

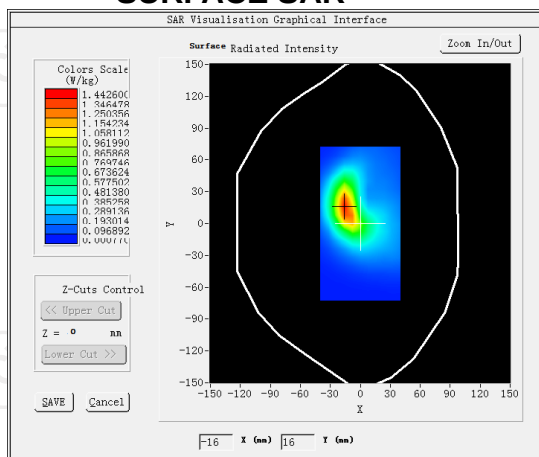
MEASUREMENT 3

High Band SAR (Channel 251)

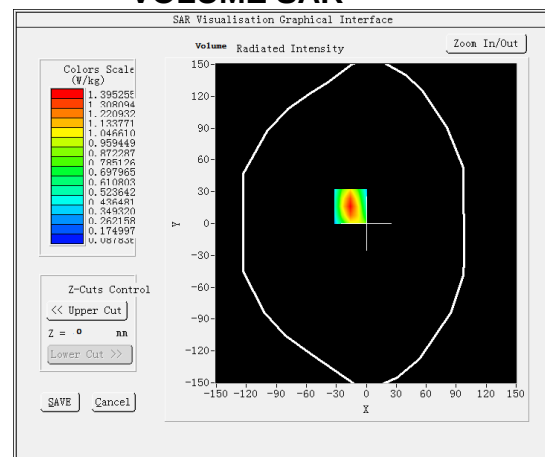
Date: 04/28/2023

Frequency (MHz)	848.800000
Relative permittivity (real part)	40.606560
Relative permittivity (imaginary part)	18.313232
Conductivity (S/m)	0.850955
Variation (%)	-0.670000
Crest Factor:	1.0
Probe Conversion factor	1.80
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(0mm)</u>
Band	<u>GSM850(GPRS 2slot hotspot)</u>

SURFACE SAR

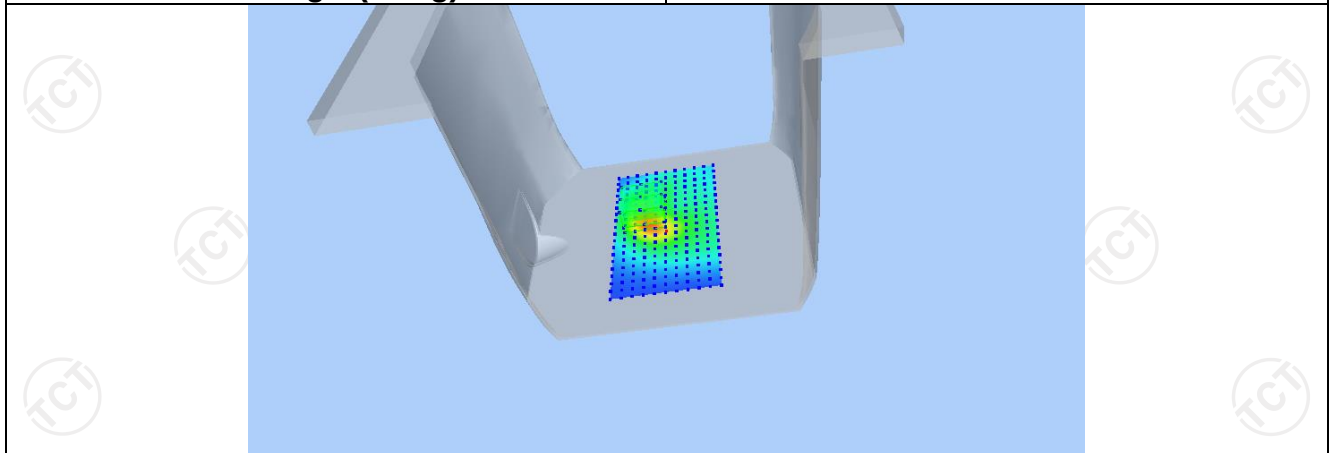


VOLUME SAR

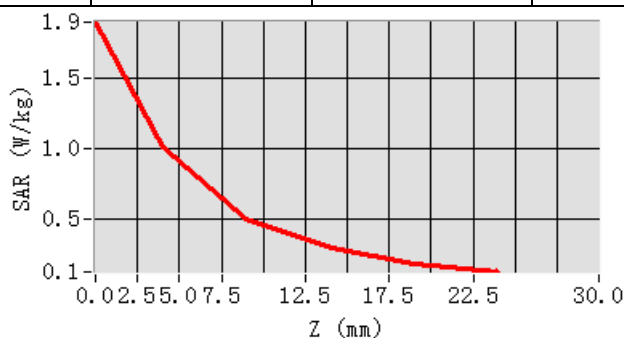


Maximum location: X=-16.00, Y=16.00 SAR Peak: 1.66 W/kg

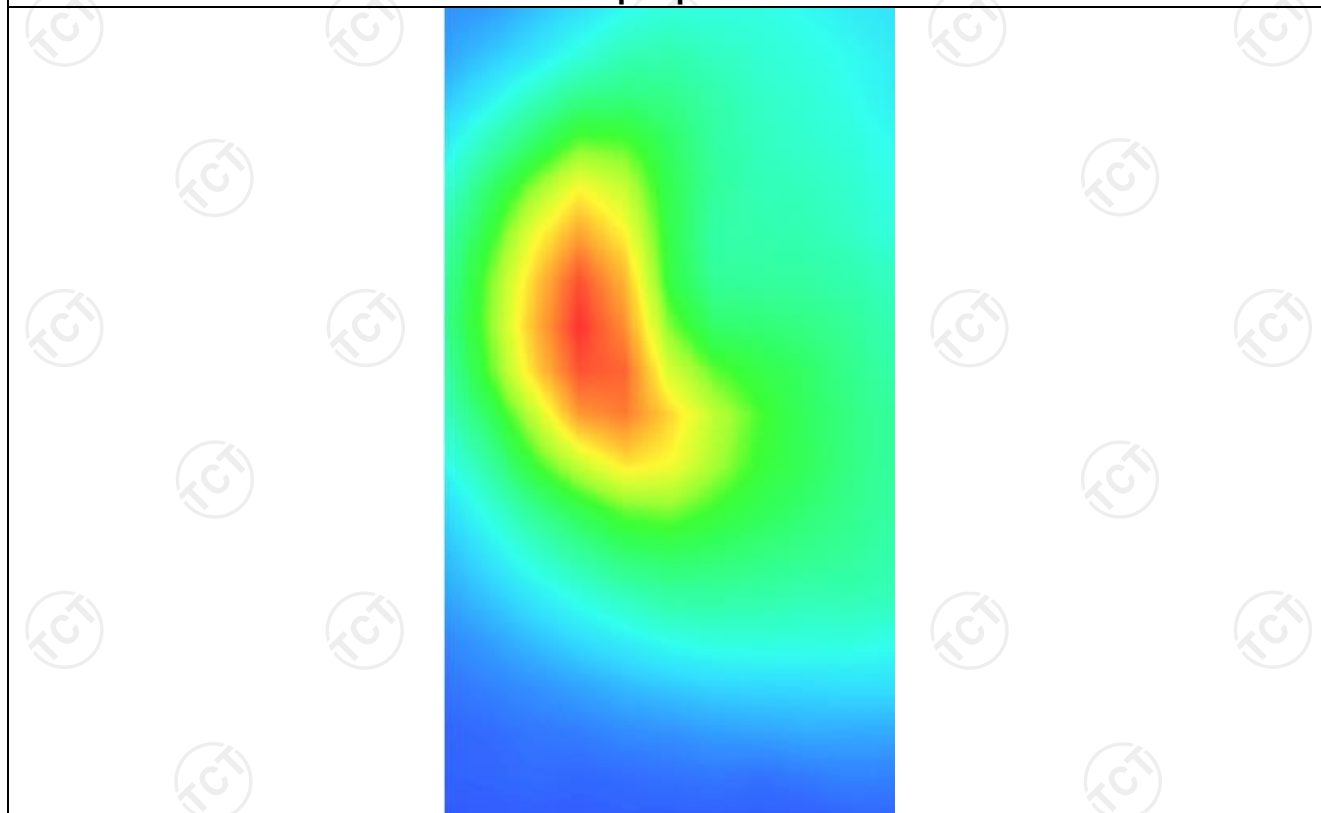
SAR 10g (W/Kg)	0.508834
SAR 1g (W/Kg)	0.747634



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.8998	1.0073	0.4897	0.2862	0.1796



Hot spot position



GSM1900

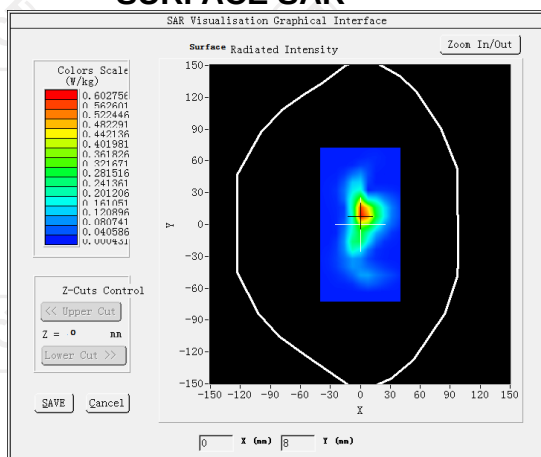
MEASUREMENT 1

Middle Band SAR (Channel 661):

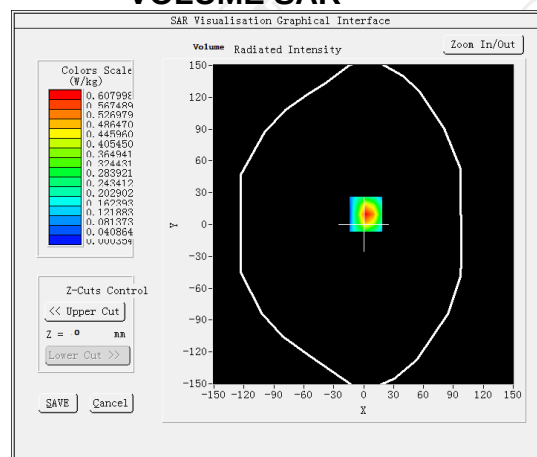
Date: 05/11/2023

Frequency (MHz)	1880.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.408000
Conductivity (S/m)	1.400391
Variation (%)	-1.380000
Crest Factor	1.0
Probe Conversion factor	2.23
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back(0mm)
Band	GSM1900(voice)

SURFACE SAR

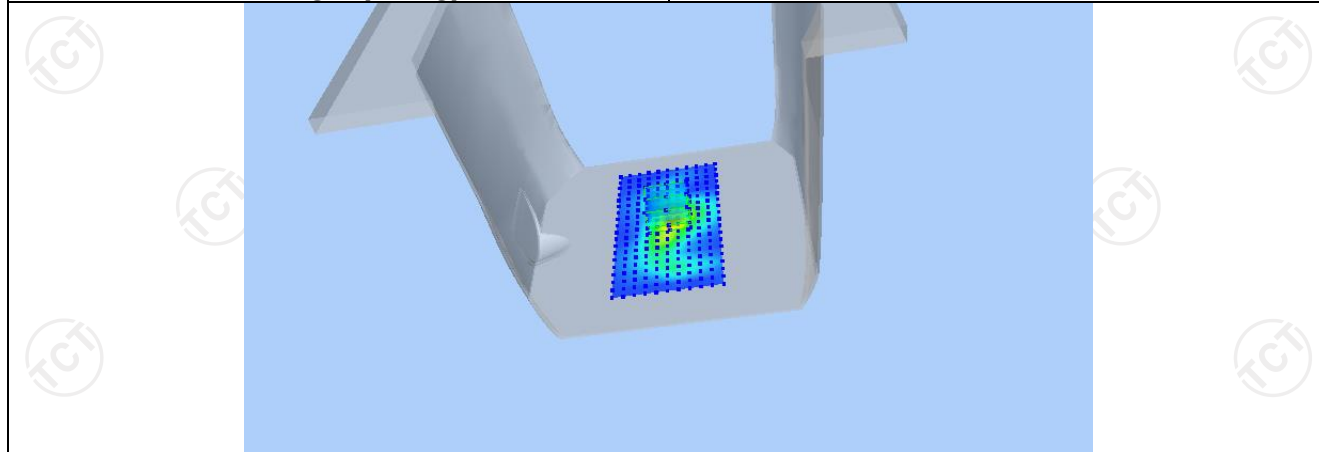


VOLUME SAR

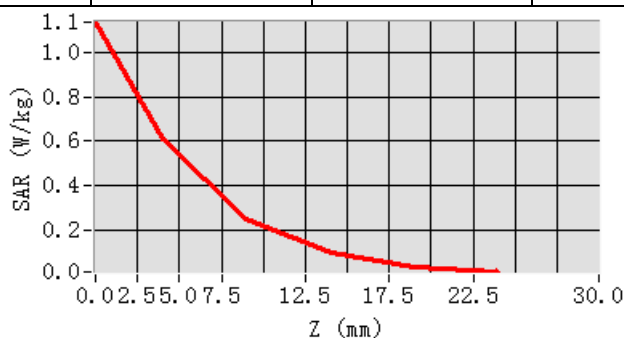


Maximum location: X=2.00, Y=10.00 SAR Peak: 1.15 W/kg

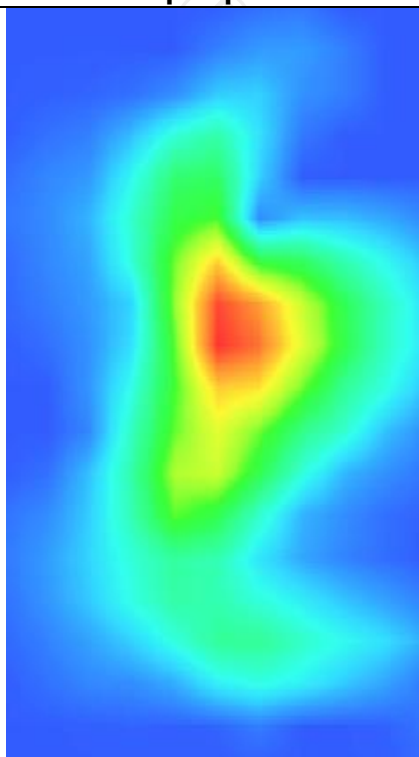
SAR 10g (W/Kg)	0.240882
SAR 1g (W/Kg)	0.568866



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.1342	0.6080	0.2524	0.0974	0.0385



Hot spot position



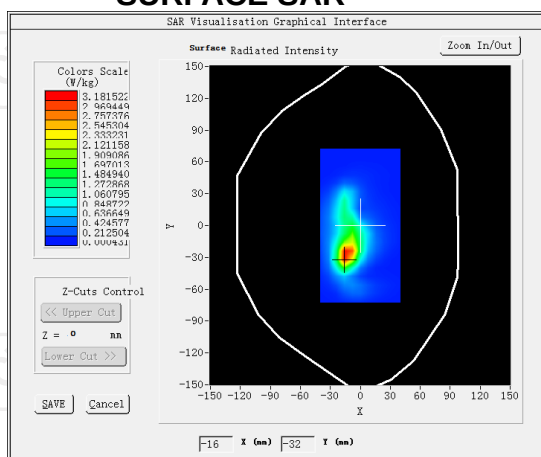
MEASUREMENT 2

Middle Band SAR (Channel 661):

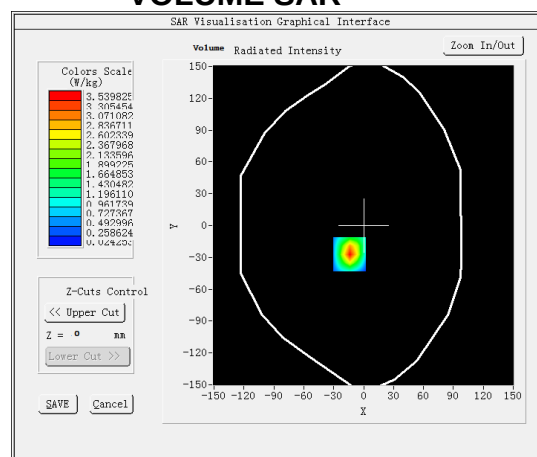
Date: 05/11/2023

Frequency (MHz)	1880.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.408000
Conductivity (S/m)	1.400391
Variation (%)	-3.160000
Crest Factor	1.0
Probe Conversion factor	2.23
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(0mm)</u>
Band	<u>GSM1900(GPRS 2slot)</u>

SURFACE SAR

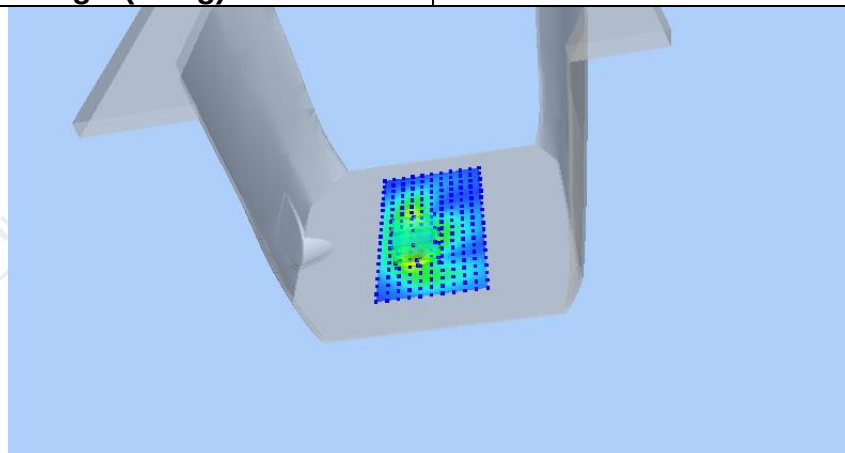


VOLUME SAR

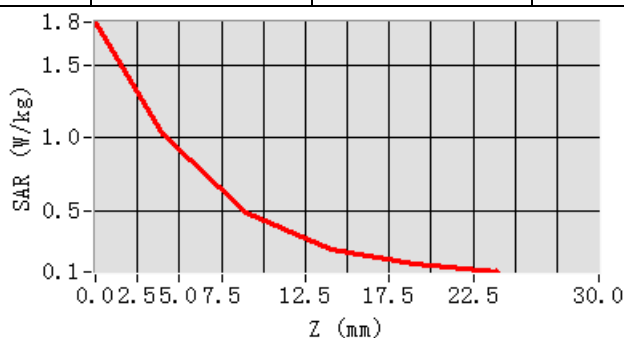


Maximum location: X=-17.00, Y=-1.00 SAR Peak:1.79 W/kg

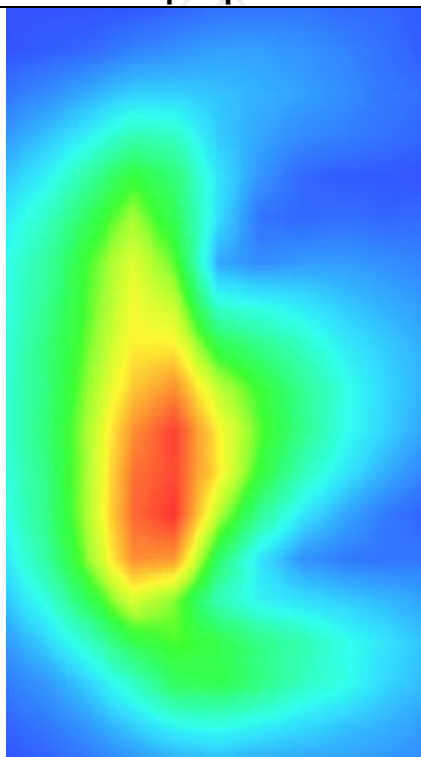
SAR 10g (W/Kg)	0.464003
SAR 1g (W/Kg)	0.645943



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.7918	1.0248	0.4870	0.2387	0.1364



Hot spot position



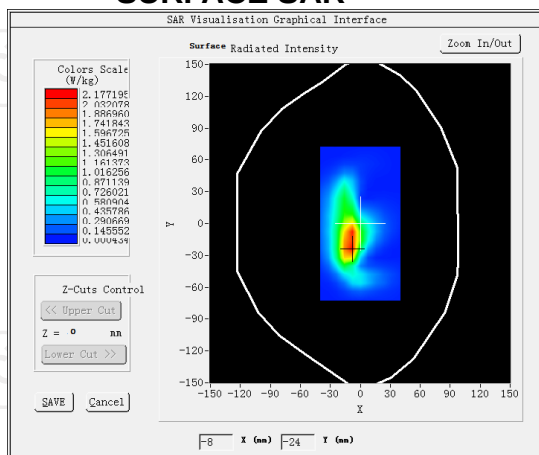
MEASUREMENT 3

Middle Band SAR (Channel 661):

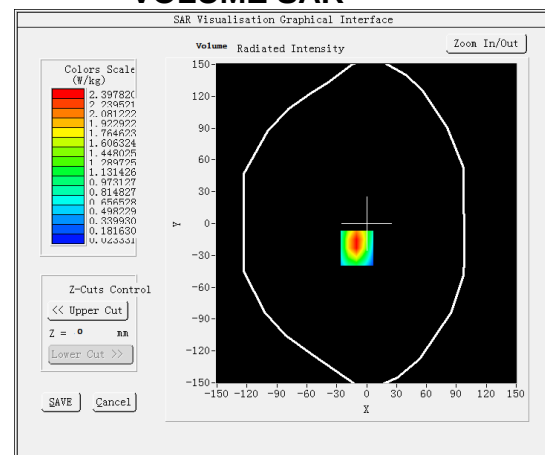
Date: 05/11/2023

Frequency (MHz)	1880.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.408000
Conductivity (S/m)	1.400391
Variation (%)	0.850000
Crest Factor	1.0
Probe Conversion factor	2.23
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(0mm)</u>
Band	<u>GSM1900(GPRS 2slot hotspot)</u>

SURFACE SAR

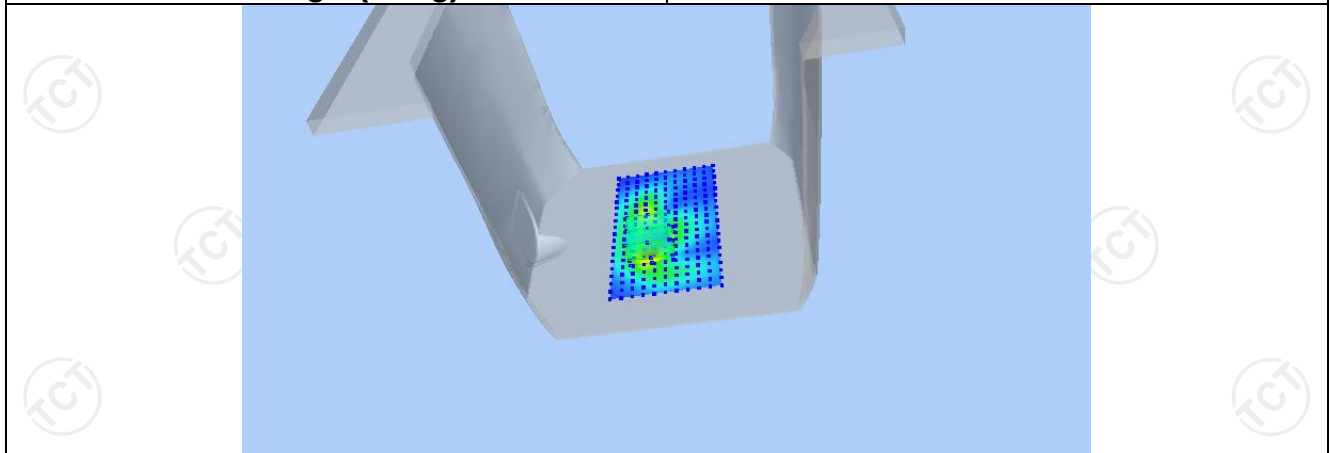


VOLUME SAR

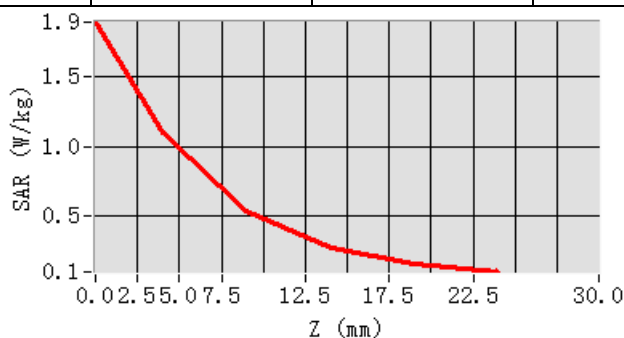


Maximum location: X=-1.00, Y=-9.00 SAR Peak: 1.89 W/kg

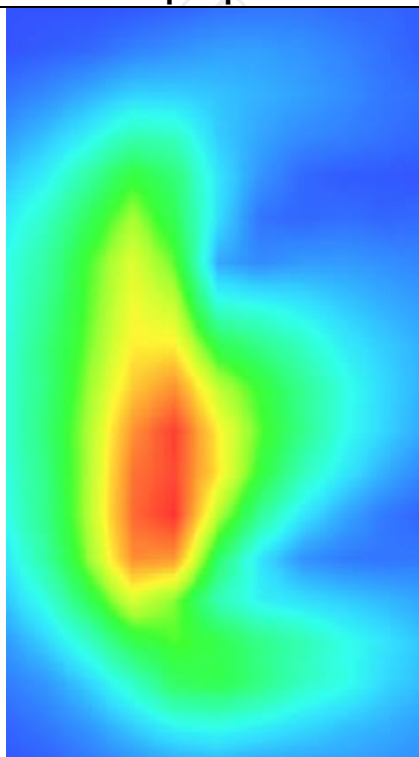
SAR 10g (W/Kg)	0.505055
SAR 1g (W/Kg)	0.727390



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.8913	1.0978	0.5344	0.2689	0.1563



Hot spot position



WCDMA Band II

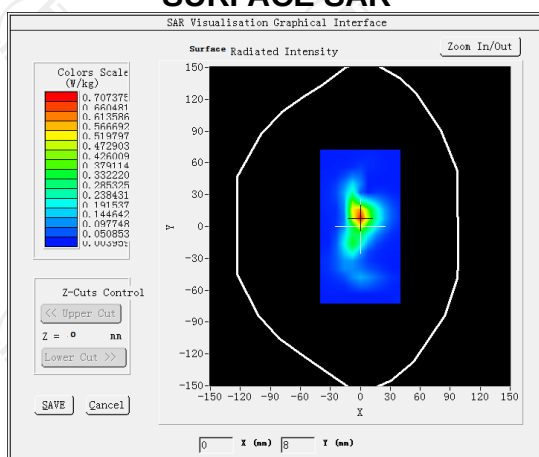
MEASUREMENT 1

Middle Band SAR (Channel 9400):

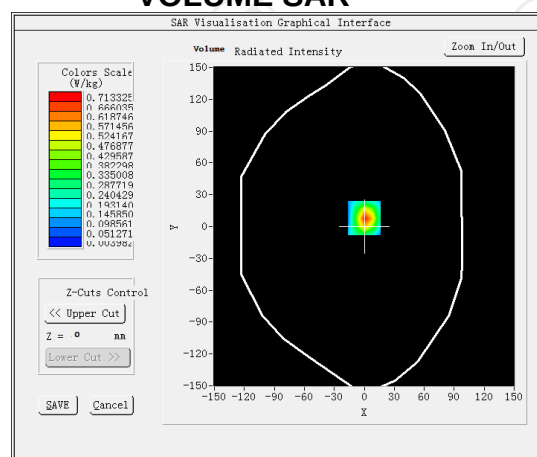
Date: 05/11/2023

Frequency (MHz)	1880.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.408000
Conductivity (S/m)	1.400391
Variation (%)	0.880000
Crest Factor	1.0
Probe Conversion factor	2.23
E-Field Probe:	SSE2 (SN 25/22 EPGO375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(0mm)</u>
Band	<u>BAND2 WCDMA1900</u>

SURFACE SAR

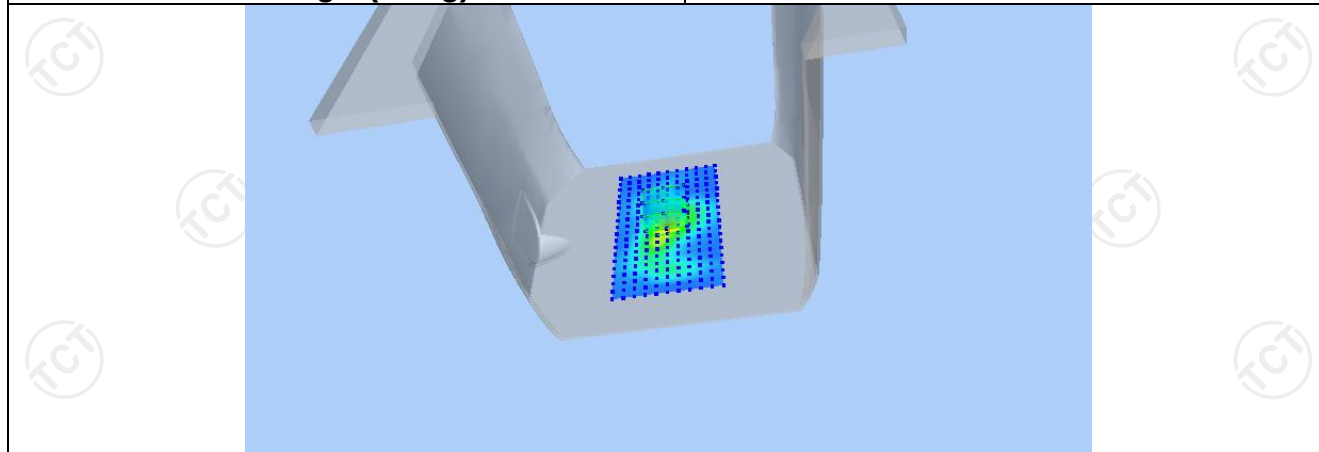


VOLUME SAR

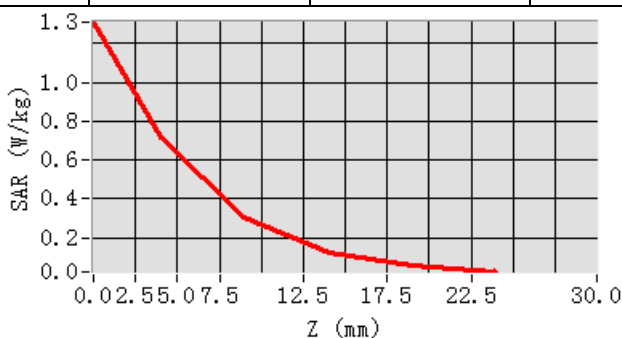


Maximum location: X=0.00, Y=8.00 SAR Peak: 1.31 W/kg

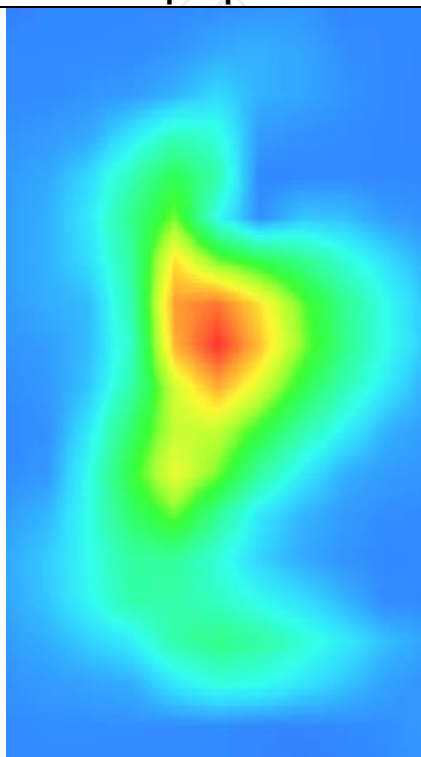
SAR 10g (W/Kg)	0.281843
SAR 1g (W/Kg)	0.653800



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.3100	0.7133	0.3058	0.1249	0.0541



Hot spot position



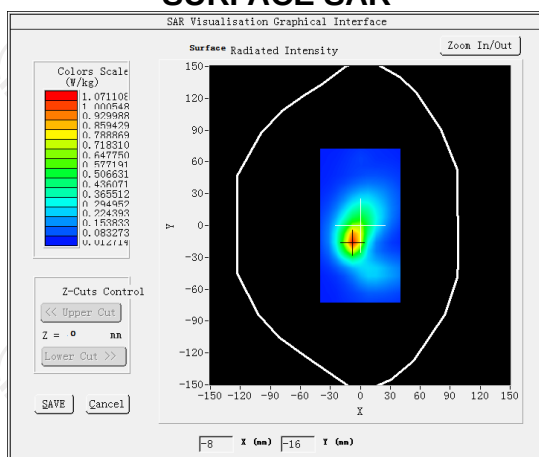
MEASUREMENT 2

Middle Band SAR (Channel 9400):

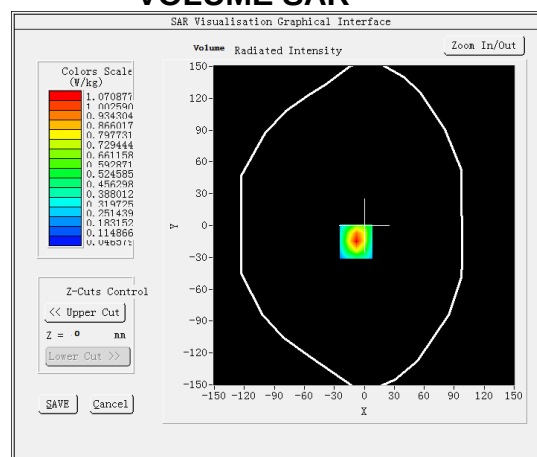
Date: 05/11/2023

Frequency (MHz)	1980.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.408000
Conductivity (S/m)	1.400391
Variation (%)	-4.560000
Crest Factor	1.0
Probe Conversion factor	2.23
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(0mm)</u>
Band	<u>BAND2 WCDMA1900(hotspot)</u>

SURFACE SAR



VOLUME SAR



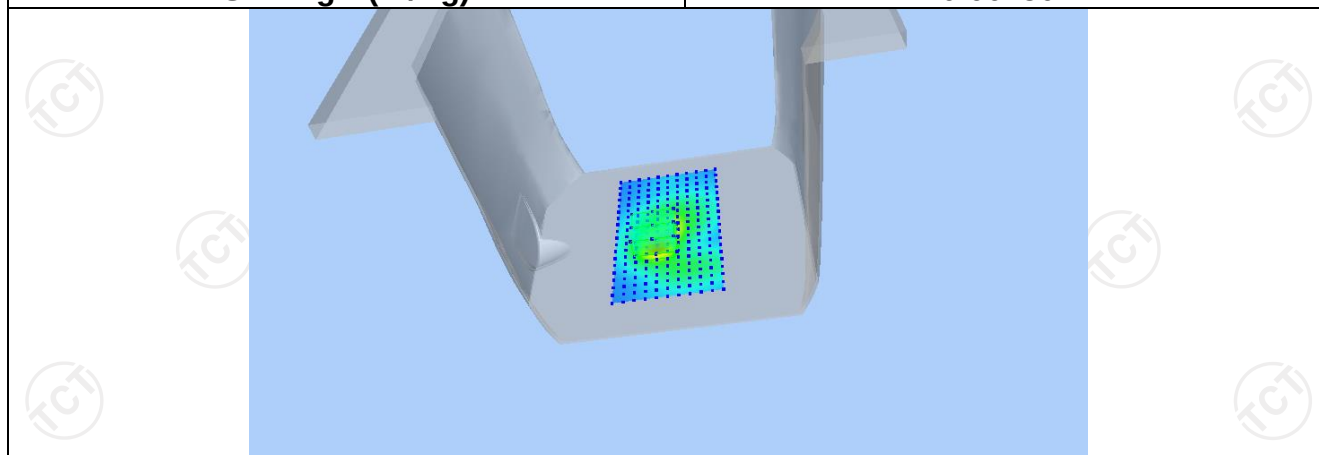
Maximum location: X=-8.00, Y=-15.00 SAR Peak: 1.82 W/kg

SAR 10g (W/Kg)

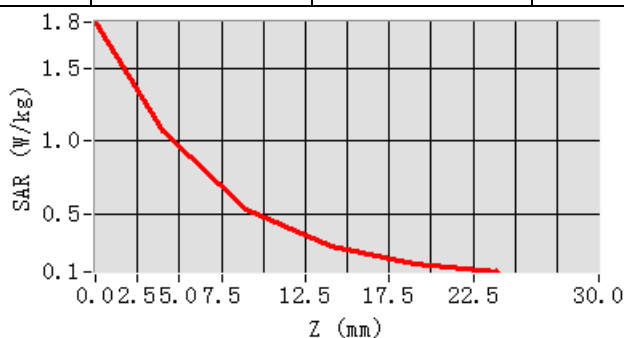
0.490574

SAR 1g (W/Kg)

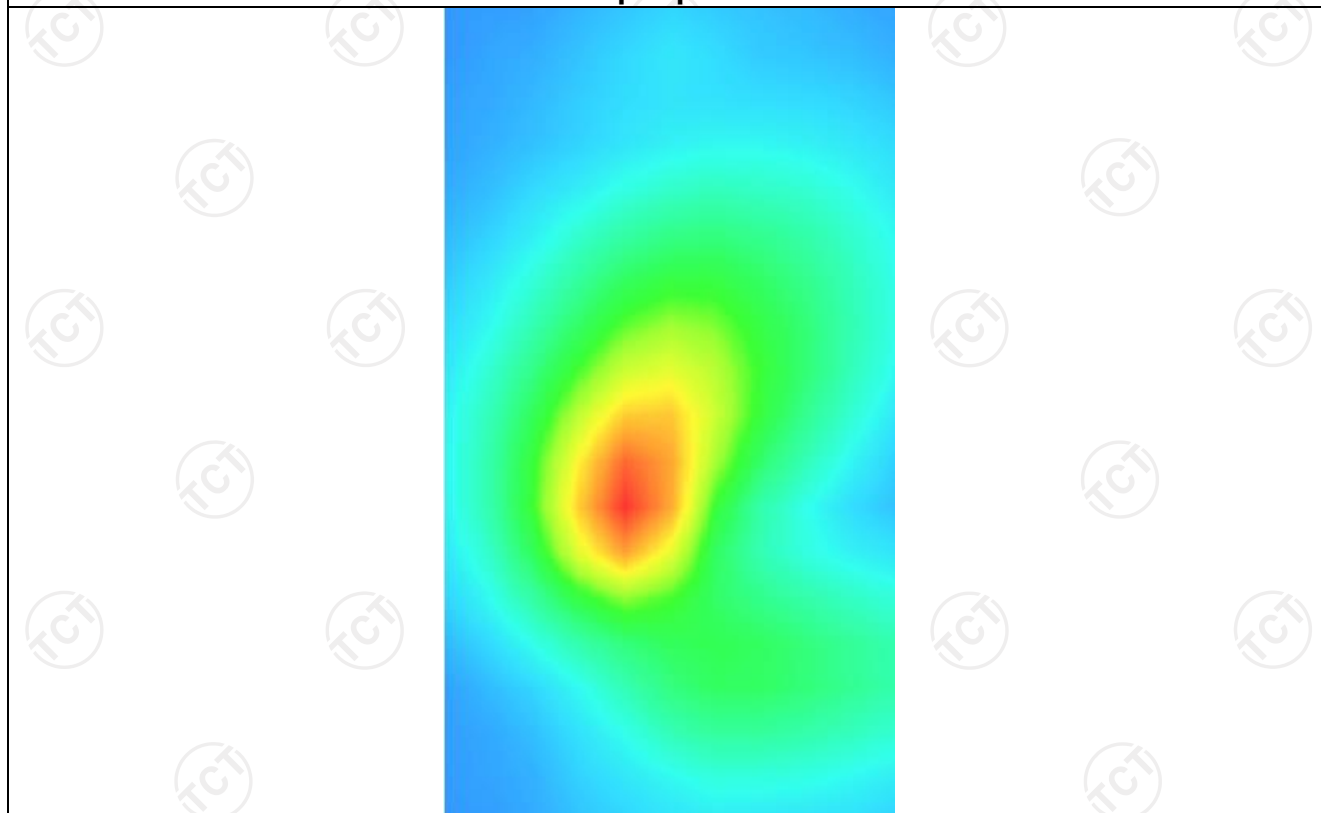
0.667307



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.8123	1.0709	0.5371	0.2800	0.1678



Hot spot position



WCDMA Band IV

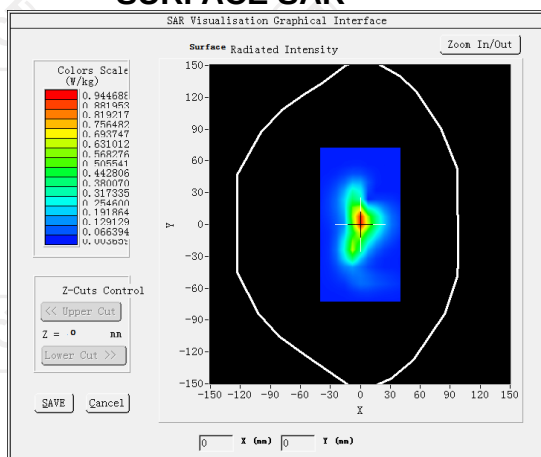
MEASUREMENT 1

High Band SAR (Channel 1513):

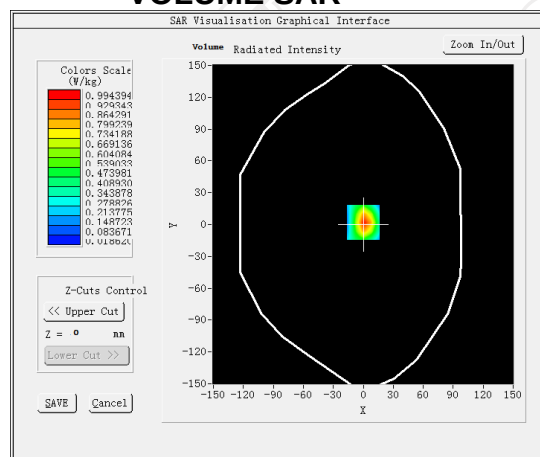
Date: 05/09/2023

Frequency (MHz)	1752.600000
Relative permittivity (real part)	40.116364
Relative permittivity (imaginary part)	14.137455
Conductivity (S/m)	1.360337
Variation (%)	2.940000
Crest Factor	1.0
Probe Conversion factor	2.08
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back(0mm)
Band	BAND4 WCDMA1700

SURFACE SAR

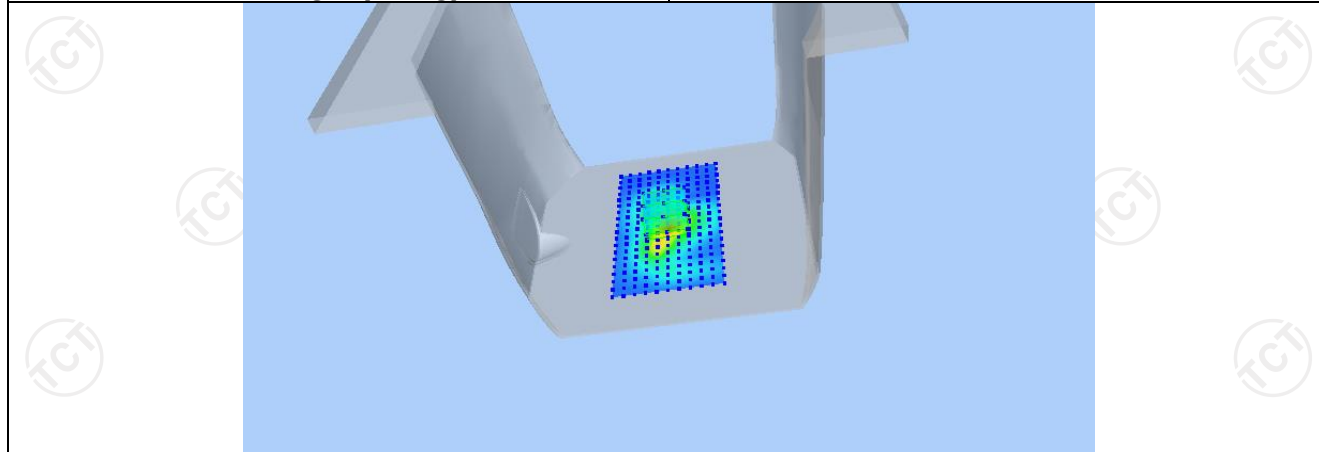


VOLUME SAR

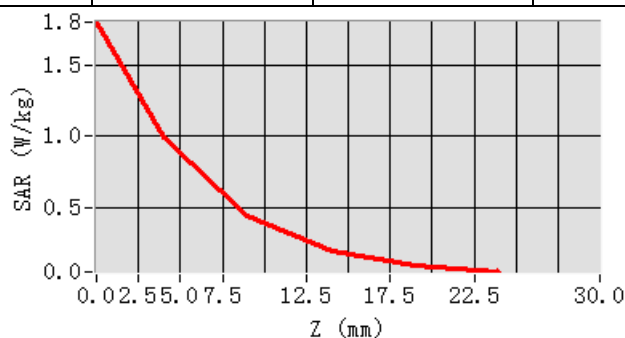


Maximum location: X=0.00, Y=2.00 SAR Peak:1.82 W/kg

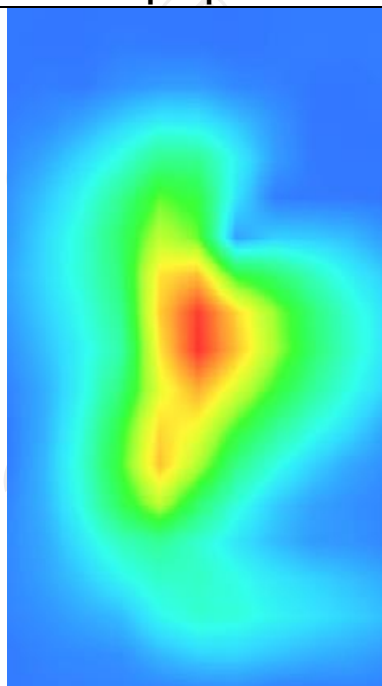
SAR 10g (W/Kg)	0.416153
SAR 1g (W/Kg)	0.721264



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.8033	0.9944	0.4385	0.1892	0.0901



Hot spot position



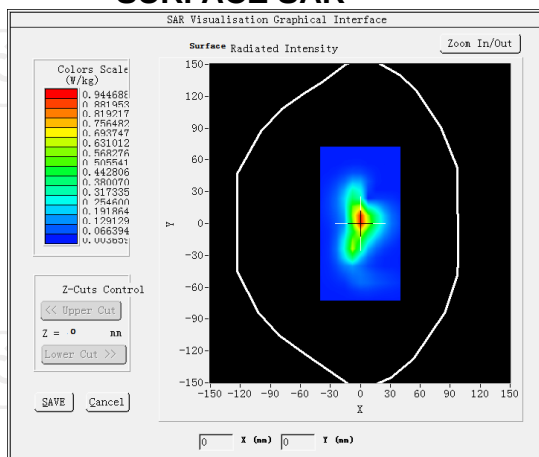
MEASUREMENT 2

High Band SAR (Channel 1513):

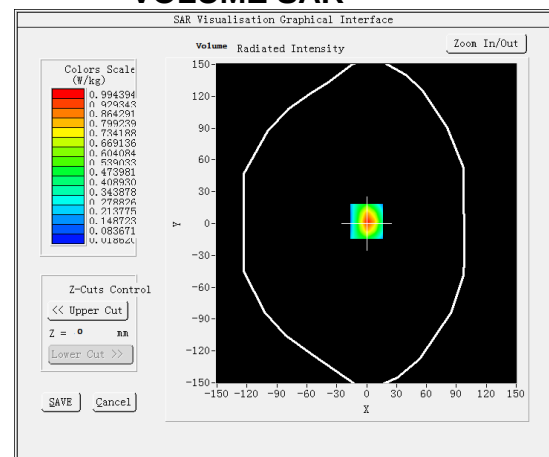
Date: 05/09/2023

Frequency (MHz)	1752.600000
Relative permittivity (real part)	40.116364
Relative permittivity (imaginary part)	14.137455
Conductivity (S/m)	1.360337
Variation (%)	-3.890000
Crest Factor	1.0
Probe Conversion factor	2.08
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(hotspot 0mm)</u>
Band	<u>BAND4 WCDMA1700</u>

SURFACE SAR



VOLUME SAR



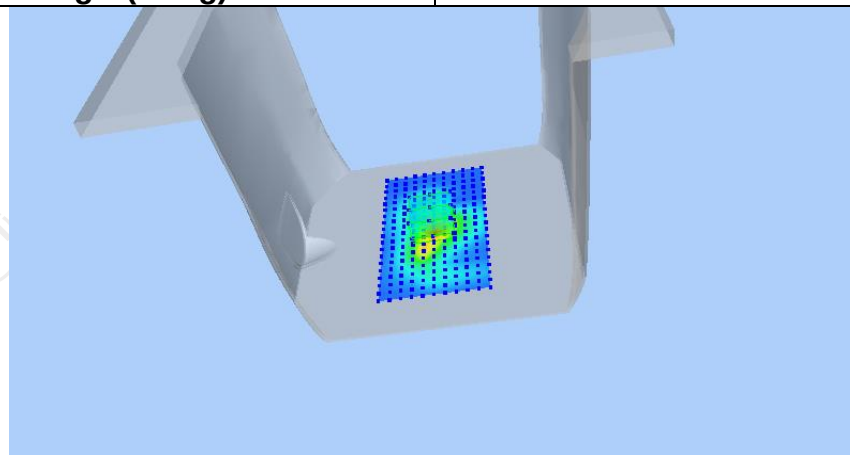
Maximum location: X=-8.00, Y=-15.00 SAR Peak: 1.58 W/kg

SAR 10g (W/Kg)

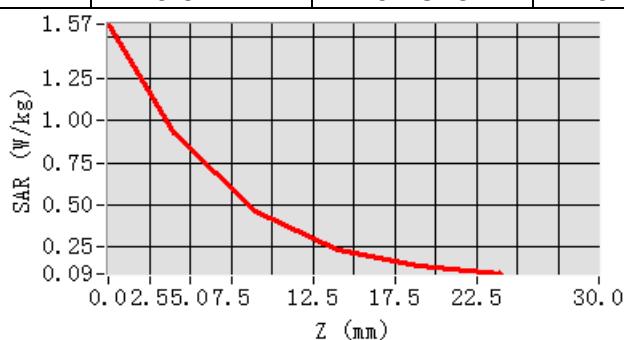
0.425613

SAR 1g (W/Kg)

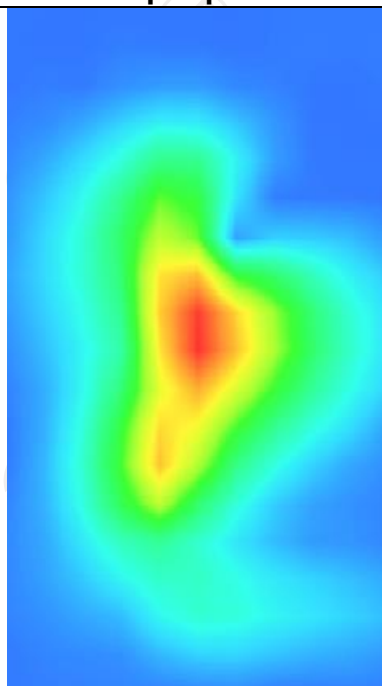
0.752592



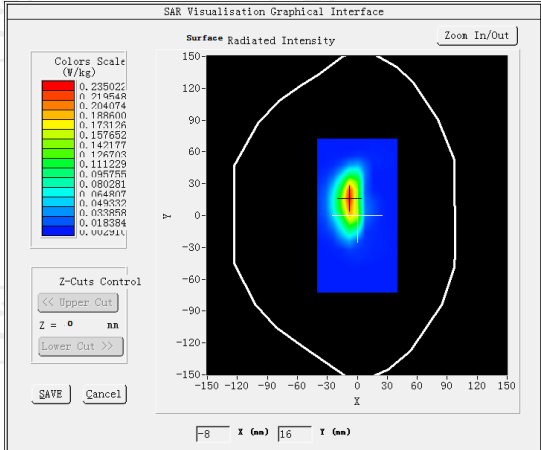
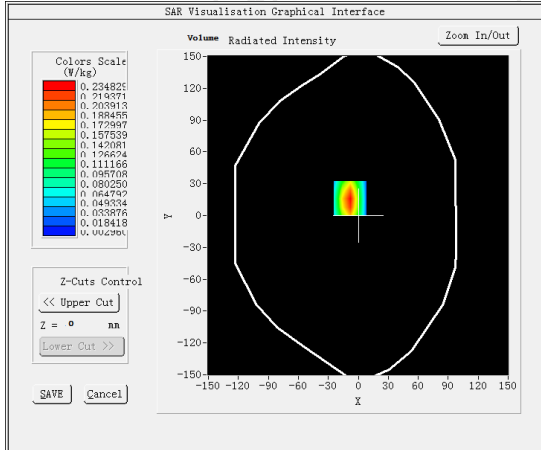
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.5712	0.9221	0.4576	0.2360	0.1406

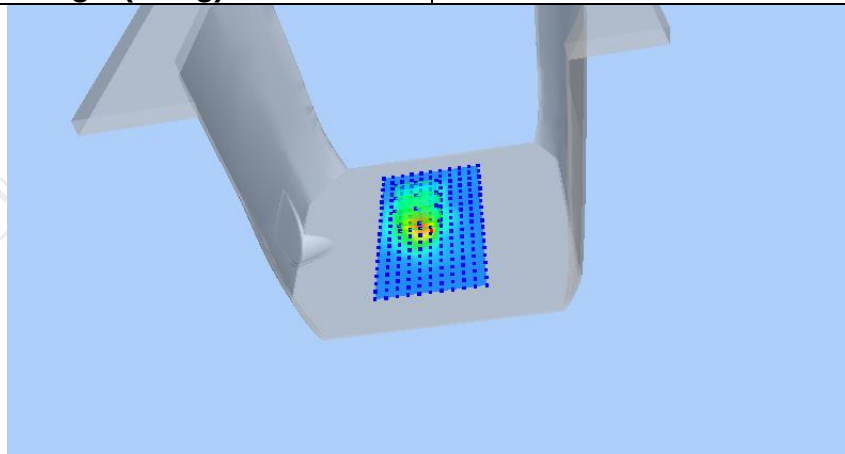


Hot spot position

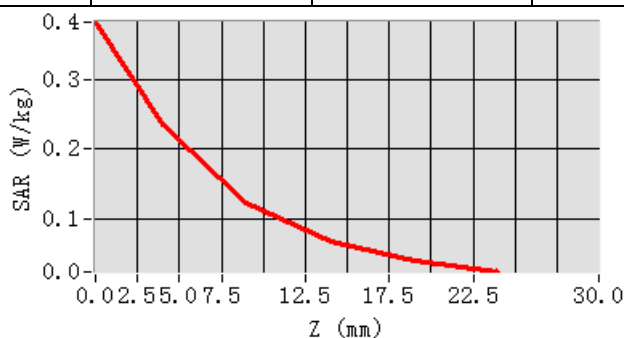


WCDMA Band V MEASUREMENT 1

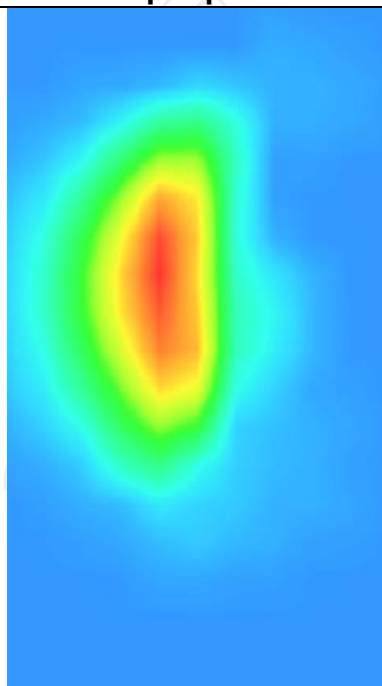
Low Band SAR (Channel 4132):		Date: 05/04/2023
Frequency (MHz)	862.400000	
Relative permittivity (real part)	41.500000	
Relative permittivity (imaginary part)	19.400000	
Conductivity (S/m)	0.901453	
Variation (%)	-1.850000	
Crest Factor:	1.0	
Probe Conversion factor	1.80	
E-Field Probe:	SSE2 (SN 25/22 EPG0375)	
Area Scan	dx=8mm dy=8mm, h= 5.00 mm	
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm	
Phantom	Validation plane	
Device Position	Body back(0mm)	
Band	BAND5 WCDMA850	
SURFACE SAR	VOLUME SAR	
		
Maximum location: X=-8.00, Y=16.00 SAR Peak: 0.39 W/kg		
SAR 10g (W/Kg)	0.108291	
SAR 1g (W/Kg)	0.217088	



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3844	0.2348	0.1229	0.0653	0.0377



Hot spot position



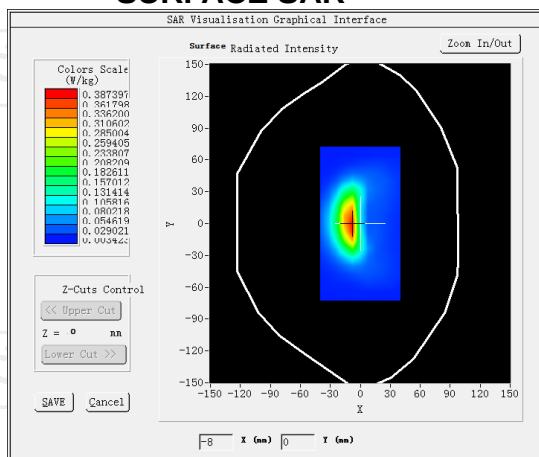
MEASUREMENT 2

Low Band SAR (Channel 4132):

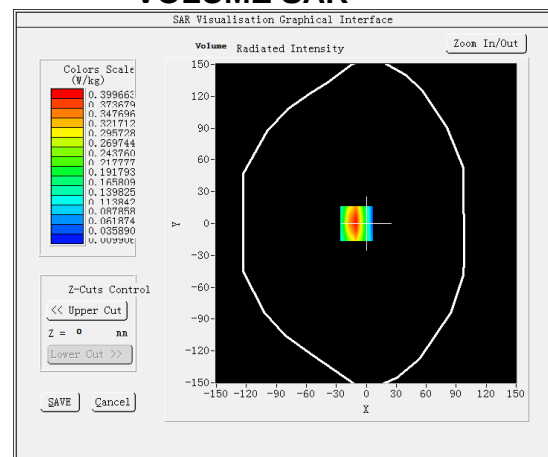
Date: 05/04/2023

Frequency (MHz)	862.400000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.901453
Variation (%)	-3.260000
Crest Factor:	1.0
Probe Conversion factor	1.80
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(0mm)</u>
Band	<u>BAND5 WCDMA850(hotspot)</u>

SURFACE SAR

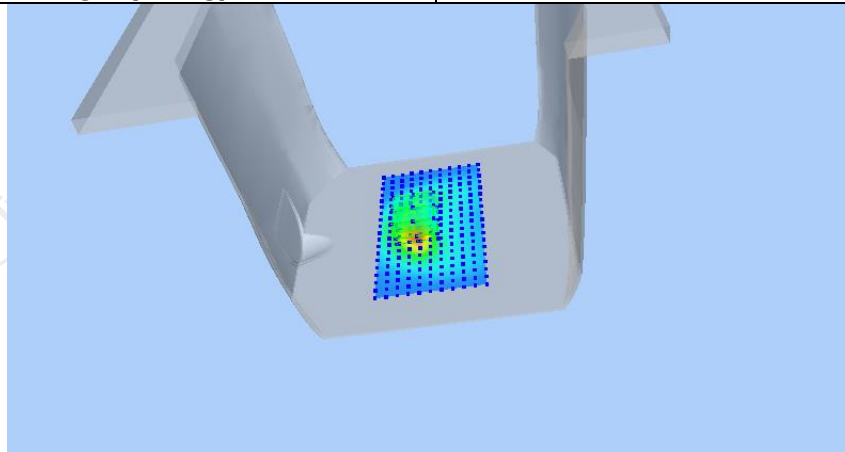


VOLUME SAR

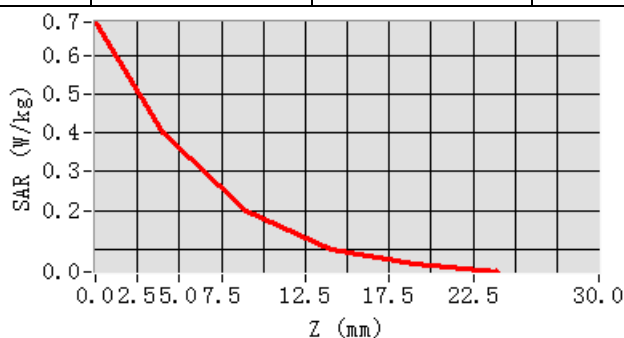


Maximum location: X=-10.00, Y=0.00 SAR Peak:0.69 W/kg

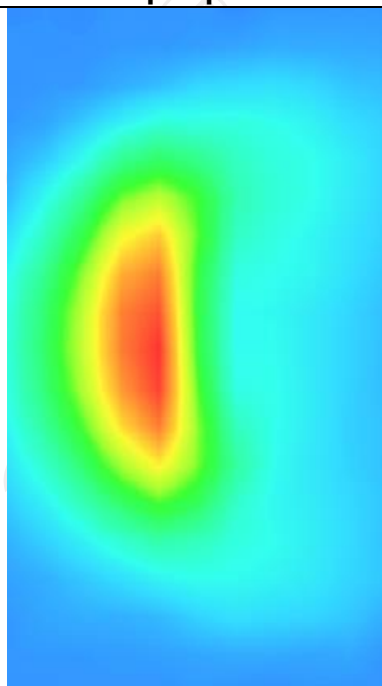
SAR 10g (W/Kg)	0.189435
SAR 1g (W/Kg)	0.375034



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6856	0.3997	0.1968	0.1016	0.0616



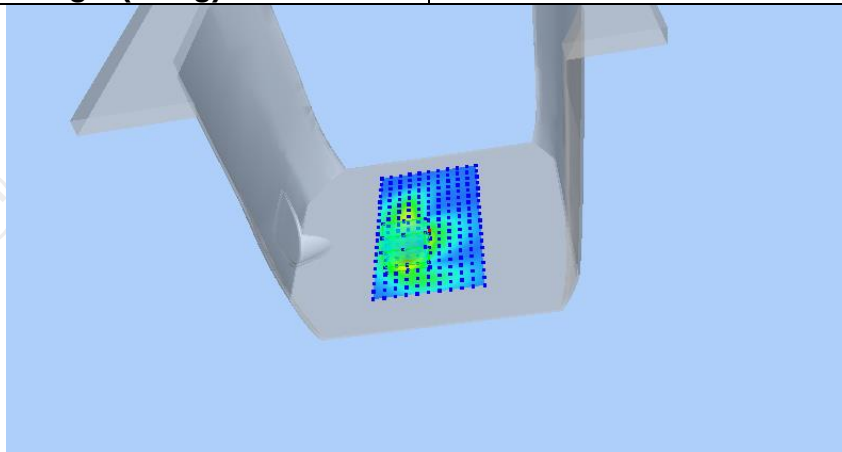
Hot spot position



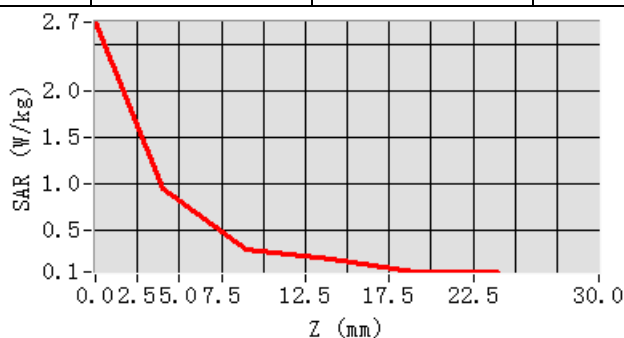
LTE Band 2

MEASUREMENT 1

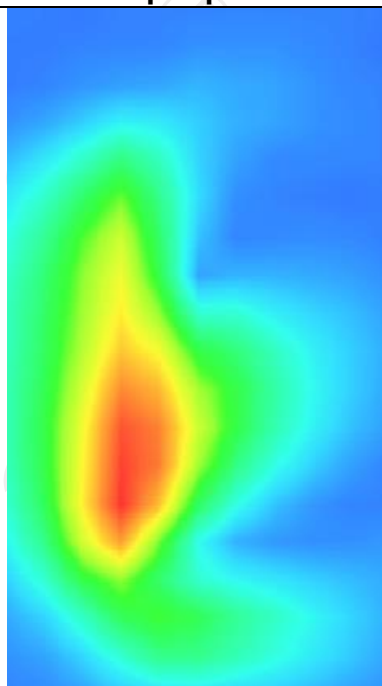
High Band SAR (Channel 19100):		Date: 05/11/2023
Frequency (MHz)	1900.000000	
Relative permittivity (real part)	40.000000	
Relative permittivity (imaginary part)	13.411700	
Conductivity (S/m)	1.400405	
Variation (%)	-0.220000	
Crest Factor	1.0	
Probe Conversion factor	2.23	
E-Field Probe:	SSE2 (SN 25/22 EPG0375)	
Area Scan	dx=8mm dy=8mm, h= 5.00 mm	
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm	
Phantom	Validation plane	
Device Position	Body back(0mm)	
Band	LTE band 2 (1 RB#49)	
SURFACE SAR	VOLUME SAR	
SAR Visualisation Graphical Interface Colors Scale (W/kg) 0.888150 0.822005 0.770259 0.711313 0.652368 0.593422 0.534476 0.475531 0.416585 0.357639 0.298693 0.239748 0.180802 0.121856 0.062911 0.003960 Z-Outs Control << Upper Out Z = 0 mm Lower Out >> SAVE Cancel Surface Radiated Intensity Zoom In/Out -150 -120 -90 -60 -30 0 30 60 90 120 150 X Y -16 X (mm) -32 Y (mm) Colors Scale (W/kg) 0.949720 0.887528 0.824929 0.762531 0.700133 0.637735 0.575337 0.512939 0.450541 0.388143 0.325745 0.263347 0.200949 0.138551 0.076153 0.013755 Z-Outs Control << Upper Out Z = 0 mm Lower Out >> SAVE Cancel Volume Radiated Intensity Zoom In/Out -150 -120 -90 -60 -30 0 30 60 90 120 150 X Y Maximum location: X=-15.00, Y=-30.00 SAR Peak: 1.74 W/kg SAR 10g (W/Kg) SAR 1g (W/Kg) 0.421724 0.690855		



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.7449	0.9497	0.2940	0.1953	0.0648



Hot spot position



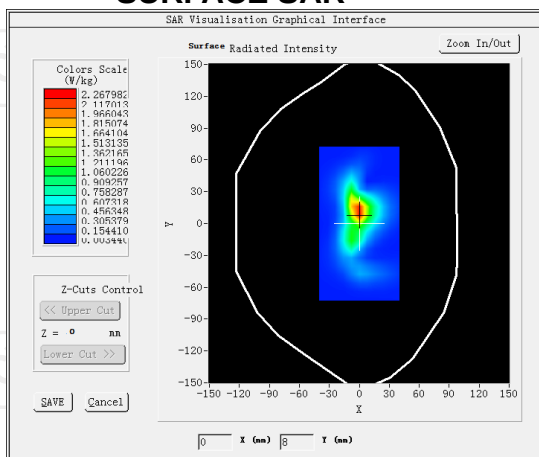
MEASUREMENT 2

High Band SAR (Channel 19100):

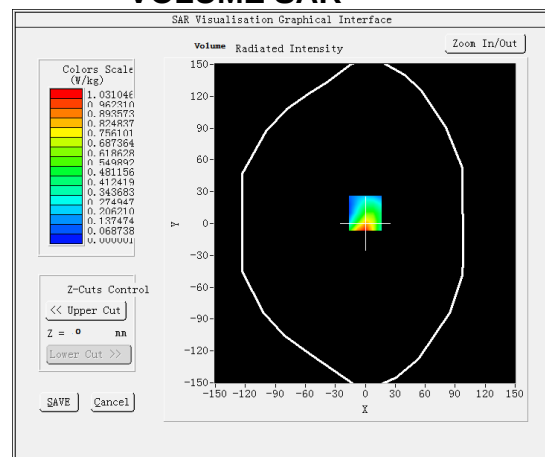
Date: 05/11/2023

Frequency (MHz)	1900.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.411700
Conductivity (S/m)	1.400405
Variation (%)	0.890000
Crest Factor	1.0
Probe Conversion factor	2.23
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(hotspot 0mm)</u>
Band	<u>LTE band 2 (1 RB#49)</u>

SURFACE SAR

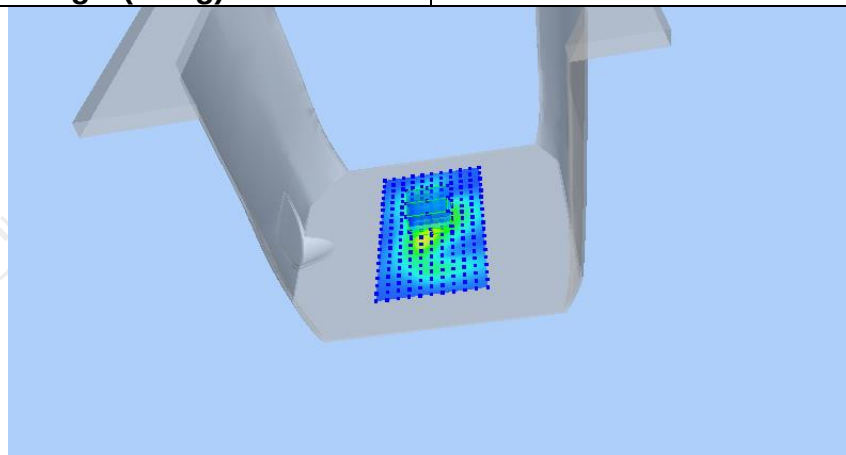


VOLUME SAR

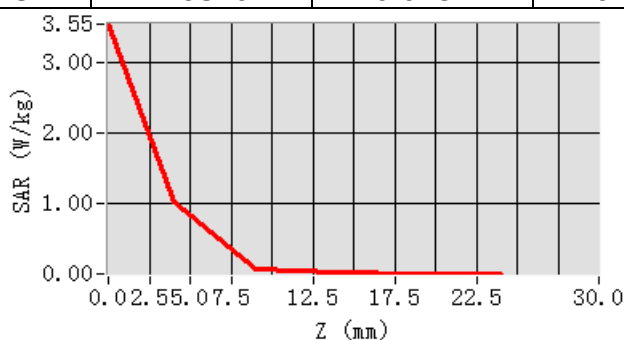


Maximum location: X=0.00, Y=10.00 SAR Peak: 3.27W/kg

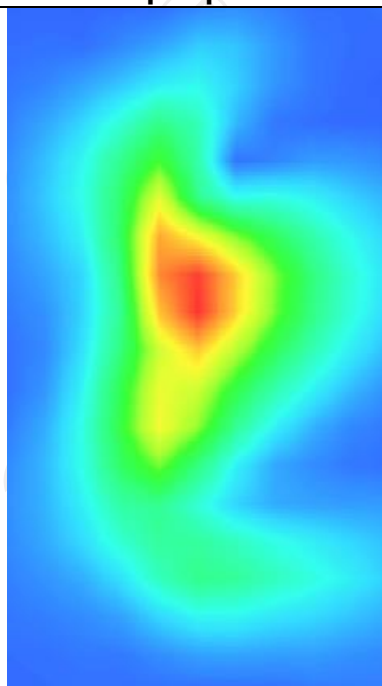
SAR 10g (W/Kg)	0.345521
SAR 1g (W/Kg)	0.748512



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	3.5513	1.0310	0.0757	0.0224	0.0099



Hot spot position



LTE Band 4

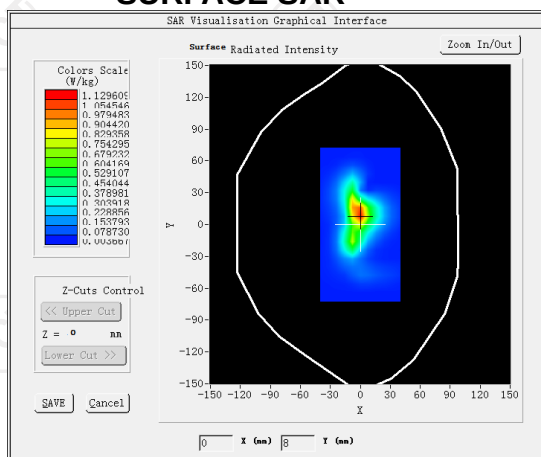
MEASUREMENT 1

High Band SAR (Channel 20300):

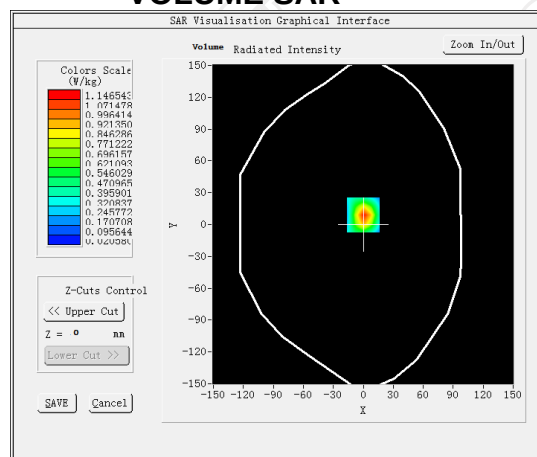
Date: 05/09/2023

Frequency (MHz)	1745.000000
Relative permittivity (real part)	40.115910
Relative permittivity (imaginary part)	14.136136
Conductivity (S/m)	1.360603
Variation (%)	-0.420000
Crest Factor	1.0
Probe Conversion factor	2.08
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back(0mm)
Band	LTE band 4(50 RB#0)

SURFACE SAR

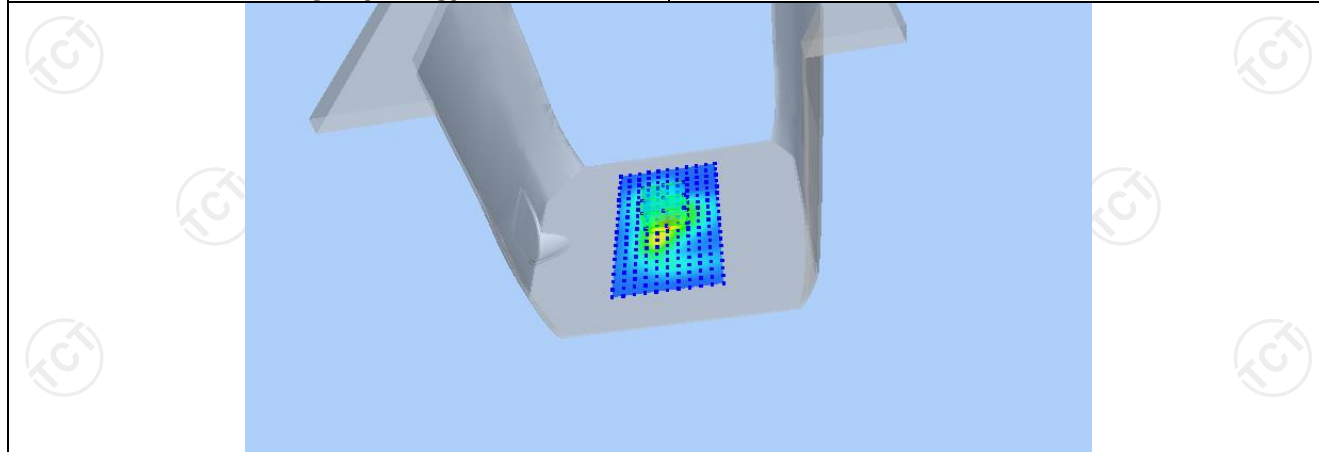


VOLUME SAR

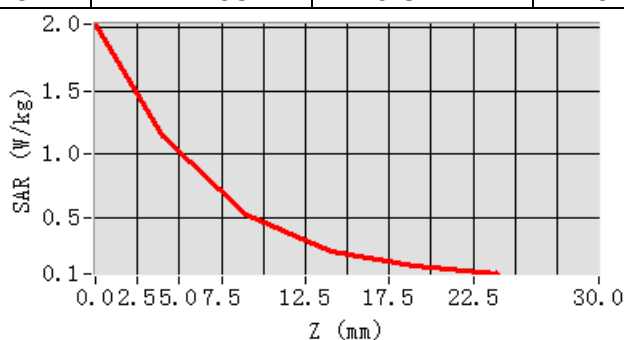


Maximum location: X=0.00, Y=9.00 SAR Peak: 2.04 W/kg

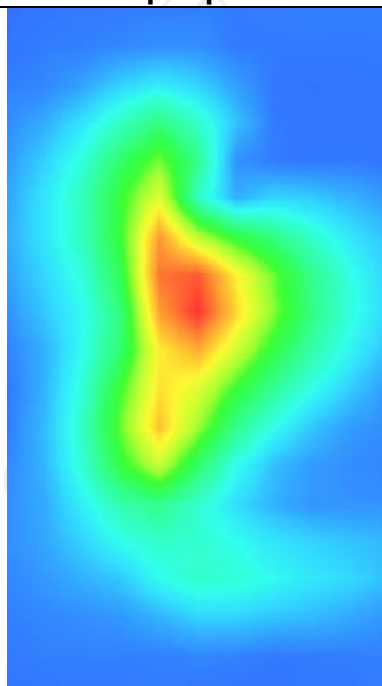
SAR 10g (W/Kg)	0.472179
SAR 1g (W/Kg)	0.706009



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.0316	1.1465	0.5247	0.2353	0.1139



Hot spot position



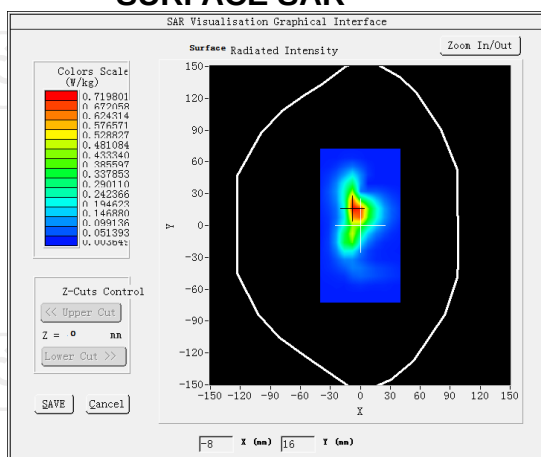
MEASUREMENT 2

High Band SAR (Channel 20300):

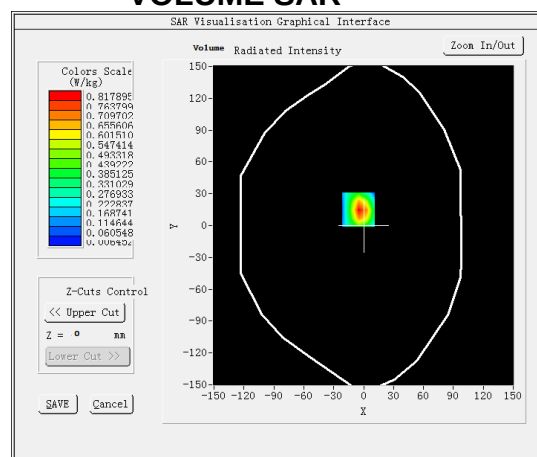
Date: 05/09/2023

Frequency (MHz)	1745.000000
Relative permittivity (real part)	40.115910
Relative permittivity (imaginary part)	14.136136
Conductivity (S/m)	1.360603
Variation (%)	-0.850000
Crest Factor	1.0
Probe Conversion factor	2.08
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(hotspot 0mm)</u>
Band	<u>LTE band 4(50 RB#0)</u>

SURFACE SAR

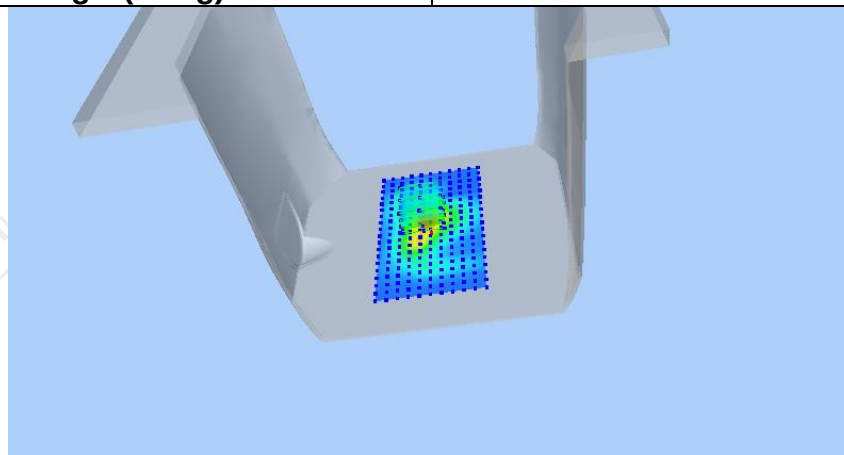


VOLUME SAR

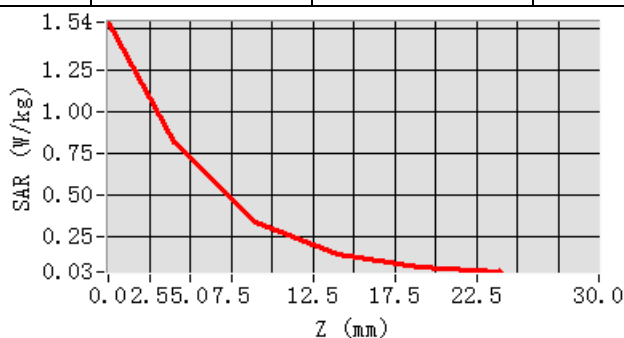


Maximum location: X=-5.00, Y=15.00 SAR Peak: 1.56 W/kg

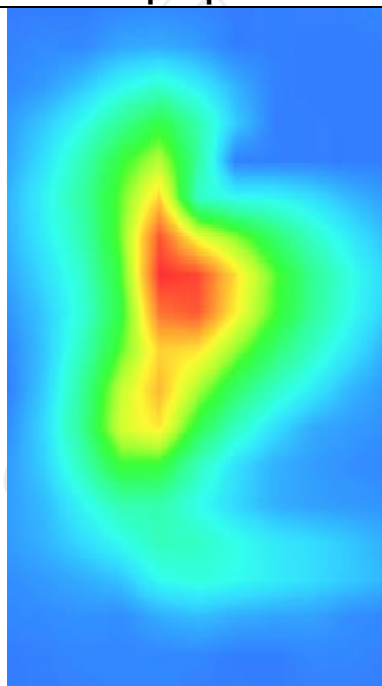
SAR 10g (W/Kg)	0.339921
SAR 1g (W/Kg)	0.767734



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.5425	0.8179	0.3384	0.1371	0.0646



Hot spot position

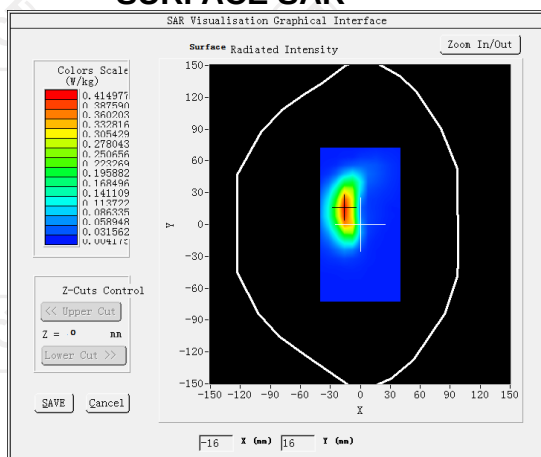


LTE Band 5

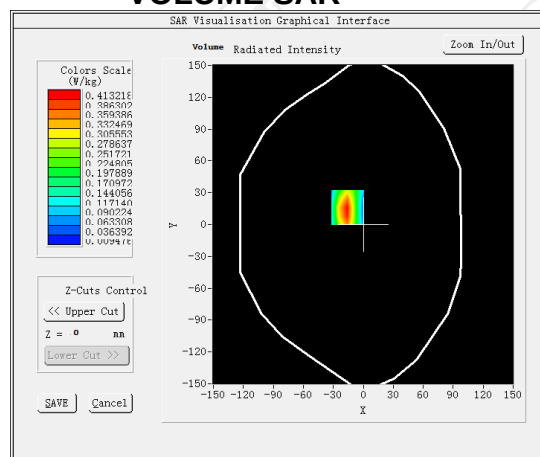
MEASUREMENT 1

High Band SAR (Channel 20600):		Date: 04/28/2023
Frequency (MHz)	844.000000	
Relative permittivity (real part)	41.500000	
Relative permittivity (imaginary part)	19.400000	
Conductivity (S/m)	0.901561	
Variation (%)	-3.780000	
Crest Factor	1.0	
Probe Conversion factor	1.80	
E-Field Probe:	SSE2 (SN 25/22 EPG0375)	
Area Scan	dx=8mm dy=8mm, h= 5.00 mm	
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm	
Phantom	Validation plane	
Device Position	Body back(0mm)	
Band	LTE band 5(25 RB#0)	

SURFACE SAR



VOLUME SAR



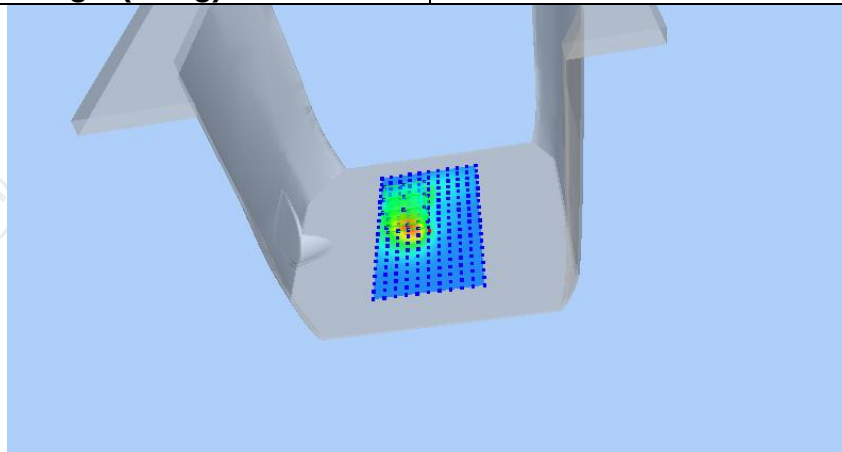
Maximum location: X=-16.00, Y=16.00 SAR Peak: 0.65W/kg

SAR 10g (W/Kg)

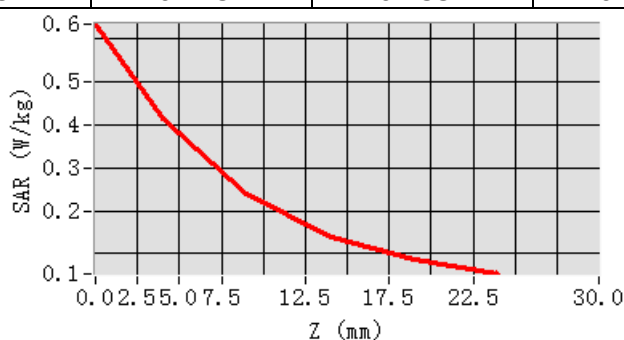
0.202599

SAR 1g (W/Kg)

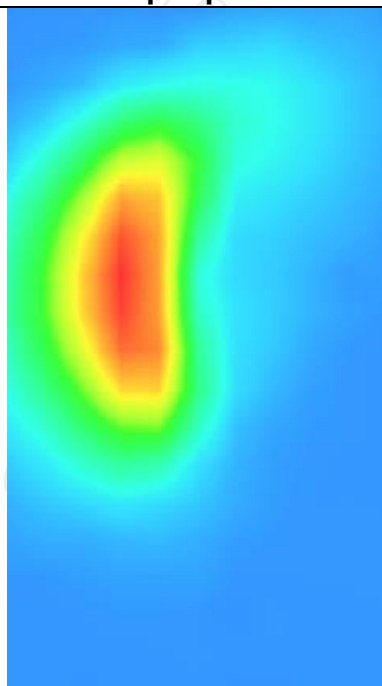
0.383754



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6331	0.4132	0.2382	0.1395	0.0862



Hot spot position



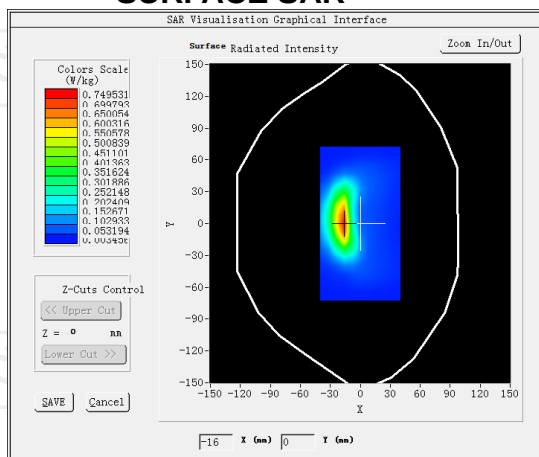
MEASUREMENT 2

High Band SAR (Channel 20600):

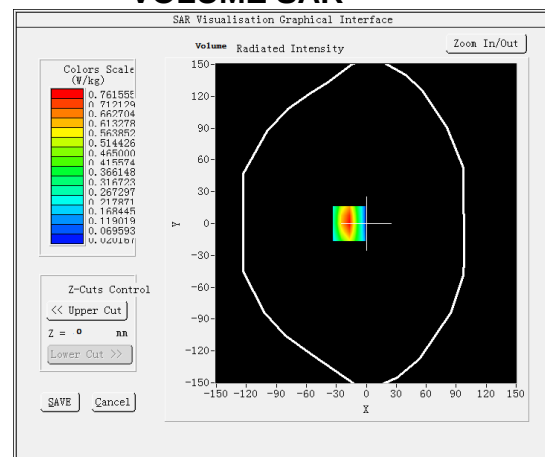
Date: 04/28/2023

Frequency (MHz)	844.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.901561
Variation (%)	-4.750000
Crest Factor	1.0
Probe Conversion factor	1.80
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back((hotspot 10mm)</u>
Band	<u>LTE band 5(25 RB#0)</u>

SURFACE SAR

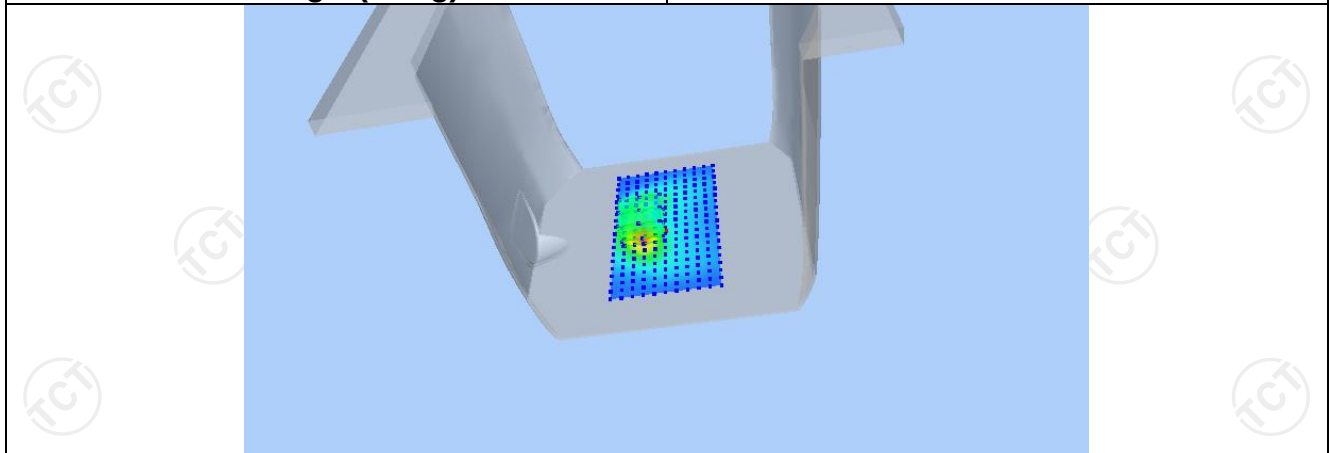


VOLUME SAR

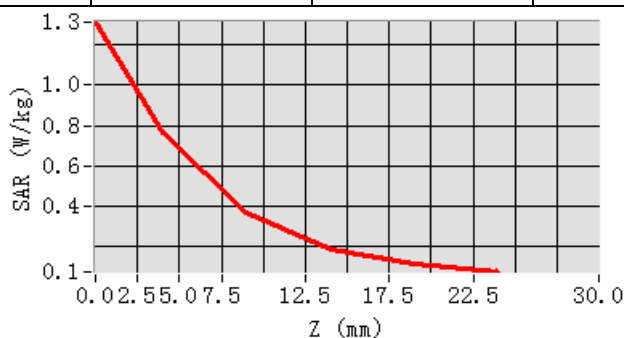


Maximum location: X=-17.00, Y=0.00 SAR Peak: 1.33 W/kg

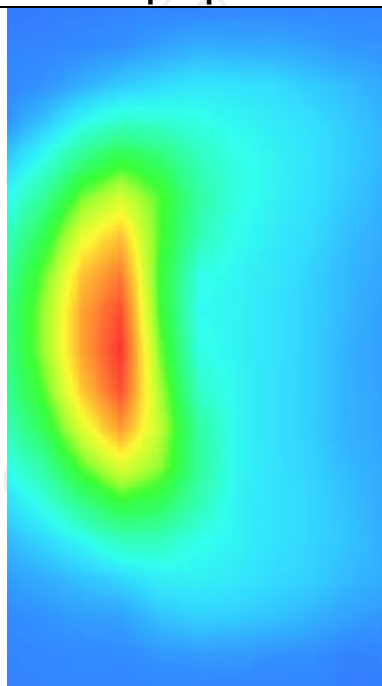
SAR 10g (W/Kg)	0.356548
SAR 1g (W/Kg)	0.403023



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.3117	0.7616	0.3719	0.1892	0.1126



Hot spot position



LTE Band 12

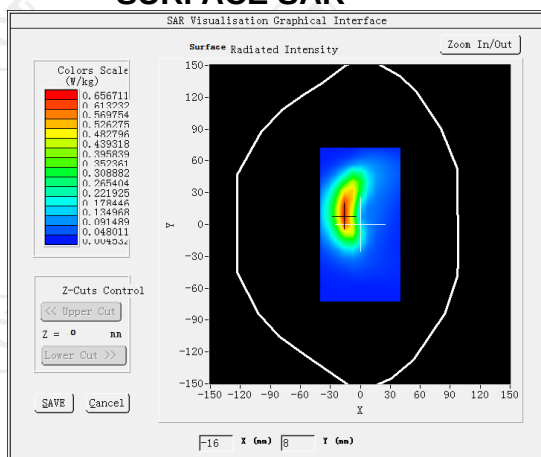
MEASUREMENT 1

High Band SAR (Channel 23130):

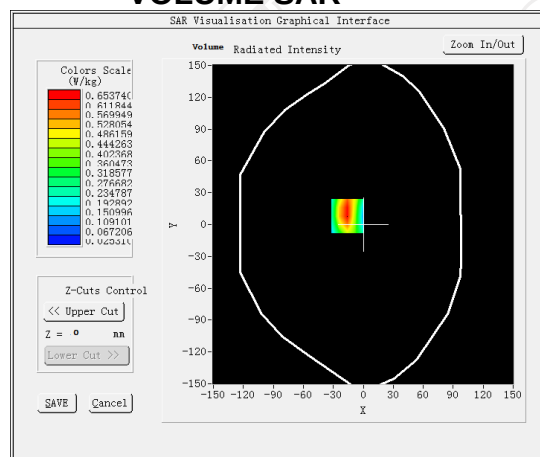
Date: 04/28/2023

Frequency (MHz)	711.000000
Relative permittivity (real part)	42.126667
Relative permittivity (imaginary part)	23.264000
Conductivity (S/m)	0.914404
Variation (%)	-2.340000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back(0mm)
Band	LTE band 12(1 RB#24)

SURFACE SAR

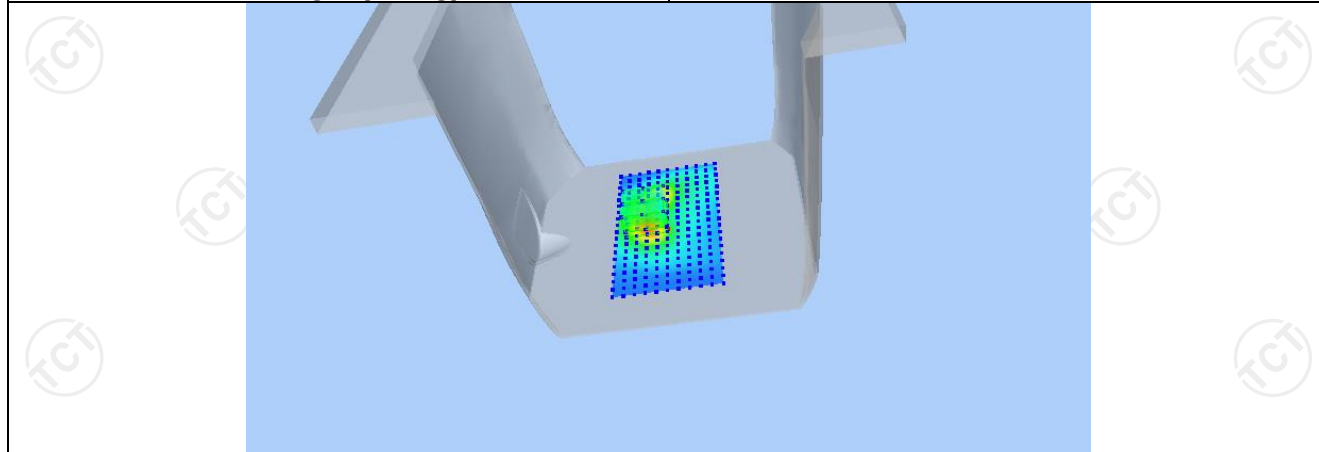


VOLUME SAR

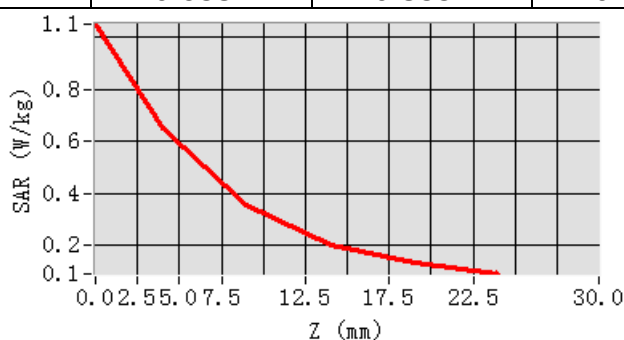


Maximum location: X=-16.00, Y=8.00 SAR Peak:1.07 W/kg

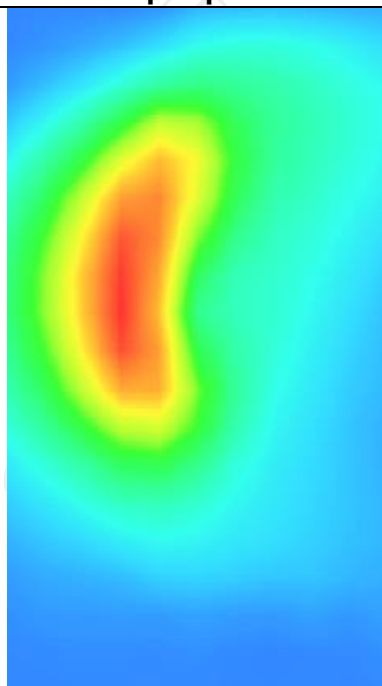
SAR 10g (W/Kg)	0.337382
SAR 1g (W/Kg)	0.627512



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.0511	0.6537	0.3557	0.2029	0.1306



Hot spot position



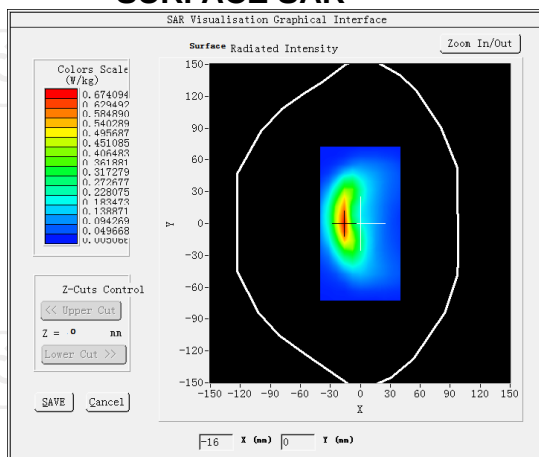
MEASUREMENT 2

High Band SAR (Channel 23130):

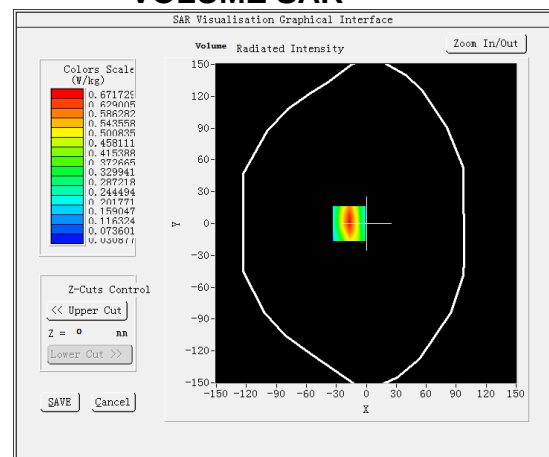
Date: 04/28/2023

Frequency (MHz)	711.000000
Relative permittivity (real part)	42.126667
Relative permittivity (imaginary part)	23.264000
Conductivity (S/m)	0.914404
Variation (%)	-1.740000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(hotspot 0mm)</u>
Band	<u>LTE band 12(1 RB#24)</u>

SURFACE SAR

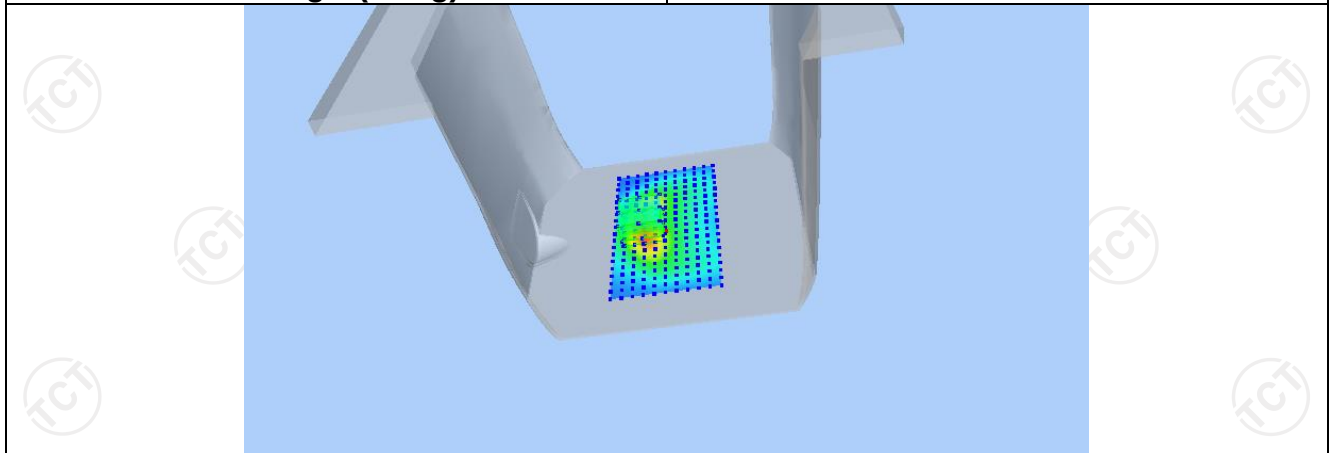


VOLUME SAR

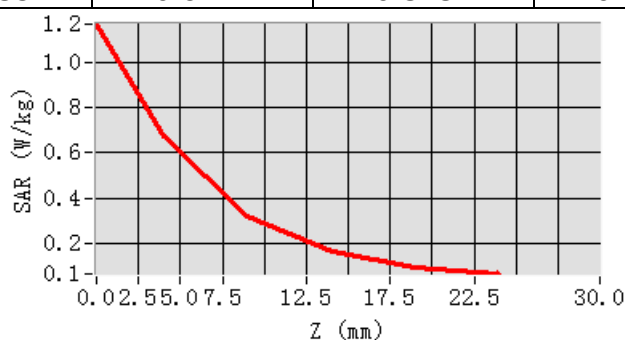


Maximum location: X=-17.00, Y=0.00 SAR Peak: 1.18W/kg

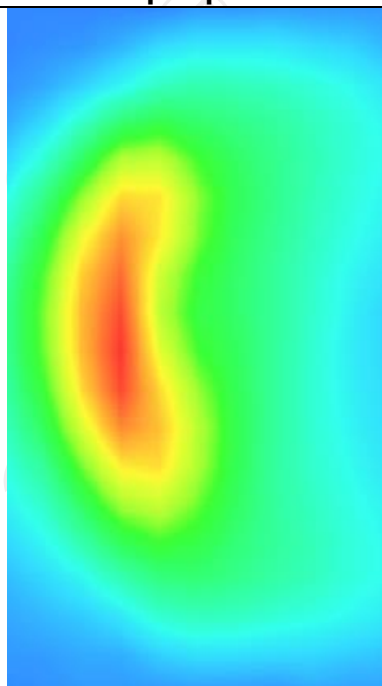
SAR 10g (W/Kg)	0.326643
SAR 1g (W/Kg)	0.641629



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.1685	0.6717	0.3234	0.1630	0.0975



Hot spot position



LTE Band 66

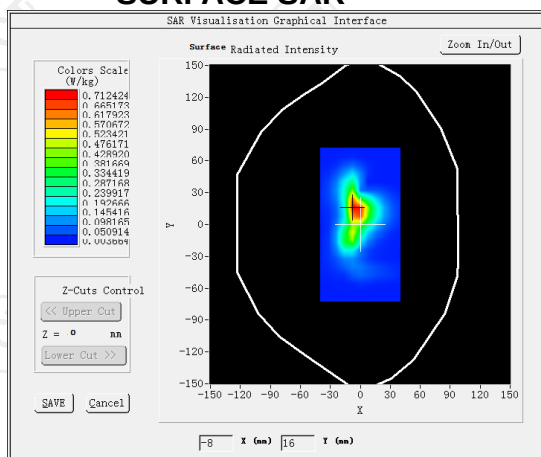
MEASUREMENT 1

High Band SAR (Channel132572):

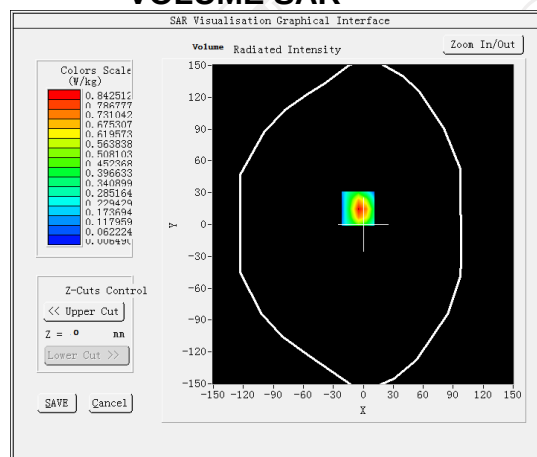
Date: 05/09/2023

Frequency (MHz)	1770.000000
Relative permittivity (real part)	40.115910
Relative permittivity (imaginary part)	14.136136
Conductivity (S/m)	1.360603
Variation (%)	2.460000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back(0mm)
Band	LTE band 66(50 RB#25)

SURFACE SAR



VOLUME SAR



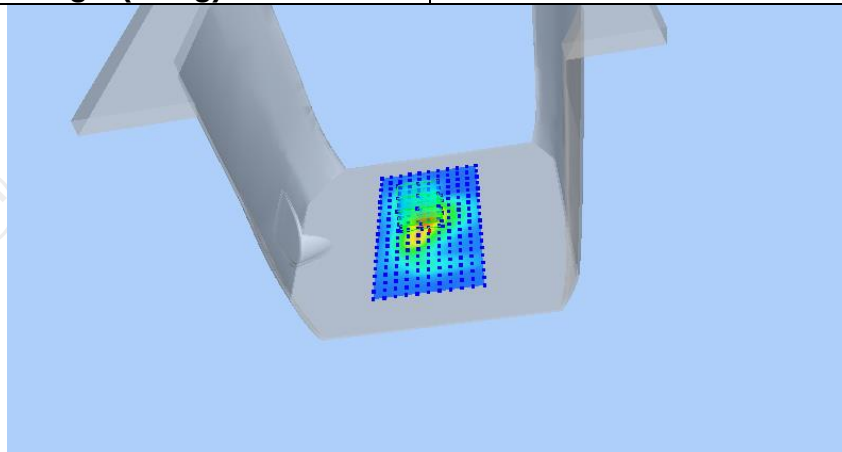
Maximum location: X=-5.00, Y=15.00 SAR Peak: 1.61 W/kg

SAR 10g (W/Kg)

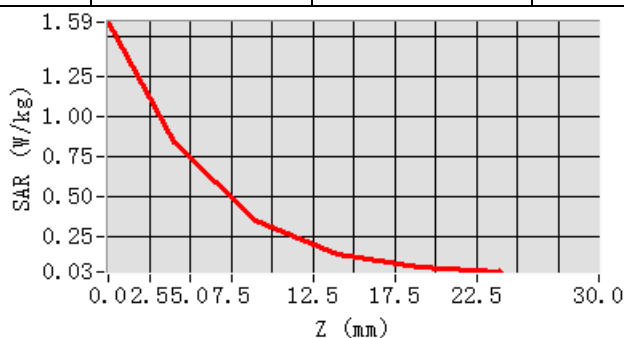
0.349619

SAR 1g (W/Kg)

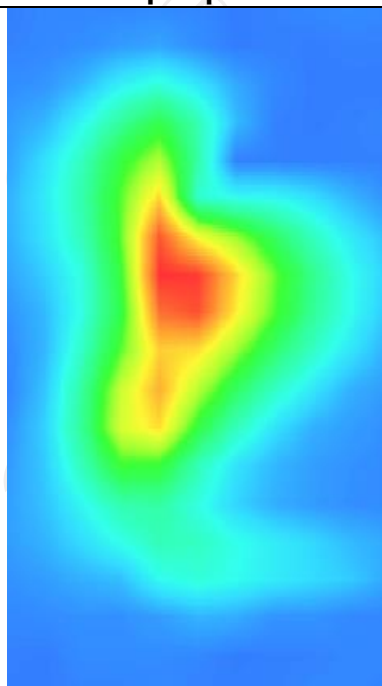
0.692113



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.5886	0.8425	0.3478	0.1393	0.0638



Hot spot position



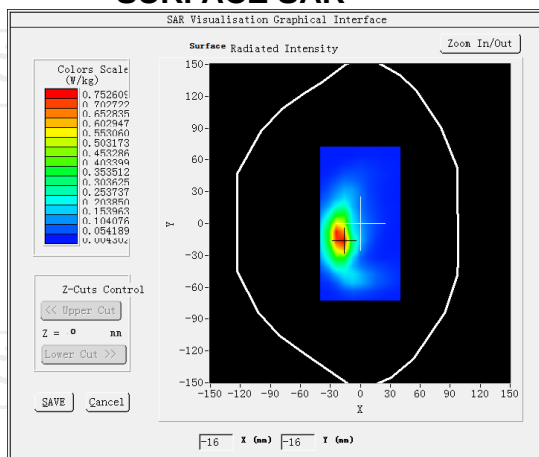
MEASUREMENT 2

High Band SAR (Channel132572):

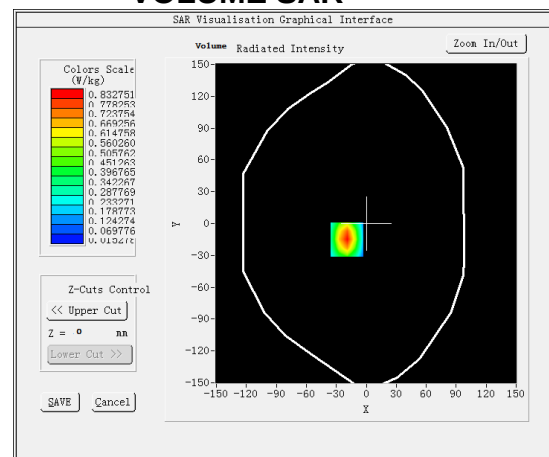
Date: 05/09/2023

Frequency (MHz)	1770.000000
Relative permittivity (real part)	40.115910
Relative permittivity (imaginary part)	14.136136
Conductivity (S/m)	1.360603
Variation (%)	-4.840000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(hotspot 10mm)</u>
Band	<u>LTE band 66(50 RB#25)</u>

SURFACE SAR



VOLUME SAR



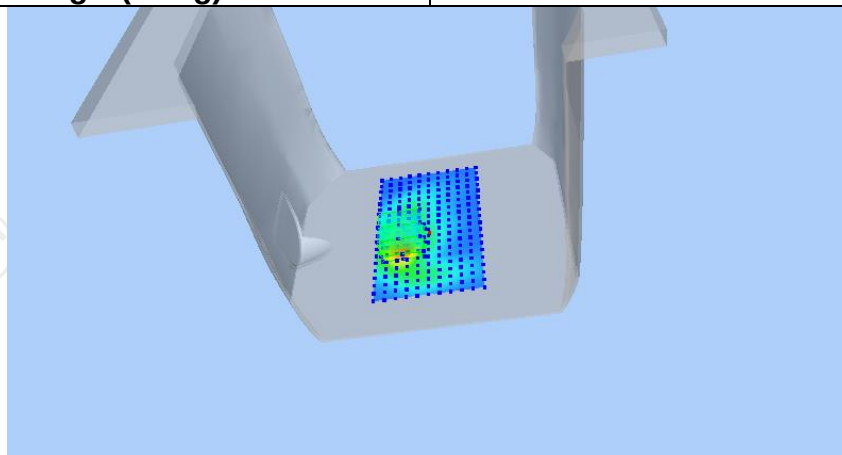
Maximum location: X=-19.00, Y=-15.00 SAR Peak: 1.51W/kg

SAR 10g (W/Kg)

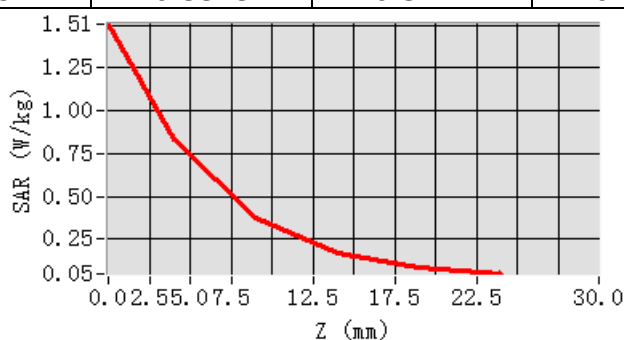
0.364890

SAR 1g (W/Kg)

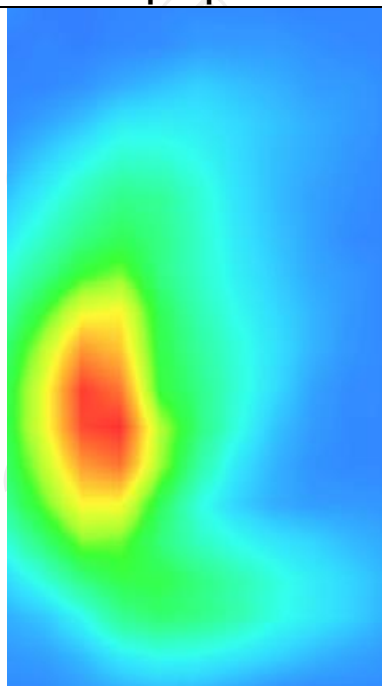
0.724420



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.5057	0.8328	0.3714	0.1655	0.0843



Hot spot position



LTE Band 71

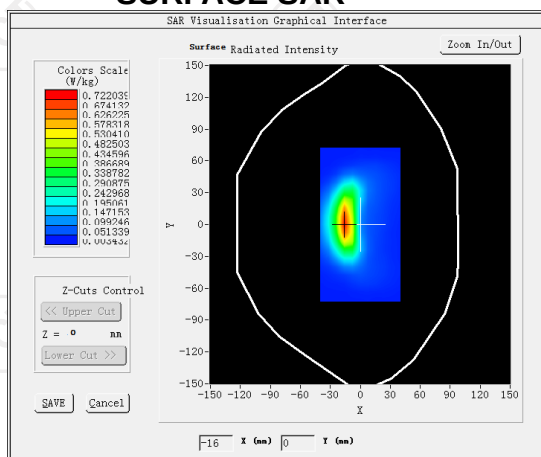
MEASUREMENT 1

Lower Band SAR (Channel 133322):

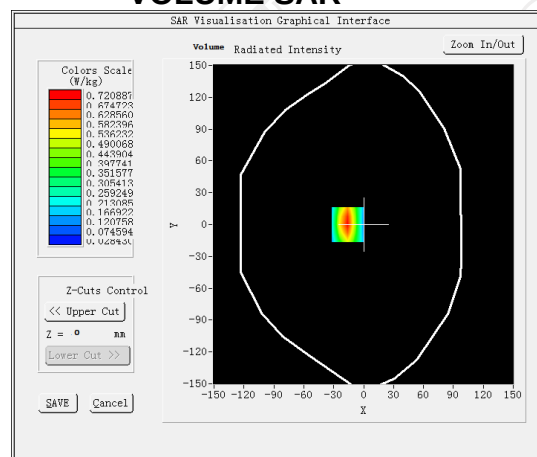
Date: 04/28/2023

Frequency (MHz)	683.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.901561
Variation (%)	-2.130000
Crest Factor	1.0
Probe Conversion factor	4.36
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back(0mm)
Band	LTE band 71(50 RB#0)

SURFACE SAR

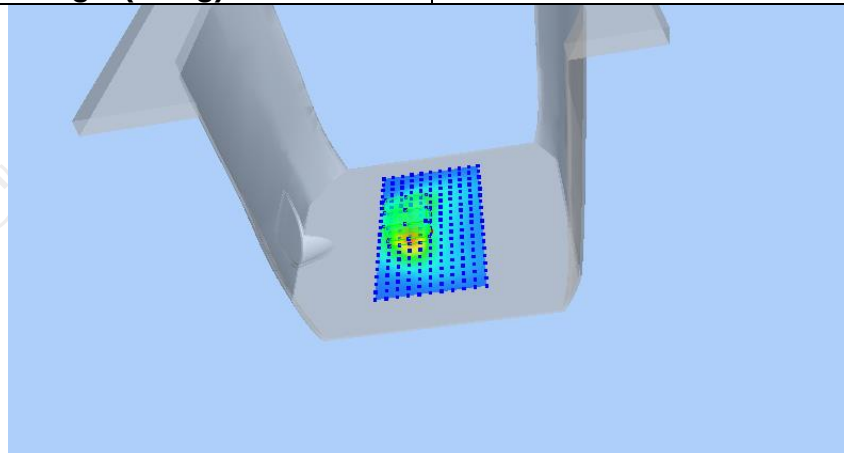


VOLUME SAR

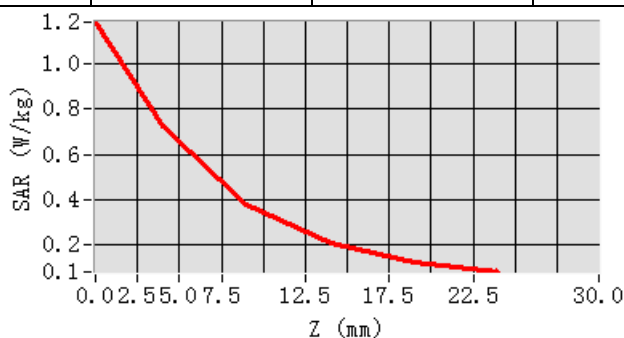


Maximum location: X=-16.00, Y=0.00 SAR Peak: 1.19 W/kg

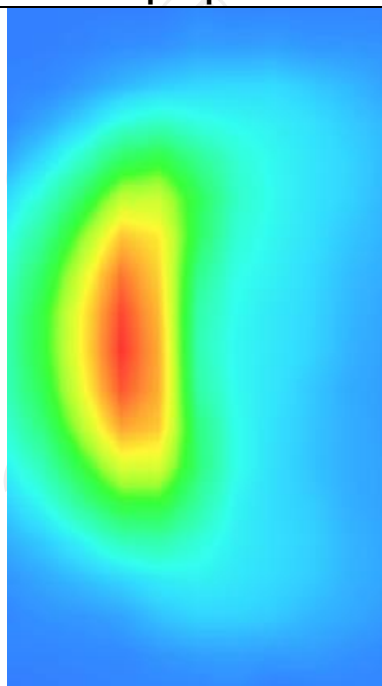
SAR 10g (W/Kg)	0.342035
SAR 1g (W/Kg)	0.667042



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.1828	0.7209	0.3786	0.2060	0.1256



Hot spot position



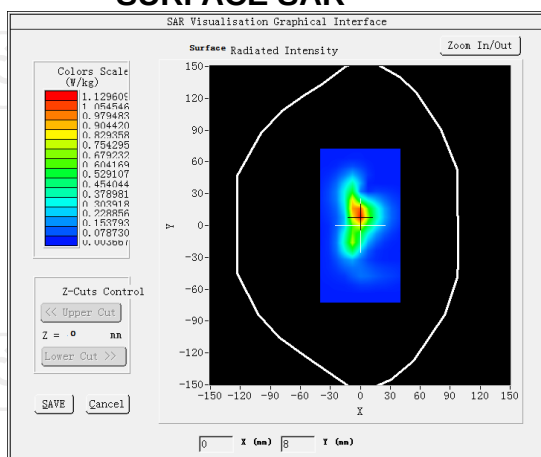
MEASUREMENT 2

Middle Band SAR (Channel 133322):

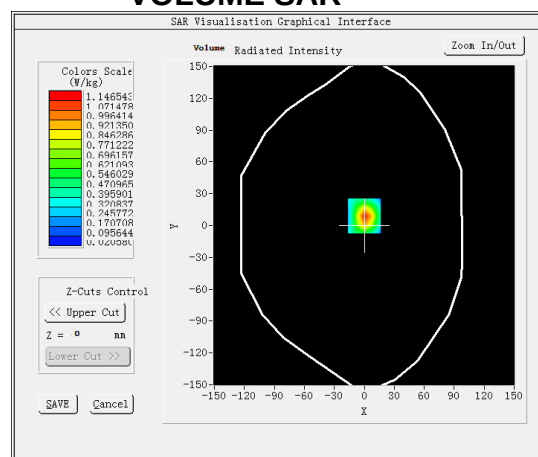
Date: 04/28/2023

Frequency (MHz)	683.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.901561
Variation (%)	-0.710000
Crest Factor	1.0
Probe Conversion factor	4.36
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	Validation plane
Device Position	Body back(hotspot 0mm)
Band	<u>LTE band 71(50 RB#0)</u>

SURFACE SAR

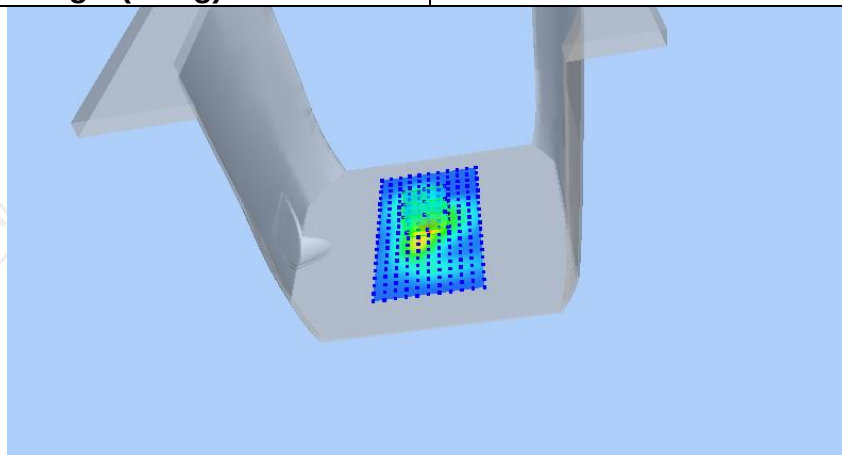


VOLUME SAR

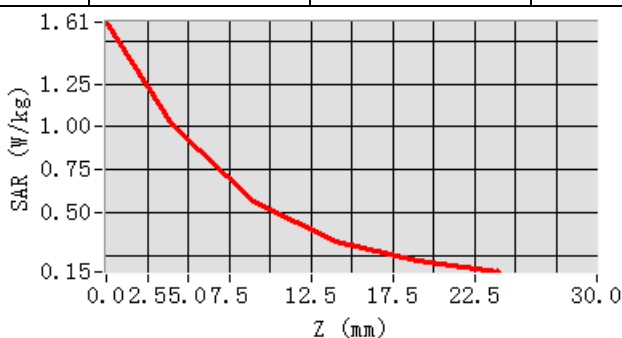


Maximum location: X=-16.00, Y=0.00 SAR Peak: 1.63 W/kg

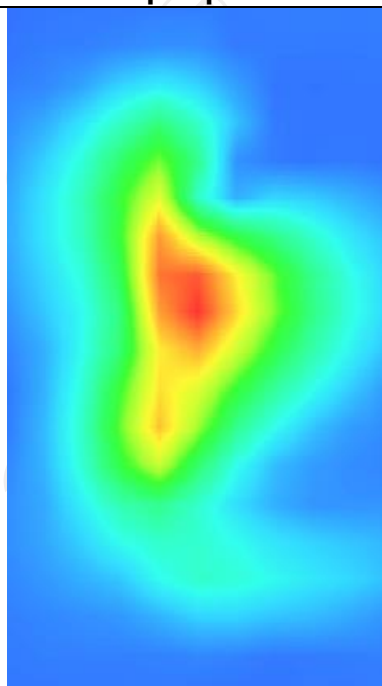
SAR 10g (W/Kg)	0.528009
SAR 1g (W/Kg)	0.567987



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.6115	1.0167	0.5657	0.3309	0.2175



Hot spot position

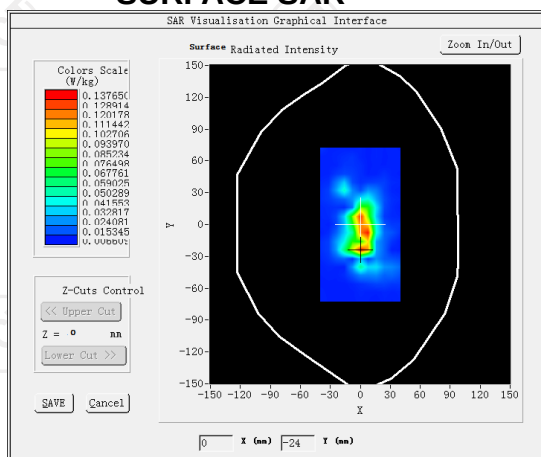


WLAN 2.4G

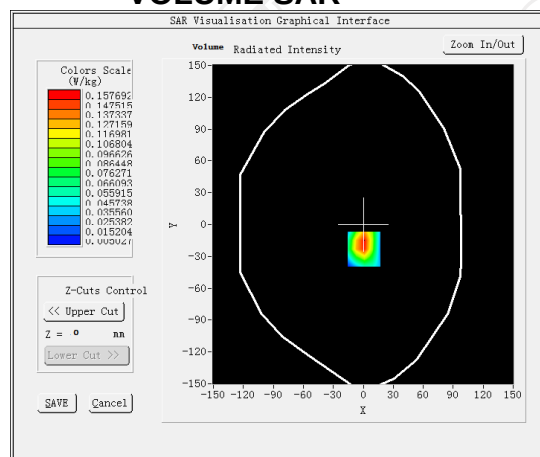
MEASUREMENT 1

Low Band SAR (Channel 1):		Date: 05/15/2023
Frequency (MHz)	2412.000000	
Relative permittivity (real part)	39.226002	
Relative permittivity (imaginary part)	13.207000	
Conductivity (S/m)	1.788081	
Variation (%)	-1.680000	
Crest Factor	1.0	
Probe Conversion factor	2.31	
E-Field Probe:	SSE2 (SN 25/22 EPG0375)	
Area Scan	dx=8mm dy=8mm, h= 5.00 mm	
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm	
Phantom	Validation plane	
Device Position	Body back(0mm)	
Band	IEEE 802.11g ISM	

SURFACE SAR

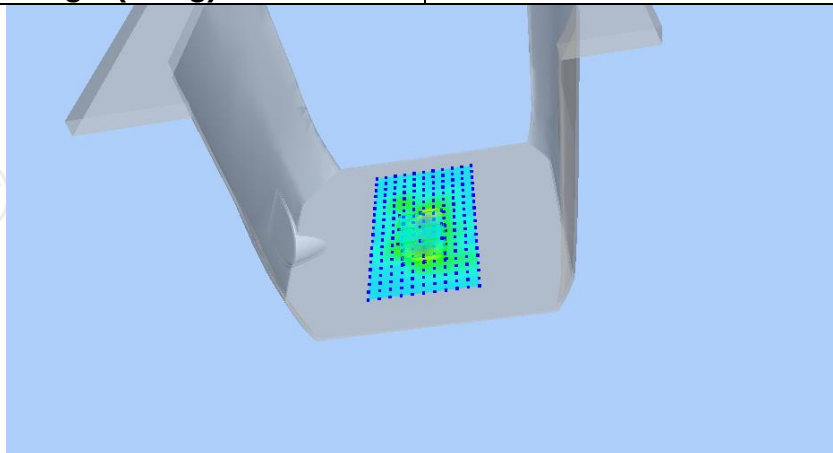


VOLUME SAR

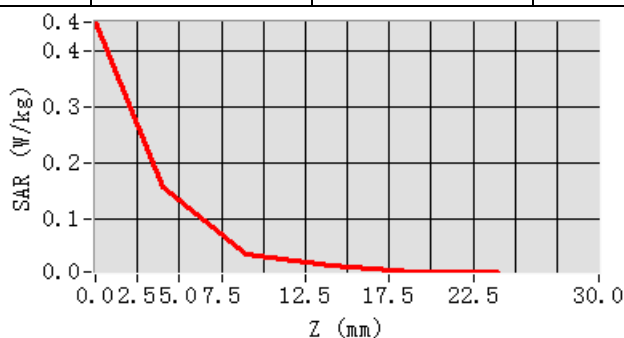


Maximum location: X=1.00, Y=23.00 SAR Peak: 0.34 W/kg

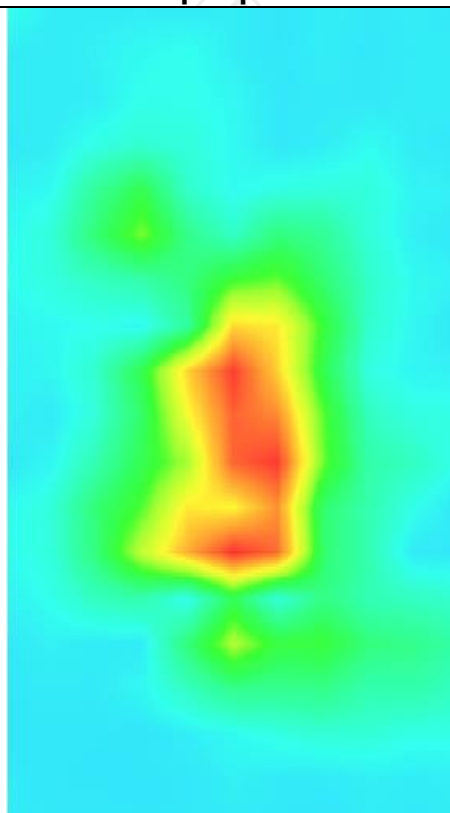
SAR 10g (W/Kg)	0.065423
SAR 1g (W/Kg)	0.153691



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4497	0.1577	0.0368	0.0175	0.0072



Hot spot position



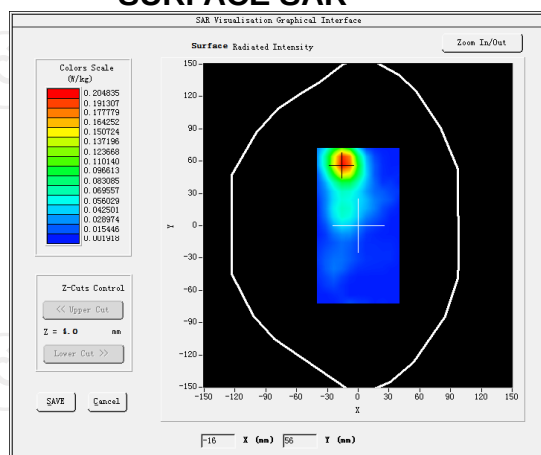
MEASUREMENT 2

Low Band SAR (Channel 1):

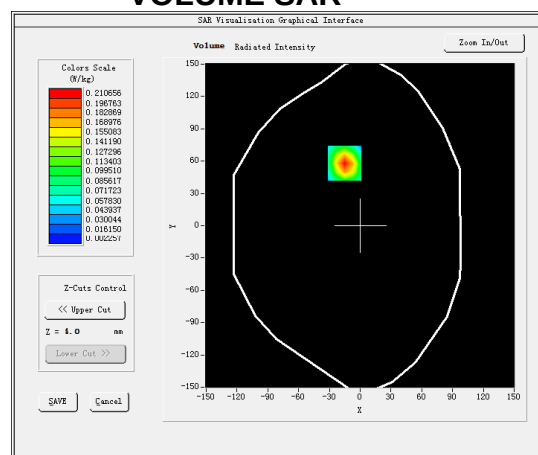
Date: 05/15/2023

Frequency (MHz)	2412.000000
Relative permittivity (real part)	39.226002
Relative permittivity (imaginary part)	13.207000
Conductivity (S/m)	1.788081
Variation (%)	-2.110000
Crest Factor	1.0
Probe Conversion factor	2.31
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	Validation plane
Device Position	Body back(0mm)
Band	<u>IEEE 802.11g ISM(hotspot)</u>

SURFACE SAR



VOLUME SAR



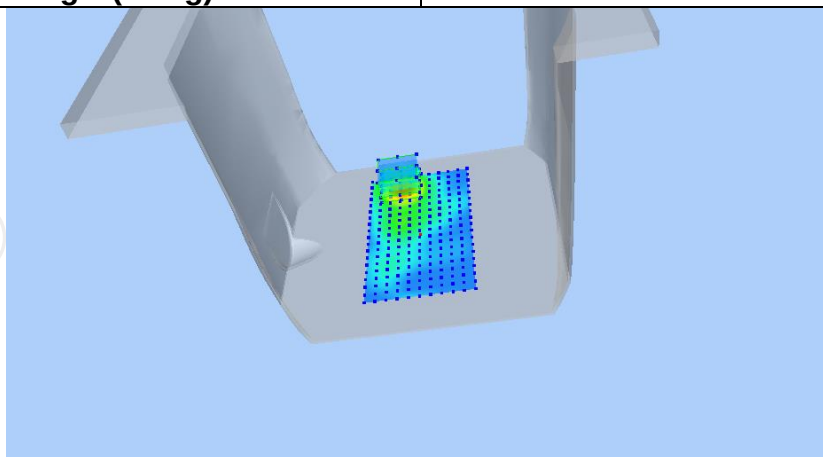
Maximum location: X=-15.00, Y=58.00 SAR Peak: 0.37 W/kg

SAR 10g (W/Kg)

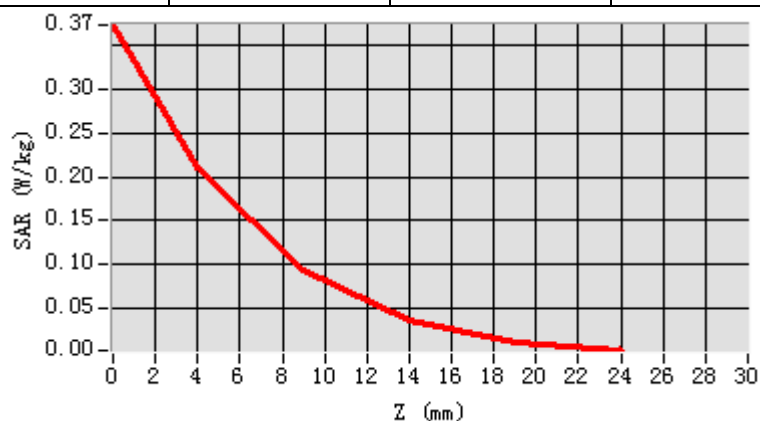
0.087182

SAR 1g (W/Kg)

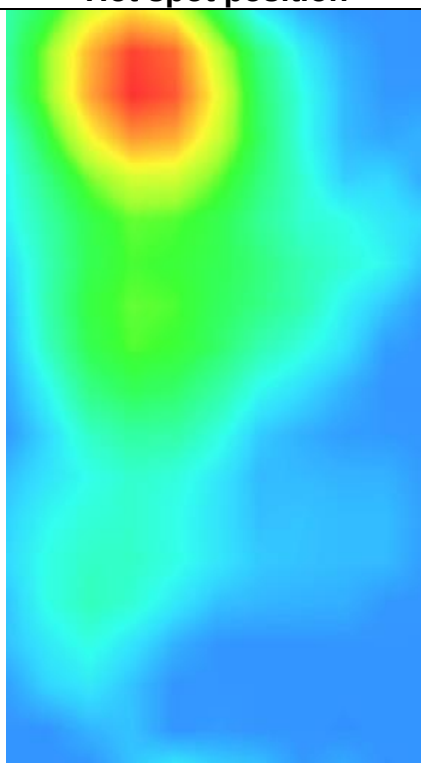
0.223788



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3732	0.2107	0.0935	0.0368	0.0124



Hot spot position



WLAN 5.2G

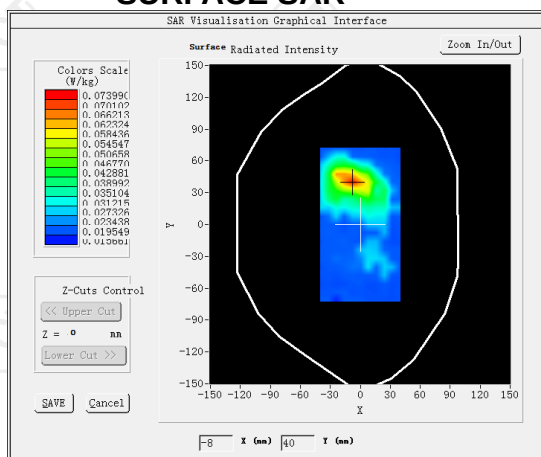
MEASUREMENT 1

SAR (Channel 36):

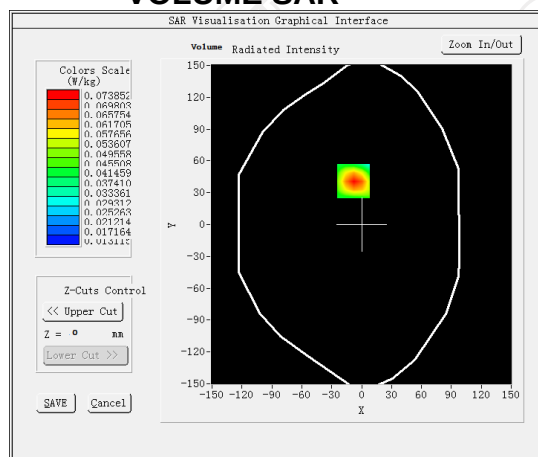
Date: 05/22/2023

Frequency (MHz)	5180.000000
Relative permittivity (real part)	35.068832
Relative permittivity (imaginary part)	13.679428
Conductivity (S/m)	5.220788
Variation (%)	-0.160000
Crest Factor	1.0
Probe Conversion factor	2.01
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back(0mm)
Band	IEEE 802.11n VHT20

SURFACE SAR

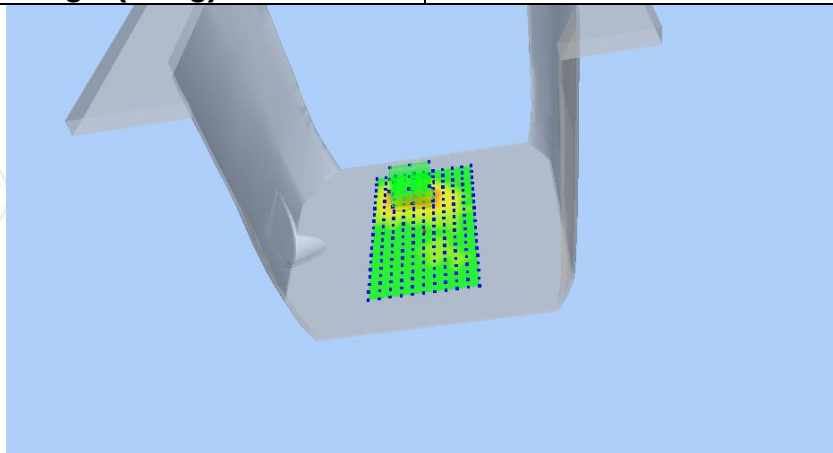


VOLUME SAR

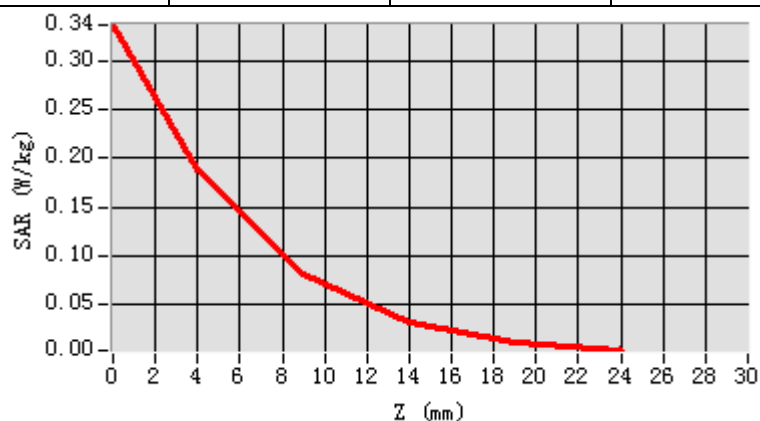


Maximum location: X=16.00, Y=63.00 SAR Peak: 0.10 W/kg

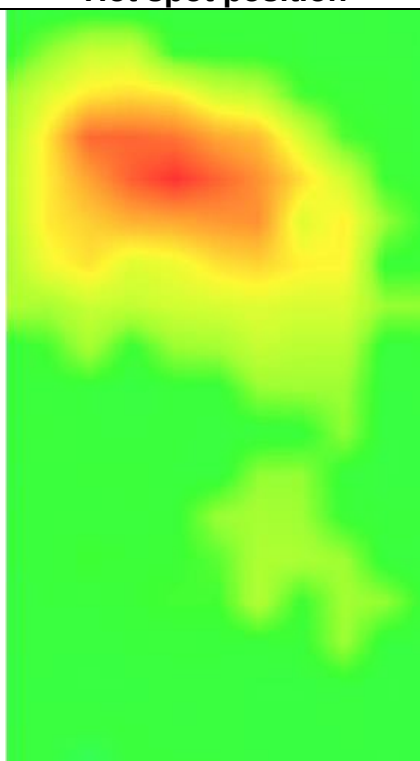
SAR 10g (W/Kg)	0.140642
SAR 1g (W/Kg)	0.218531



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3372	0.1876	0.0816	0.0317	0.0109



Hot spot position



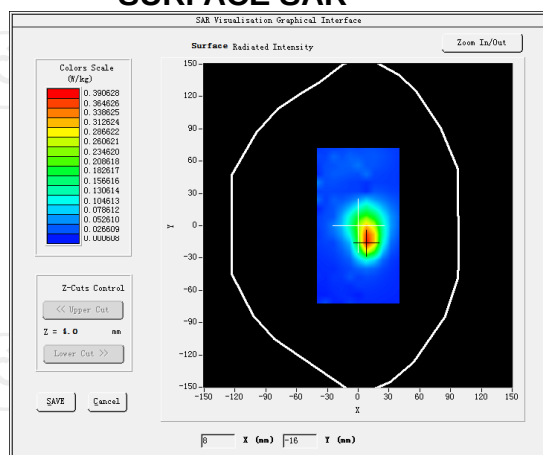
MEASUREMENT 2

SAR (Channel 36):

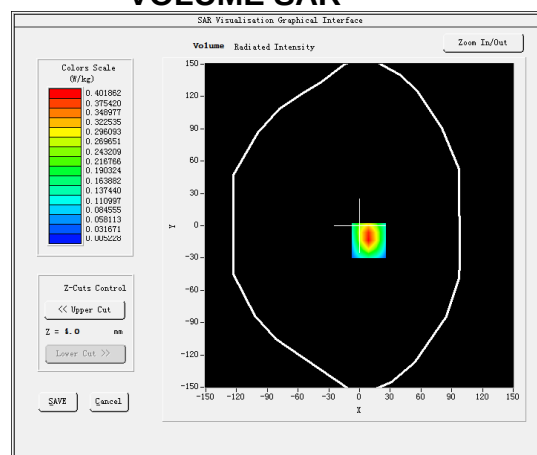
Date: 05/22/2023

Frequency (MHz)	5240.000000
Relative permittivity (real part)	35.068832
Relative permittivity (imaginary part)	13.679428
Conductivity (S/m)	5.220788
Variation (%)	-1.220000
Crest Factor	1.0
Probe Conversion factor	2.01
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	Validation plane
Device Position	Body back(hotspot 0mm)
Band	<u>IEEE 802.11n VHT20</u>

SURFACE SAR

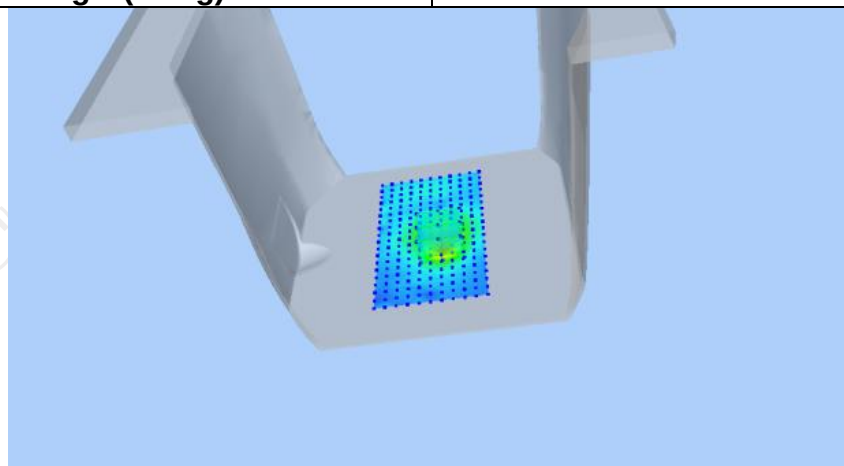


VOLUME SAR

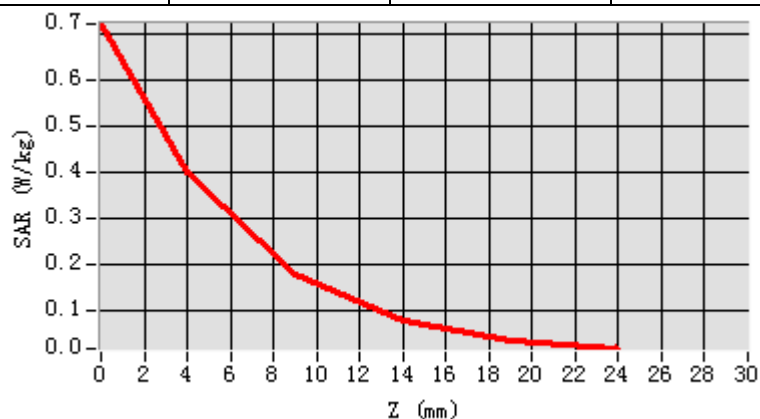


Maximum location: X=19.00, Y=-12.00 SAR Peak: 0.70 W/kg

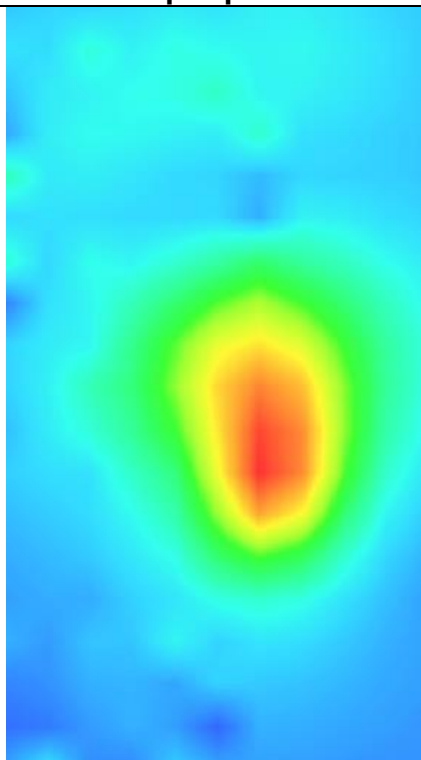
SAR 10g (W/Kg)	0.174213
SAR 1g (W/Kg)	0.241152



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7042	0.4012	0.1842	0.0710	0.0314



Hot spot position



WLAN 5.8G

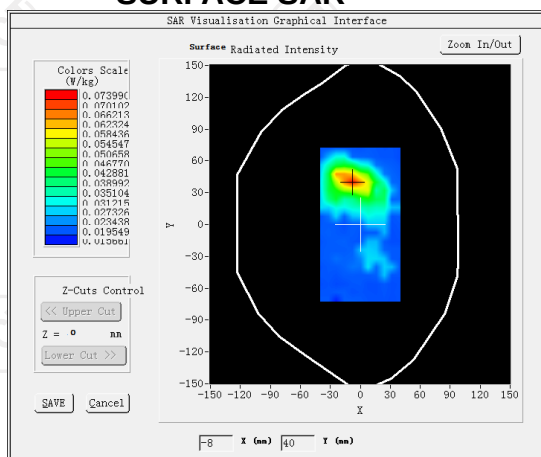
MEASUREMENT 1

SAR (Channel 157):

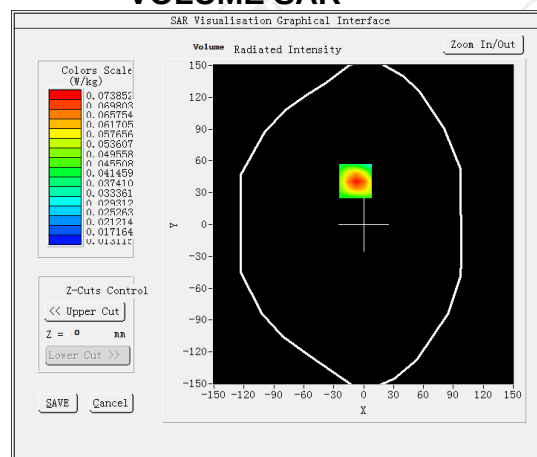
Date: 05/24/2023

Frequency (MHz)	5785.000000
Relative permittivity (real part)	38.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	5.430828
Variation (%)	-0.450000
Crest Factor	1.0
Probe Conversion factor	2.13
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back(0mm)
Band	IEEE 802.11n VHT20

SURFACE SAR

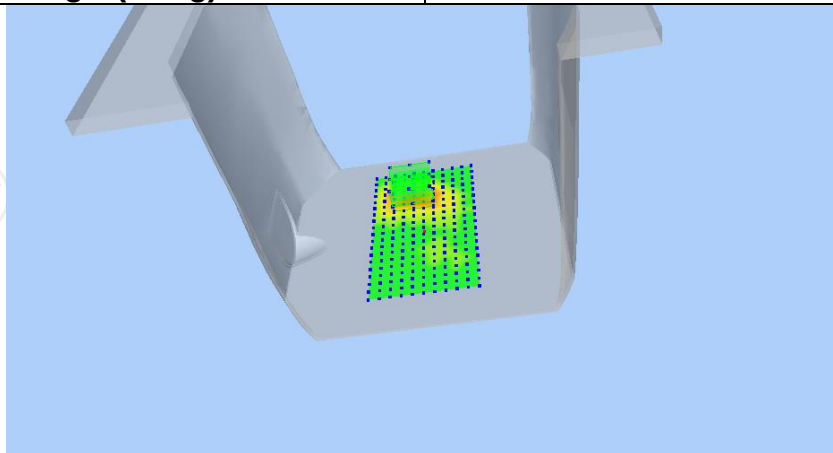


VOLUME SAR

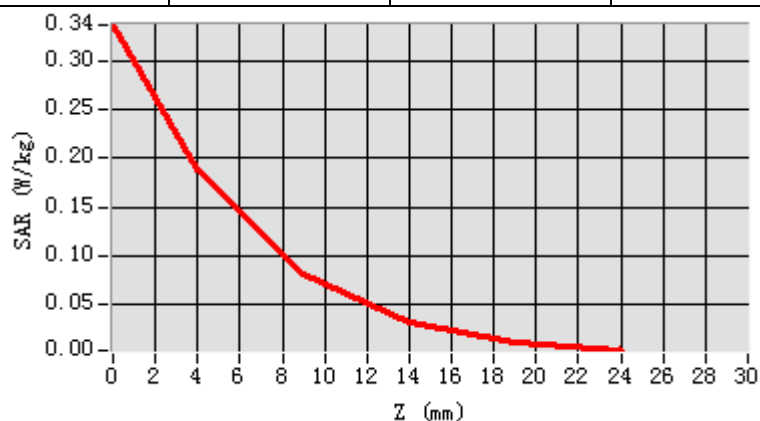


Maximum location: X=15.00, Y=60.00 SAR Peak: 0.34 W/kg

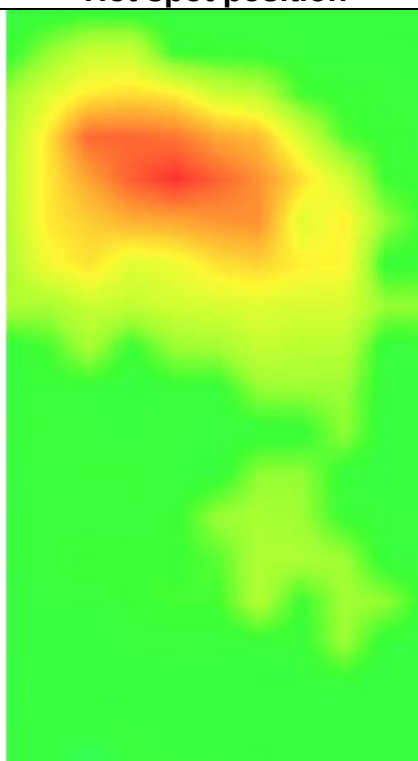
SAR 10g (W/Kg)	0.151431
SAR 1g (W/Kg)	0.185420



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3397	0.1890	0.0823	0.0317	0.0117



Hot spot position



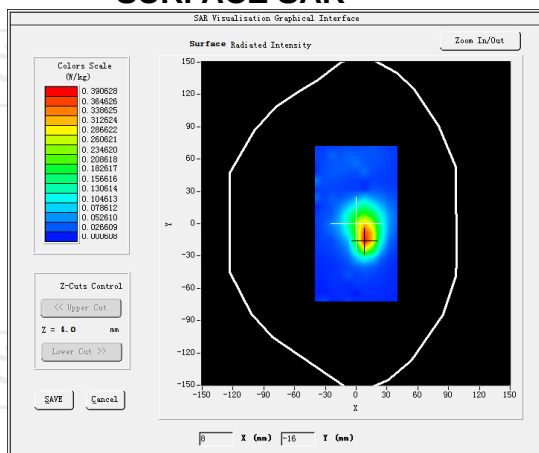
MEASUREMENT 2

SAR (Channel 157):

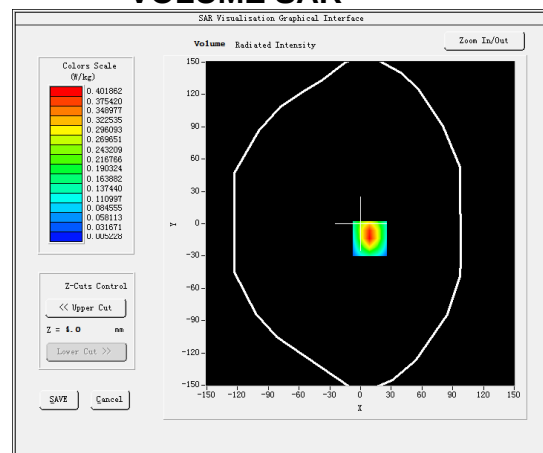
Date: 05/24/2023

Frequency (MHz)	5785.000000
Relative permittivity (real part)	38.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	5.430828
Variation (%)	-1.450000
Crest Factor	1.0
Probe Conversion factor	2.13
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(0mm)</u>
Band	<u>IEEE 802.11n ISM(hotspot)</u>

SURFACE SAR

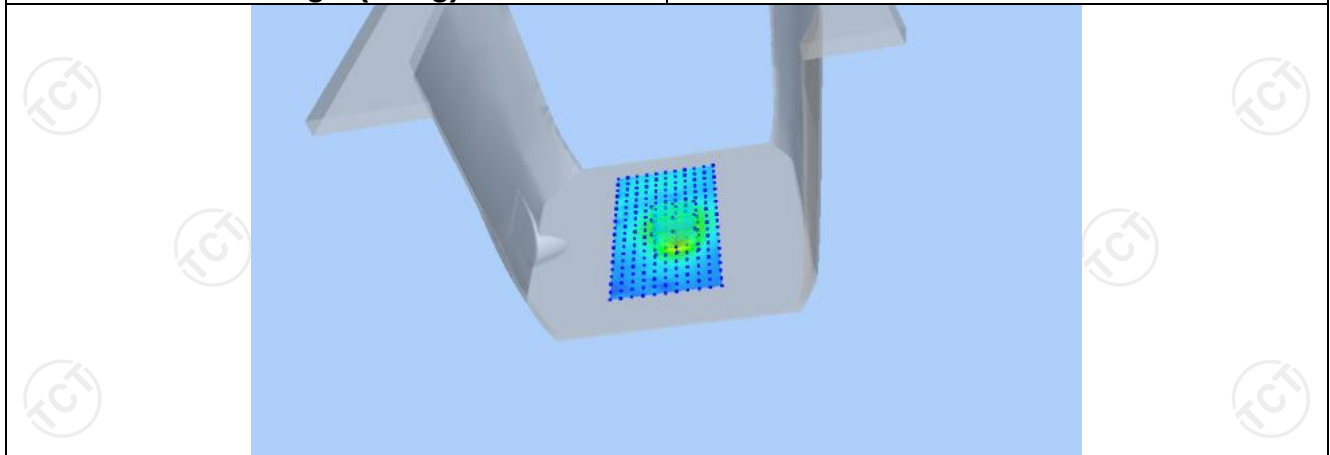


VOLUME SAR

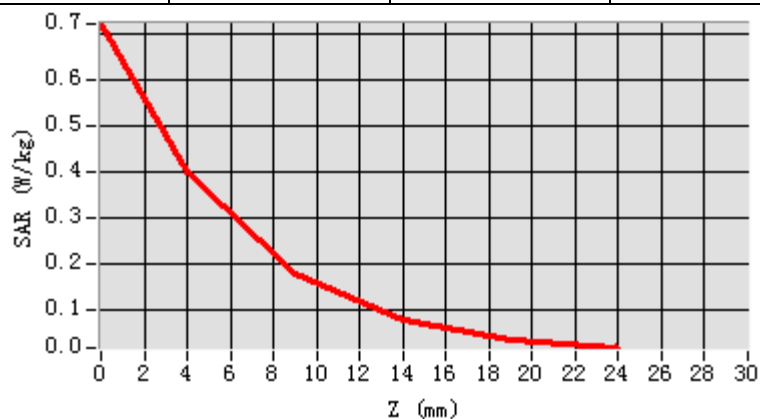


Maximum location: X=19.00, Y=-12.00 SAR Peak: 0.70 W/kg

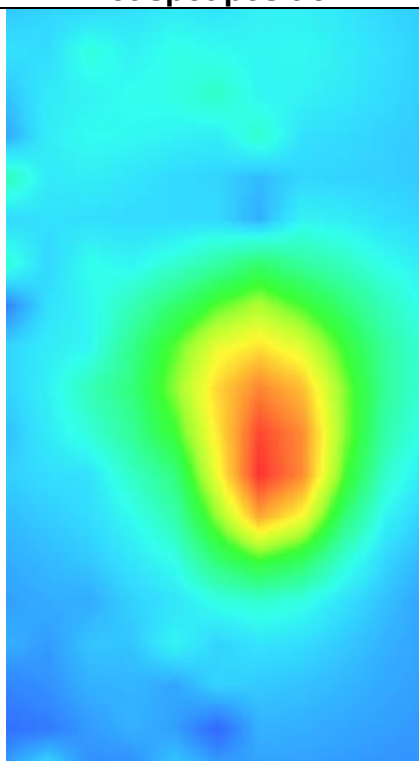
SAR 10g (W/Kg)	0.163397
SAR 1g (W/Kg)	0.342473



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7032	0.4014	0.1808	0.0734	0.0402



Hot spot position



BT

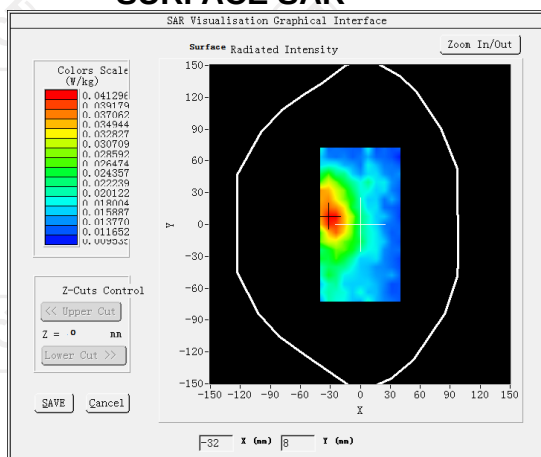
MEASUREMENT 1

Low Band SAR (Channel 0):

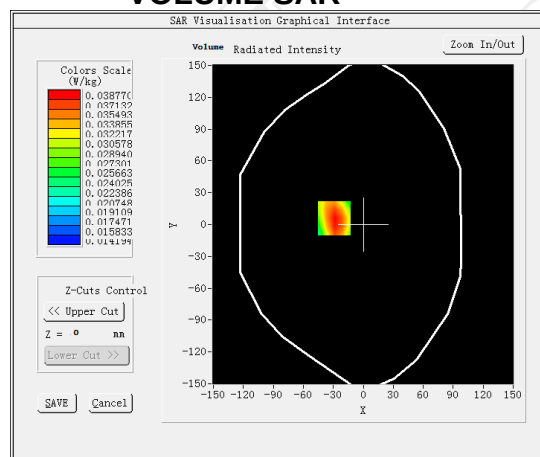
Date: 05/15/2023

Frequency (MHz)	2402.000000
Relative permittivity (real part)	39.217999
Relative permittivity (imaginary part)	13.211000
Conductivity (S/m)	1.791558
Variation (%)	2.110000
Crest Factor	1.0
Probe Conversion factor	2.31
E-Field Probe:	SSE2 (SN 25/22 EPG0375)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back(0mm)
Band	8DPSK

SURFACE SAR

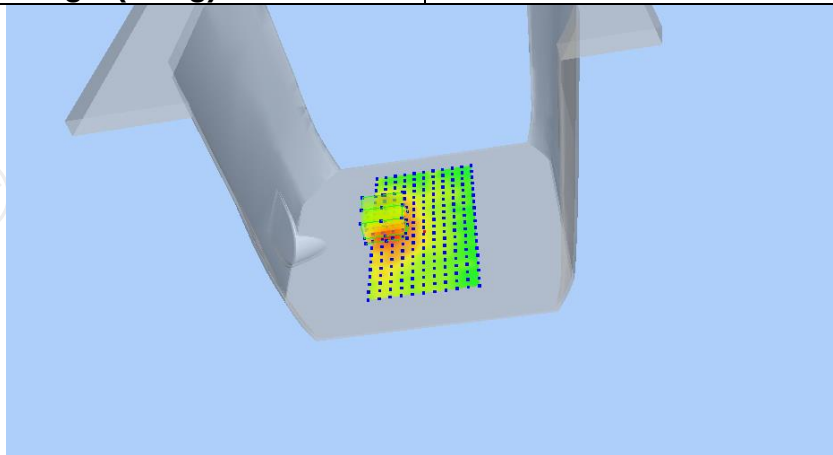


VOLUME SAR

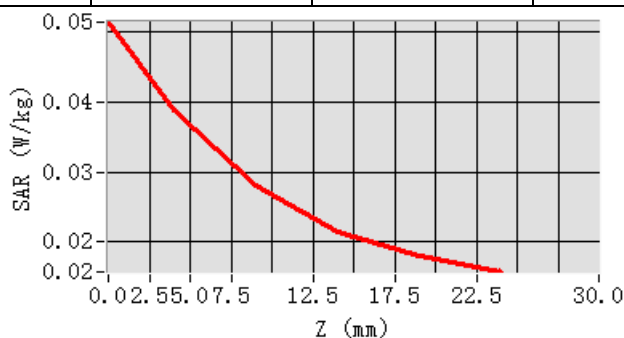


Maximum location: X=-29.00, Y=6.00 SAR Peak: 0.05 W/kg

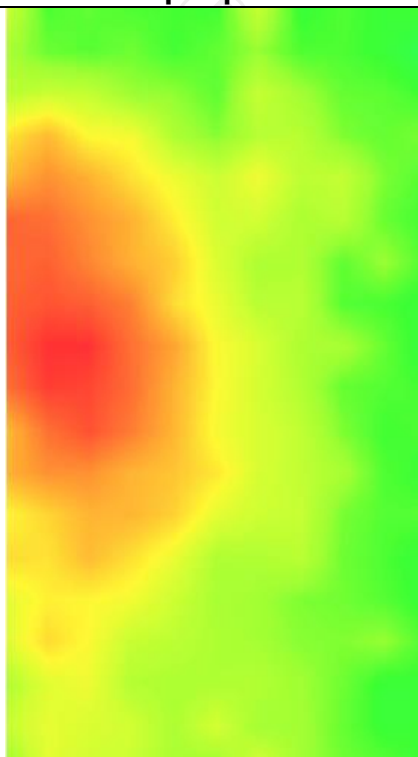
SAR 10g (W/Kg)	0.028107
SAR 1g (W/Kg)	0.047717



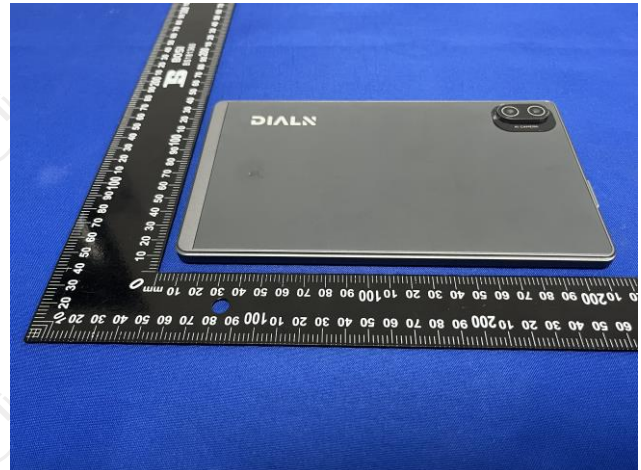
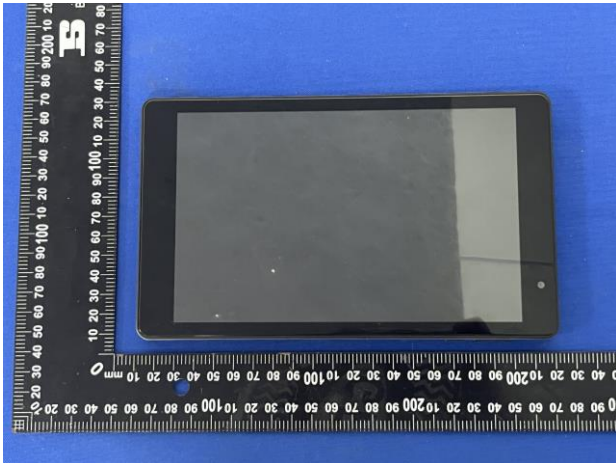
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0515	0.0388	0.0280	0.0215	0.0180



Hot spot position



Appendix A: EUT Photos



Liquid depth



The Body Liquid of 835MHz (15.4cm)



The Body Liquid of 1800MHz (15.2 cm)



The Body Liquid of 1900MHz (16.4 cm)



The Body Liquid of 2450MHz (15.3cm)



The Body Liquid of 5000-6000MHz (16.5cm)

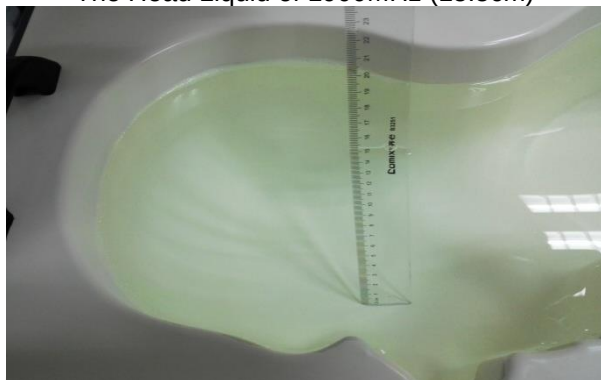
The Body Liquid of 750MHz (15.4cm)



The Head Liquid of 1900MHz (15.5cm)



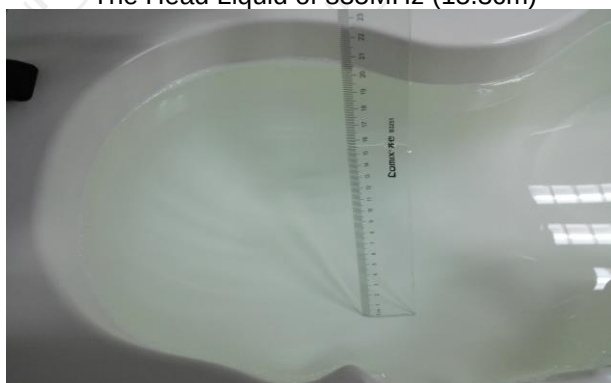
The Head Liquid of 2450MHz (15.6cm)



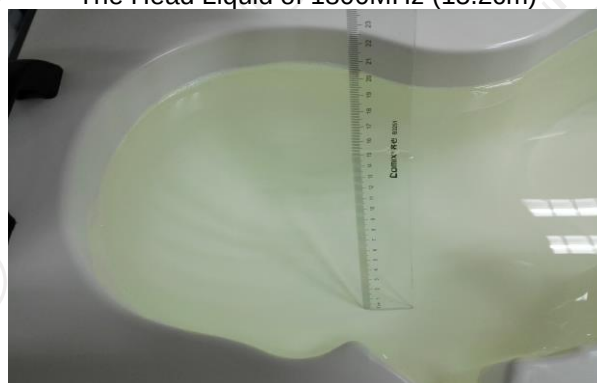
The Head Liquid of 835MHz (15.3cm)



The Head Liquid of 1800MHz (15.2cm)



The Body Liquid of 5000-6000MHz MHz (15.8cm)



The Head Liquid of 750MHz (15.4cm)

Appendix B: Test Setup Photos



Body worn – Front (0mm)



Body worn – Back (0mm)



Body worn – Bottom (0mm)



Hotspo Front (0mm)



Hotspo Back (0mm)



Hotspot Bottom (0mm)

Appendix C: Probe Calibration Certificate

COMOSAR E-FIELD Probe



COMOSAR E-Field Probe Calibration Report

Ref : ACR.180.7.22.BES.B

SHENZHEN TONGCE TESTIN LAB.
TCT TESTING INDUSTRIAL PAR, FUQIAO 5TH INDUSTRIAL
ZONE, FUHAI STREET, BAO'AN DISTRICT, SHENZHEN,
GUANGDONG, 518103, PEOPLE'S REPUBLIC OF CHINA
MVG COMOSAR DOSIMETRIC E-FIELD PROBE
SERIAL NO.: SN 25/22 EPG0375

Calibrated at MVG
Z.I. de la pointe du diable
Technopôle Brest Iroise – 295 avenue Alexis de Rochon
29280 PLOUZANE - FRANCE

Calibration date: 06/29/2022



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

The use of the Cofrac brand and the accreditation references is prohibited from any reproduction.

Summary:

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



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.180.7.22.BES.B

	Name	Function	Date	Signature
Prepared by :	Jérôme Le Gall	Measurement Responsible	6/30/2022	
Checked & approved by:	Jérôme Luc	Technical Manager	6/30/2022	
Authorized by:	Yann Toutain	Laboratory Director	7/05/2022	

2022.07.05
09:30:00 +02'00'

	Customer Name
Distribution :	SHENHEN TONGCE TESTING LAB.

Issue	Name	Date	Modifications
A	Jérôme Le Gall	6/30/2022	Initial release

Page: 2/11

Template_ACR.DDD.N.YY.MVGB.ISSUE_COMOSAR Probe vK

This document shall not be reproduced, except in full or in part, without the written approval of MVG. The information contained herein is to be used only for the purpose for which it is submitted and is not to be released in whole or part without written approval of MVG.

Page 138 of 236



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.180.7.22.BES.B

TABLE OF CONTENTS

1	Device Under Test	4
2	Product Description	4
2.1	General Information	4
3	Measurement Method	4
3.1	Linearity	4
3.2	Sensitivity	4
3.3	Lower Detection Limit	5
3.4	Isotropy	5
3.1	Boundary Effect	5
4	Measurement Uncertainty	6
5	Calibration Measurement Results	6
5.1	Sensitivity in air	6
5.2	Linearity	7
5.3	Sensitivity in liquid	8
5.4	Isotropy	9
6	List of Equipment	10

**COMOSAR E-FIELD PROBE CALIBRATION REPORT**

Ref: ACR.180.7.22.BES.B

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	SN 25/22 EPGO375
Product Condition (new / used)	New
Frequency Range of Probe	0.15 GHz-6GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.197 MΩ Dipole 2: R2=0.230 MΩ Dipole 3: R3=0.208 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 affect. All calibrations / measurements performed meet the fore mentioned standards.

3.1 LINEARITY

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

3.2 SENSITIVITY

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

Page: 4/11

Template_ACR.DDD.N.YY.MVGB.ISSUE_COMOSAR Probe vK

This document shall not be reproduced, except in full or in part, without the written approval of MVG. The information contained herein is to be used only for the purpose for which it is submitted and is not to be released in whole or part without written approval of MVG.

Page 140 of 236



3.3 LOWER DETECTION LIMIT

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

3.4 ISOTROPY

The axial isotropy was evaluated by exposing the probe to a reference wave from a standard dipole with the dipole mounted under the flat phantom in the test configuration suggested for system validations and checks. The probe was rotated along its main axis from 0 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°).

3.1 BOUNDARY EFFECT

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

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

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

where

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

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



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 an E-field probe calibration using the waveguide technique. All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

Uncertainty analysis of the probe calibration in waveguide					
ERROR SOURCES	Uncertainty value (%)	Probability Distribution	Divisor	ci	Standard Uncertainty (%)
Expanded uncertainty 95 % confidence level $k = 2$					14 %

5 CALIBRATION MEASUREMENT RESULTS

Calibration Parameters	
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

5.1 SENSITIVITY IN AIR

Normx dipole 1 ($\mu\text{V}/(\text{V}/\text{m})^2$)	Normy dipole 2 ($\mu\text{V}/(\text{V}/\text{m})^2$)	Normz dipole 3 ($\mu\text{V}/(\text{V}/\text{m})^2$)
0.64	0.53	0.44

DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
106	108	109

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

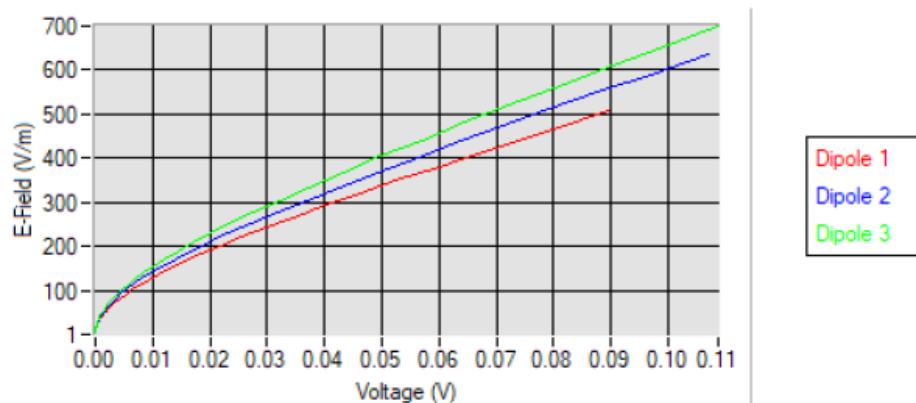
$$E = \sqrt{E_1^2 + E_2^2 + E_3^2}$$



COMOSAR E-FIELD PROBE CALIBRATION REPORT

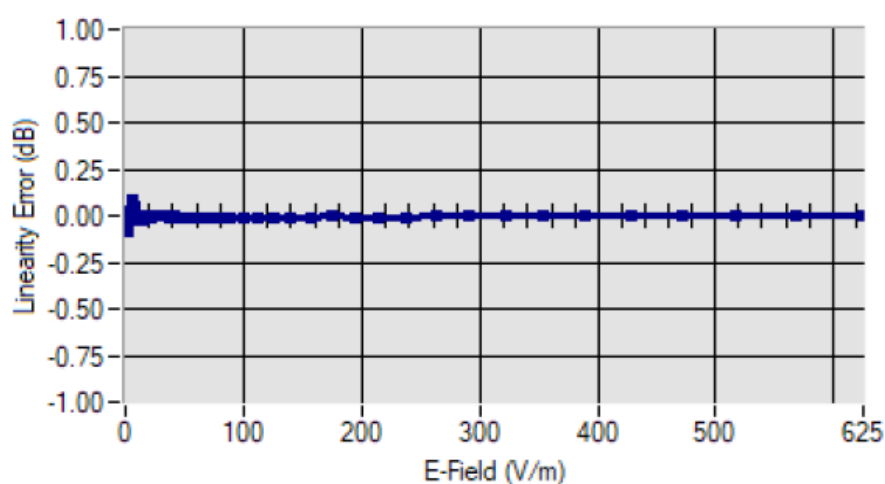
Ref: ACR.180.7.22.BES.B

Calibration curves



5.2 LINEARITY

Linearity



Linearity: $\pm 1.94\%$ ($\pm 0.09\text{dB}$)



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.180.7.22.BES.B

5.3 SENSITIVITY IN LIQUID

<u>Liquid</u>	<u>Frequency</u> <u>(MHz +/-</u> <u>100MHz)</u>	<u>ConvF</u>
HL750	750	1.71
BL750	750	1.78
HL900	900	1.91
BL900	900	1.96
HL1800	1800	2.08
BL1800	1800	2.16
HL2000	2000	2.03
BL2000	2000	2.10
HL2450	2450	2.31
BL2450	2450	2.37
HL2600	2600	2.16
BL2600	2600	2.23
HL3500	3500	2.21
BL3500	3500	2.28
HL3700	3700	3.45
BL3700	3700	3.15
HL4600	4600	3.30
BL4600	4600	3.70
HL5200	5200	2.01
BL5200	5200	2.08
HL5600	5600	2.07
BL5600	5600	2.12
HL5800	5800	2.06
BL5800	5800	2.13

LOWER DETECTION LIMIT: 7mW/kg

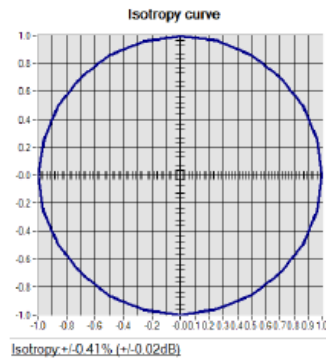


COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.180.7.22.BES.B

5.4 ISOTROPY

HL1800 MHz





COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.180.7.22.BES.B

6 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	Manufacturer / Model	Identification No.	Current Calibration Date	Next Calibration Date
CALIPROBE Test Bench	Version 2	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rohde & Schwarz ZVM	100203	08/2021	08/2024
Network Analyzer	Agilent 8753ES	MY40003210	10/2019	10/2022
Network Analyzer – Calibration kit	HP 85033D	3423A08186	06/2021	06/2027
Multimeter	Keithley 2000	1160271	02/2020	02/2023
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	Rohde & Schwarz NRVD	832839-056	11/2019	11/2022
Directional Coupler	Krytar 158020	131467	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Waveguide	MVG	SN 32/16 WG4_1	Validated. No cal required.	Validated. No cal required.
Liquid transition	MVG	SN 32/16 WGLIQ_0G900_1	Validated. No cal required.	Validated. No cal required.
Waveguide	MVG	SN 32/16 WG6_1	Validated. No cal required.	Validated. No cal required.
Liquid transition	MVG	SN 32/16 WGLIQ_1G500_1	Validated. No cal required.	Validated. No cal required.
Waveguide	MVG	SN 32/16 WG8_1	Validated. No cal required.	Validated. No cal required.
Liquid transition	MVG	SN 32/16 WGLIQ_1G800B_1	Validated. No cal required.	Validated. No cal required.
Liquid transition	MVG	SN 32/16 WGLIQ_1G800H_1	Validated. No cal required.	Validated. No cal required.
Waveguide	MVG	SN 32/16 WG10_1	Validated. No cal required.	Validated. No cal required.
Liquid transition	MVG	SN 32/16 WGLIQ_3G500_1	Validated. No cal required.	Validated. No cal required.
Waveguide	MVG	SN 32/16 WG12_1	Validated. No cal required.	Validated. No cal required.

Page: 10/11

Template_ACR.DDD.N.YY.MVGB.ISSUE_COMOSAR Probe vK

This document shall not be reproduced, except in full or in part, without the written approval of MVG. The information contained herein is to be used only for the purpose for which it is submitted and is not to be released in whole or part without written approval of MVG.



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.180.7.22.BES.B

Liquid transition	MVG	SN 32/16 WGLIQ_5G000_1	Validated. No cal required.	Validated. No cal required.
Temperature / Humidity Sensor	Testo 184 H1	44225320	06/2021	06/2024



Dielectric Probe Calibration Report

Ref : ACR.138.4.33.SATU.A

SHENZHEN TCT TESTING TECHNOLOGY CO., LTD
2101&2201, ZHENCHANG FACTORY, RENSHAN
INDUSTRIAL ZONE, FUHAI SUBDISTRICT, BAOAN
DISTRICT, SHENZHEN, GUANGDONG, 518103,
PEOPLES REPUBLIC OF CHINA

MVG COMOSAR DOSIMETRIC E-FIELD PROBE

FREQUENCY: 0.3-6 GHZ

SERIAL NO.: SN 19/15 OCPG 71

Calibrated at MVG US
2105 Barrett Park Dr. - Kennesaw, GA 30144



Calibration Date: 06/05/2021

Summary:

This document presents the method and results from an accredited Dielectric Probe calibration performed in MVG USA using the LIMESAR test bench. All calibration results are traceable to national metrology institutions.



SAR DIELECTRIC PROBE CALIBRATION REPORT

Ref: ACR.138.4.33..SATUA

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	06/05/2021	<i>JS</i>
Checked by :	Jérôme LUC	Product Manager	06/05/2021	<i>JS</i>
Approved by :	Kim RUTKOWSKI	Quality Manager	06/05/2021	<i>Kim Rutkowski</i>

	Customer Name
Distribution :	SHENZHEN TONGCE TESTING LAB

Issue	Date	Modifications
A	06/05/2021	Initial release

Page: 2/7

This document shall not be reproduced, except in full or in part, without the written approval of MVG.
The information contained herein is to be used only for the purpose for which it is submitted and is not to be released in whole or part without written approval of MVG.

Page 149 of 236



SAR DIELECTRIC PROBE CALIBRATION REPORT

Ref: ACR.138.4.33..SATU.A

TABLE OF CONTENTS

1	Introduction.....	4
2	Device Under Test	4
3	Product Description	4
3.1	General Information	4
4	Measurement Method	5
4.1	Liquid Permittivity Measurements	5
5	Measurement Uncertainty	5
5.1	Dielectric Permittivity Measurement	5
6	Calibration Measurement Results	6
6.1	Liquid Permittivity Measurement	6
7	List of Equipment	7

Page: 3/7

*This document shall not be reproduced, except in full or in part, without the written approval of MVG.
The information contained herein is to be used only for the purpose for which it is submitted and is not to be released in whole or part without written approval of MVG.*