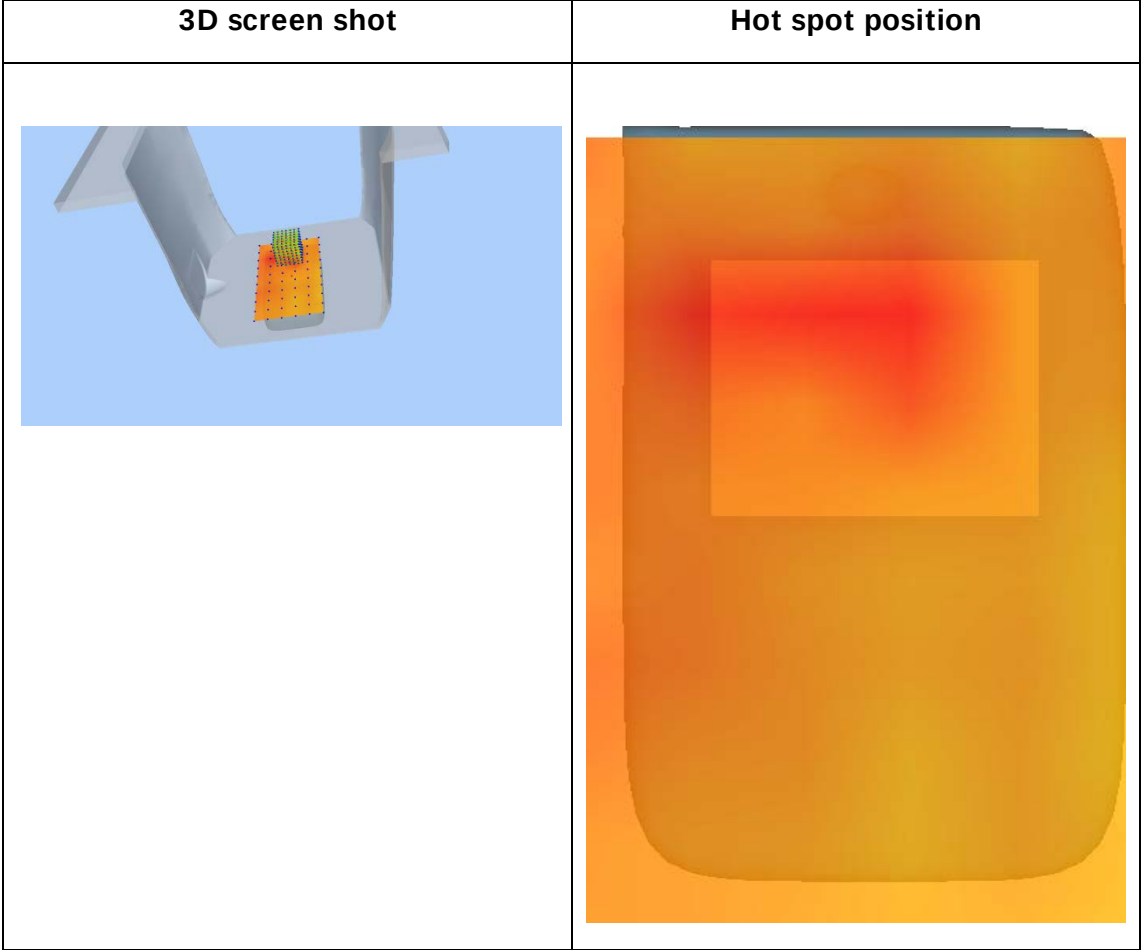
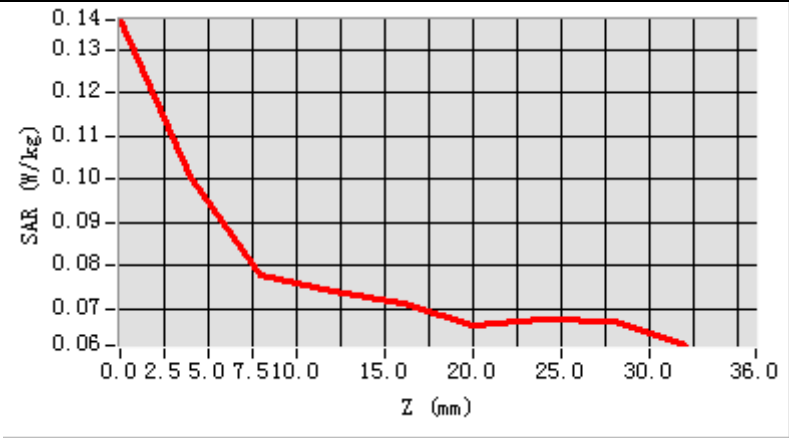


Maximum location: X=-1.00, Y=32.00

SAR Peak: 0.14 W/kg

SAR 10g (W/Kg)	0.329014
SAR 1g (W/Kg)	0.697265

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.1370	0.1006	0.0779	0.0739	0.0711	0.0663	0.0677	0.0673



MEASUREMENT 15

Rear-side-20M-1RB#50-middle

Type: Phone measurement (Complete)

Date of measurement: 17/10/2024

Measurement duration: 14 minutes 26 seconds

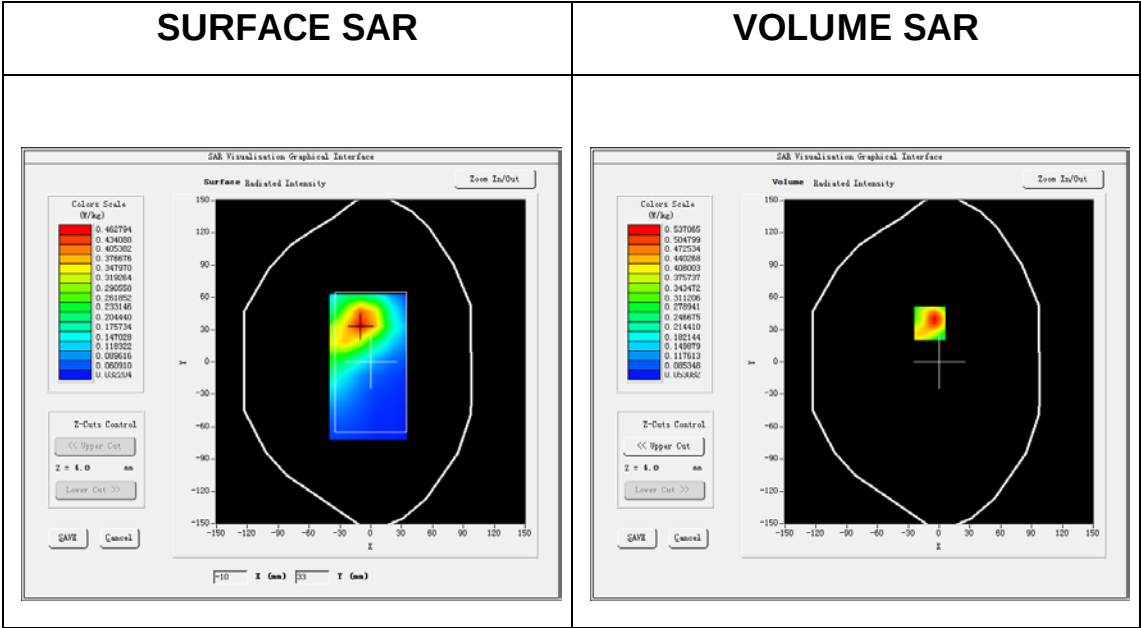
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</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>Duty Cycle: 1.00 (Crest factor: 1.0)</u>

B. SAR Measurement Results

Middle Band SAR (Channel 40620):

Frequency (MHz)	2593.000000
Relative permittivity (real part)	41.496365
Relative permittivity (imaginary part)	19.383636
Conductivity (S/m)	0.971336
Variation (%)	-0.560000

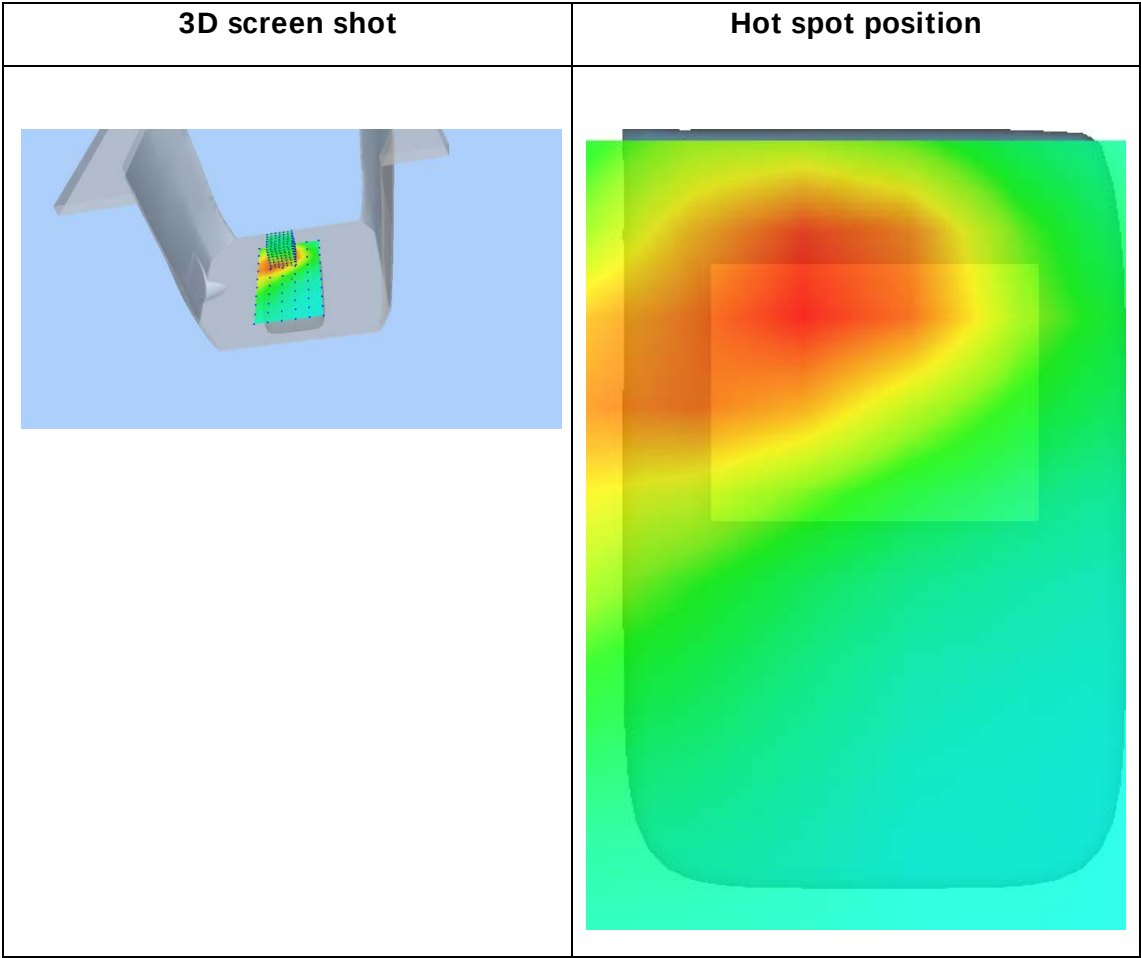
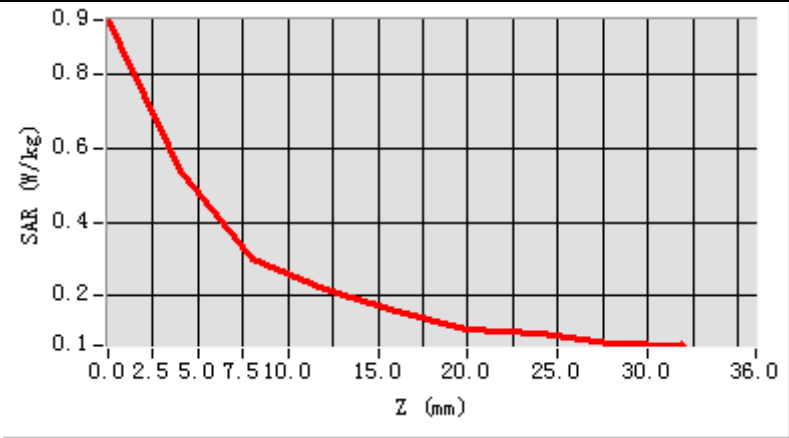


Maximum location: X=-9.00, Y=36.00

SAR Peak: 0.87 W/kg

SAR 10g (W/Kg)	0.333029
SAR 1g (W/Kg)	0.713625

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.9471	0.5371	0.2991	0.2163	0.1573	0.1115	0.0959	0.0731



MEASUREMENT 16

Front-side-20M-1RB#50-middle

Type: Phone measurement (Complete)

Date of measurement: 30/09/2024

Measurement duration: 15 minutes 43 seconds

A. Experimental conditions.

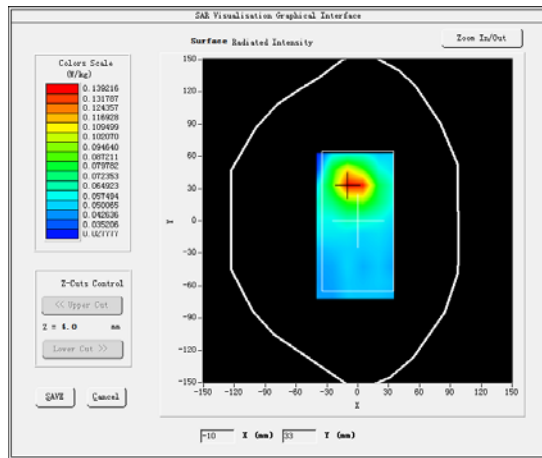
<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8,dx=5mm dy=5mm</u> <u>dz=4mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>LTE band 66</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>Duty Cycle: 1.00 (Crest factor: 1.0)</u>

B. SAR Measurement Results

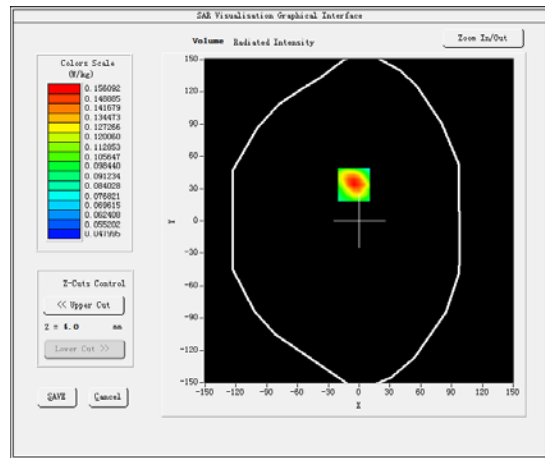
Middle Band SAR (Channel 132622):

Frequency (MHz)	1775.000000
Relative permittivity (real part)	40.102364
Relative permittivity (imaginary part)	14.096855
Conductivity (S/m)	1.368491
Variation (%)	-0.280000

SURFACE SAR



VOLUME SAR

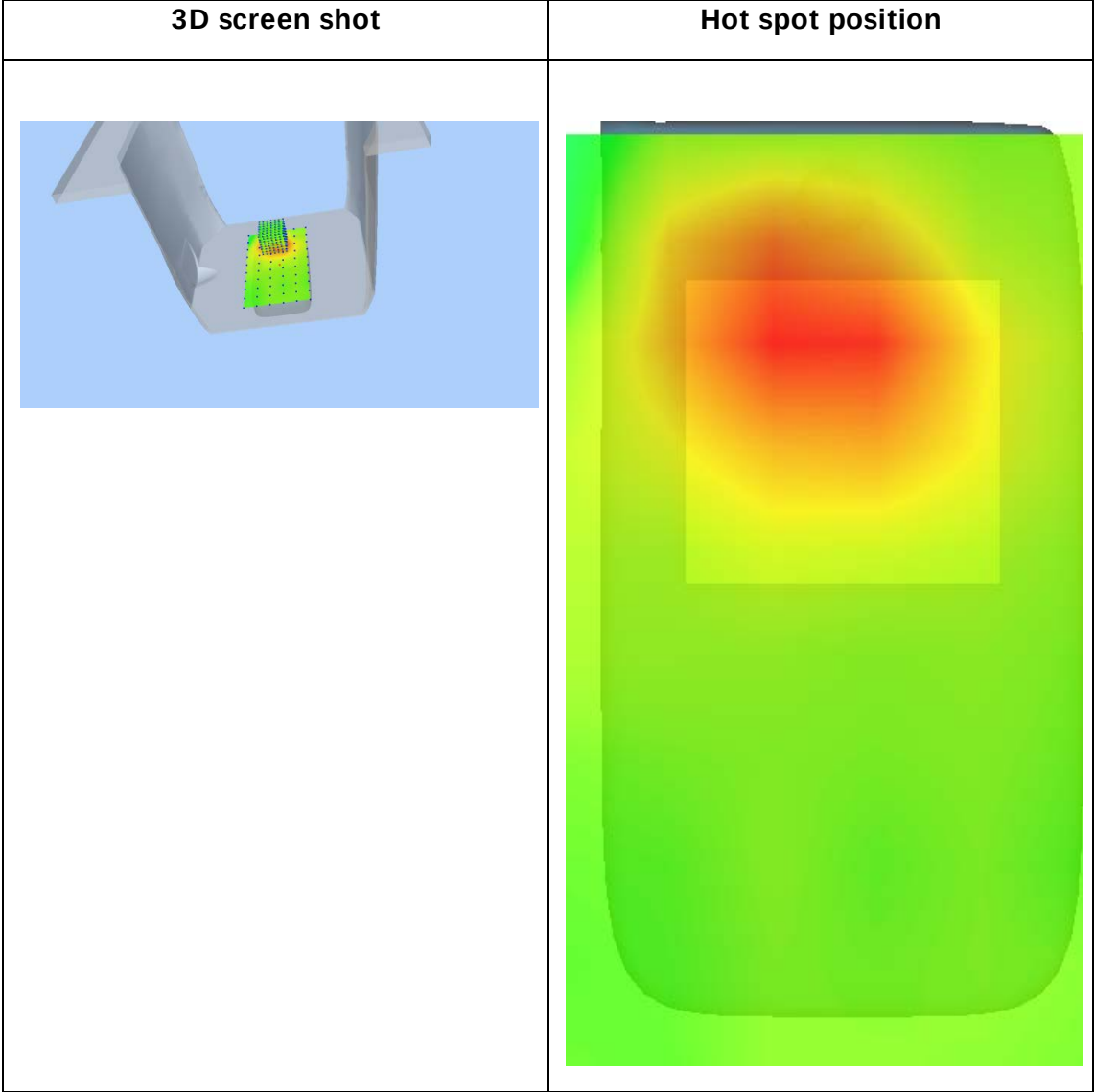
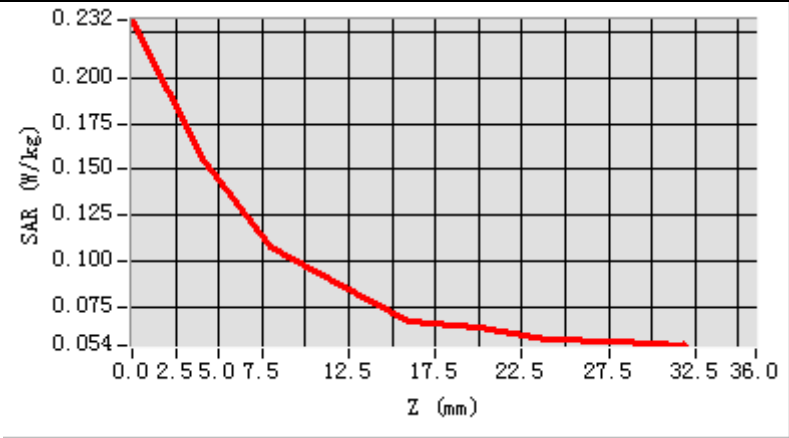


Maximum location: X=-5.00, Y=34.00

SAR Peak: 0.23 W/kg

SAR 10g (W/Kg)	0.228584
SAR 1g (W/Kg)	0.472154

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.2316	0.1561	0.1076	0.0869	0.0673	0.0635	0.0571	0.0554



MEASUREMENT 17

Towards-ground- Middle

Type: Phone measurement (Complete)

Date of measurement:24/10/2024

Measurement duration:10 minutes 22 seconds

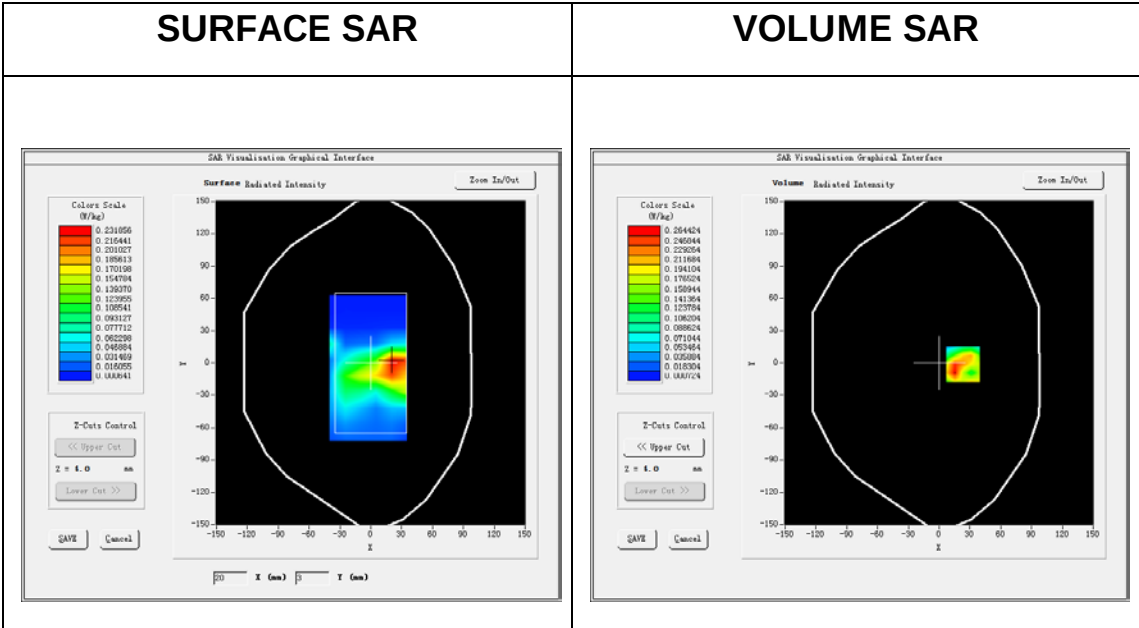
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=10mm dy=10mm</u>
<u>ZoomScan</u>	<u>7x7x12,dx=4mm dy=4mm</u> <u>dz=2mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>IEEE 802.11a U-NII-1</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>Duty cycle:1:1</u>

B. SAR Measurement Results

Middle Band SAR (Channel 46):

Frequency (MHz)	5230.000000
Relative permittivity (real part)	35.858526
Relative permittivity (imaginary part)	15.623689
Conductivity (S/m)	4.494532
Variation (%)	-2.690000

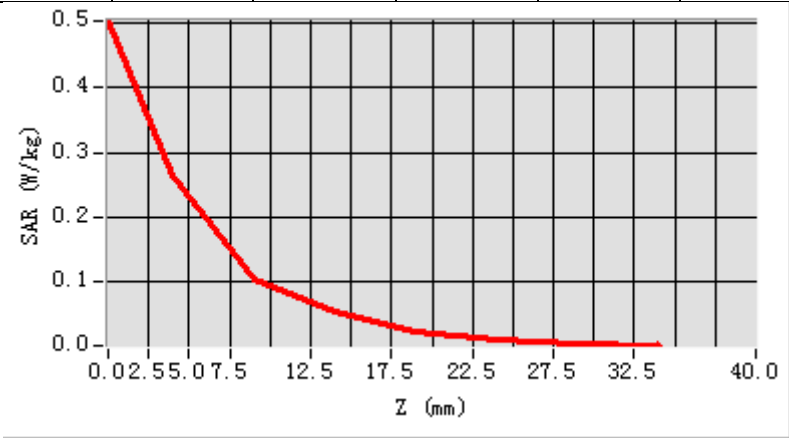


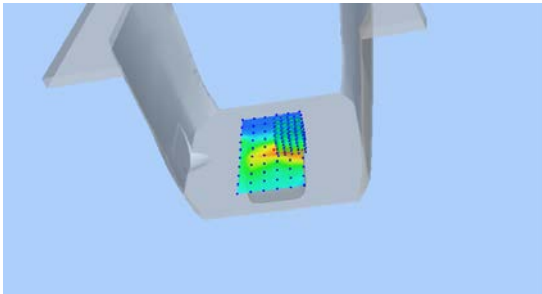
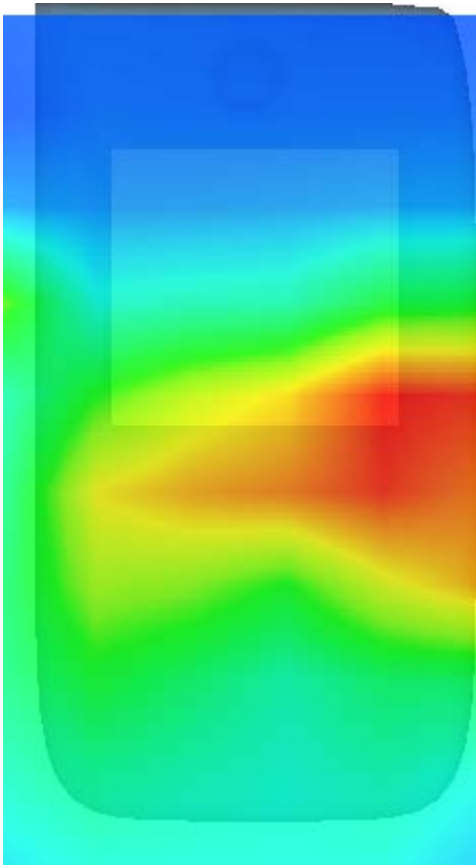
Maximum location: X=23.00, Y=-1.00

SAR Peak: 0.48 W/kg

SAR 10g (W/Kg)	0.204158
SAR 1g (W/Kg)	0.558255

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.5035	0.2644	0.1036	0.0539	0.0226	0.0107	0.0050



3D screen shot	Hot spot position
	

MEASUREMENT 18

Towards-ground- Middle

Type: Phone measurement (Complete)

Date of measurement: 24/10/2024

Measurement duration: 9 minutes 25 seconds

A. Experimental conditions.

<u>Area Scan</u>	<u>dx=10mm dy=10mm</u>
<u>ZoomScan</u>	<u>7x7x12,dx=4mm dy=4mm</u> <u>dz=2mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>IEEE 802.11a U-NII-2a</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>Duty cycle:1:1</u>

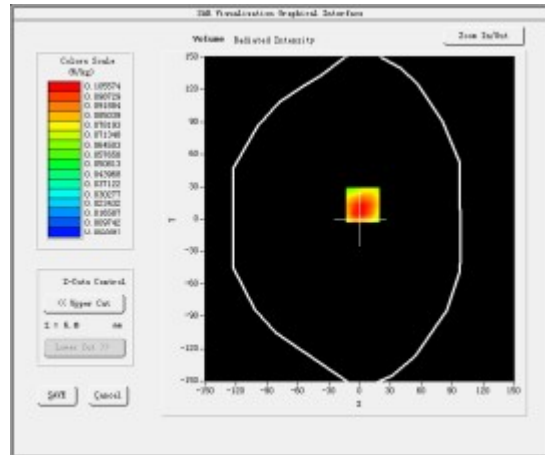
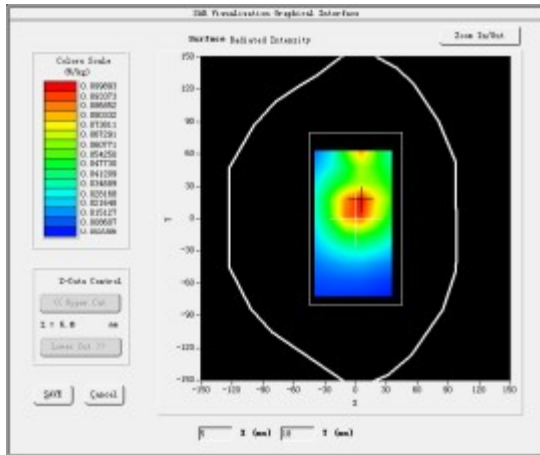
B. SAR Measurement Results

Middle Band SAR (Channel 62):

Frequency (MHz)	5310.000000
Relative permittivity (real part)	48.235748
Relative permittivity (imaginary part)	19.060800
Conductivity (S/m)	6.173560
Variation (%)	3.760000

SURFACE SAR

VOLUME SAR

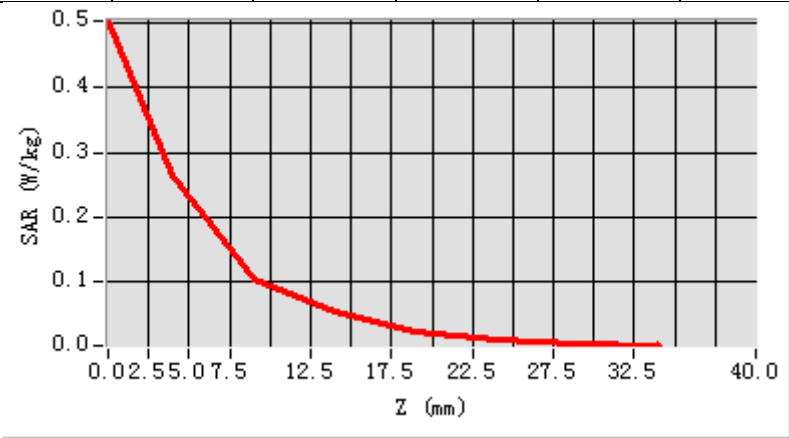


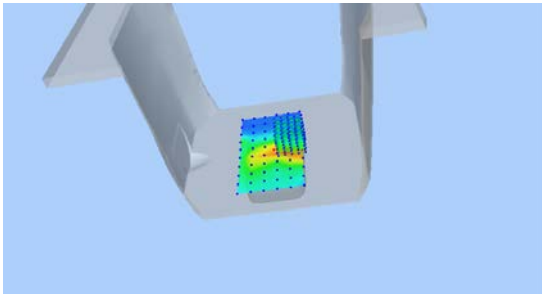
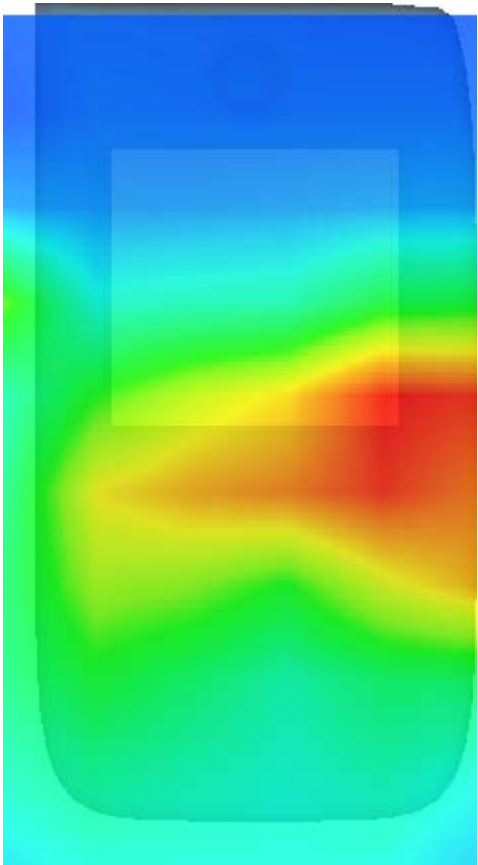
Maximum location: X=3.00, Y=13.00

SAR Peak: 0.47 W/kg

SAR 10g (W/Kg)	0.230851
SAR 1g (W/Kg)	0.536856

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.5035	0.2644	0.1036	0.0539	0.0226	0.0107	0.0050



3D screen shot	Hot spot position
	

MEASUREMENT 19

Towards-ground- Middle

Type: Phone measurement (Complete)

Date of measurement: 24/10/2024

Measurement duration: 9 minutes 25 seconds

A. Experimental conditions.

<u>Area Scan</u>	<u>dx=10mm dy=10mm</u>
<u>ZoomScan</u>	<u>7x7x12,dx=4mm dy=4mm</u> <u>dz=2mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>IEEE 802.11a U-NII-3</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>Duty cycle:1:1</u>

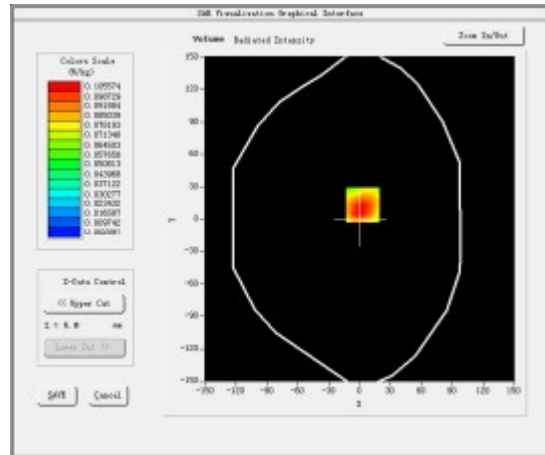
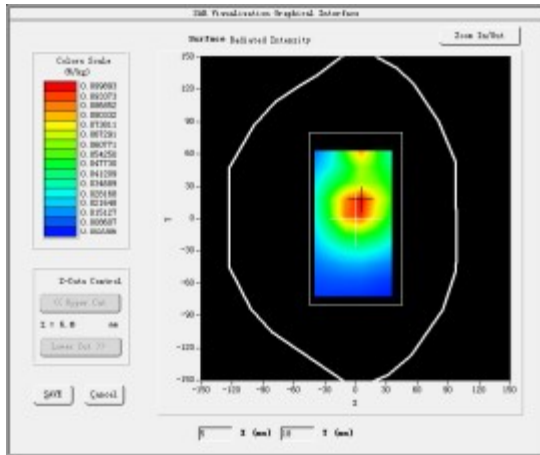
B. SAR Measurement Results

Middle Band SAR (Channel 134):

Frequency (MHz)	5670.000000
Relative permittivity (real part)	48.235748
Relative permittivity (imaginary part)	19.060800
Conductivity (S/m)	6.173560
Variation (%)	-2.710000

SURFACE SAR

VOLUME SAR

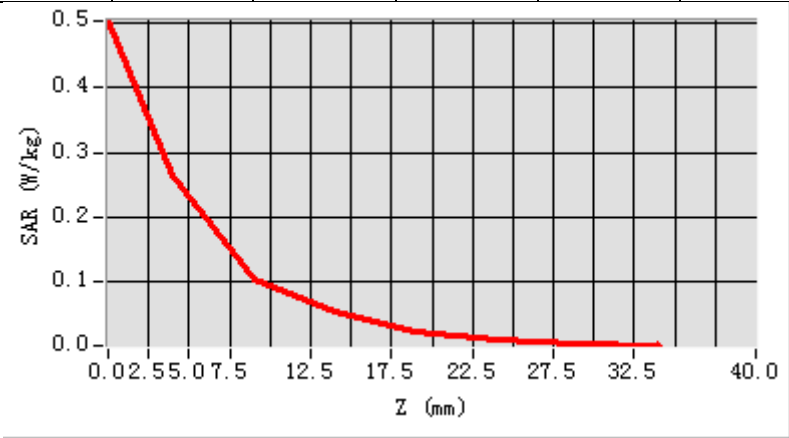


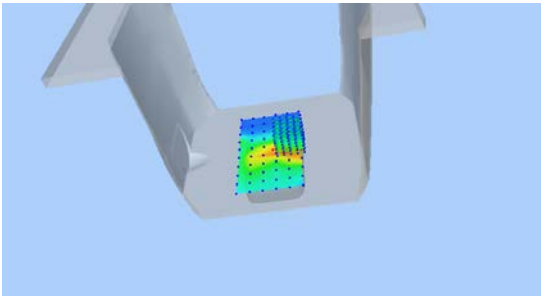
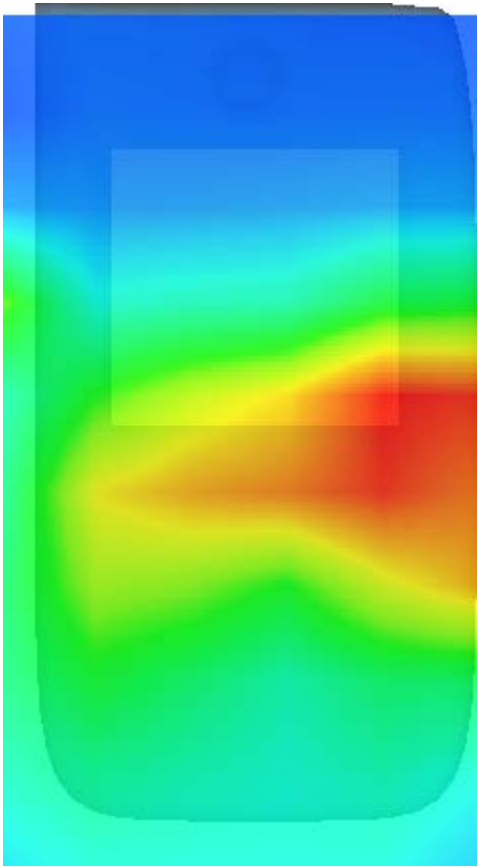
Maximum location: X=3.00, Y=13.00

SAR Peak: 0.47 W/kg

SAR 10g (W/Kg)	0.221885
SAR 1g (W/Kg)	0.557826

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.5035	0.2644	0.1036	0.0539	0.0226	0.0107	0.0050



3D screen shot	Hot spot position
	

MEASUREMENT 20

Towards-ground- Middle

Type: Phone measurement (Complete)

Date of measurement: 24/10/2024

Measurement duration: 8 minutes 25 seconds

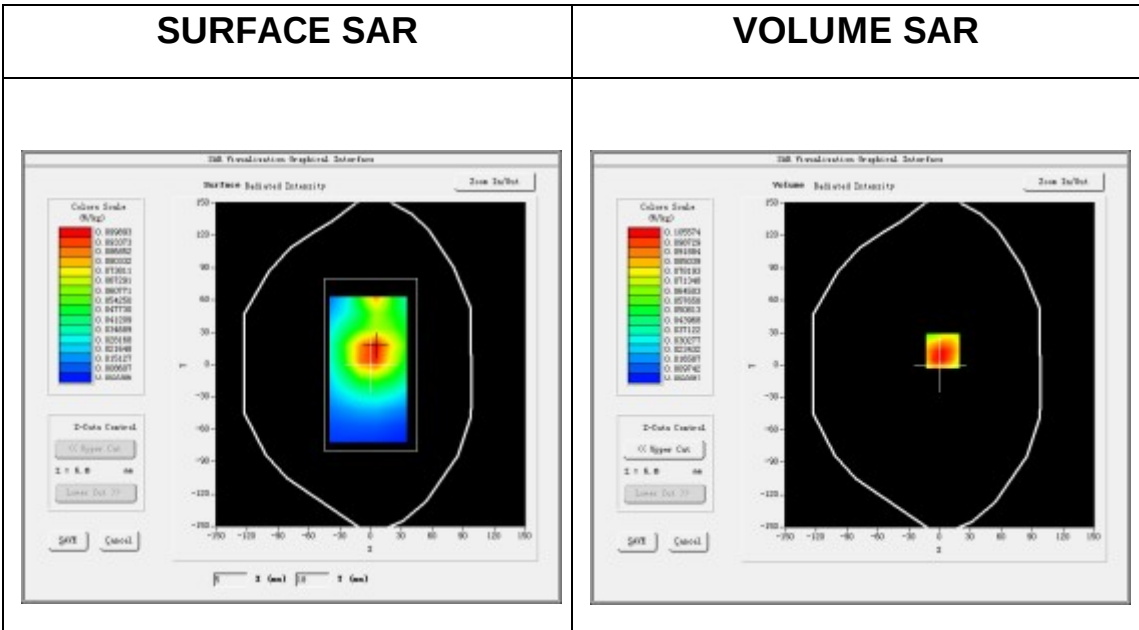
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=10mm dy=10mm</u>
<u>ZoomScan</u>	<u>7x7x12,dx=4mm dy=4mm</u> <u>dz=2mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>IEEE 802.11a U-NII-4</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>Duty cycle:1:1</u>

B. SAR Measurement Results

Middle Band SAR (Channel 159):

Frequency (MHz)	5795.000000
Relative permittivity (real part)	48.235748
Relative permittivity (imaginary part)	19.060800
Conductivity (S/m)	6.173560
Variation (%)	1.050000

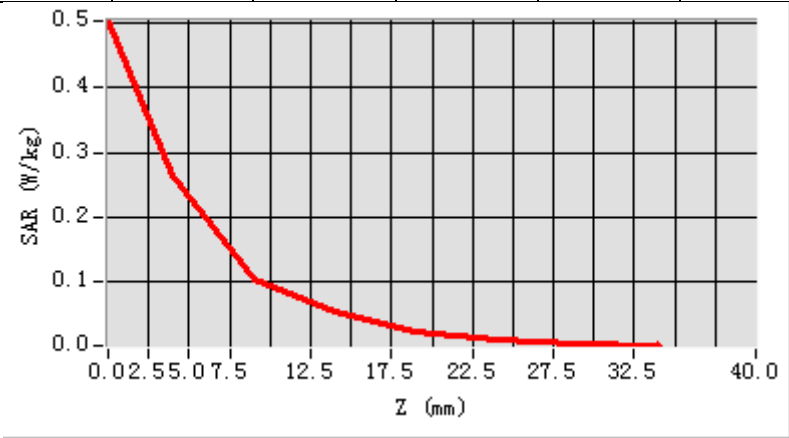


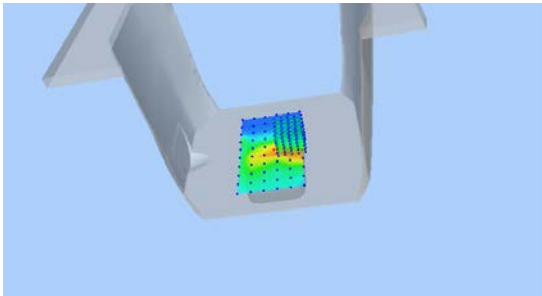
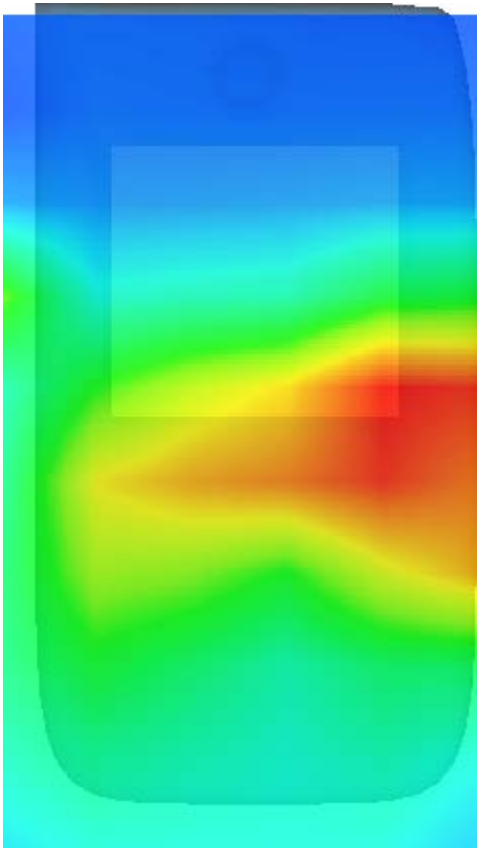
Maximum location: X=3.00, Y=13.00

SAR Peak: 0.47 W/kg

SAR 10g (W/Kg)	0.219254
SAR 1g (W/Kg)	0.608236

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.5035	0.2644	0.1036	0.0539	0.0226	0.0107	0.0050



3D screen shot	Hot spot position
	

MEASUREMENT 21

Front-side-middle

Type: Phone measurement (Complete)

Date of measurement:30/09/2024

Measurement duration: 11 minutes 17 seconds

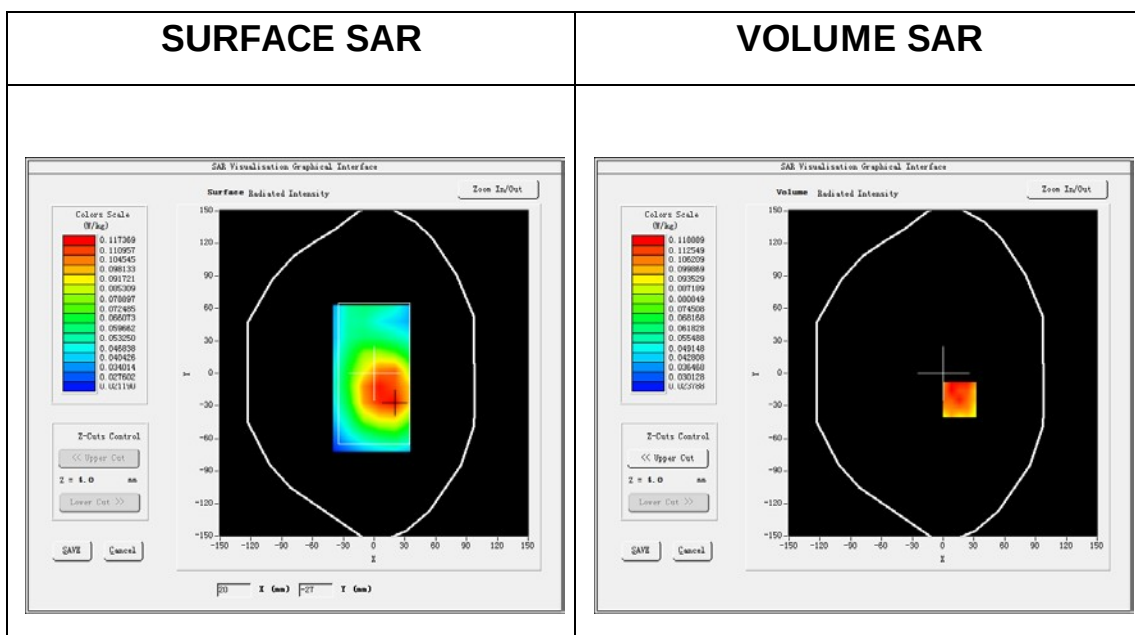
A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>CUSTOM (GPRS850_4Tx)</u>
<u>Channels</u>	<u>Low</u>
<u>Signal</u>	<u>Duty Cycle: 2.00 (Crest factor: 2.0)</u>

B. SAR Measurement Results

Middle Band SAR (Channel 128):

Frequency (MHz)	824.200000
Relative permittivity (real part)	53.891621
Relative permittivity (imaginary part)	20.664499
Conductivity (S/m)	0.946204
Variation (%)	1.200000

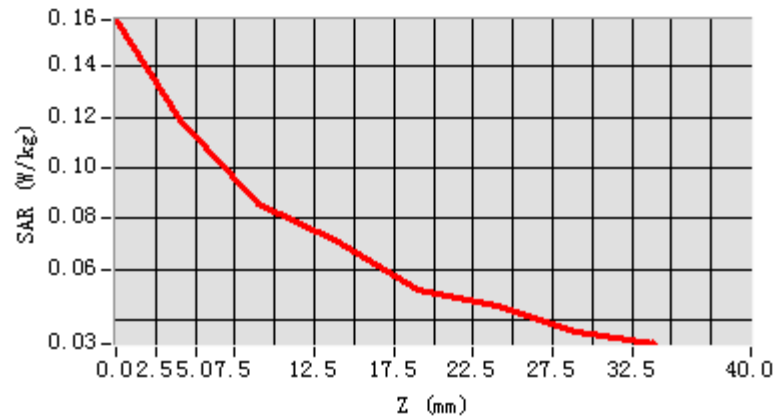


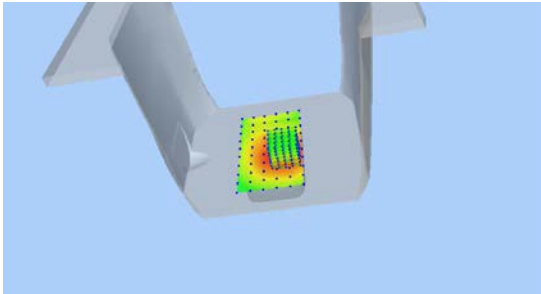
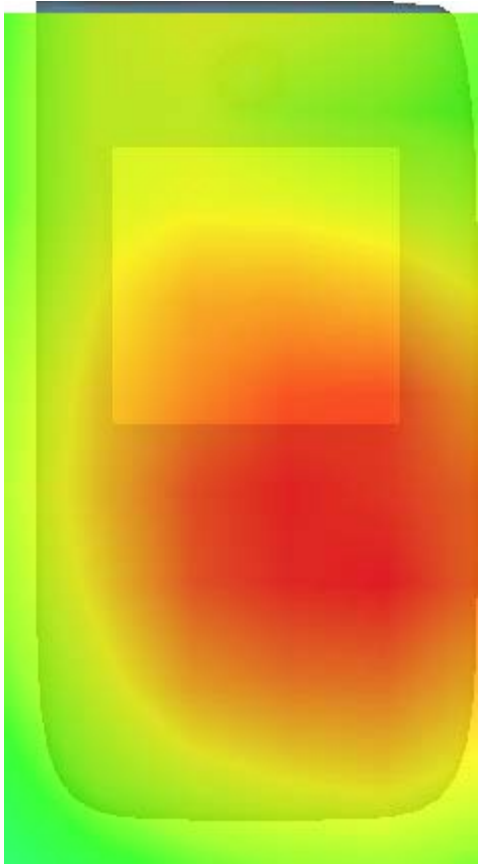
Maximum location: X=16.00, Y=-24.00

SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)	0.383656
SAR 1g (W/Kg)	0.735966

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1583	0.1189	0.0856	0.0706	0.0517	0.0459	0.0356



3D screen shot	Hot spot position
	

MEASUREMENT 22

Type: Phone measurement

Date of

measurement: 30/09/2024

Measurement duration: 6 minutes 17 seconds

A. Experimental conditions.

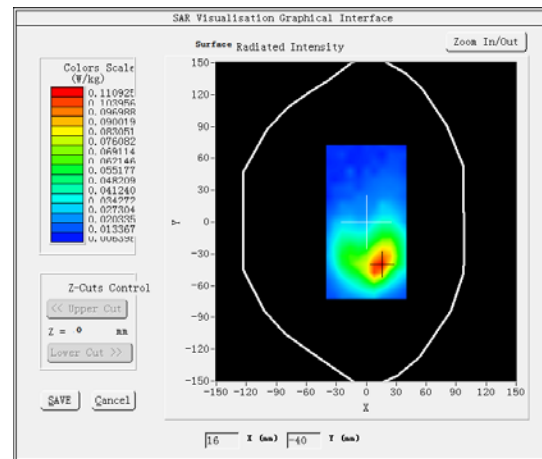
<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>Bluetooth</u>
<u>Channels</u>	<u>High</u>
<u>Signal</u>	<u>Bluetooth (Crest factor: 1.0)</u>

B. SAR Measurement Results

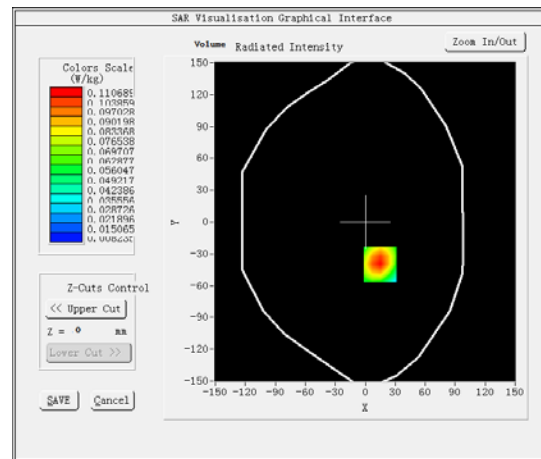
Higher Band SAR (Channel 39):

<u>Frequency (MHz)</u>	2441.000000
<u>Relative permittivity (real part)</u>	39.160000
<u>Relative permittivity (imaginary)</u>	13.290000
<u>Conductivity (S/m)</u>	1.831067
<u>Variation (%)</u>	0.360000

SURFACE SAR



VOLUME SAR

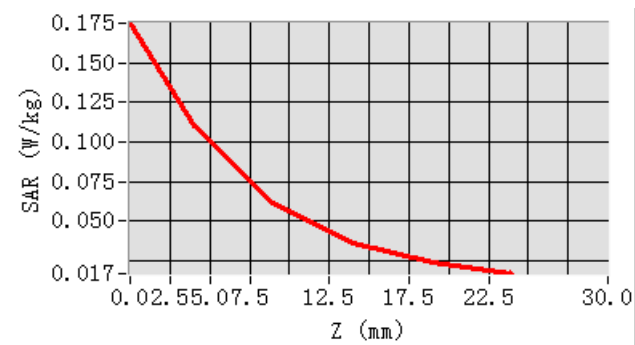


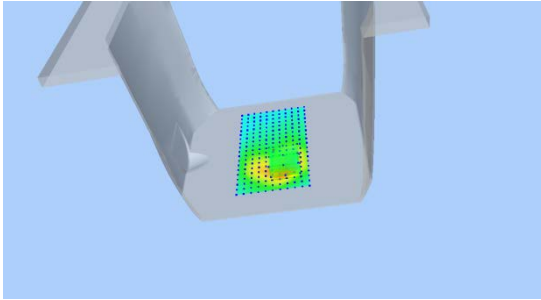
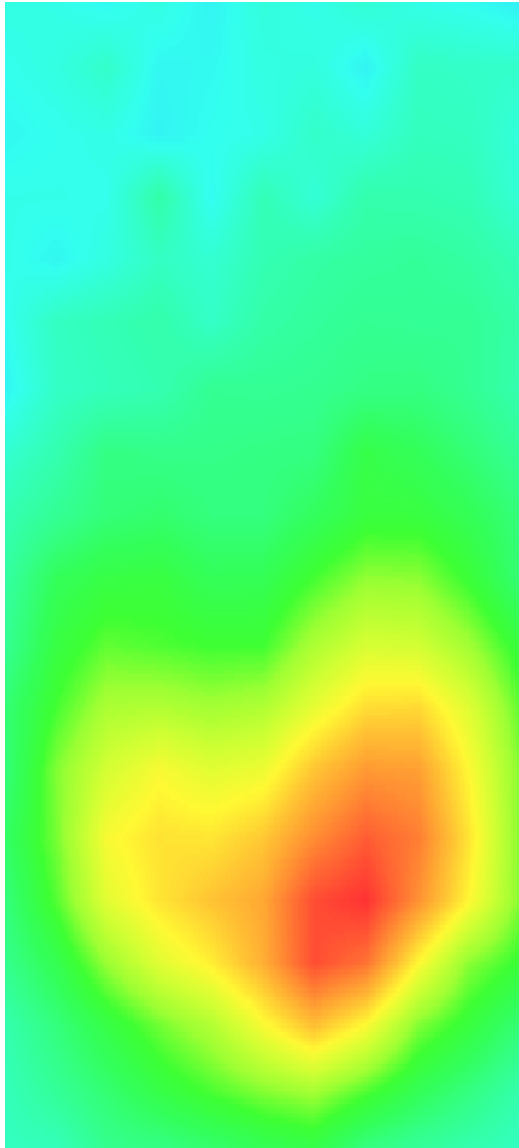
Maximum location: X=15.00, Y=-40.00

SAR Peak: 0.18 W/kg

SAR 10g (W/Kg)	0.062621
SAR 1g (W/Kg)	0.133327

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1752	0.1107	0.0617	0.0362	0.0238



3D screen shot	Hot spot position
	

MEASUREMENT 23

Front-side-middle

Type: Phone measurement (Complete)

Date of measurement: 11/10/2024

Measurement duration: 13 minutes 7 seconds

A. Experimental conditions.

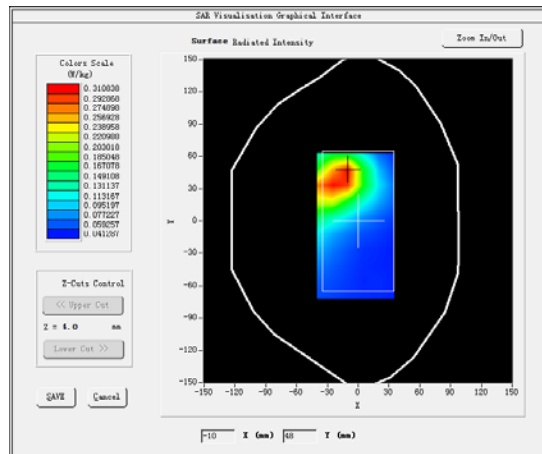
<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8, dx=5mm dy=5mm</u> <u>dz=4mm, Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>Band2_UMTS</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>

B. SAR Measurement Results

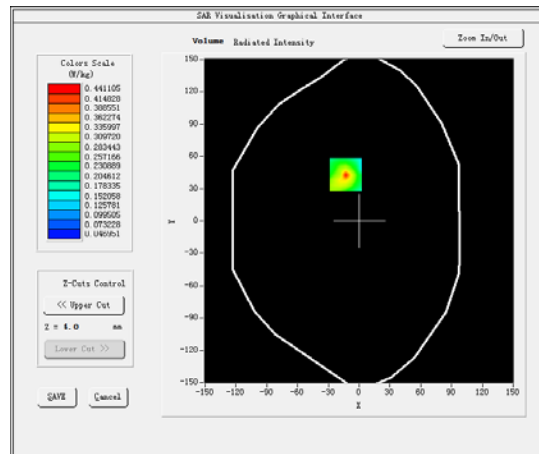
Middle Band SAR (Channel 9538):

Frequency (MHz)	1907.600000
Relative permittivity (real part)	38.332157
Relative permittivity (imaginary part)	19.839600
Conductivity (S/m)	0.921880
Variation (%)	4.740000

SURFACE SAR



VOLUME SAR

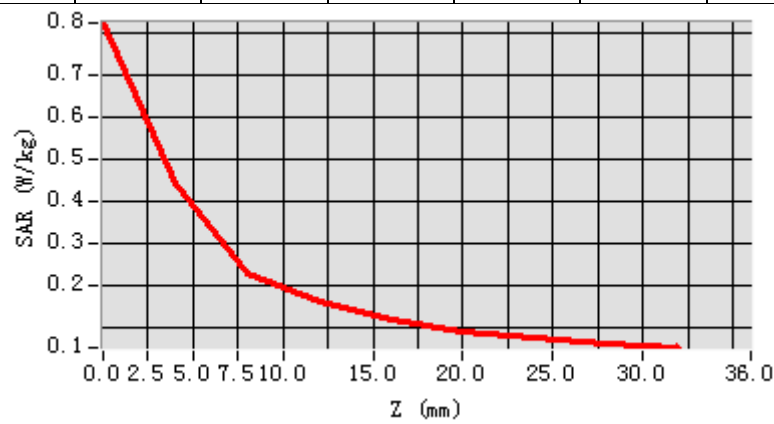


Maximum location: X=-13.00, Y=43.00

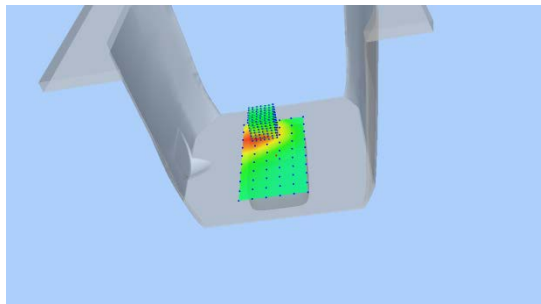
SAR Peak: 0.80 W/kg

SAR 10g (W/Kg)	0.314024
SAR 1g (W/Kg)	0.672845

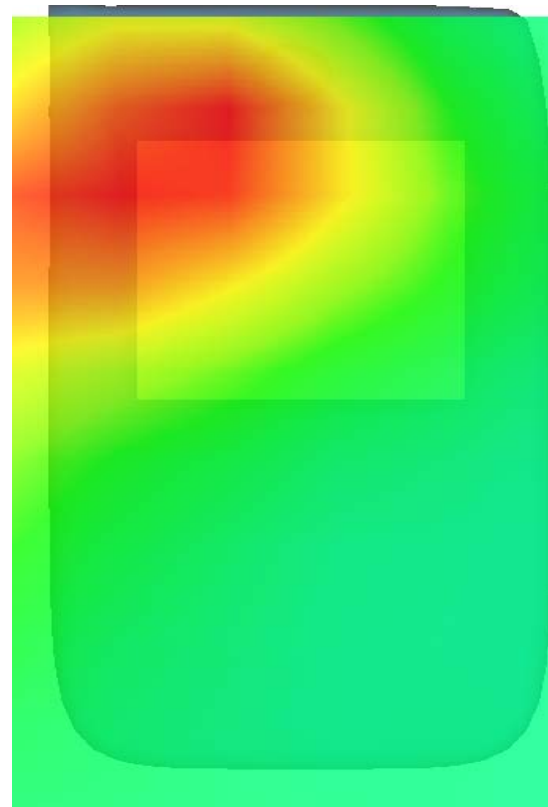
Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.8231	0.4411	0.2286	0.1636	0.1172	0.0914	0.0758	0.0603



3D screen shot



Hot spot position



MEASUREMENT 23

Front-side-middle

Type: Phone measurement (Complete)

Date of measurement: 11/10/2024

Measurement duration: 13 minutes 7 seconds

A. Experimental conditions.

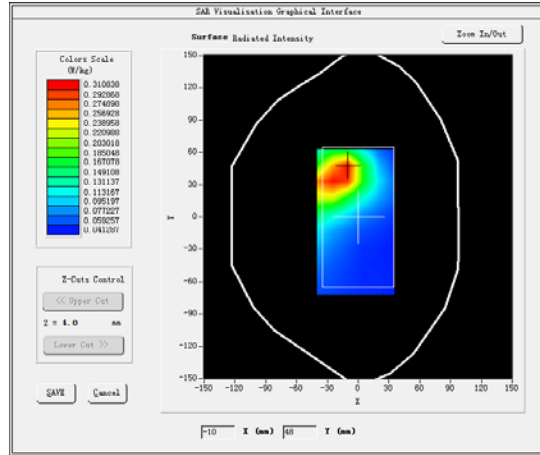
<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8, dx=5mm dy=5mm</u> <u>dz=4mm, Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>Band2_UMTS</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>

B. SAR Measurement Results

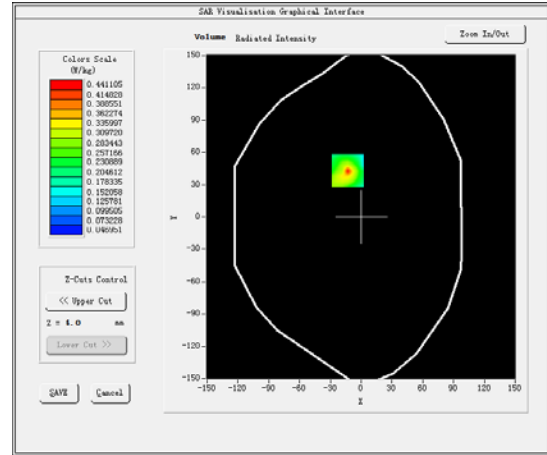
Middle Band SAR (Channel 9538):

Frequency (MHz)	1907.600000
Relative permittivity (real part)	38.332157
Relative permittivity (imaginary part)	19.839600
Conductivity (S/m)	0.921880
Variation (%)	4.740000

SURFACE SAR



VOLUME SAR

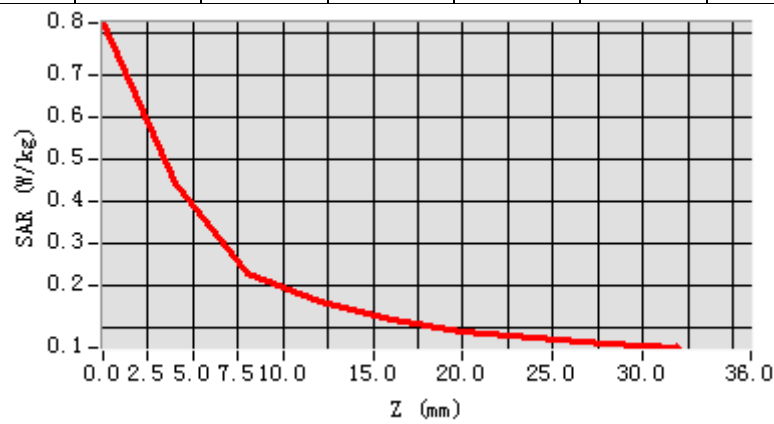


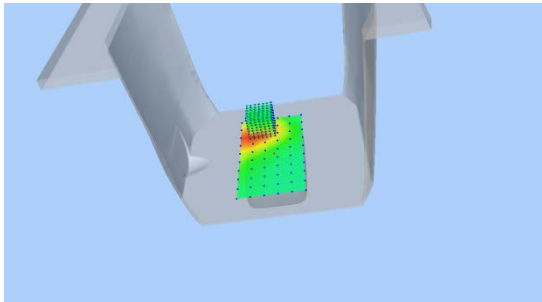
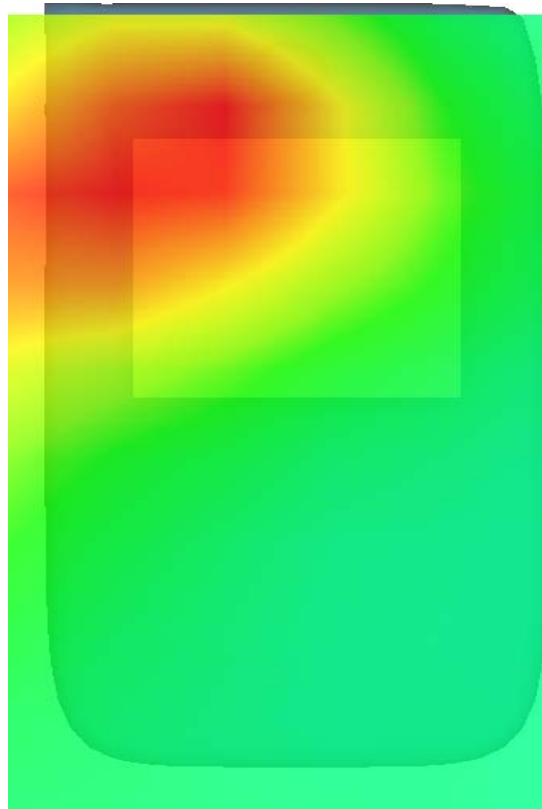
Maximum location: X=-13.00, Y=43.00

SAR Peak: 0.80 W/kg

SAR 10g (W/Kg)	0.314024
SAR 1g (W/Kg)	0.672845

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.8231	0.4411	0.2286	0.1636	0.1172	0.0914	0.0758	0.0603



3D screen shot	Hot spot position
	

MEASUREMENT 23

Front-side-middle

Type: Phone measurement (Complete)

Date of measurement: 11/10/2024

Measurement duration: 13 minutes 7 seconds

A. Experimental conditions.

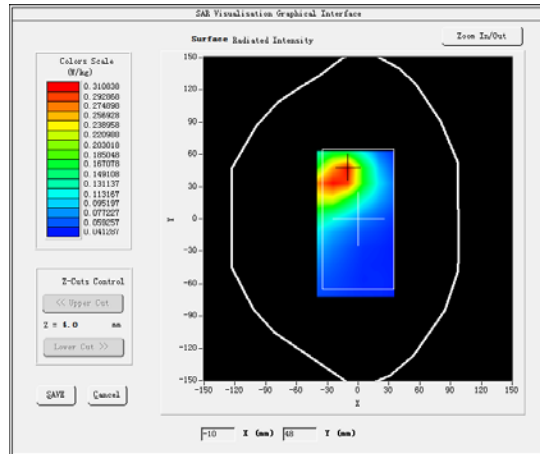
<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8, dx=5mm dy=5mm</u> <u>dz=4mm, Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>Band5_UMTS</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>

B. SAR Measurement Results

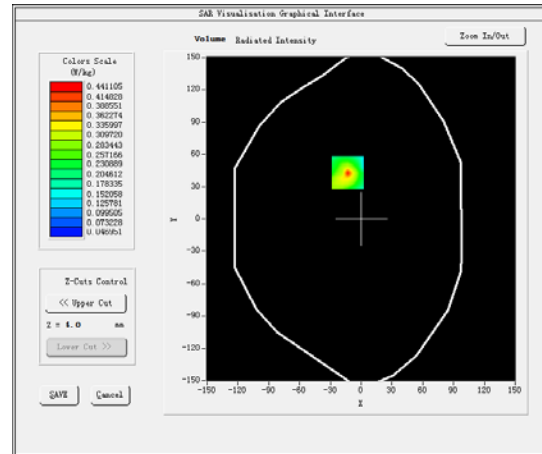
Middle Band SAR (Channel 4132):

Frequency (MHz)	826.400000
Relative permittivity (real part)	38.332157
Relative permittivity (imaginary part)	19.839600
Conductivity (S/m)	0.921880
Variation (%)	1.670000

SURFACE SAR



VOLUME SAR

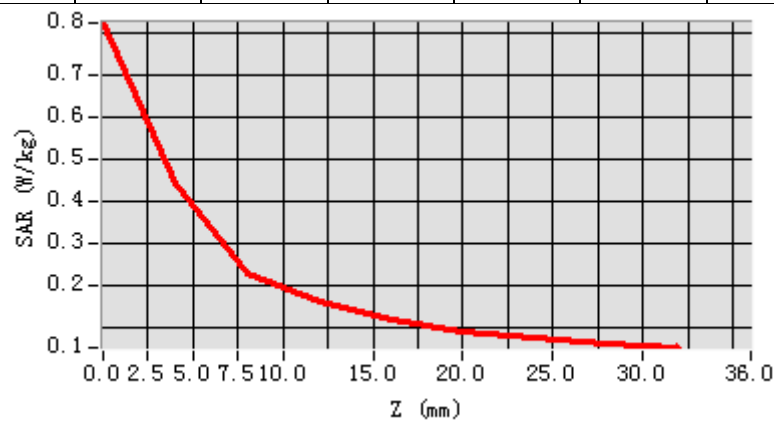


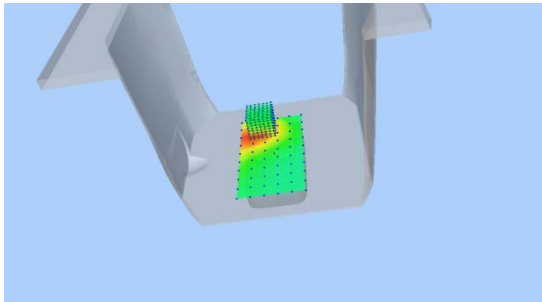
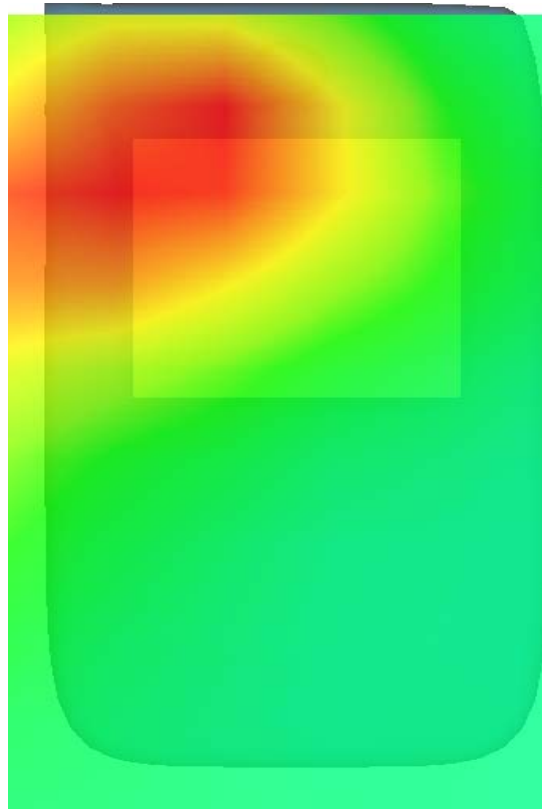
Maximum location: X=-13.00, Y=43.00

SAR Peak: 0.80 W/kg

SAR 10g (W/Kg)	0.345024
SAR 1g (W/Kg)	0.669845

Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.8231	0.4411	0.2286	0.1636	0.1172	0.0914	0.0758	0.0603



3D screen shot	Hot spot position
	

MEASUREMENT 24

Front-side-middle

Type: Phone measurement (Complete)

Date of measurement: 11/10/2024

Measurement duration: 13 minutes 7 seconds

A. Experimental conditions.

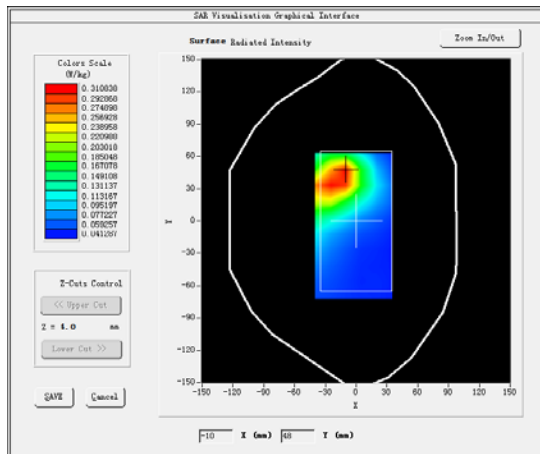
<u>Area Scan</u>	<u>dx=15mm dy=15mm</u>
<u>ZoomScan</u>	<u>7x7x8, dx=5mm dy=5mm</u> <u>dz=4mm, Complete</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>WCDMA (Crest factor: 1.0)</u>

B. SAR Measurement Results

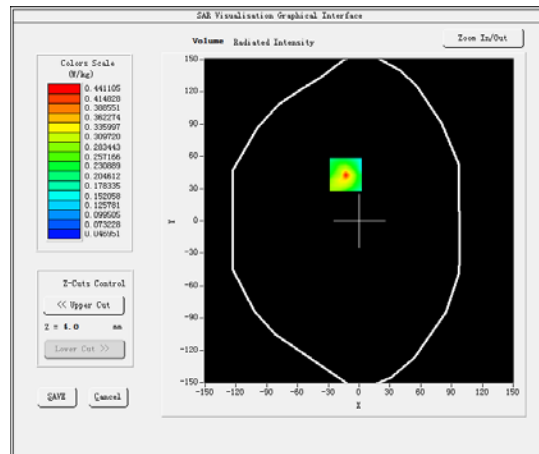
Middle Band SAR (Channel 26740):

Frequency (MHz)	819.000000
Relative permittivity (real part)	38.332157
Relative permittivity (imaginary part)	19.839600
Conductivity (S/m)	0.921880
Variation (%)	0.230000

SURFACE SAR



VOLUME SAR

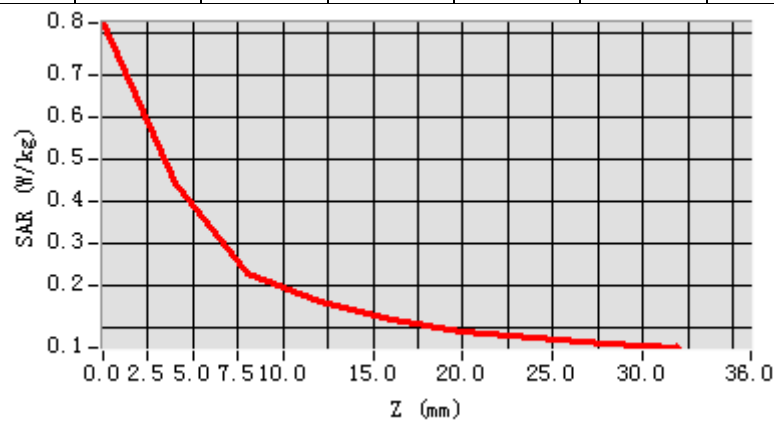


Maximum location: X=-13.00, Y=43.00

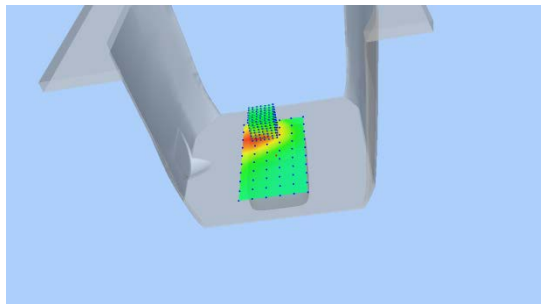
SAR Peak: 0.80 W/kg

SAR 10g (W/Kg)	0.357016
SAR 1g (W/Kg)	0.711655

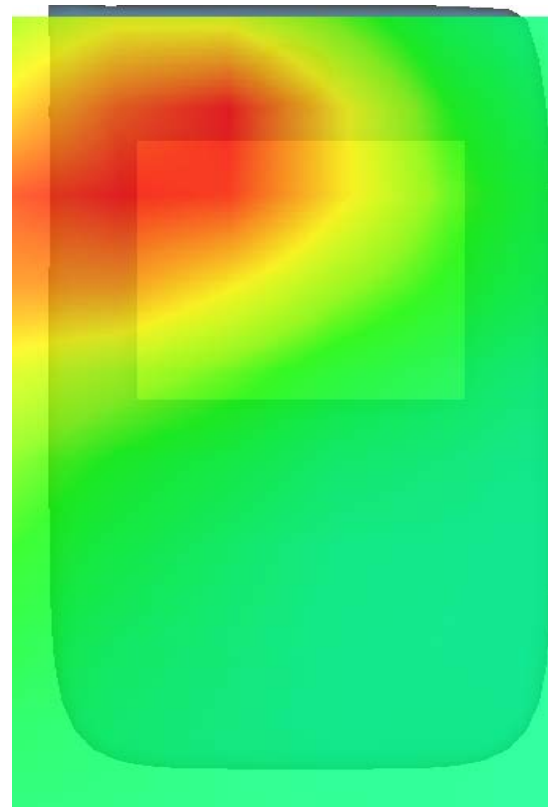
Z (mm)	0.00	4.00	8.00	12.00	16.00	20.00	24.00	28.00
SAR (W/Kg)	0.8231	0.4411	0.2286	0.1636	0.1172	0.0914	0.0758	0.0603



3D screen shot



Hot spot position





Annex C: Calibration Reports

Tested Model : X1101B

Report Number:

WSCT-ANAB-R&E241100056A-SAR



SAR Reference Dipole Calibration Report

Ref : ACR.313.11.23.BES.A

WORLD STANDARDIZATION CERTIFICATION & TESTING GROUP CO.,LTD

BLOCK A, BAO SHI SCIENCE PARK, BAO SHI ROAD,
BAO'AN DISTRICT

SHENZHEN 518108, P.R. CHINA

MVG COMOSAR REFERENCE DIPOLE

FREQUENCY: 835 MHZ

SERIAL NO.: 3723-DIP0G835-733

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 09/11/2023



Accreditations #2-6789 and #2-6814

Scope available on www.cofrac.fr

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Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.



	<i>Name</i>	<i>Function</i>	<i>Date</i>	<i>Signature</i>
<i>Prepared by :</i>	Cyrille ONNEE	Measurement Responsible	11/9/2023	
<i>Checked & approved by:</i>	Jérôme Luc	Technical Manager	11/9/2023	
<i>Authorized by:</i>	Yann Toutain	Laboratory Director	11/9/2023	

Yann
Toutain ID

Signature numérique
de Yann Toutain ID
Date : 2023.11.09
16:42:07 +01'00'

	<i>Customer Name</i>
<i>Distribution :</i>	World Standardization Certification & Testing Group Co ,Ltd

<i>Issue</i>	<i>Name</i>	<i>Date</i>	<i>Modifications</i>
A	Cyrille ONNEE	11/9/2023	Initial release



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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 835 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID835
Serial Number	3723-DIP0G835-733
Product Condition (new / used)	New

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards. The product is designed for use with the COMOSAR test bench only.



Figure 1 – MVG COMOSAR Validation Dipole



4 MEASUREMENT METHOD

4.1 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards specify the mechanical components and dimensions of the validation dipoles, with the dimension's frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness. A direct method is used with a ISO17025 calibrated caliper.

4.2 S11 PARAMETER REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a S11 of -20 dB or better. The S11 measurement shall be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. A direct method is used with a network analyser and its calibration kit, both with a valid ISO17025 calibration.

4.3 SAR REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore-mentioned standards.

5 MEASUREMENT UNCERTAINTY

5.1 MECHANICAL DIMENSIONS

For the measurement in the range 0-300mm, the estimated expanded uncertainty ($k=2$) in calibration for the dimension measurement in mm is ± 0.20 mm with respect to measurement conditions.

For the measurement in the range 300-450mm, the estimated expanded uncertainty ($k=2$) in calibration for the dimension measurement in mm is ± 0.44 mm with respect to measurement conditions.

5.2 S11 PARAMETER

The estimated expanded uncertainty ($k=2$) in calibration for the S11 parameter in linear is ± 0.08 with respect to measurement conditions.

5.3 SAR

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

The estimated expanded uncertainty ($k=2$) in calibration for the 1g and 10g SAR measurement in W/kg is $\pm 19\%$ with respect to measurement conditions.

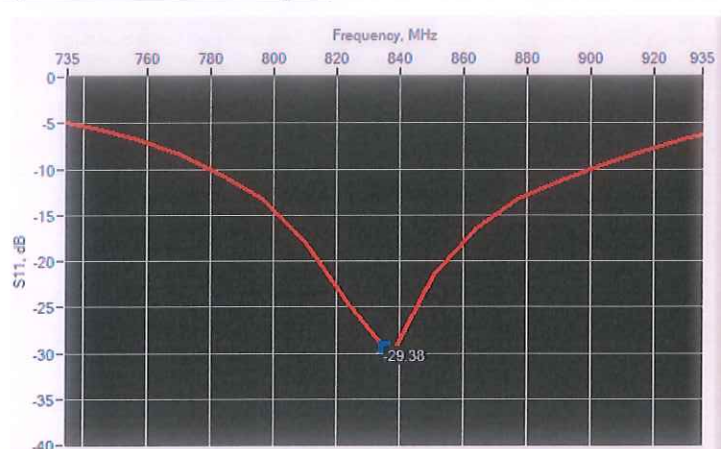
6 CALIBRATION RESULTS

6.1 MECHANICAL DIMENSIONS

L mm		h mm		d mm	
Measured	Required	Measured	Required	Measured	Required
161.22	161.00 +/- 2%	89.32	89.80 +/- 2%	3.60	3.60 +/- 2%

6.2 S11 PARAMETER

6.2.1 S11 parameter in Head Liquid



Frequency (MHz)	S11 parameter (dB)	Requirement (dB)	Impedance
835	-29.38	-20	49.7Ω - 2.9jΩ

6.3 SAR

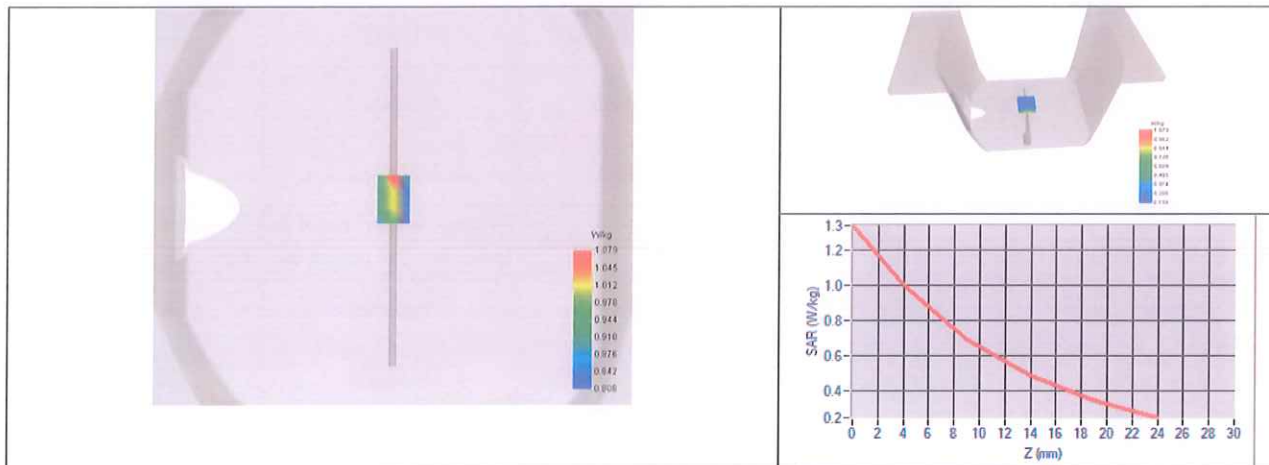
The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

6.3.1 SAR with Head Liquid

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

Software	OPENSAR V5
Phantom	SN 13/09 SAM68
Probe	SN 41/18 EPG0333
Liquid	Head Liquid Values: ϵ_{ps}' : 45.5 σ : 0.92
Distance between dipole center and liquid	15.0 mm
Area scan resolution	$dx=8mm/dy=8mm$
Zoon Scan Resolution	$dx=8mm/dy=8mm/dz=5mm$
Frequency	835 MHz
Input power	20 dBm
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

Frequency	1g SAR (W/kg)			10g SAR (W/kg)		
	Measured	Measured normalized to 1W	Target normalized to 1W	Measured	Measured normalized to 1W	Target normalized to 1W
835 MHz	0.94	9.42	9.56	0.62	6.21	6.22





7 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	Manufacturer / Model	Identification No.	Current Calibration Date	Next Calibration Date
SAM Phantom	MVG	SN 13/09 SAM68	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rohde & Schwarz ZVM	100203	08/2021	08/2024
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	07/2022	07/2025
Calipers	Mitutoyo	SN 0009732	11/2022	11/2025
Reference Probe	MVG	3523-EPGO-429	11/2023	11/2024
Multimeter	Keithley 2000	4013982	02/2023	02/2026
Signal Generator	Rohde & Schwarz SMB	106589	03/2022	03/2025
Amplifier	MVG	MODU-023-C-0002	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	NI-USB 5680	170100013	06/2021	06/2024
Power Meter	Keysight U2000A	SN: MY62340002	10/2022	10/2025
Directional Coupler	Krytar 158020	131467	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2021	06/2024



SAR Reference Dipole Calibration Report

Ref : ACR.313.13.23.BES.A

WORLD STANDARDIZATION CERTIFICATION & TESTING GROUP CO.,LTD

BLOCK A, BAO SHI SCIENCE PARK, BAO SHI ROAD,
BAO'AN DISTRICT

SHENZHEN 518108, P.R. CHINA

MVG COMOSAR REFERENCE DIPOLE

FREQUENCY: 1800 MHZ

SERIAL NO.: 3723-DIP1G800-735

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 09/11/2023



Accreditations #2-6789 and #2-6814

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Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.



	<i>Name</i>	<i>Function</i>	<i>Date</i>	<i>Signature</i>
<i>Prepared by :</i>	Cyrille ONNEE	Measurement Responsible	11/9/2023	
<i>Checked & approved by:</i>	Jérôme Luc	Technical Manager	11/9/2023	
<i>Authorized by:</i>	Yann Toutain	Laboratory Director	11/9/2023	

Yann
Toutain ID

Signature
numérique de
Yann Toutain ID
Date : 2023.11.09
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	<i>Customer Name</i>
<i>Distribution :</i>	World Standardization Certification & Testing Group Co .,Ltd

<i>Issue</i>	<i>Name</i>	<i>Date</i>	<i>Modifications</i>
A	Cyrille ONNEE	11/9/2023	Initial release



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1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 1800 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID1800
Serial Number	3723-DIP1G800-735
Product Condition (new / used)	New

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards. The product is designed for use with the COMOSAR test bench only.



Figure 1 – MVG COMOSAR Validation Dipole

4 MEASUREMENT METHOD

4.1 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards specify the mechanical components and dimensions of the validation dipoles, with the dimension's frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness. A direct method is used with a ISO17025 calibrated caliper.

4.2 S11 PARAMETER REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a S11 of -20 dB or better. The S11 measurement shall be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. A direct method is used with a network analyser and its calibration kit, both with a valid ISO17025 calibration.

4.3 SAR REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore-mentioned standards.

5 MEASUREMENT UNCERTAINTY

5.1 MECHANICAL DIMENSIONS

For the measurement in the range 0-300mm, the estimated expanded uncertainty ($k=2$) in calibration for the dimension measurement in mm is ± 0.20 mm with respect to measurement conditions.

For the measurement in the range 300-450mm, the estimated expanded uncertainty ($k=2$) in calibration for the dimension measurement in mm is ± 0.44 mm with respect to measurement conditions.

5.2 S11 PARAMETER

The estimated expanded uncertainty ($k=2$) in calibration for the S11 parameter in linear is ± 0.08 with respect to measurement conditions.

5.3 SAR

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

The estimated expanded uncertainty ($k=2$) in calibration for the 1g and 10g SAR measurement in W/kg is $\pm 19\%$ with respect to measurement conditions.

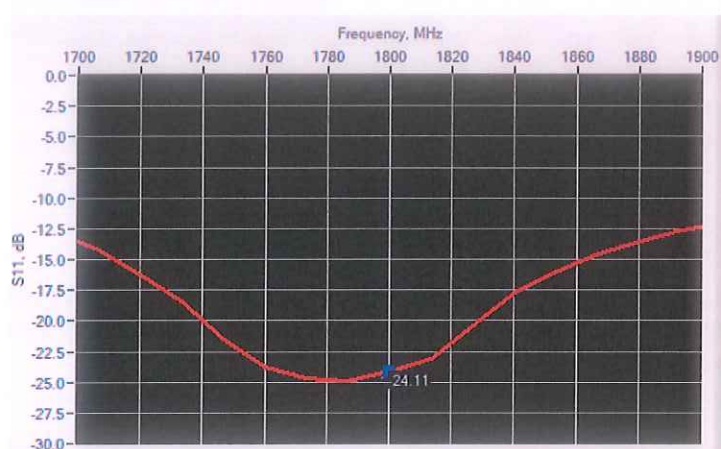
6 CALIBRATION RESULTS

6.1 MECHANICAL DIMENSIONS

L mm		h mm		d mm	
Measured	Required	Measured	Required	Measured	Required
72.12	72.00 +/- 2%	41.48	41.70 +/- 2%	3.60	3.60 +/- 2%

6.2 S11 PARAMETER

6.2.1 S11 parameter in Head Liquid



Frequency (MHz)	S11 parameter (dB)	Requirement (dB)	Impedance
1800	-24.11	-20	$47.6\Omega + 5.6j\Omega$

6.3 SAR

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

6.3.1 SAR with Head Liquid

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.