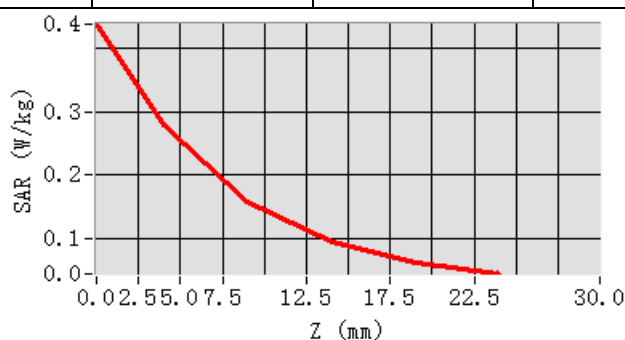
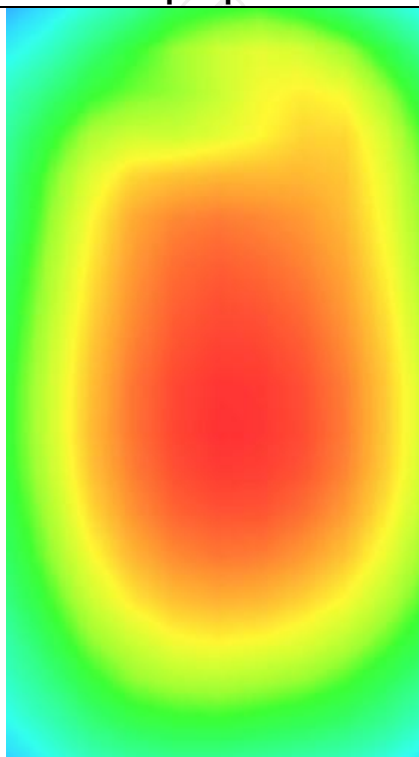


Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4021	0.3326	0.2598	0.2008	0.1530



Hot spot position



LTE Band 2

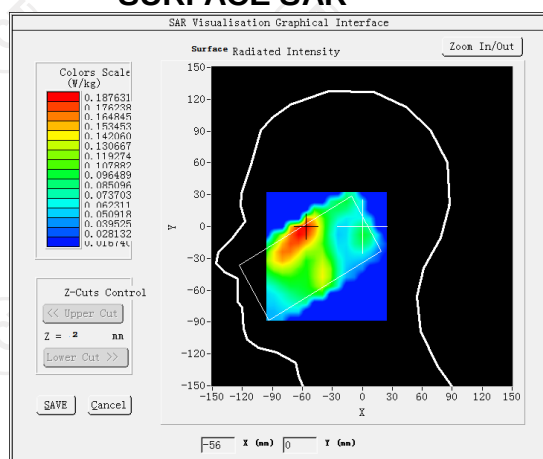
MEASUREMENT 1

Middle Band SAR (Channel 18900):

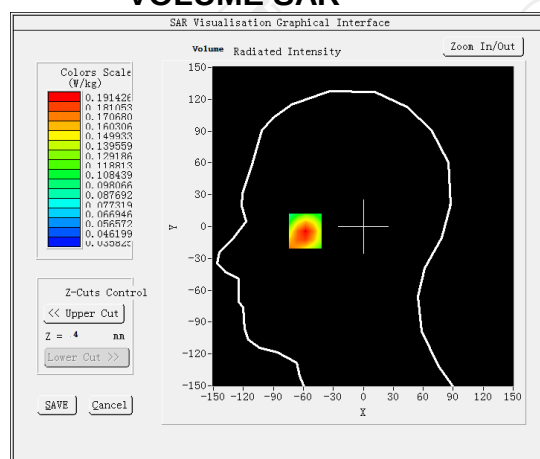
Date: 09/13/2022

Frequency (MHz)	1880.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.411700
Conductivity (S/m)	1.400405
Variation (%)	1.330000
Crest Factor	1.0
Probe Conversion factor	2.23
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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>Left head</u>
Device Position	<u>Cheek</u>
Band	<u>LTE band 2 (1 RB#0)</u>

SURFACE SAR

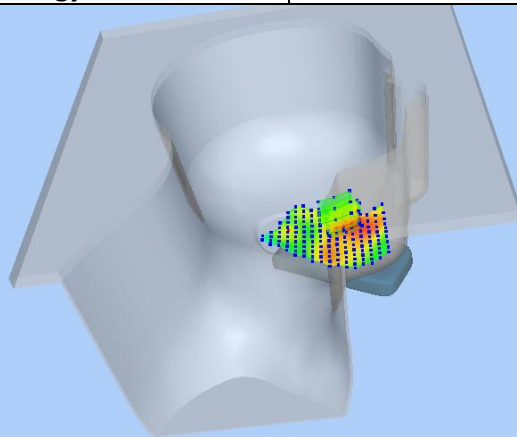


VOLUME SAR

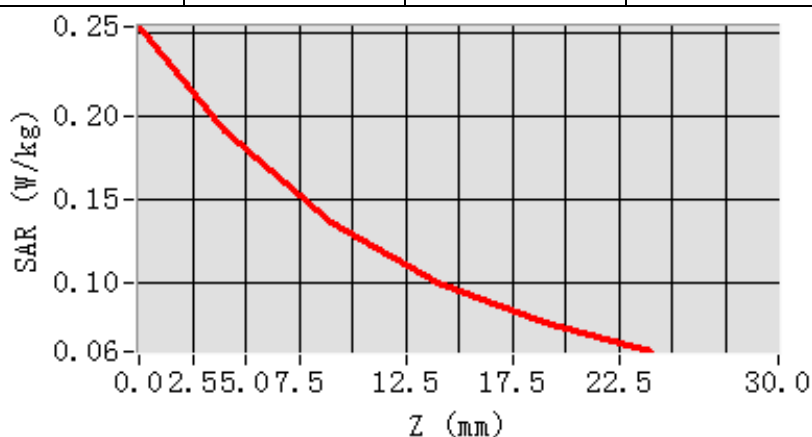


Maximum location: X=-58.00, Y=-2.00 SAR Peak: 0.25 W/kg

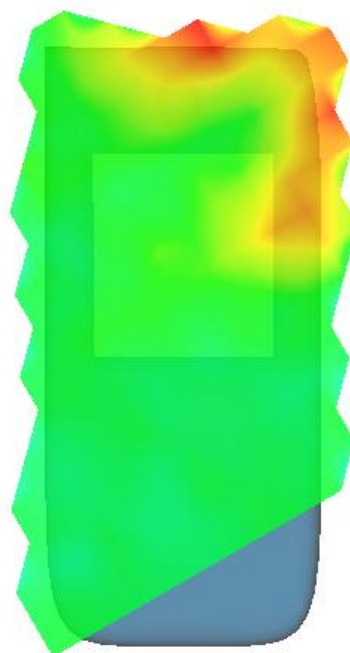
SAR 10g (W/Kg)	0.123810
SAR 1g (W/Kg)	0.183110



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6282	0.4222	0.3397	0.2201	0.1424



Hot spot position



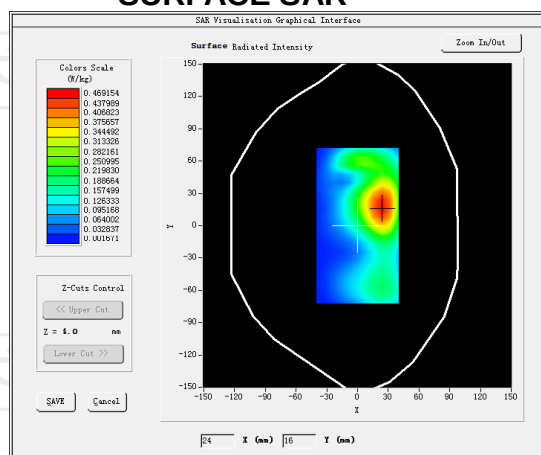
MEASUREMENT 2

Middle Band SAR (Channel 18900):

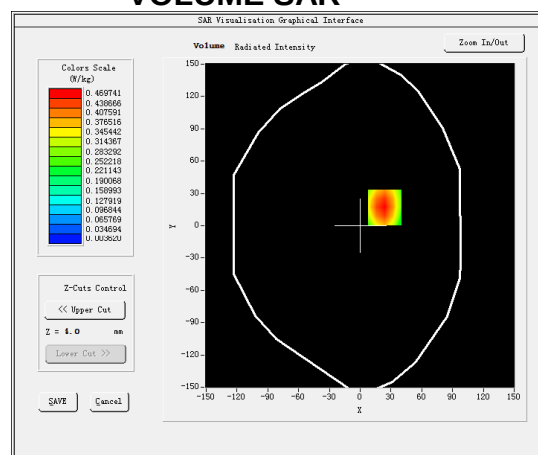
Date: 09/13/2022

Frequency (MHz)	1880.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.411700
Conductivity (S/m)	1.400405
Variation (%)	0.760000
Crest Factor	1.0
Probe Conversion factor	2.23
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(10mm)</u>
Band	<u>LTE band 2 (1 RB#0)</u>

SURFACE SAR

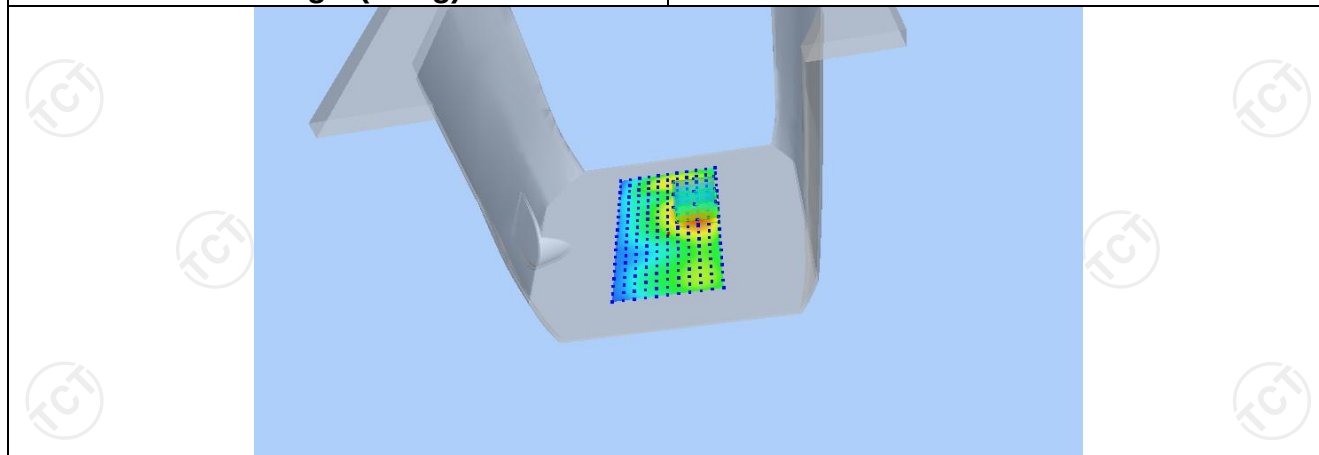


VOLUME SAR

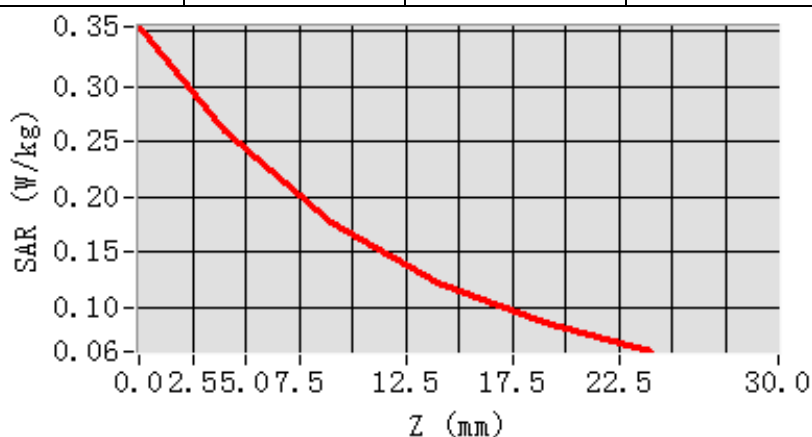


Maximum location: X=14.00, Y=24.00 SAR Peak: 0.36 W/kg

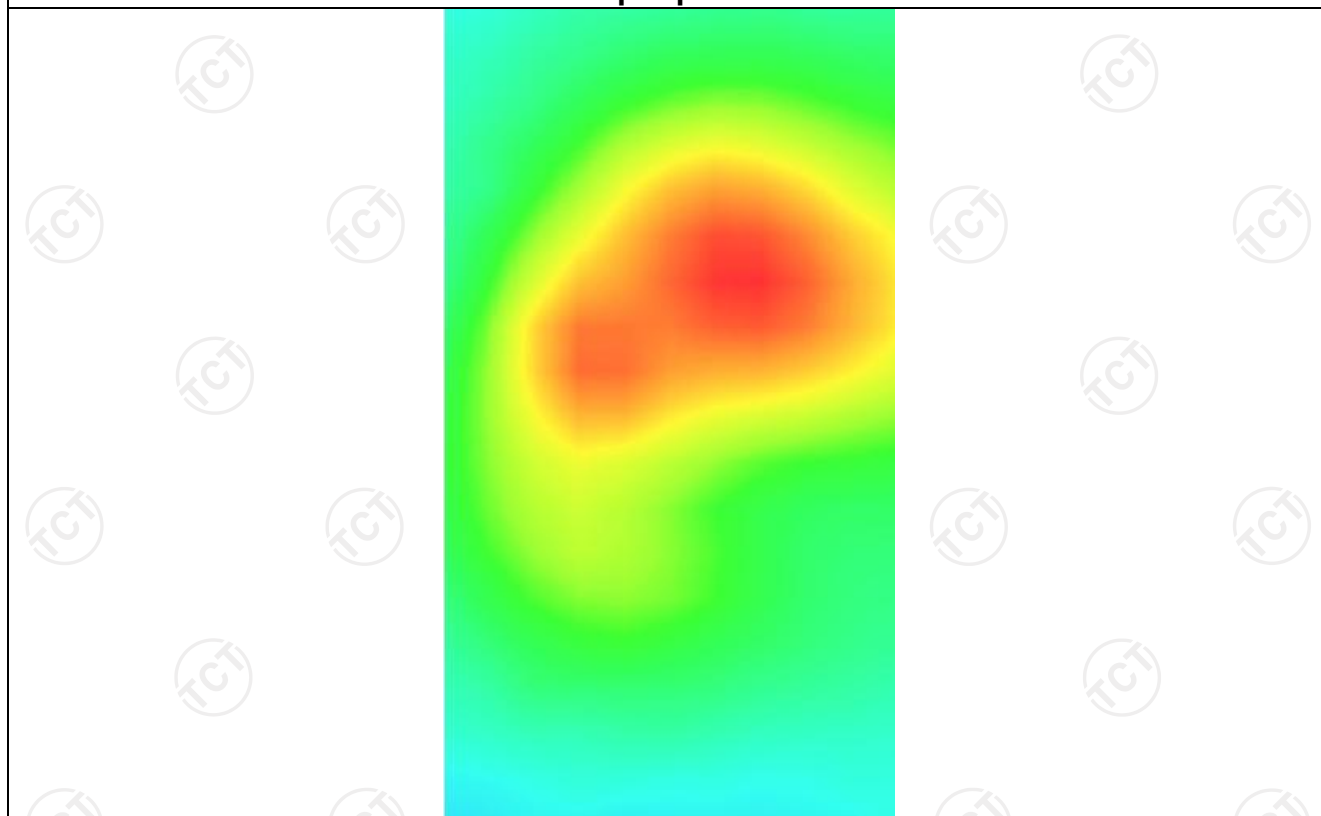
SAR 10g (W/Kg)	0.167129
SAR 1g (W/Kg)	0.240050



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3546	0.2609	0.1773	0.1222	0.0863



Hot spot position



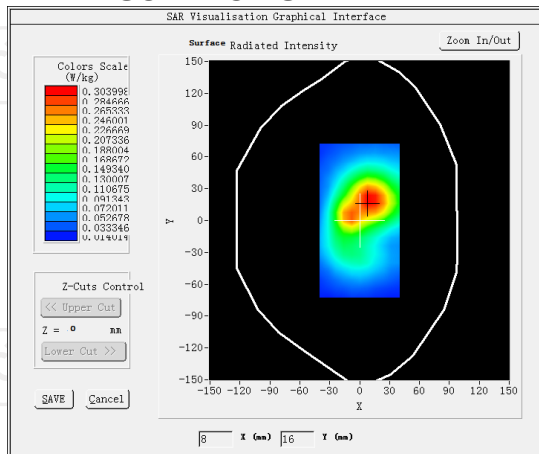
MEASUREMENT 3

Middle Band SAR (Channel 18900):

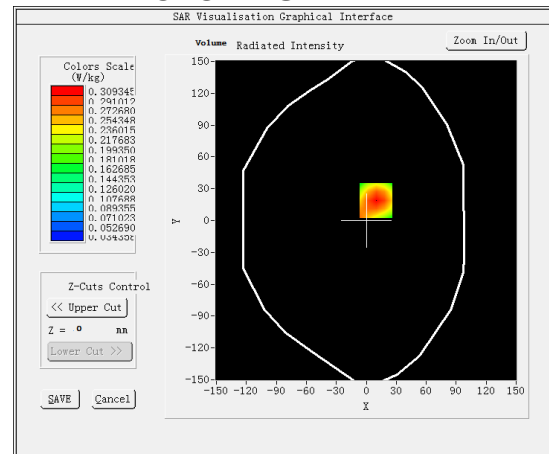
Date: 09/13/2022

Frequency (MHz)	1880.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.411700
Conductivity (S/m)	1.400405
Variation (%)	0.480000
Crest Factor	1.0
Probe Conversion factor	2.23
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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 2 (1 RB#0)</u>

SURFACE SAR

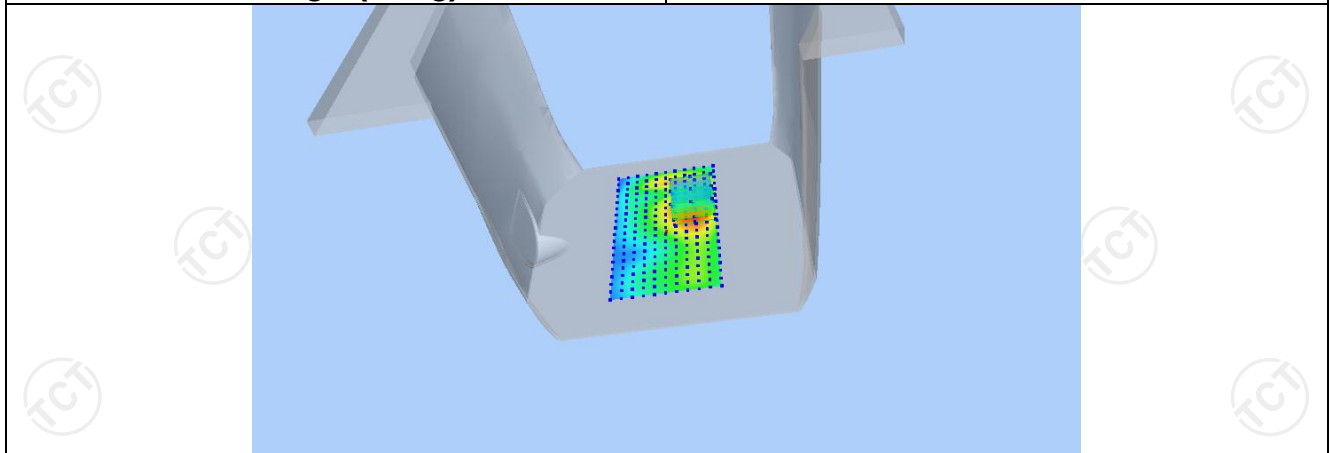


VOLUME SAR

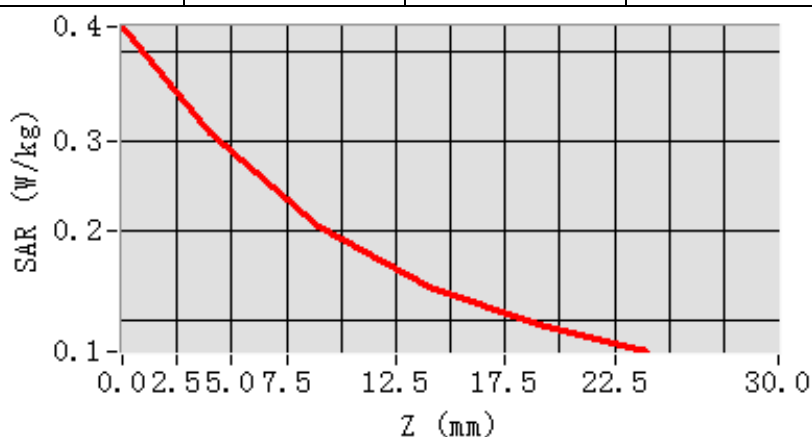


Maximum location: X=10.00, Y=19.00 SAR Peak: 0.44 W/kg

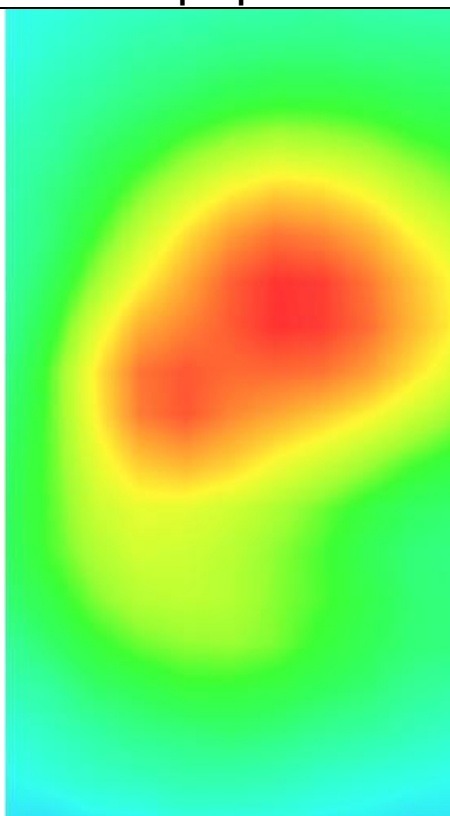
SAR 10g (W/Kg)	0.193211
SAR 1g (W/Kg)	0.292330



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8721	0.5112	0.1933	0.0877	0.0287



Hot spot position



LTE Band 4

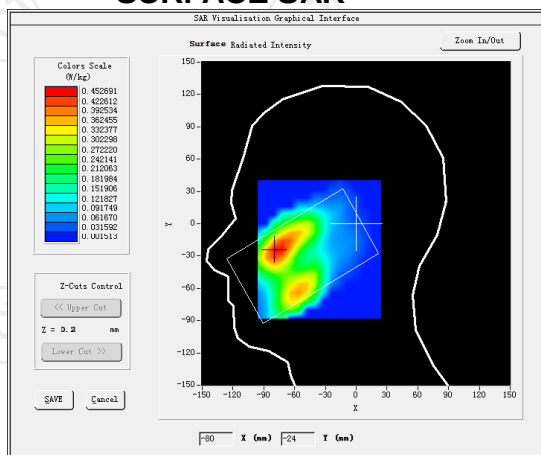
MEASUREMENT 1

Middle Band SAR (Channel 20175):

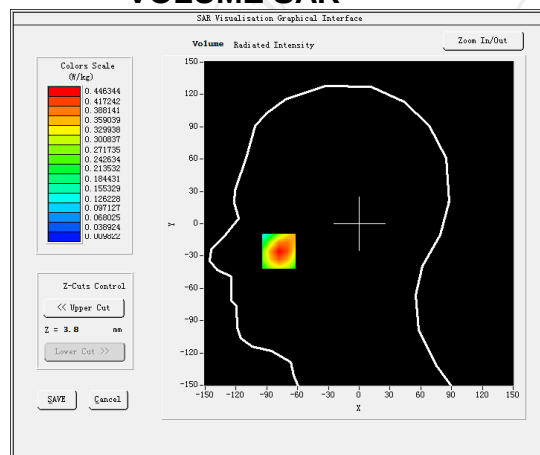
Date: 09/13/2022

Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.070000
Relative permittivity (imaginary part)	14.000000
Conductivity (S/m)	1.380000
Variation (%)	-1.020000
Crest Factor	1.0
Probe Conversion factor	2.08
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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>Left head</u>
Device Position	<u>Cheek</u>
Band	<u>LTE band 4(1 RB#0)</u>

SURFACE SAR



VOLUME SAR



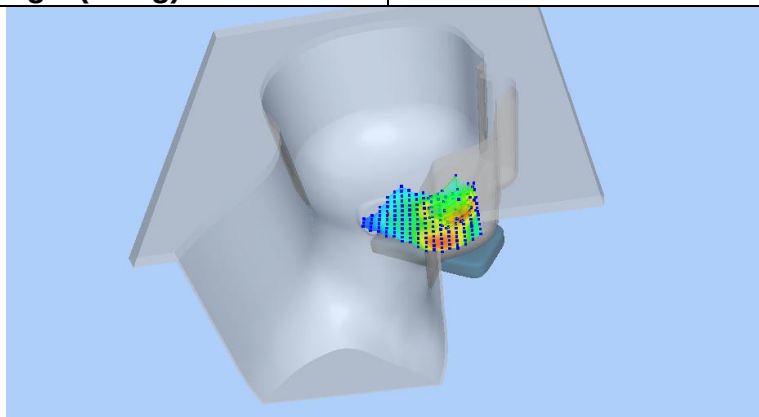
Maximum location: X=-42.00, Y=-43.00 SAR Peak: 0.16 W/kg

SAR 10g (W/Kg)

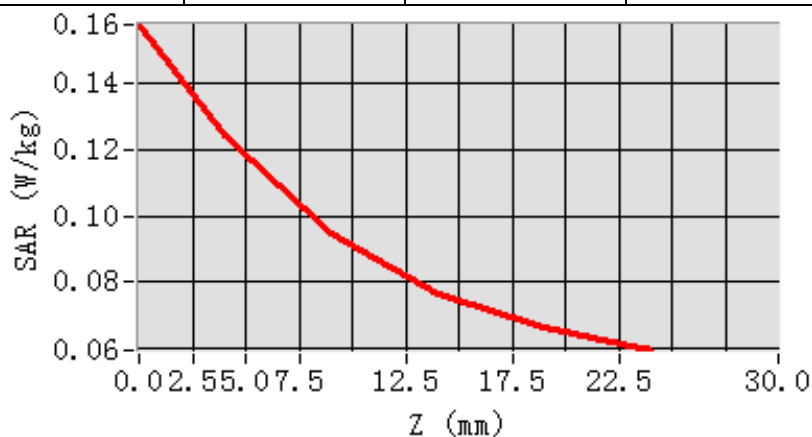
0.085039

SAR 1g (W/Kg)

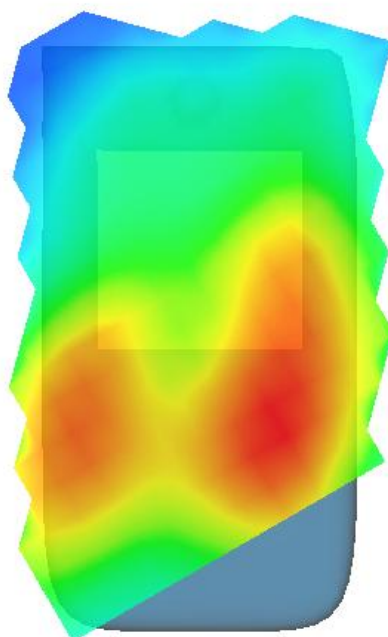
0.111117



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6064	0.4440	0.2912	0.1923	0.1315



Hot spot position



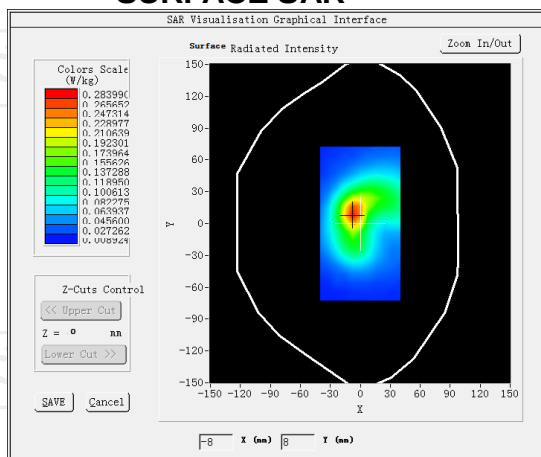
MEASUREMENT 2

Middle Band SAR (Channel 20175):

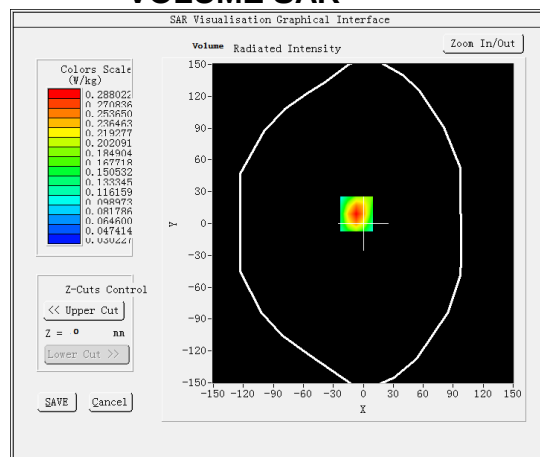
Date: 09/13/2022

Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.070000
Relative permittivity (imaginary part)	14.000000
Conductivity (S/m)	1.380000
Variation (%)	0.210000
Crest Factor	1.0
Probe Conversion factor	2.08
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(10mm)</u>
Band	<u>LTE band 4(1 RB#0)</u>

SURFACE SAR

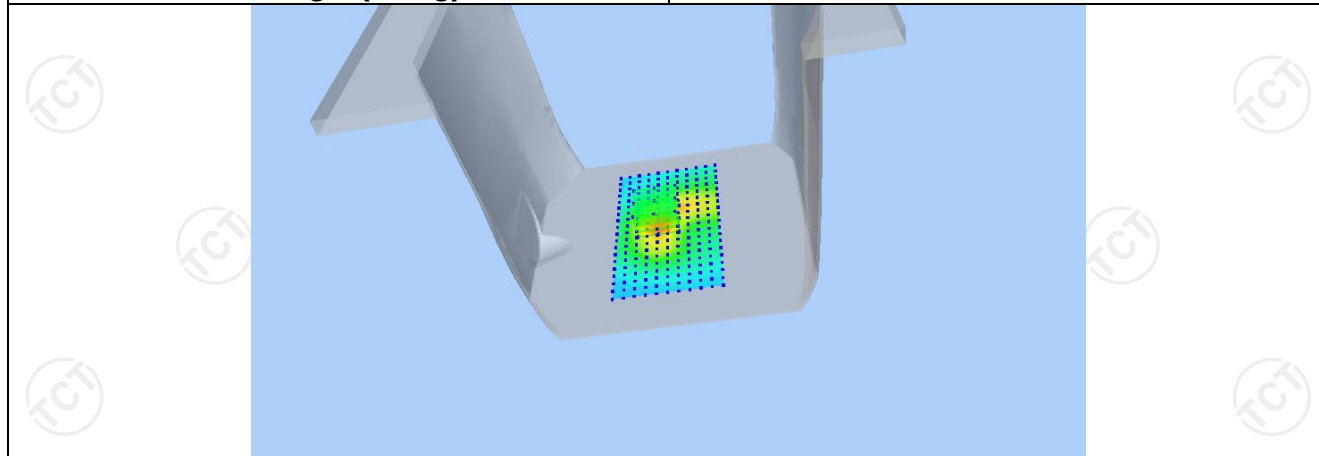


VOLUME SAR

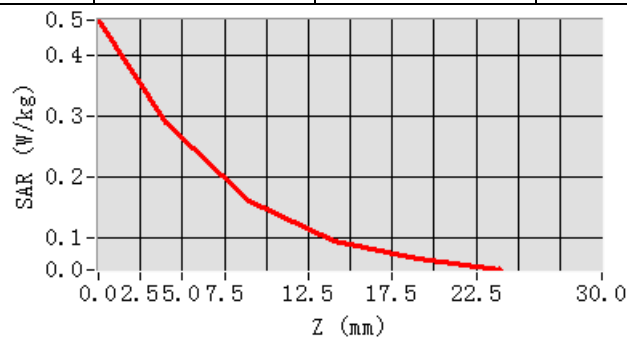


Maximum location: X=-23.00, Y=36.00 SAR Peak: 1.01 W/kg

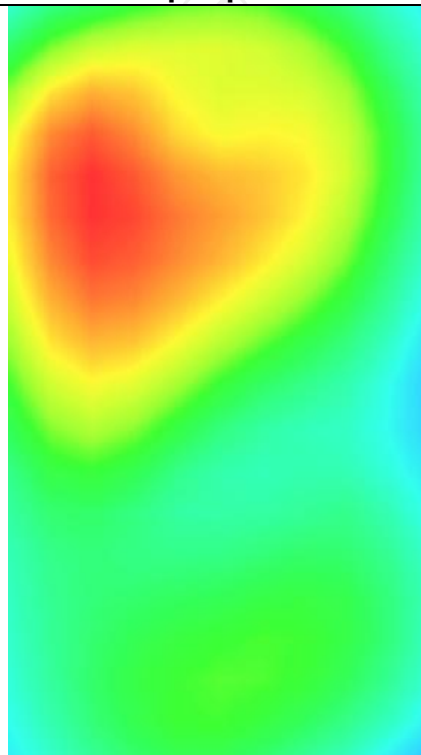
SAR 10g (W/Kg)	0.159505
SAR 1g (W/Kg)	0.266694



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.0050	0.5801	0.2718	0.1204	0.0526



Hot spot position



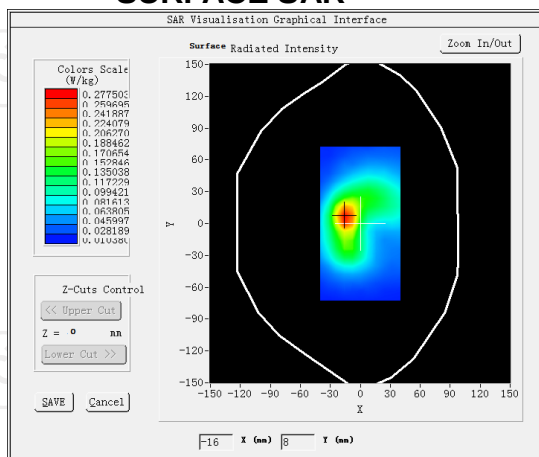
MEASUREMENT 3

Middle Band SAR (Channel 20175):

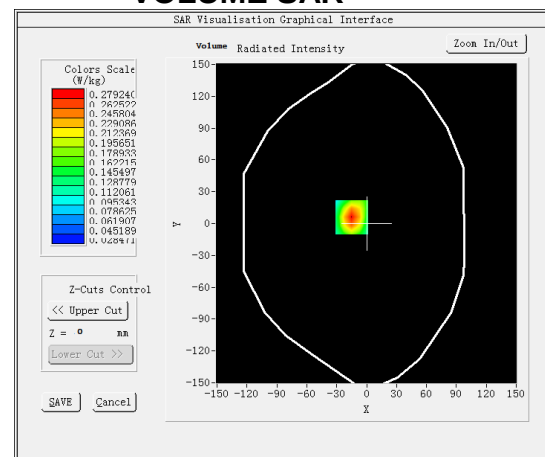
Date: 09/13/2022

Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.070000
Relative permittivity (imaginary part)	14.000000
Conductivity (S/m)	1.380000
Variation (%)	0.910000
Crest Factor	1.0
Probe Conversion factor	2.08
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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 4(1 RB#0)</u>

SURFACE SAR

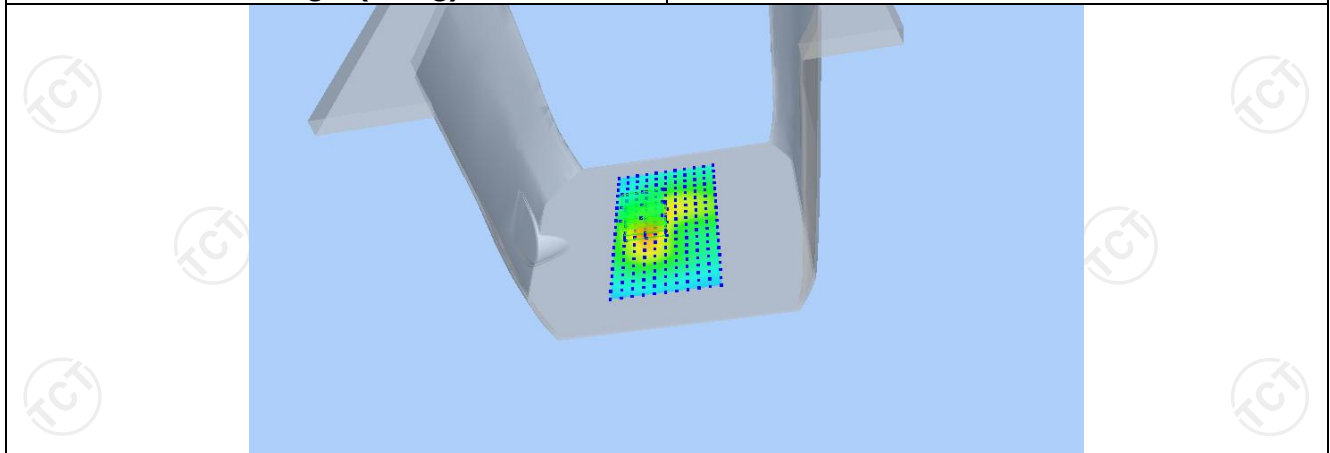


VOLUME SAR

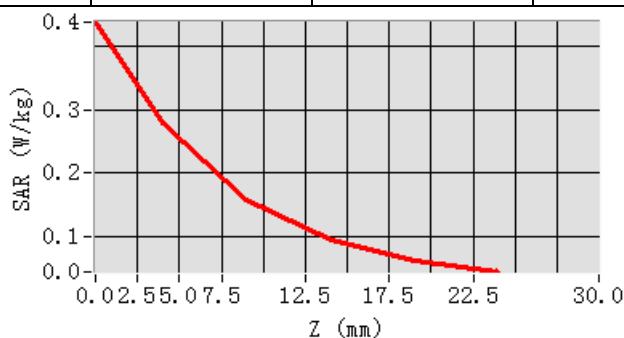


Maximum location: X=-15.00, Y=6.00 SAR Peak: 0.44W/kg

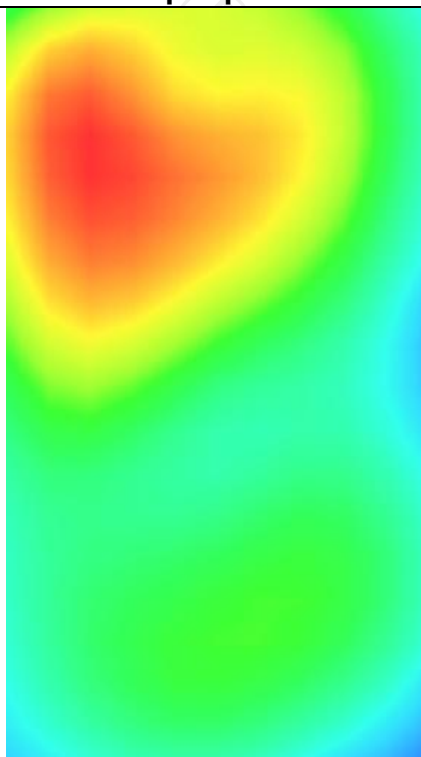
SAR 10g (W/Kg)	0.147565
SAR 1g (W/Kg)	0.266932



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.0151	0.5893	0.2786	0.1246	0.0547



Hot spot position



LTE Band 5

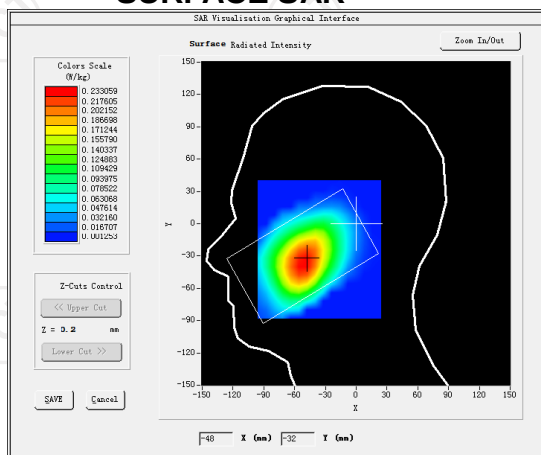
MEASUREMENT 1

Lower Band SAR (Channel 20450):

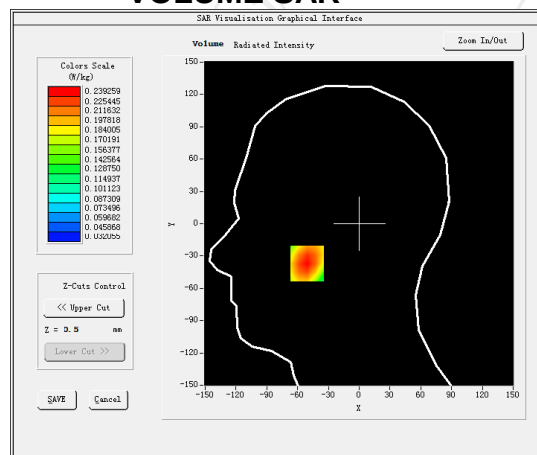
Date: 09/13/2022

Frequency (MHz)	829.000000
Relative permittivity (real part)	41.417760
Relative permittivity (imaginary part)	18.129852
Conductivity (S/m)	0.874923
Variation (%)	1.690000
Crest Factor	1.0
Probe Conversion factor	1.80
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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>Left head</u>
Device Position	<u>Cheek</u>
Band	<u>LTE band 5(1 RB#0)</u>

SURFACE SAR



VOLUME SAR



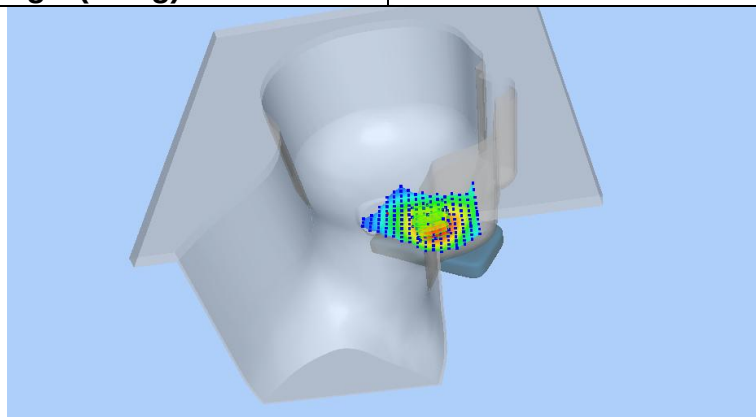
Maximum location: X=-51.00, Y=-37.00 SAR Peak: 0.08 W/kg

SAR 10g (W/Kg)

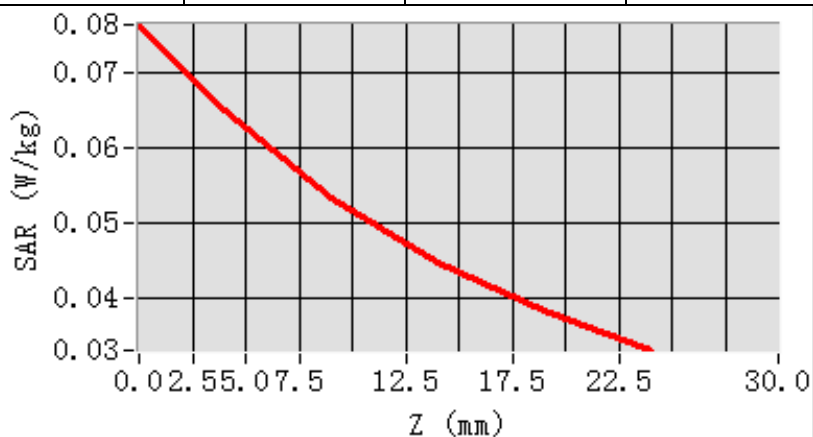
0.043789

SAR 1g (W/Kg)

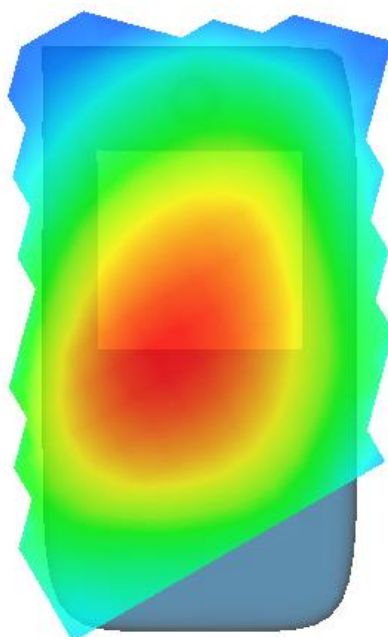
0.069156



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2913	0.2393	0.1850	0.1411	0.1058



Hot spot position



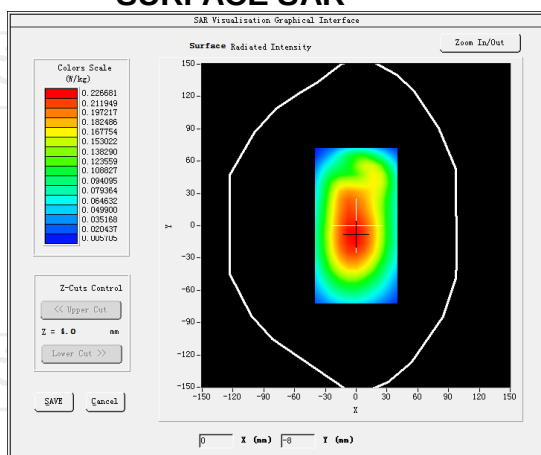
MEASUREMENT 2

Lower Band SAR (Channel 20450):

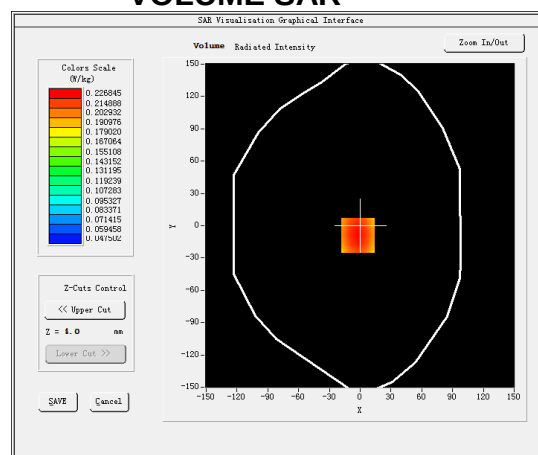
Date: 09/13/2022

Frequency (MHz)	829.000000
Relative permittivity (real part)	41.417760
Relative permittivity (imaginary part)	18.129852
Conductivity (S/m)	0.874923
Variation (%)	-0.160000
Crest Factor	1.0
Probe Conversion factor	1.80
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(10mm)</u>
Band	<u>LTE band 5(1 RB#0)</u>

SURFACE SAR

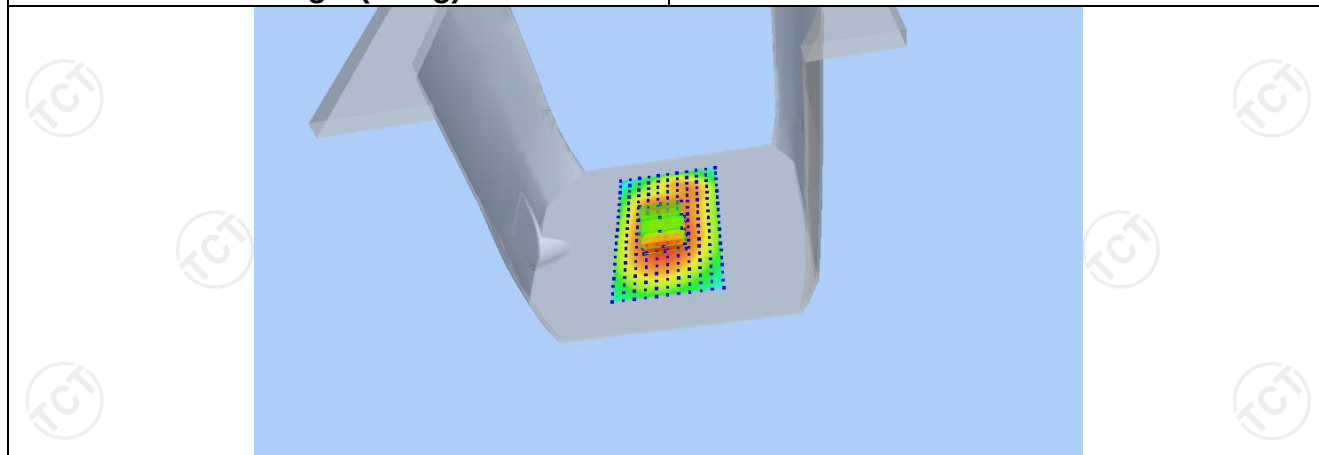


VOLUME SAR

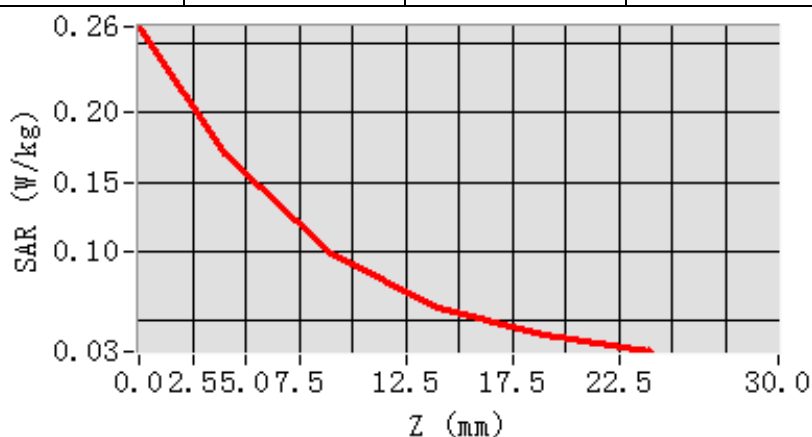


Maximum location: X=-7.00, Y=-3.00 SAR Peak: 0.28 W/kg

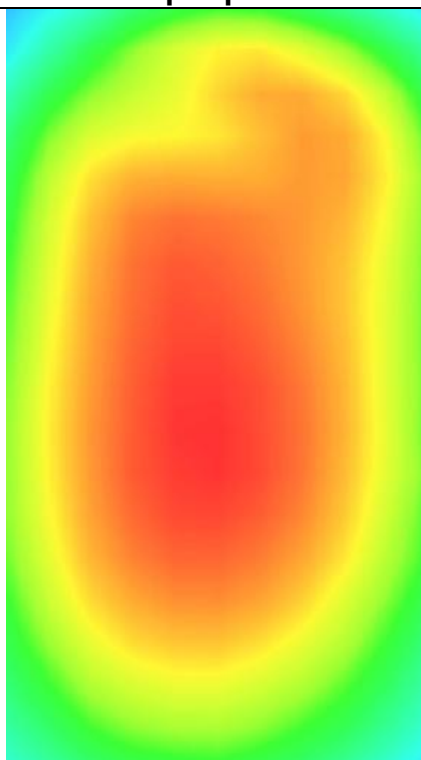
SAR 10g (W/Kg)	0.087407
SAR 1g (W/Kg)	0.158518



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2817	0.2268	0.1708	0.1268	0.0924



Hot spot position



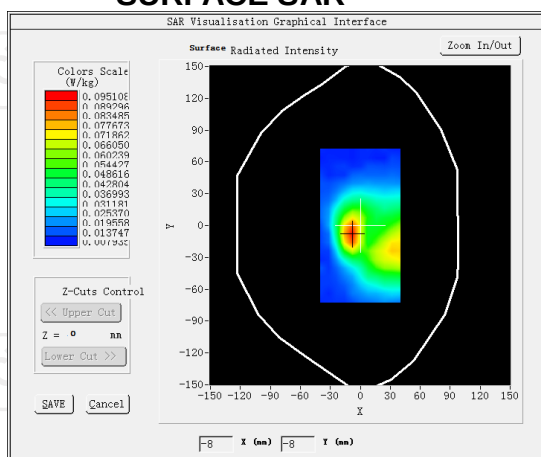
MEASUREMENT 3

Lower Band SAR (Channel 20450):

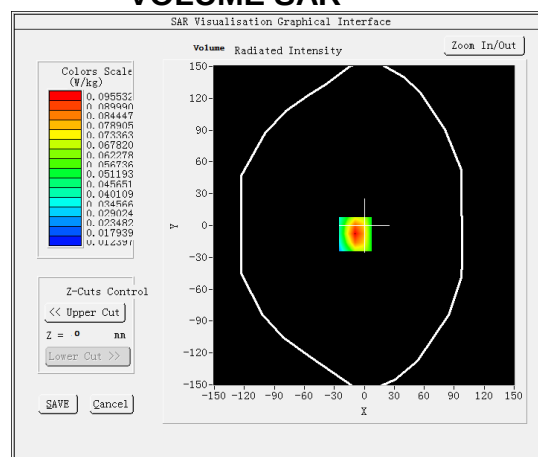
Date: 09/13/2022

Frequency (MHz)	829.000000
Relative permittivity (real part)	41.417760
Relative permittivity (imaginary part)	18.129852
Conductivity (S/m)	0.874923
Variation (%)	-1.190000
Crest Factor	1.0
Probe Conversion factor	1.80
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(1 RB#0)</u>

SURFACE SAR

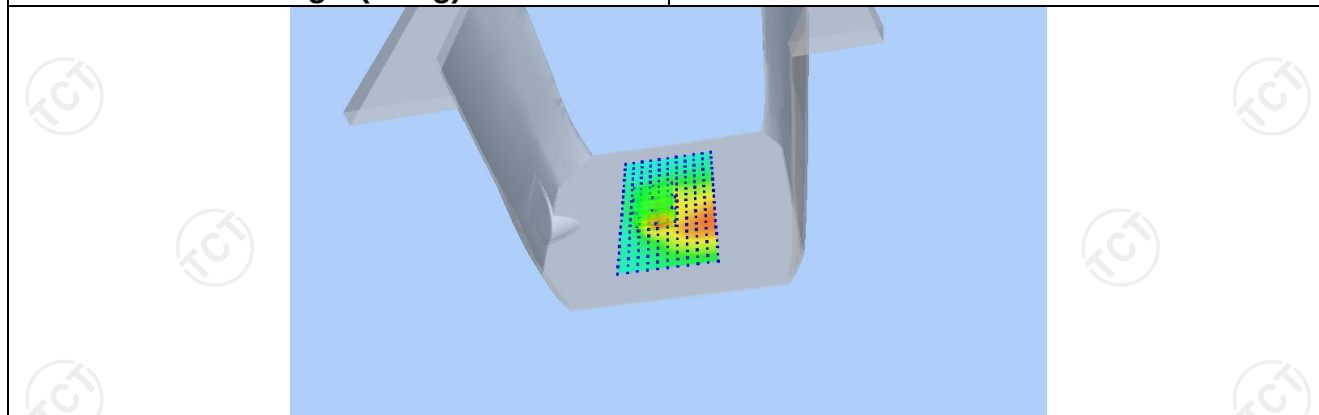


VOLUME SAR



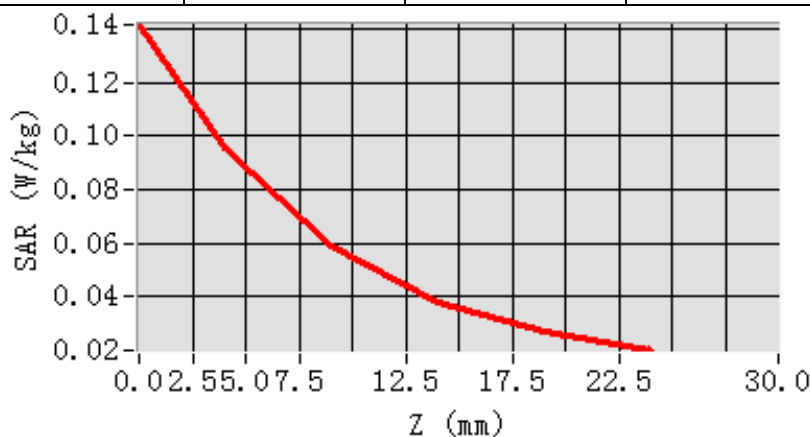
Maximum location: X=-9.00, Y=-8.00 SAR Peak: 0.14 W/kg

SAR 10g (W/Kg)	0.055419
SAR 1g (W/Kg)	0.087376

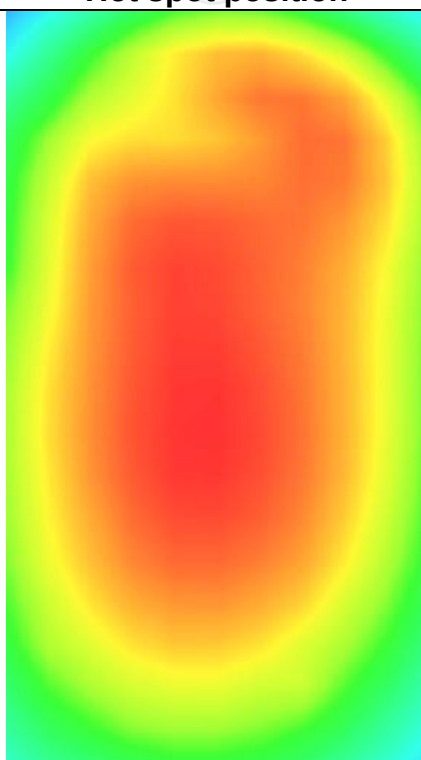


Z (mm)	0.00	4.00	9.00	14.00	19.00
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SAR (W/Kg)	0.2917	0.2356	0.1788	0.1345	0.1000
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Hot spot position



LTE Band 7

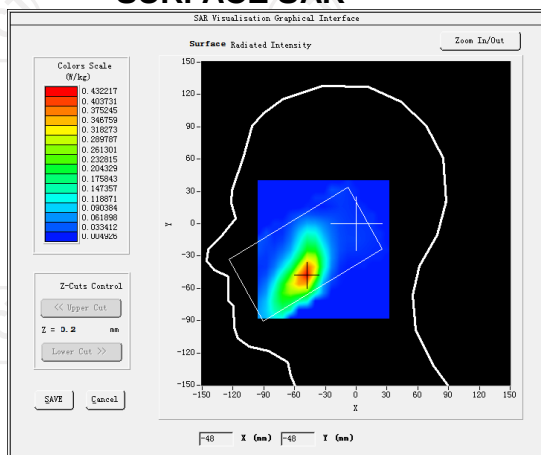
MEASUREMENT 1

Middle Band SAR (Channel 21100):

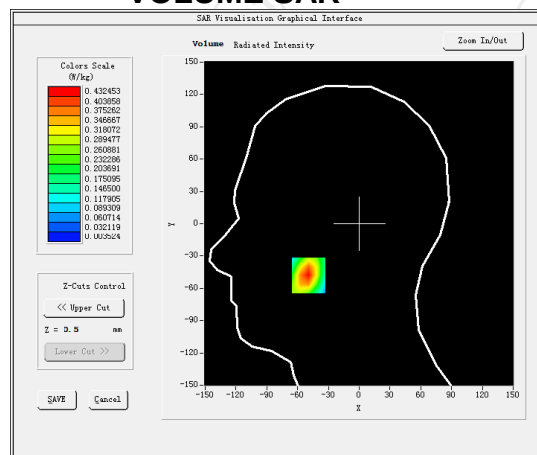
Date: 09/13/2022

Frequency (MHz)	2535.000000
Relative permittivity (real part)	38.853477
Relative permittivity (imaginary part)	13.545489
Conductivity (S/m)	1.922567
Variation (%)	-0.390000
Crest Factor	1.0
Probe Conversion factor	4.36
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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	Left head
Device Position	Cheek
Band	LTE band 7(1 RB#0)

SURFACE SAR



VOLUME SAR



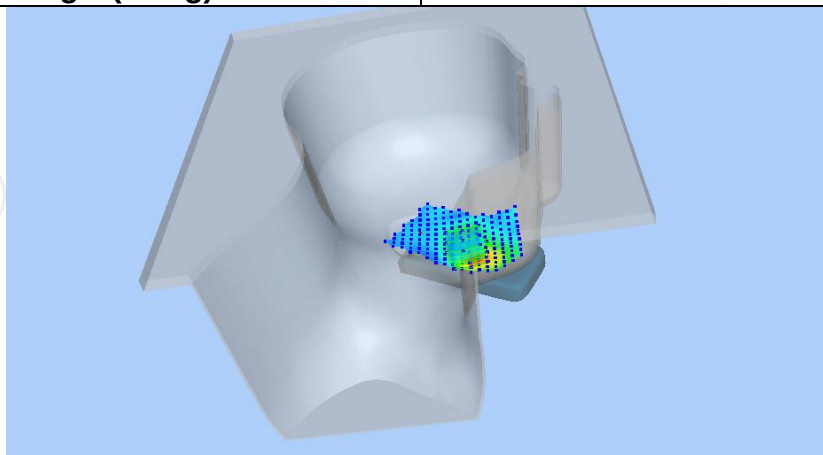
Maximum location: X=-80.00, Y=-66.00 SAR Peak: 0.10 W/kg

SAR 10g (W/Kg)

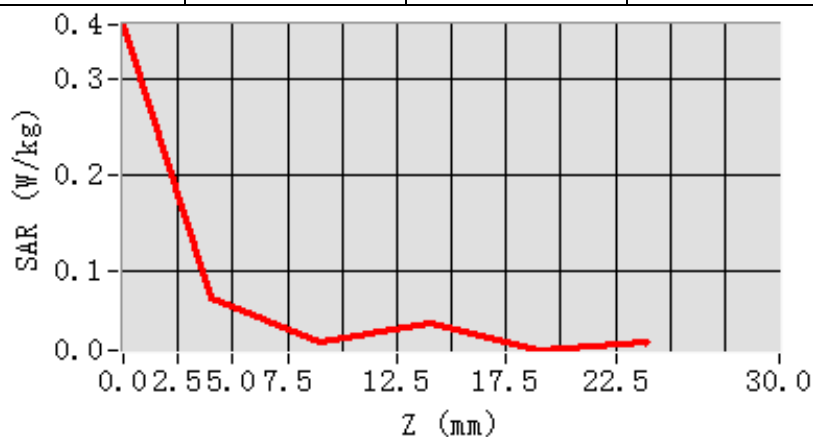
0.044588

SAR 1g (W/Kg)

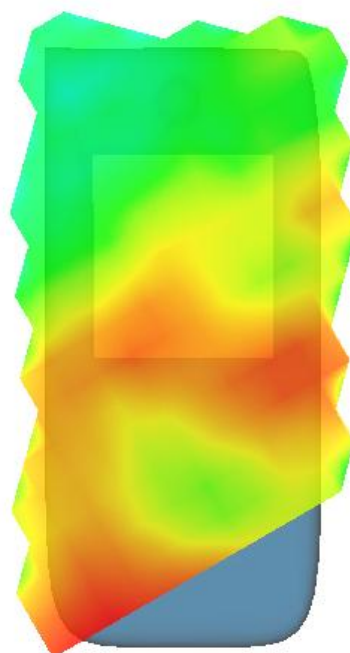
0.060219



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3571	0.0718	0.0276	0.0508	0.0199



Hot spot position



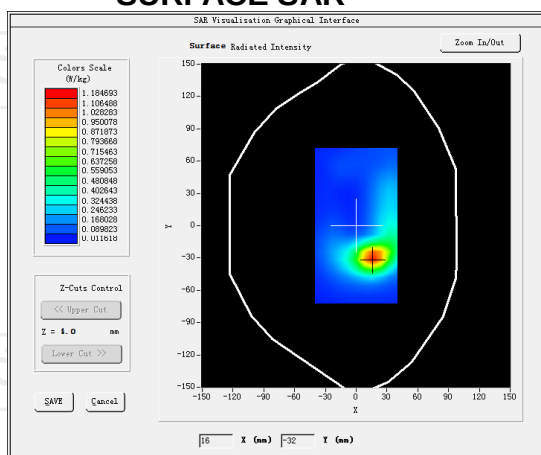
MEASUREMENT 2

Middle Band SAR (Channel 21100):

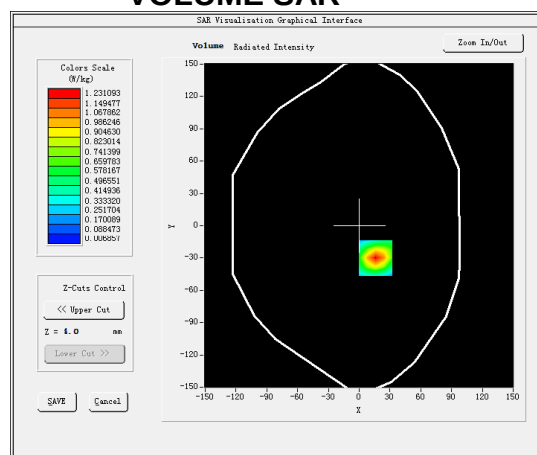
Date: 09/13/2022

Frequency (MHz)	2535.000000
Relative permittivity (real part)	38.853477
Relative permittivity (imaginary part)	13.545489
Conductivity (S/m)	1.922567
Variation (%)	-0.230000
Crest Factor	1.0
Probe Conversion factor	4.36
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(10mm)</u>
Band	<u>LTE band 7(1 RB#0)</u>

SURFACE SAR

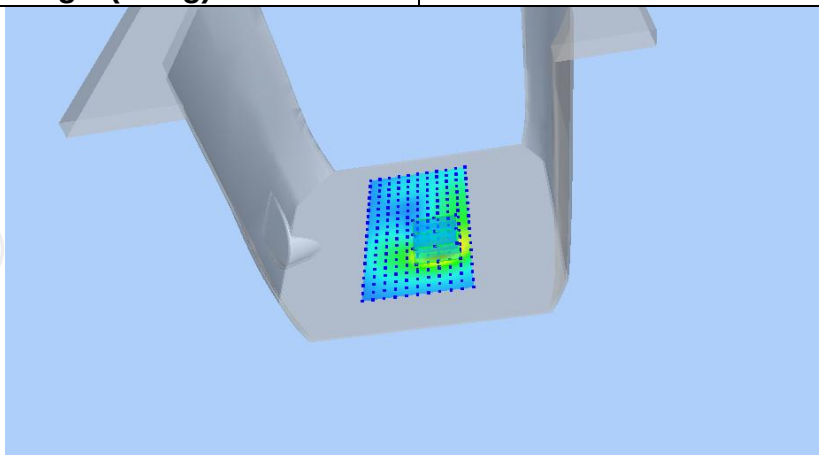


VOLUME SAR

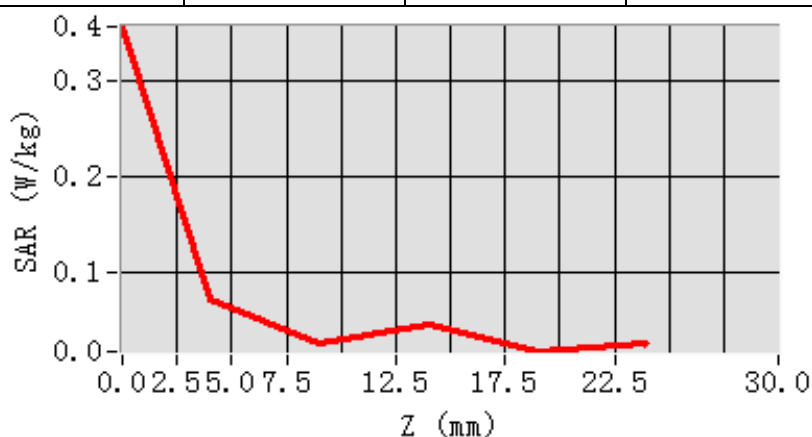


Maximum location: X=16.00, Y=-30.00 SAR Peak: 2.49 W/kg

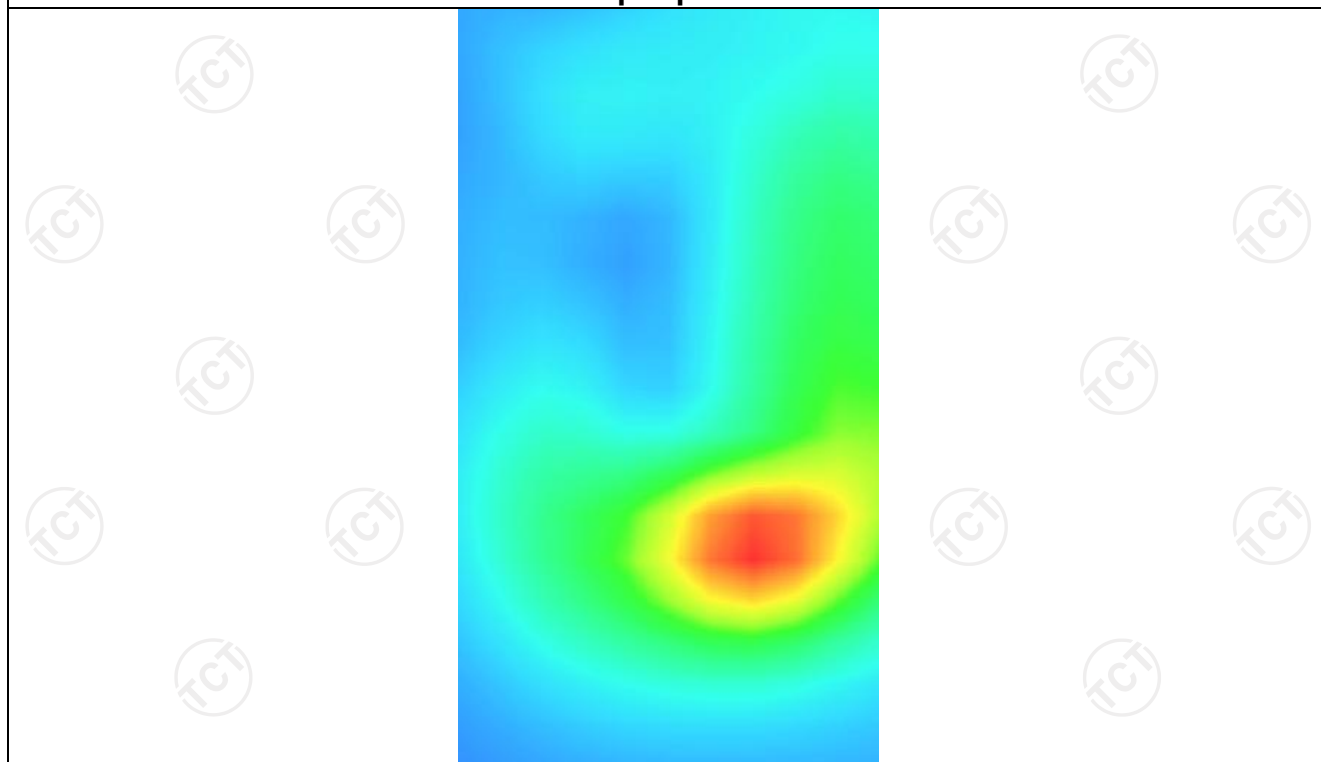
SAR 10g (W/Kg)	0.985495
SAR 1g (W/Kg)	0.429891



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.4978	1.2311	0.4399	0.1414	0.0507



Hot spot position



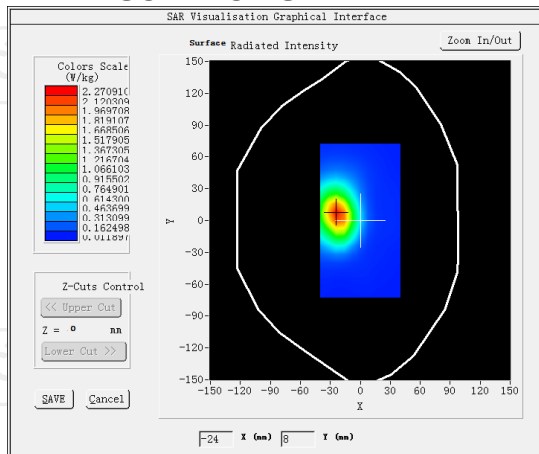
MEASUREMENT 3

Middle Band SAR (Channel 21100):

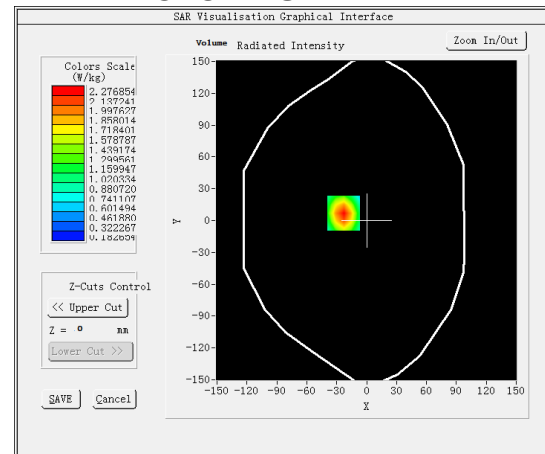
Date: 09/13/2022

Frequency (MHz)	2535.000000
Relative permittivity (real part)	38.853477
Relative permittivity (imaginary part)	13.545489
Conductivity (S/m)	1.922567
Variation (%)	-0.070000
Crest Factor	1.0
Probe Conversion factor	4.36
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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 7(1 RB#0)</u>

SURFACE SAR



VOLUME SAR



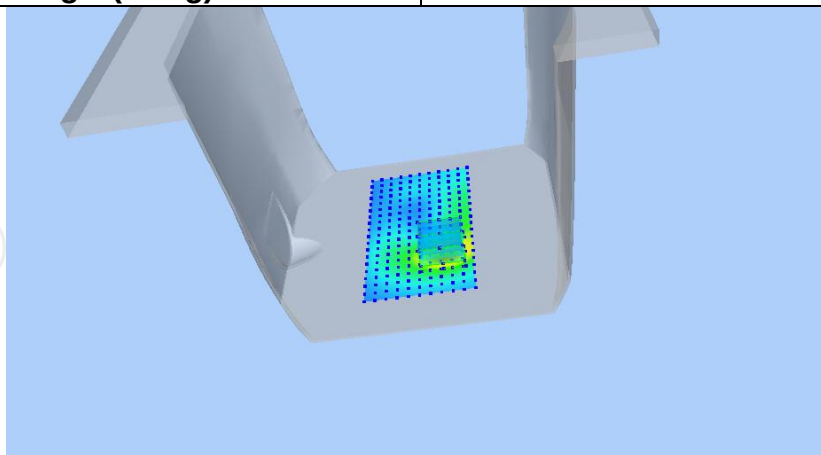
Maximum location: X=18.00, Y=-32.00 SAR Peak: 2.29 W/kg

SAR 10g (W/Kg)

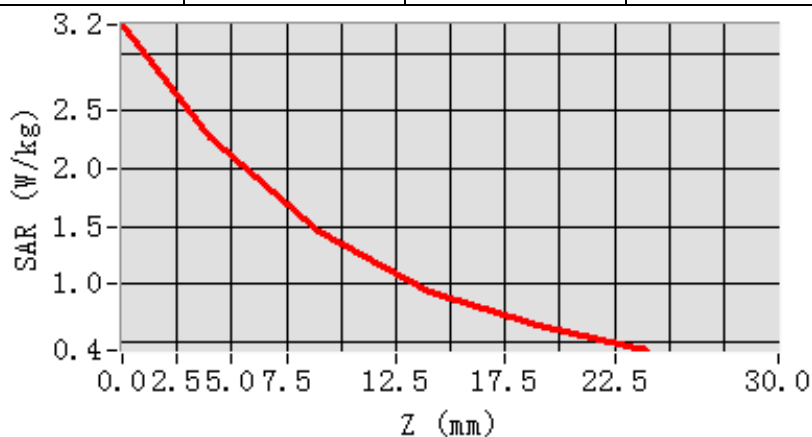
0.970208

SAR 1g (W/Kg)

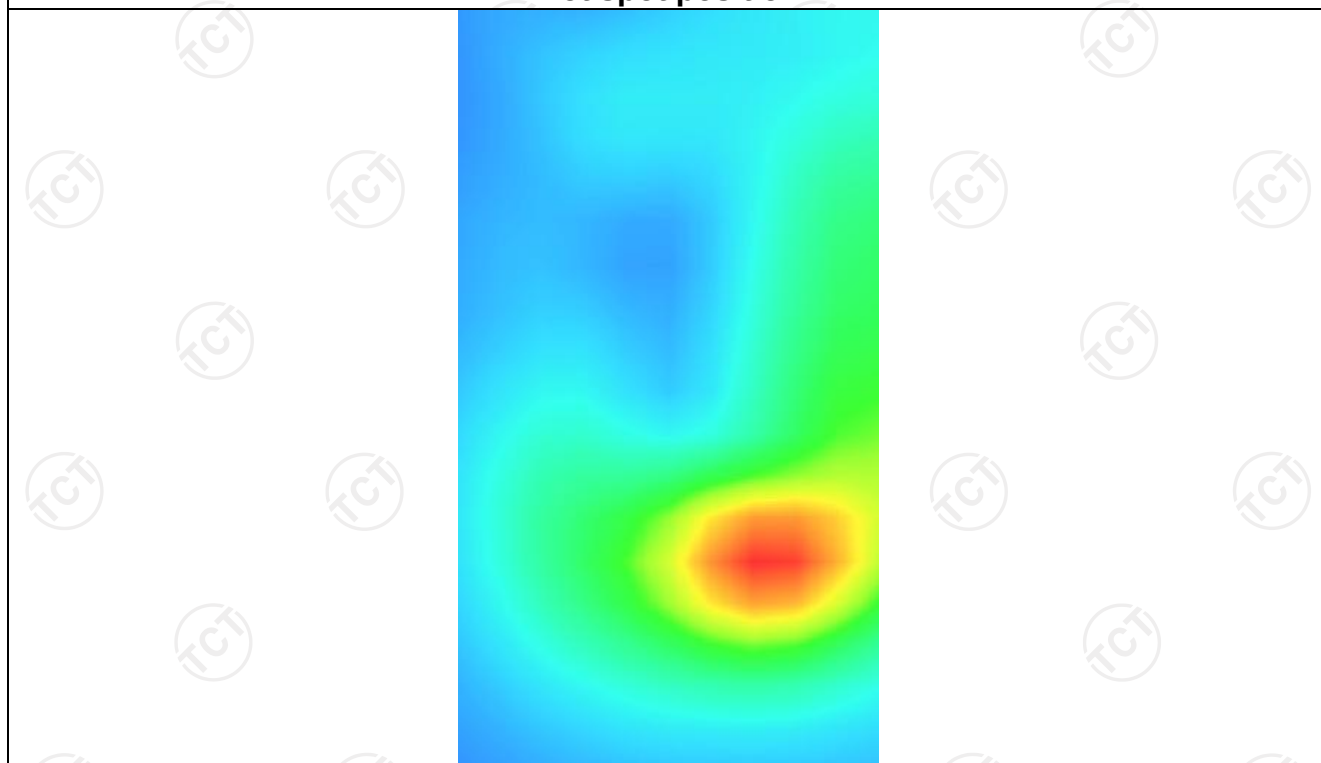
0.459411



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.2975	1.1307	0.4031	0.1294	0.0466



Hot spot position



LTE Band 12

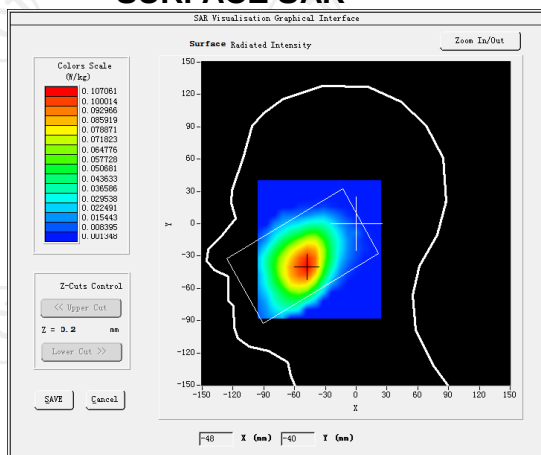
MEASUREMENT 1

Middle Band SAR (Channel 23095):

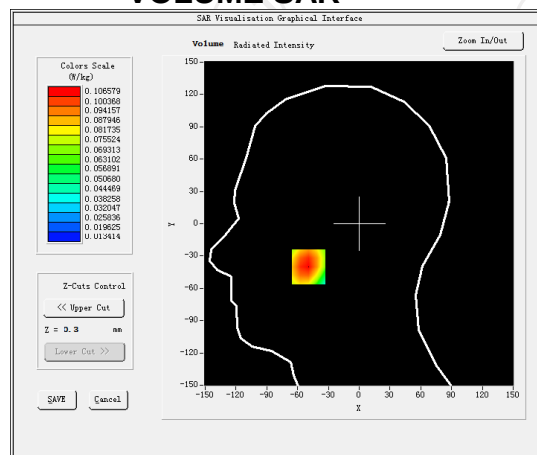
Date: 08/30/2022

Frequency (MHz)	707.500000
Relative permittivity (real part)	40.761260
Relative permittivity (imaginary part)	17.130904
Conductivity (S/m)	0.931220
Variation (%)	-1.570000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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>Left head</u>
Device Position	<u>Cheek</u>
Band	<u>LTE band 12(1 RB#0)</u>

SURFACE SAR



VOLUME SAR



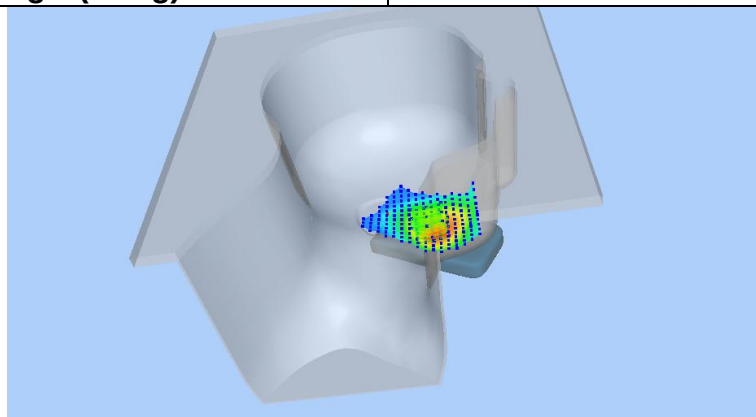
Maximum location: X=-39.00, Y=-41.00 SAR Peak: 0.11 W/kg

SAR 10g (W/Kg)

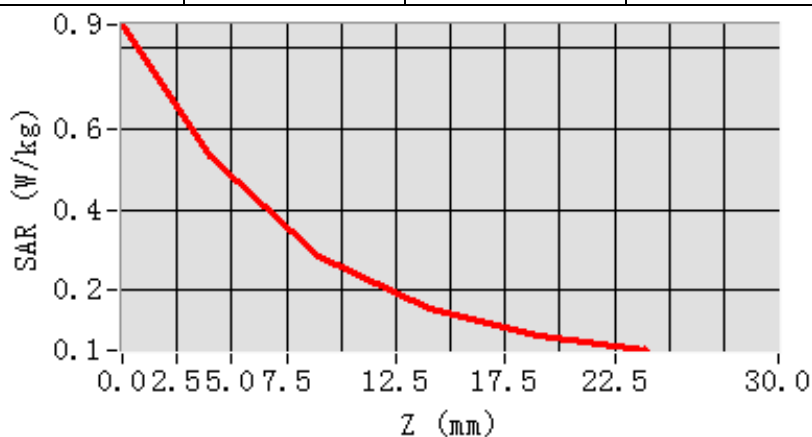
0.072366

SAR 1g (W/Kg)

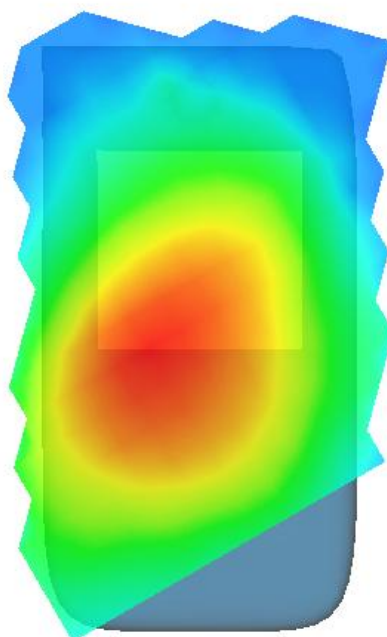
0.103483



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1331	0.1051	0.0707	0.0606	0.0451



Hot spot position



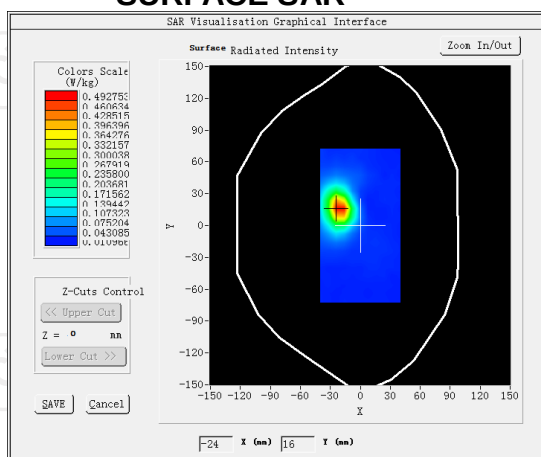
MEASUREMENT 2

Middle Band SAR (Channel 23095):

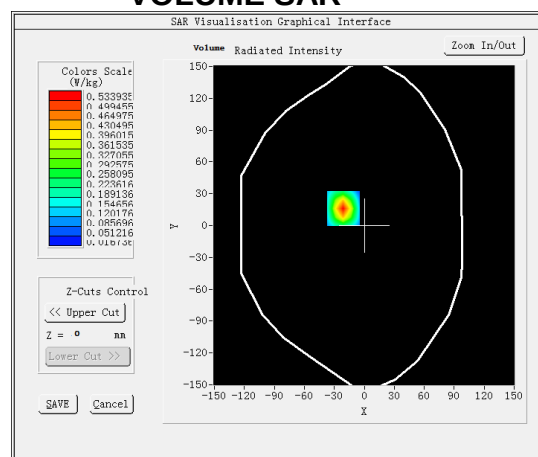
Date: 08/30/2022

Frequency (MHz)	707.500000
Relative permittivity (real part)	40.761260
Relative permittivity (imaginary part)	17.130904
Conductivity (S/m)	0.931220
Variation (%)	-2.820000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(10mm)</u>
Band	<u>LTE band 12(1 RB#0)</u>

SURFACE SAR

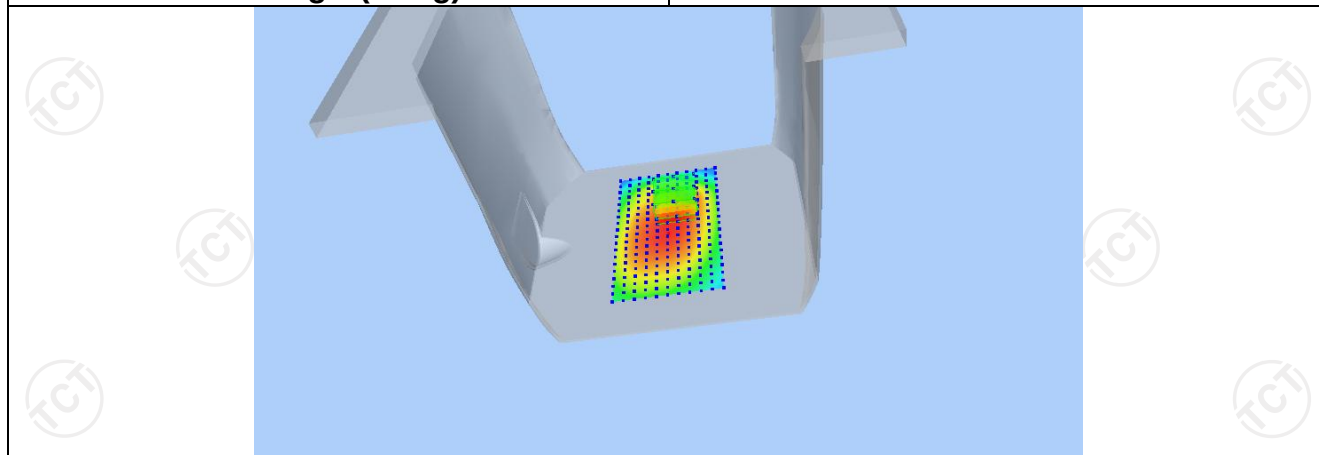


VOLUME SAR

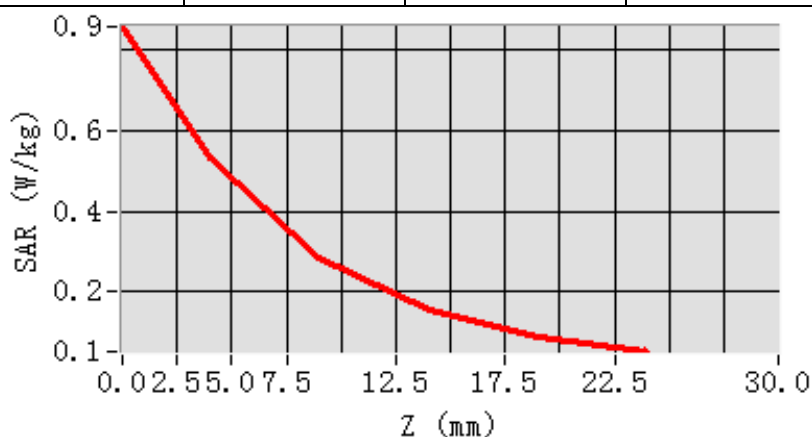


Maximum location: X=-21.00, Y=16.00 SAR Peak: 0.86 W/kg

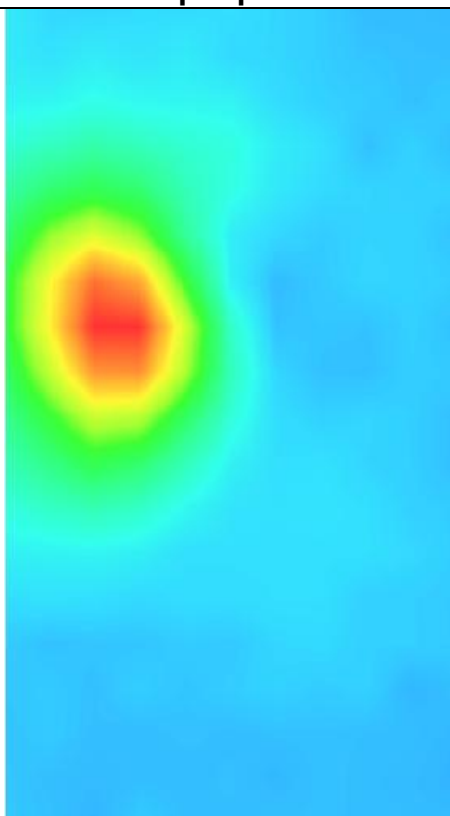
SAR 10g (W/Kg)	0.236660
SAR 1g (W/Kg)	0.490840



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2343	0.1763	0.1220	0.0836	0.0566



Hot spot position



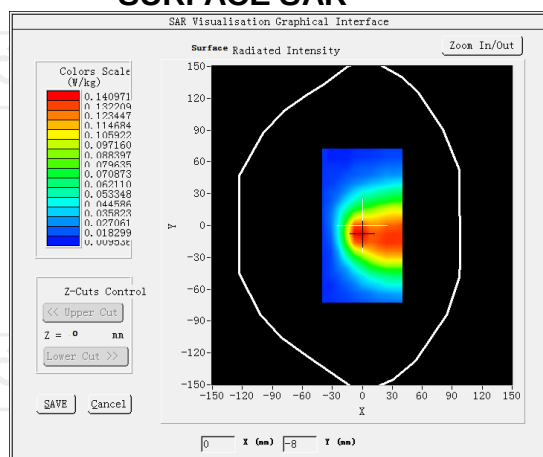
MEASUREMENT 3

Middle Band SAR (Channel 23095):

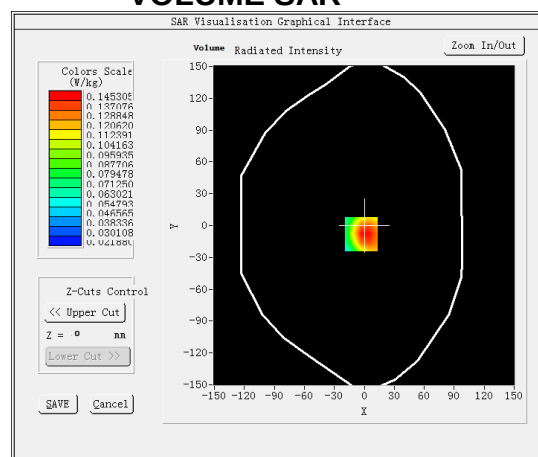
Date: 08/30/2022

Frequency (MHz)	707.500000
Relative permittivity (real part)	40.761260
Relative permittivity (imaginary part)	17.130904
Conductivity (S/m)	0.931220
Variation (%)	0.060000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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 12(1 RB#0)</u>

SURFACE SAR

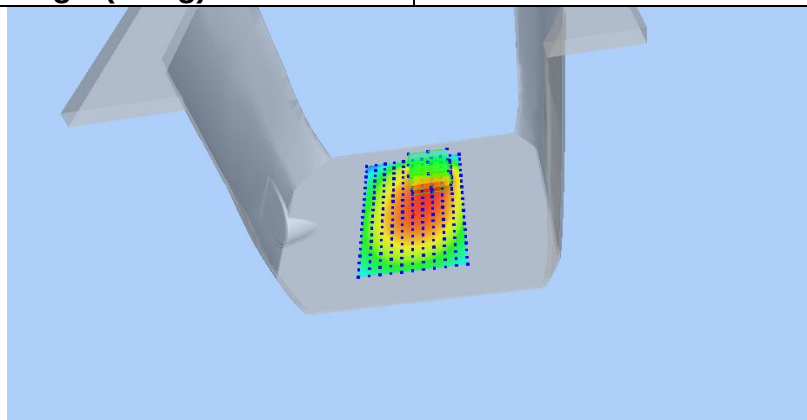


VOLUME SAR

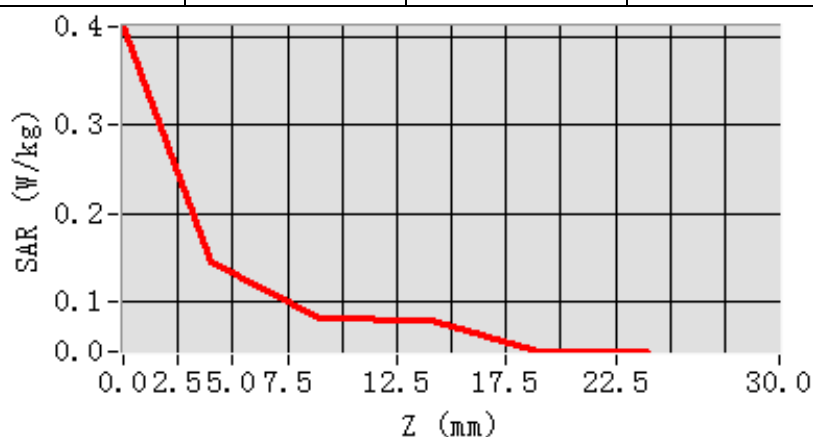


Maximum location: X=6.00, Y=28.00 SAR Peak: 0.15 W/kg

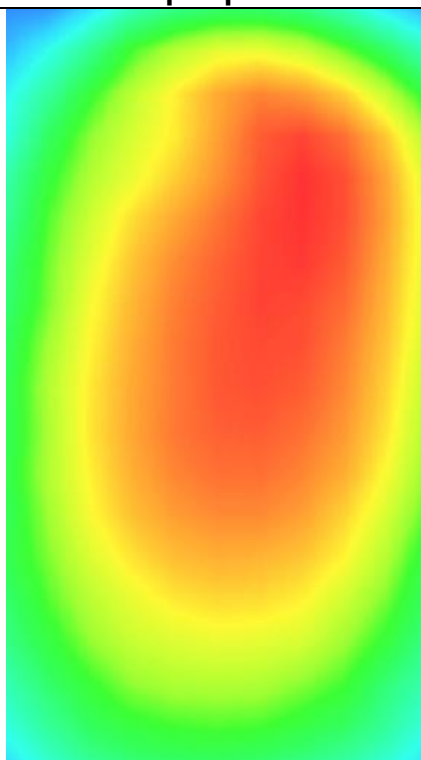
SAR 10g (W/Kg)	0.099621
SAR 1g (W/Kg)	0.142340



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2499	0.1801	0.1173	0.0758	0.0481



Hot spot position



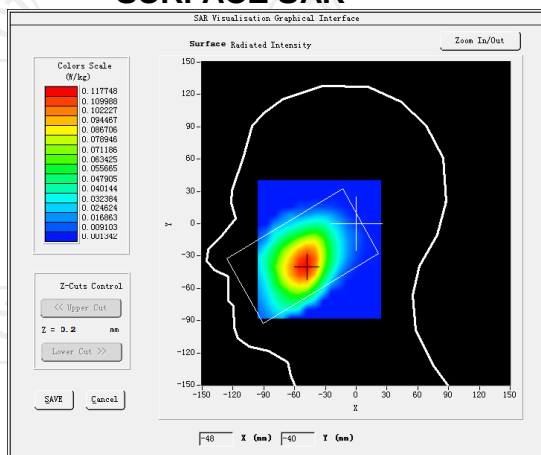
LTE Band 17

MEASUREMENT 1

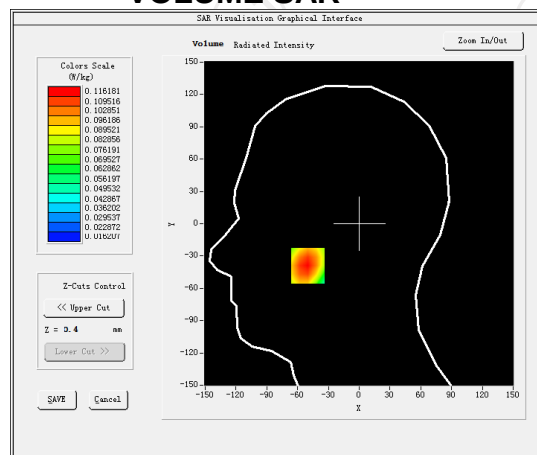
Hight Band SAR (Channel 23800): Date: 08/30/2022

Frequency (MHz)	711.000000
Relative permittivity (real part)	40.761260
Relative permittivity (imaginary part)	17.130904
Conductivity (S/m)	0.931220
Variation (%)	0.720000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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	Left head
Device Position	Cheek
Band	LTE band 17(1 RB#0)

SURFACE SAR



VOLUME SAR



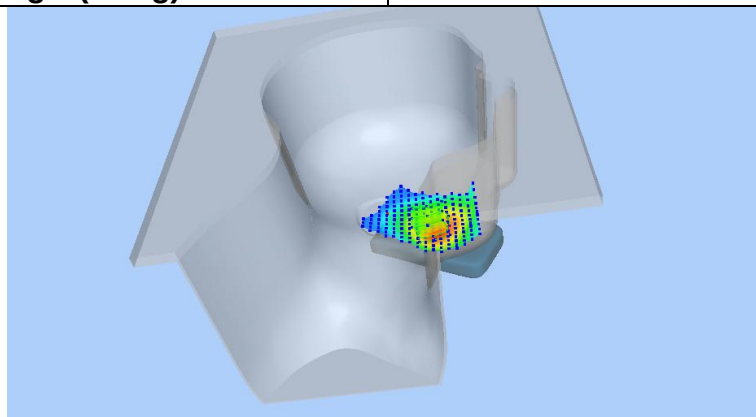
Maximum location: X=-47.00, Y=-31.00 SAR Peak: 0.07 W/kg

SAR 10g (W/Kg)

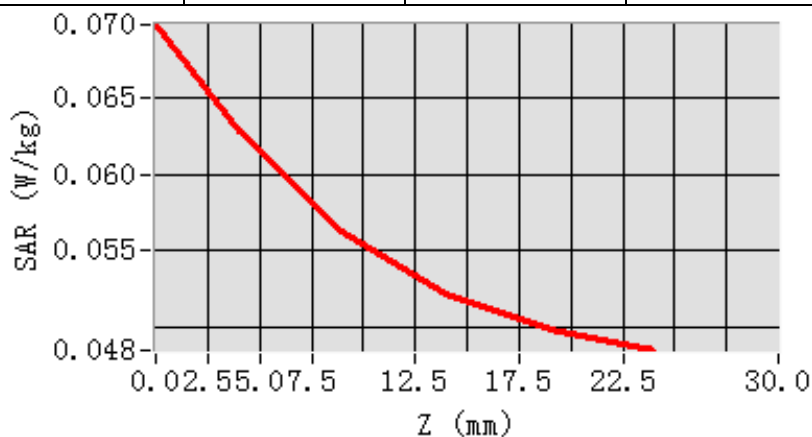
0.051643

SAR 1g (W/Kg)

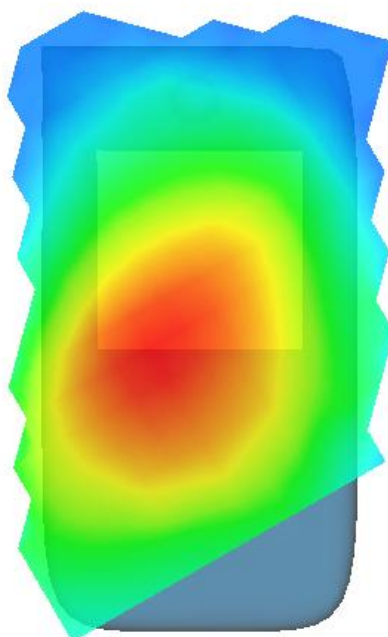
0.063733



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0698	0.0628	0.0563	0.0522	0.0499



Hot spot position



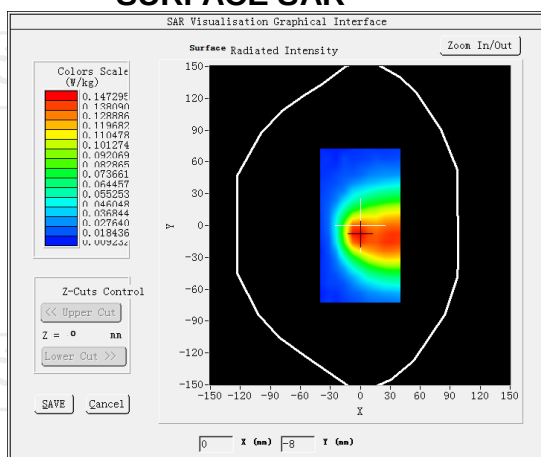
MEASUREMENT 2

Hight Band SAR (Channel 23800):

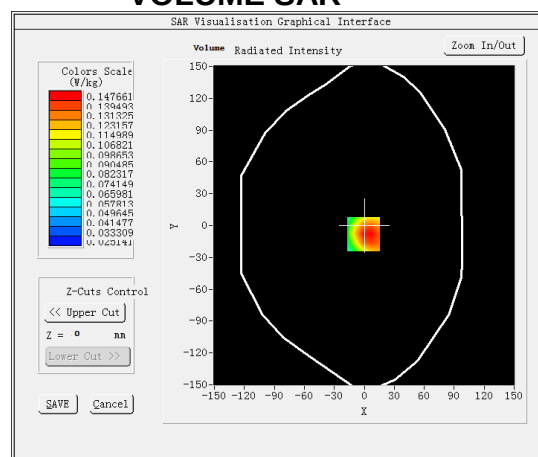
Date: 08/30/2022

Frequency (MHz)	711.000000
Relative permittivity (real part)	40.761260
Relative permittivity (imaginary part)	17.130904
Conductivity (S/m)	0.931220
Variation (%)	0.290000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(10mm)</u>
Band	<u>LTE band 17(1 RB#0)</u>

SURFACE SAR

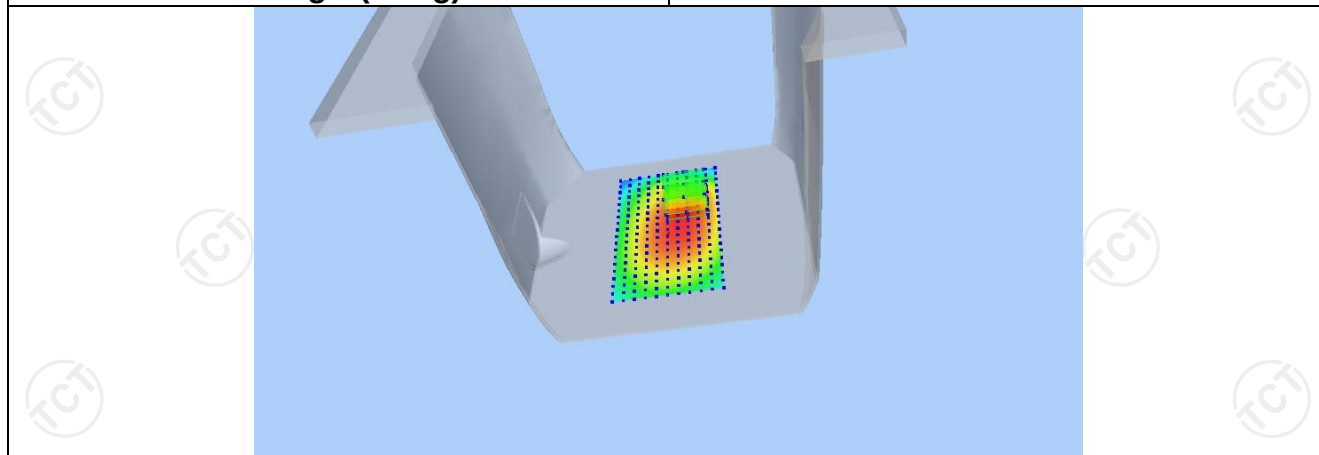


VOLUME SAR

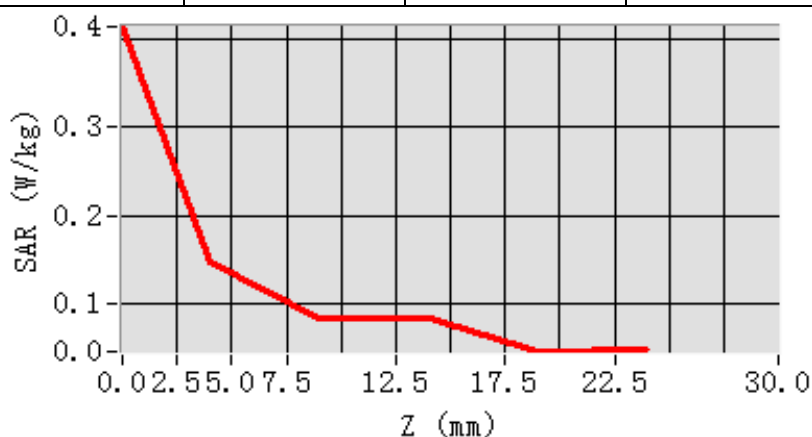


Maximum location: X=-1.00, Y=-8.00 SAR Peak: 0.20 W/kg

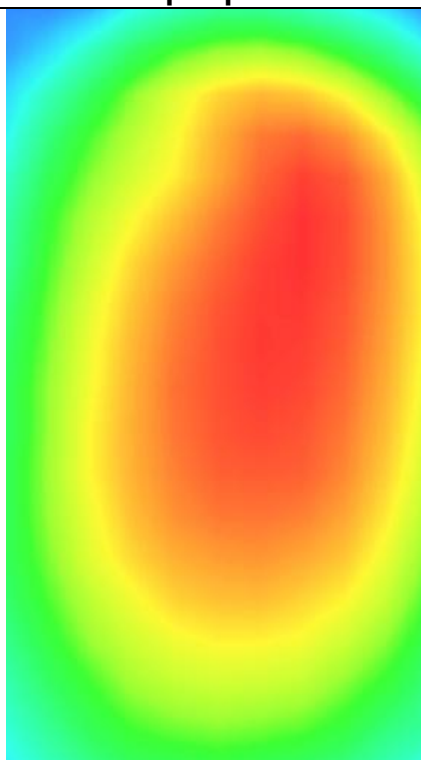
SAR 10g (W/Kg)	0.102715
SAR 1g (W/Kg)	0.140877



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3647	0.1761	0.1123	0.0891	0.0484



Hot spot position



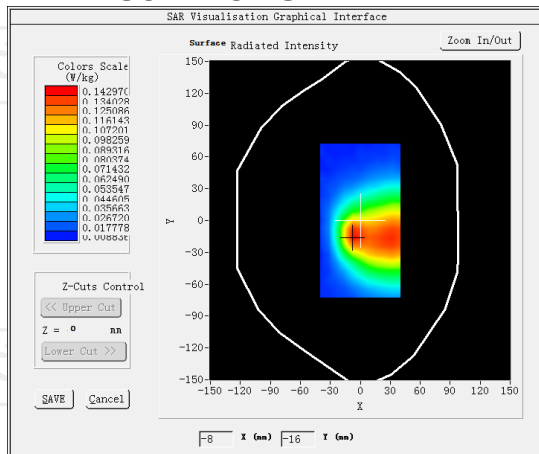
MEASUREMENT 3

Hight Band SAR (Channel 23800):

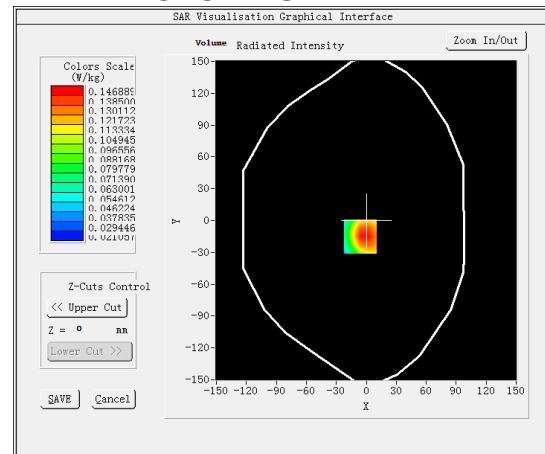
Date: 08/30/2022

Frequency (MHz)	711.000000
Relative permittivity (real part)	40.761260
Relative permittivity (imaginary part)	17.130904
Conductivity (S/m)	0.931220
Variation (%)	0.170000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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 17(1 RB#0)</u>

SURFACE SAR

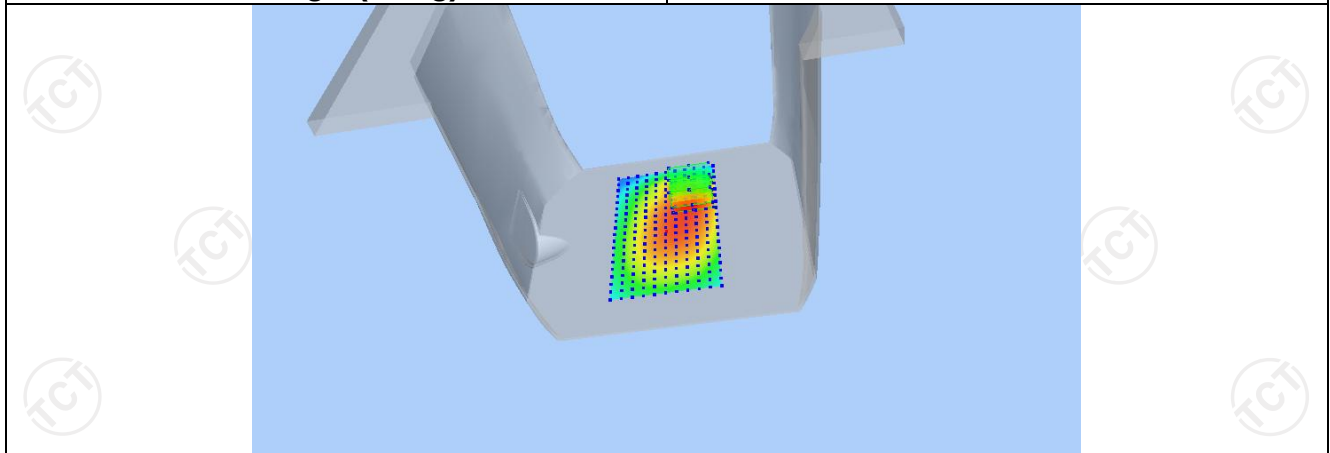


VOLUME SAR

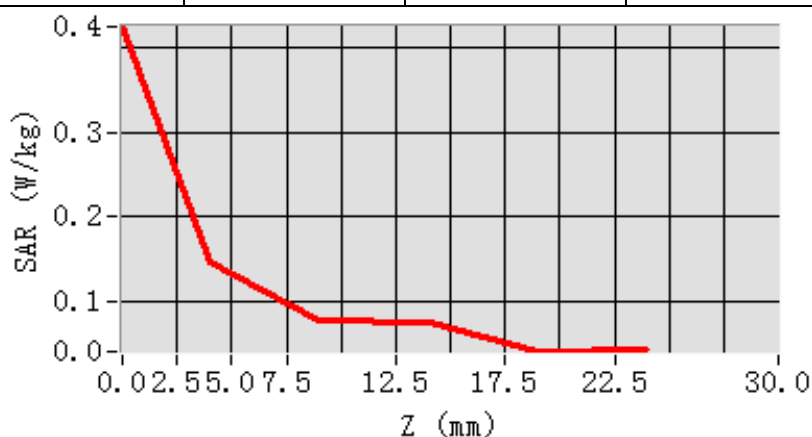


Maximum location: X=22.00, Y=33.00 SAR Peak: 0.29 W/kg

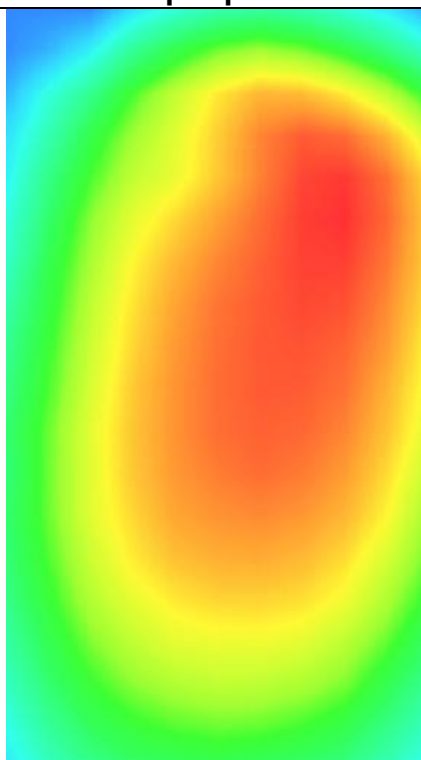
SAR 10g (W/Kg)	0.098321
SAR 1g (W/Kg)	0.141390



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4242	0.1468	0.0768	0.0745	0.0411



Hot spot position



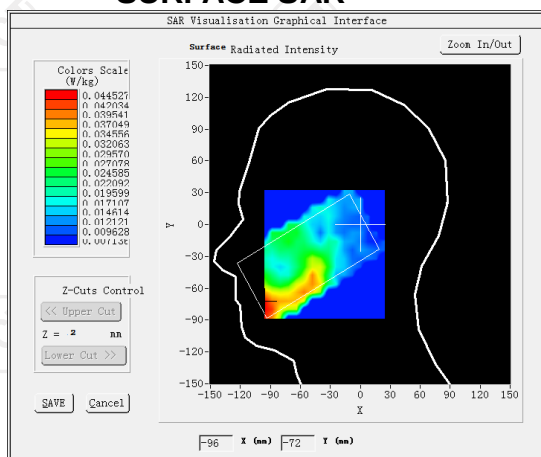
LTE Band 41

MEASUREMENT 1

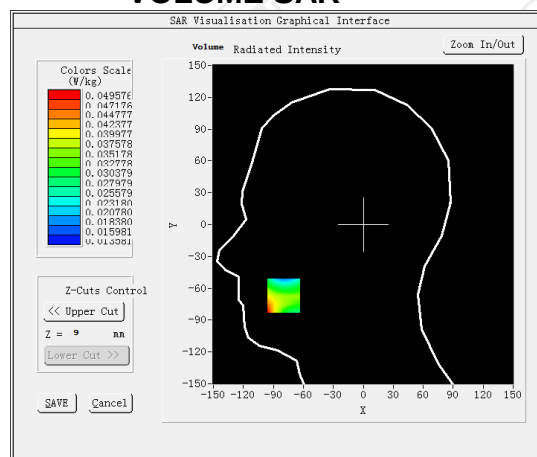
Lower Band SAR (Channel 39750): Date: 09/19/2022

Frequency (MHz)	2506.000000
Relative permittivity (real part)	38.853477
Relative permittivity (imaginary part)	13.545489
Conductivity (S/m)	1.922567
Variation (%)	-0.570000
Crest Factor	1.0
Probe Conversion factor	4.36
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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>Right head</u>
Device Position	<u>Cheek</u>
Band	<u>LTE band 41(1 RB#49)</u>

SURFACE SAR

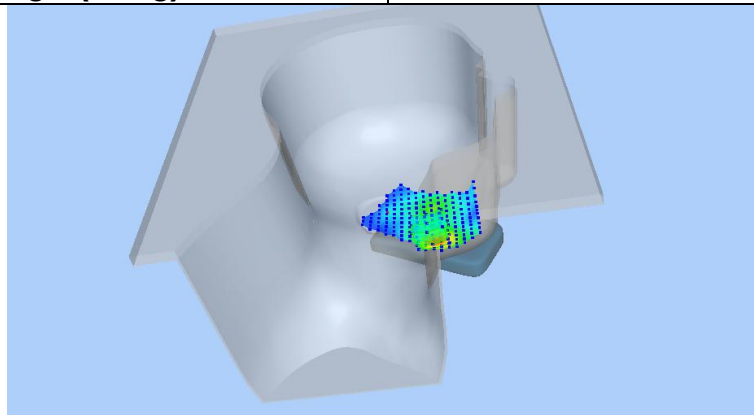


VOLUME SAR

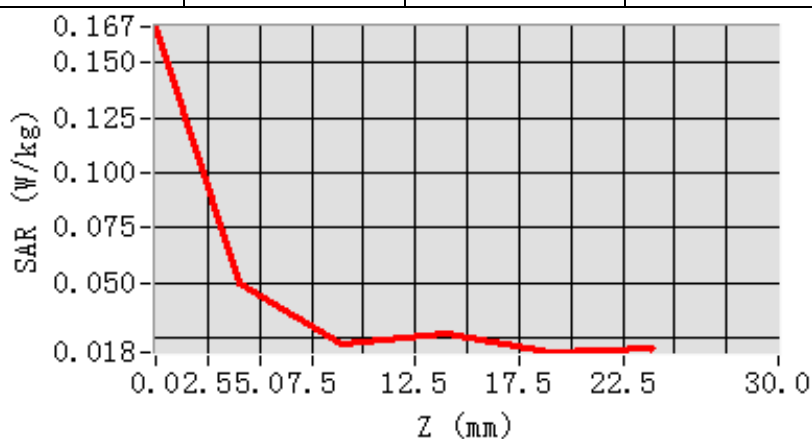


Maximum location: X=-80.00, Y=-67.00 SAR Peak: 0.07 W/kg

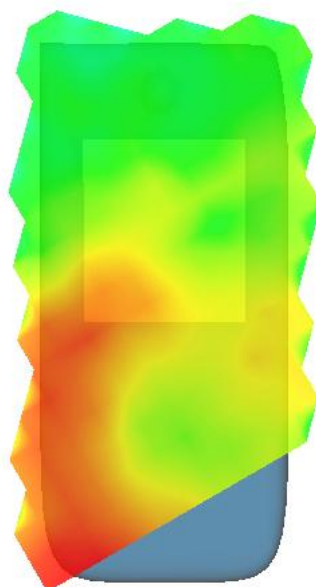
SAR 10g (W/Kg)	0.021552
SAR 1g (W/Kg)	0.043455



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4061	0.2471	0.1272	0.0656	0.0355



Hot spot position



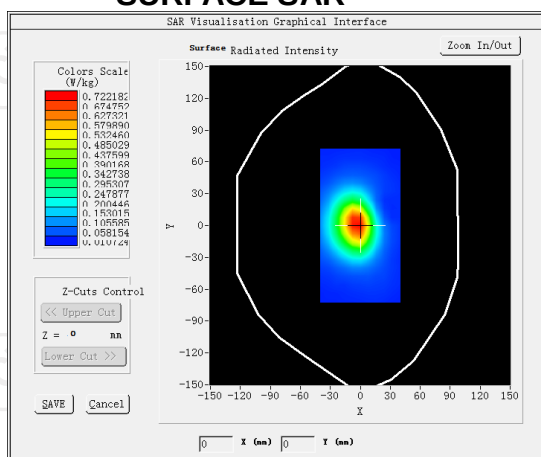
MEASUREMENT 2

Lower Band SAR (Channel 39750):

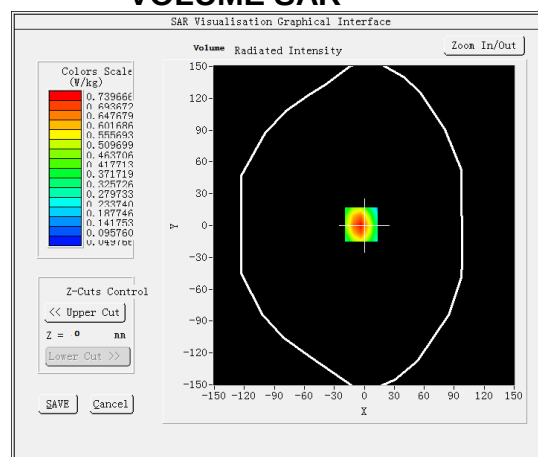
Date: 09/19/2022

Frequency (MHz)	2506.000000
Relative permittivity (real part)	38.853477
Relative permittivity (imaginary part)	13.545489
Conductivity (S/m)	1.922567
Variation (%)	-3.690000
Crest Factor	1.0
Probe Conversion factor	4.36
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(10mm)
Band	<u>LTE band 41(1 RB#49)</u>

SURFACE SAR

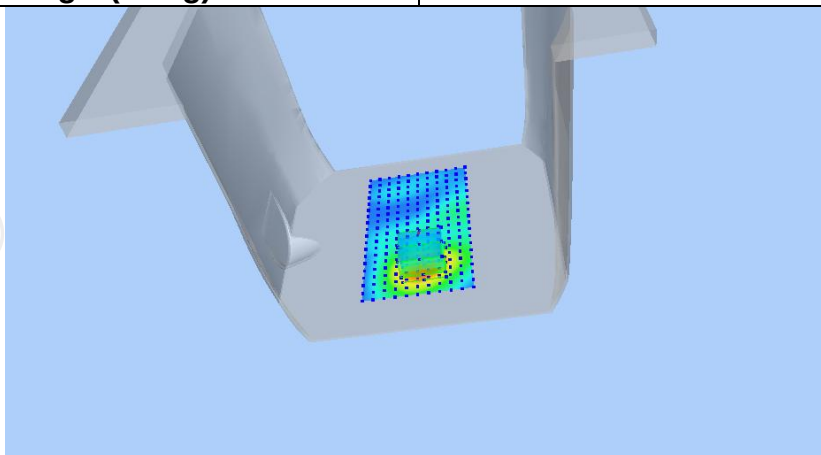


VOLUME SAR

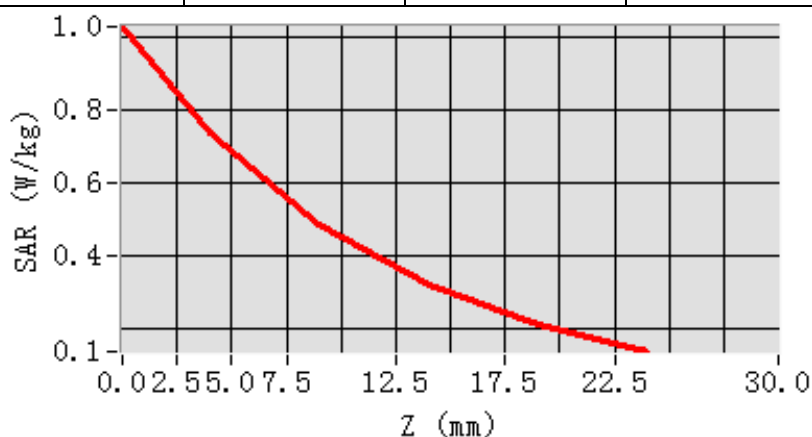


Maximum location: X=5.00, Y=-42.00 SAR Peak: 0.56 W/kg

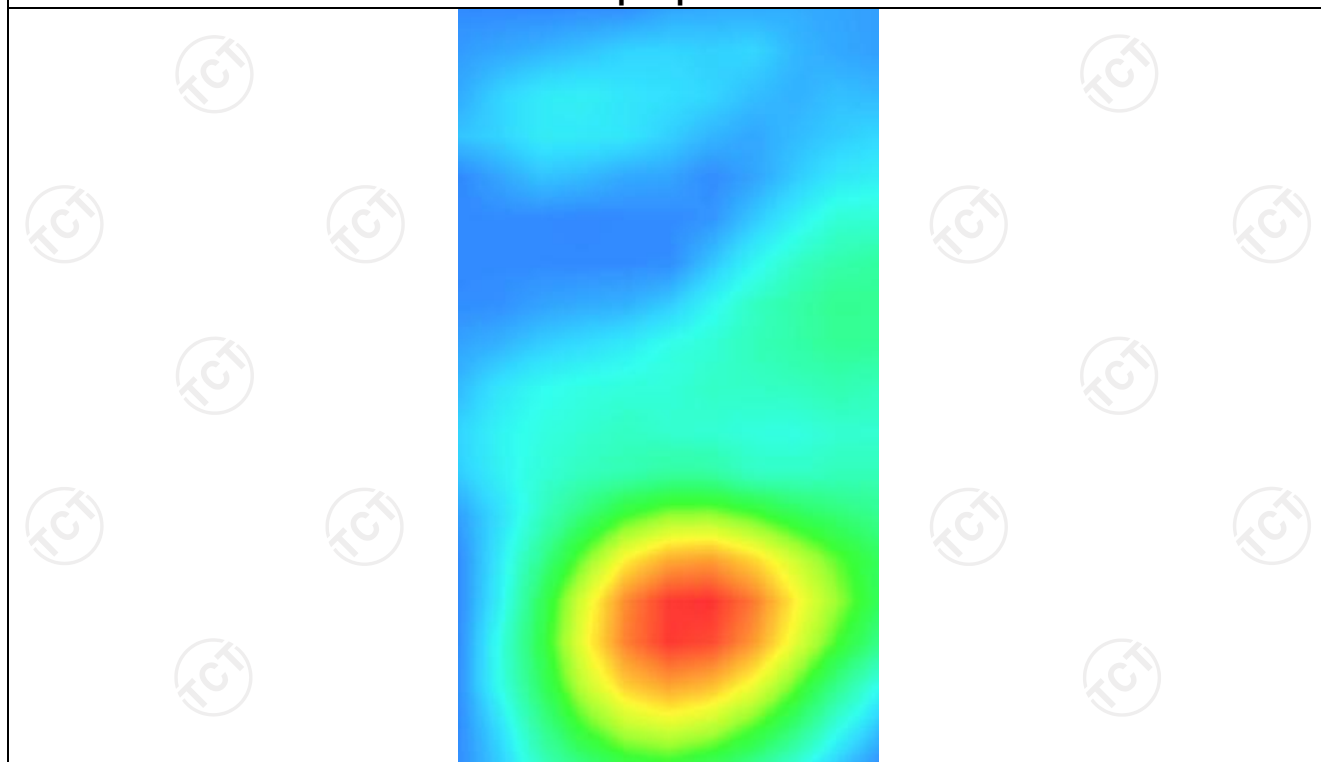
SAR 10g (W/Kg)	0.444922
SAR 1g (W/Kg)	0.691120



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.5568	0.3206	0.1482	0.0630	0.0249



Hot spot position



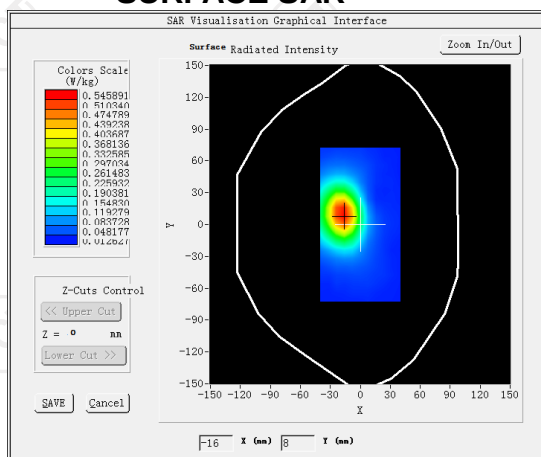
MEASUREMENT 3

Lower Band SAR (Channel 39750):

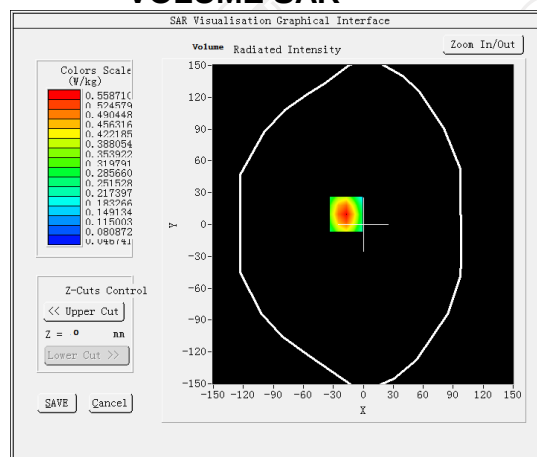
Date: 09/19/2022

Frequency (MHz)	2506.000000
Relative permittivity (real part)	38.853477
Relative permittivity (imaginary part)	13.545489
Conductivity (S/m)	1.922567
Variation (%)	-1.810000
Crest Factor	1.0
Probe Conversion factor	4.36
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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((hotspot10mm)
Band	<u>LTE band 41(1 RB#49)</u>

SURFACE SAR

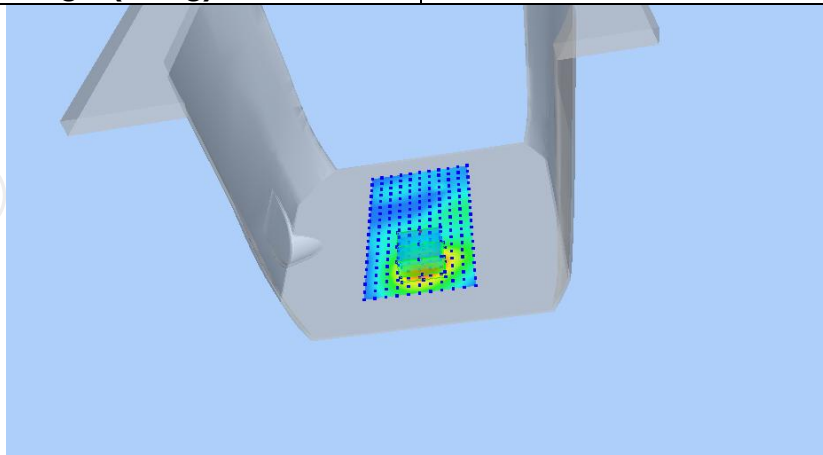


VOLUME SAR

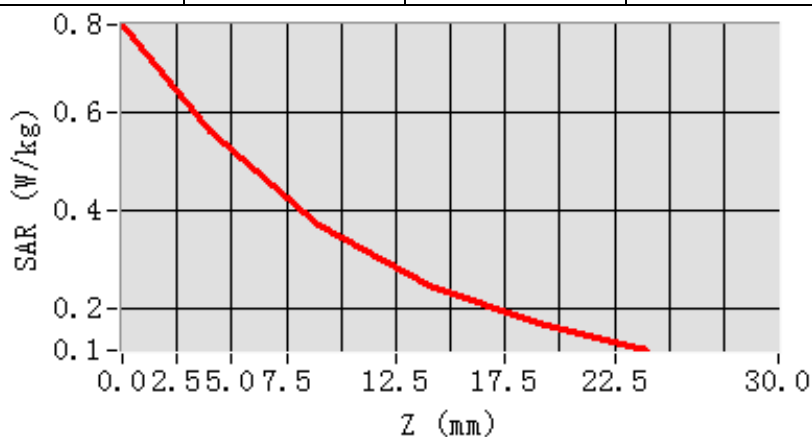


Maximum location: X=17.00, Y=10.00 SAR Peak: 0.78 W/kg

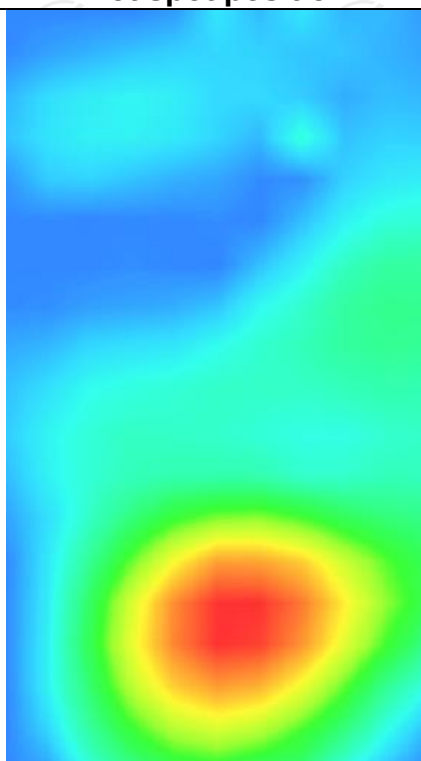
SAR 10g (W/Kg)	0.327130
SAR 1g (W/Kg)	0.521301



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.6005	0.3517	0.1663	0.0719	0.0279



Hot spot position



WLAN 2.4G

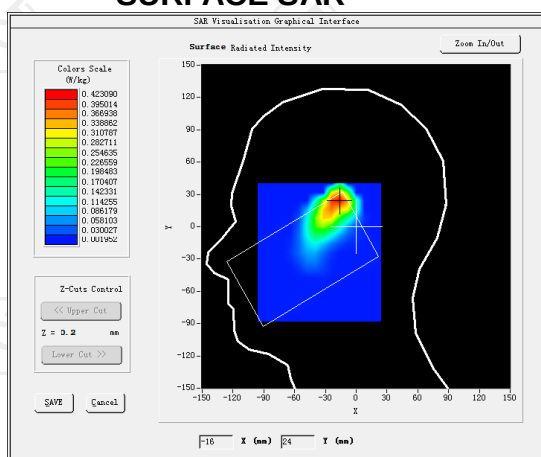
MEASUREMENT 1

Lower Band SAR (Channel 01):

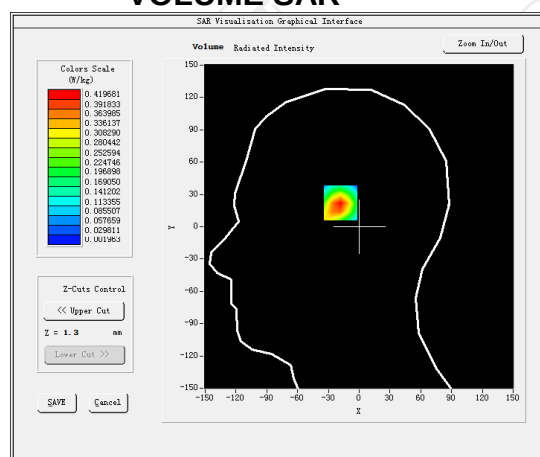
Date: 09/16/2022

Frequency (MHz)	2412.000000
Relative permittivity (real part)	37.821613
Relative permittivity (imaginary part)	13.546980
Conductivity (S/m)	1.834111
Variation (%)	-1.360000
Crest Factor	1.0
Probe Conversion factor	2.31
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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>Right head</u>
Device Position	<u>Cheek</u>
Band	<u>IEEE 802.11b ISM</u>

SURFACE SAR

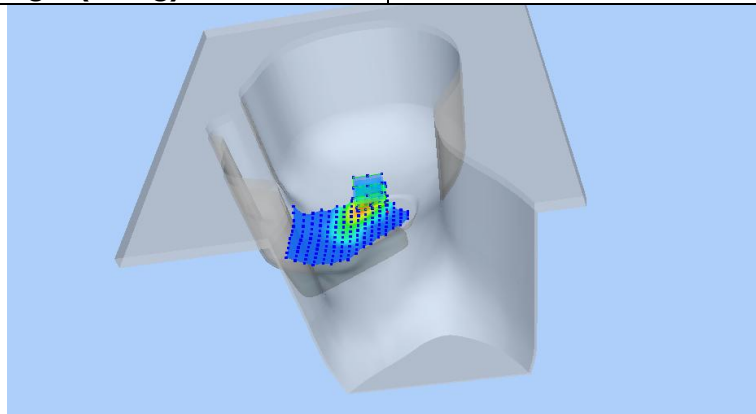


VOLUME SAR

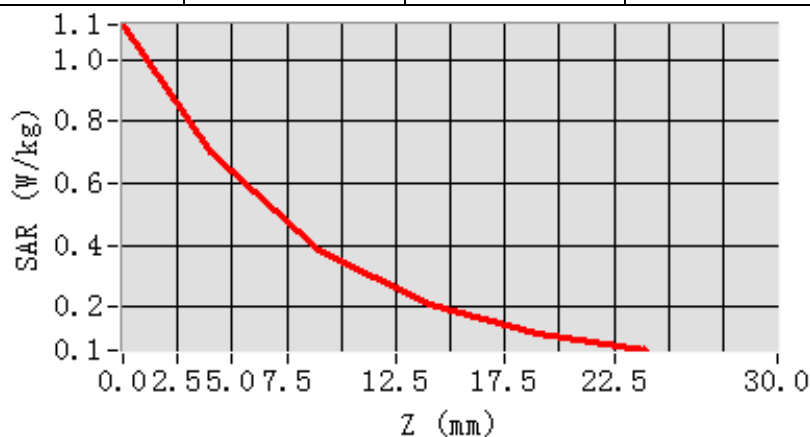


Maximum location: X=-17.00, Y=24.00 SAR Peak: 0.78 W/kg

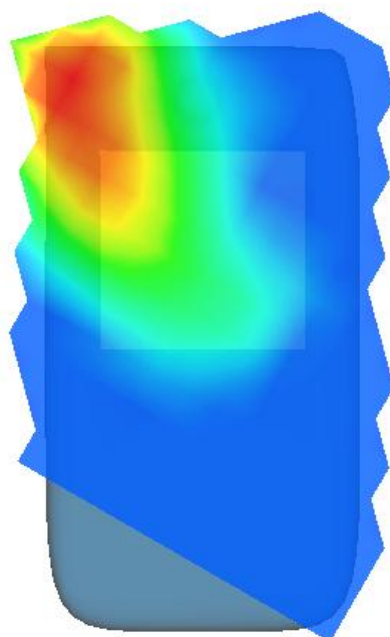
SAR 10g (W/Kg)	0.080066
SAR 1g (W/Kg)	0.255053



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7682	0.4197	0.1767	0.0654	0.0210



Hot spot position



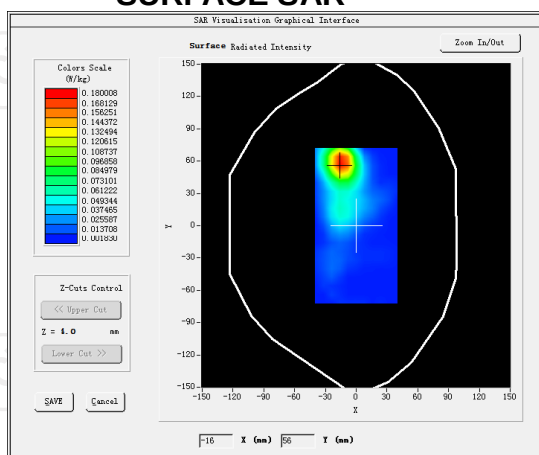
MEASUREMENT 2

Lower Band SAR (Channel 01):

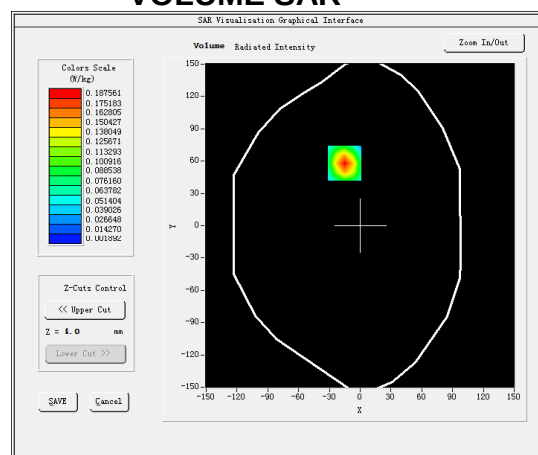
Date: 09/16/2022

Frequency (MHz)	2412.000000
Relative permittivity (real part)	37.821613
Relative permittivity (imaginary part)	13.546980
Conductivity (S/m)	1.834111
Variation (%)	2.120000
Crest Factor	1.0
Probe Conversion factor	2.31
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(10mm)
Band	<u>IEEE 802.11b ISM</u>

SURFACE SAR

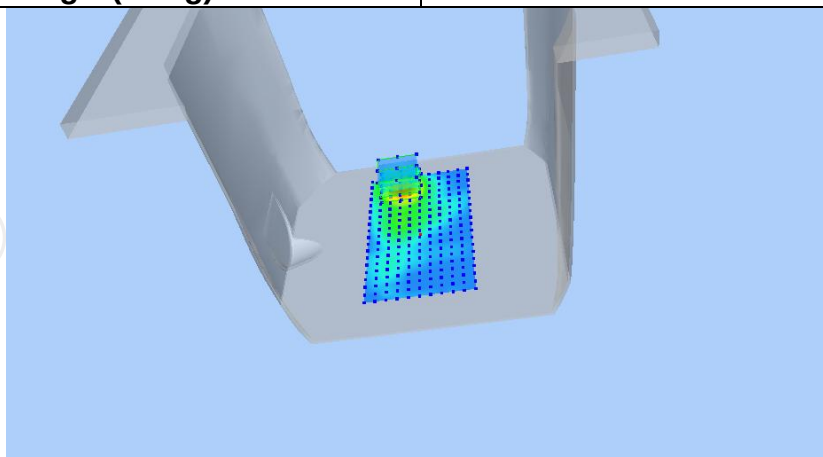


VOLUME SAR

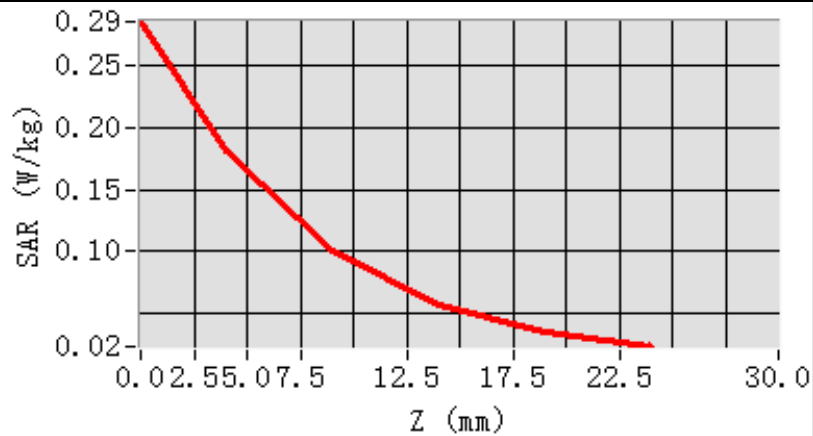


Maximum location: X=-15.00, Y=58.00 SAR Peak: 0.34 W/kg

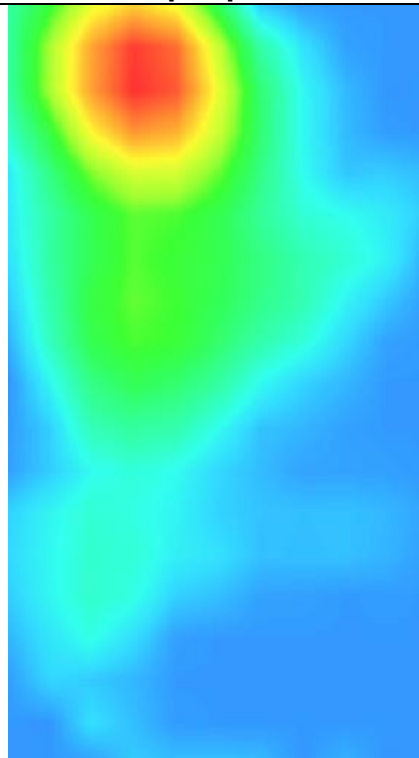
SAR 10g (W/Kg)	0.077530
SAR 1g (W/Kg)	0.293292



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



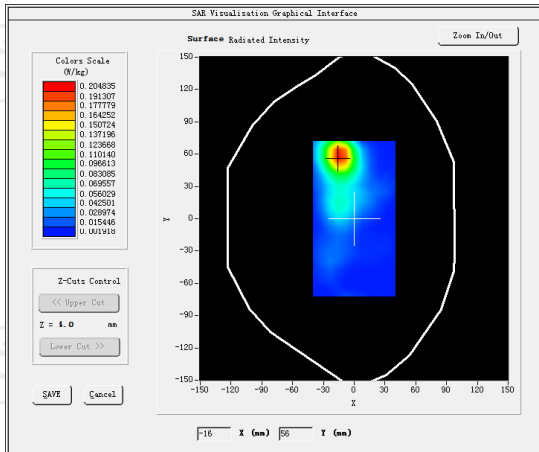
MEASUREMENT 3

Lower Band SAR (Channel 01):

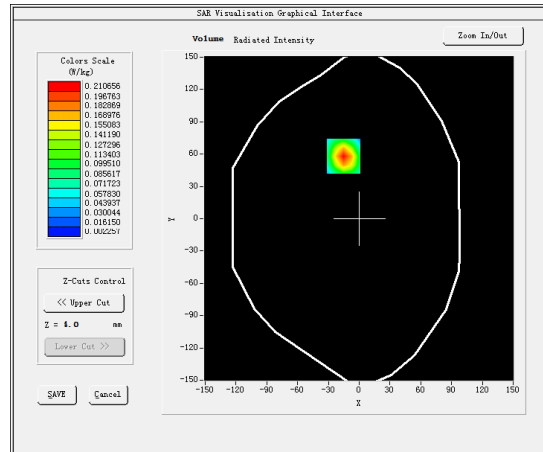
Date: 09/16/2022

Frequency (MHz)	2412.000000
Relative permittivity (real part)	37.821613
Relative permittivity (imaginary part)	13.546980
Conductivity (S/m)	1.834111
Variation (%)	-2.110000
Crest Factor	1.0
Probe Conversion factor	2.31
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(10mm)
Band	<u>IEEE 802.11b ISM(hotspot)</u>

SURFACE SAR



VOLUME SAR



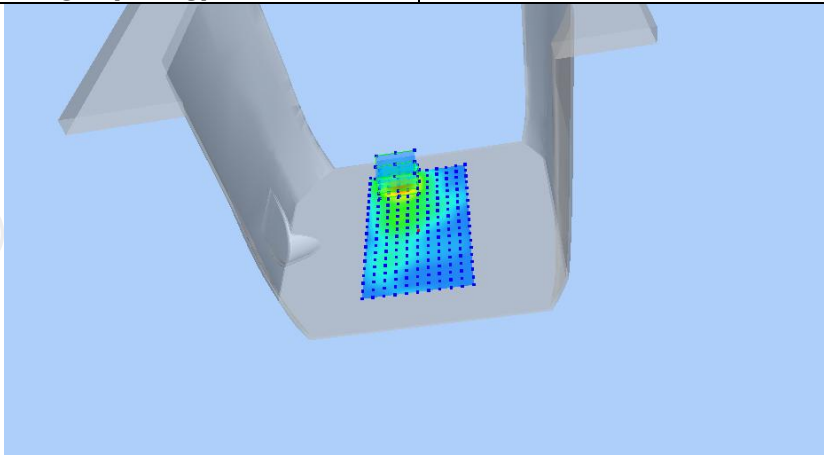
Maximum location: X=-15.00, Y=58.00 SAR Peak: 0.37 W/kg

SAR 10g (W/Kg)

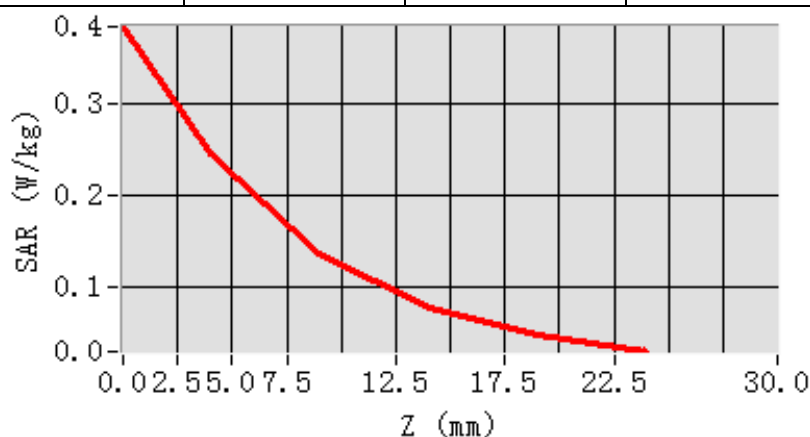
0.087182

SAR 1g (W/Kg)

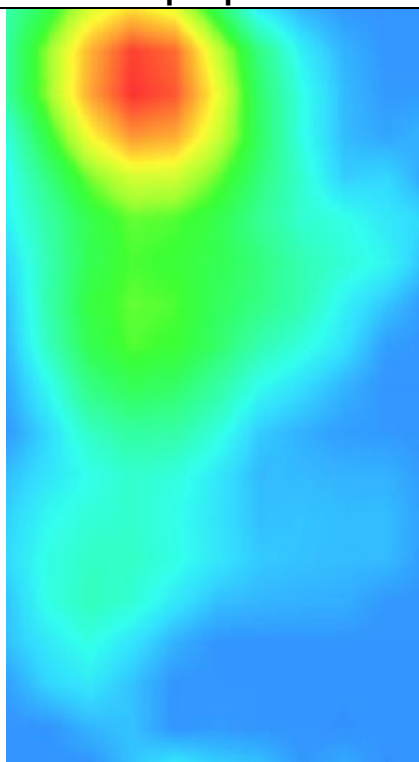
0.323788



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

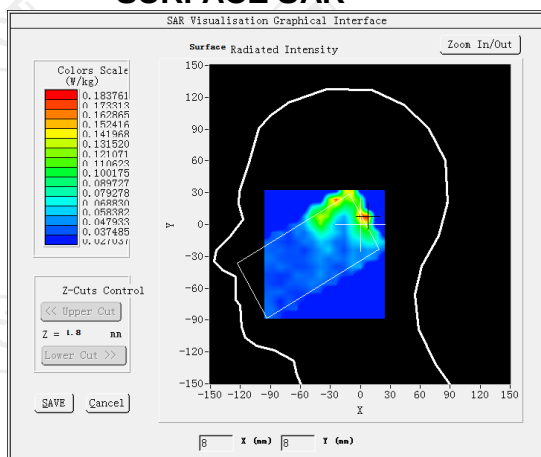
MEASUREMENT 1

SAR (Channel 42):

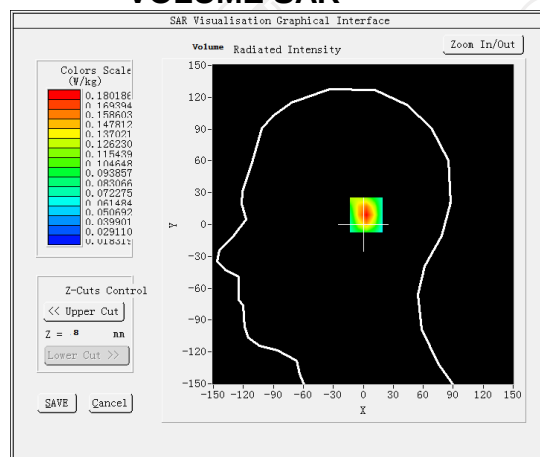
Date: 09/21/2022

Frequency (MHz)	5210.000000
Relative permittivity (real part)	35.068832
Relative permittivity (imaginary part)	16.679428
Conductivity (S/m)	4.220788
Variation (%)	-7.430000
Crest Factor	1.0
Probe Conversion factor	2.01
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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>Right head</u>
Device Position	<u>Cheek</u>
Band	<u>IEEE 802.11ac HT80 ISM</u>

SURFACE SAR

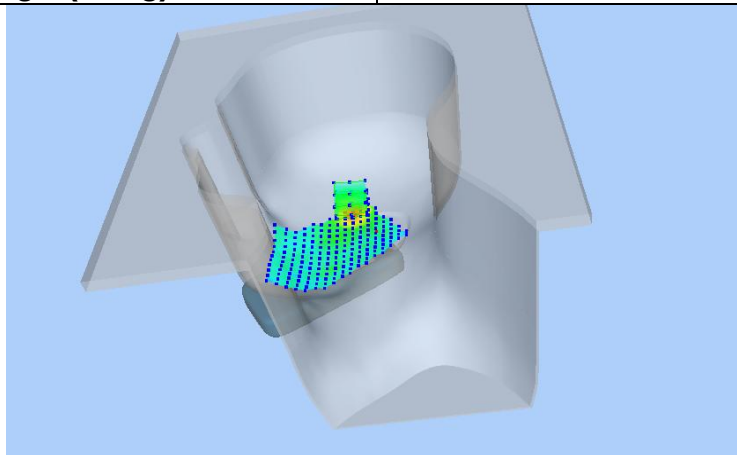


VOLUME SAR

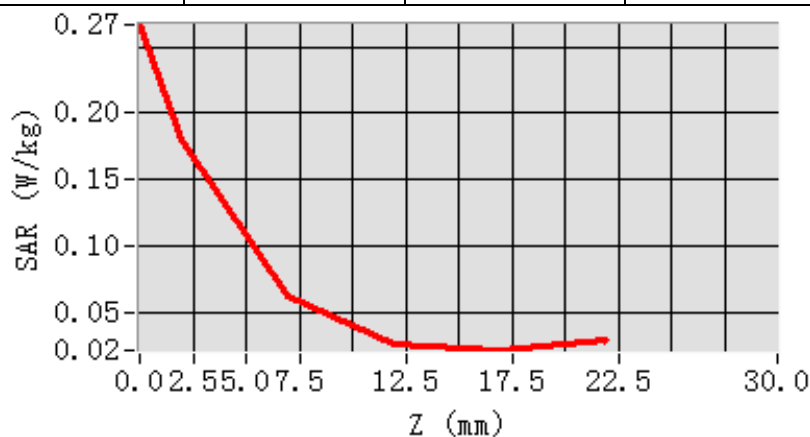


Maximum location: X=8.00, Y=9.00 SAR Peak: 0.38 W/kg

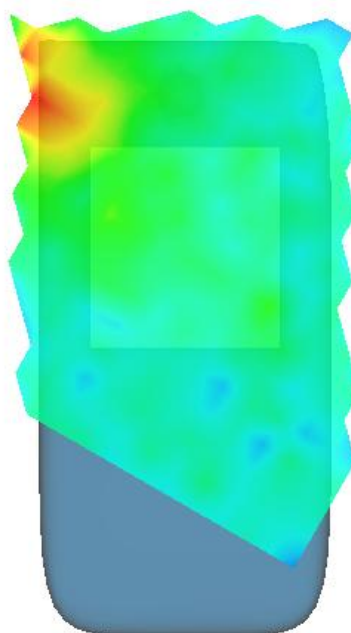
SAR 10g (W/Kg)	0.082740
SAR 1g (W/Kg)	0.173952



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1621	0.1032	0.0510	0.0347	0.0210



Hot spot position



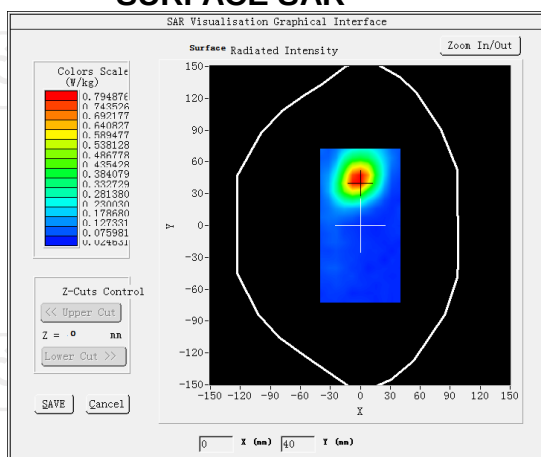
MEASUREMENT 2

SAR (Channel 42):

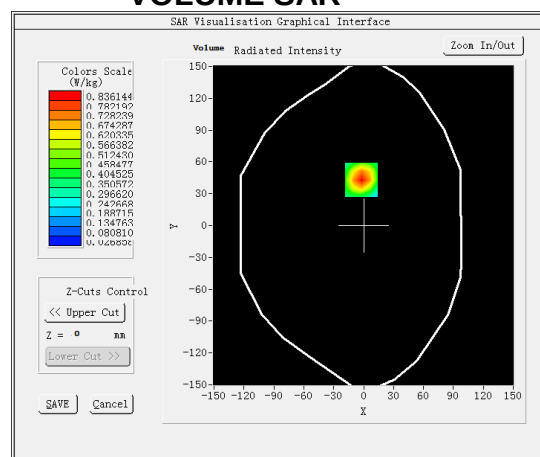
Date: 09/21/2022

Frequency (MHz)	5210.000000
Relative permittivity (real part)	35.068832
Relative permittivity (imaginary part)	13.679428
Conductivity (S/m)	5.220788
Variation (%)	-0.560000
Crest Factor	1.0
Probe Conversion factor	2.01
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(10mm)
Band	<u>IEEE 802.11ac HT80 ISM</u>

SURFACE SAR

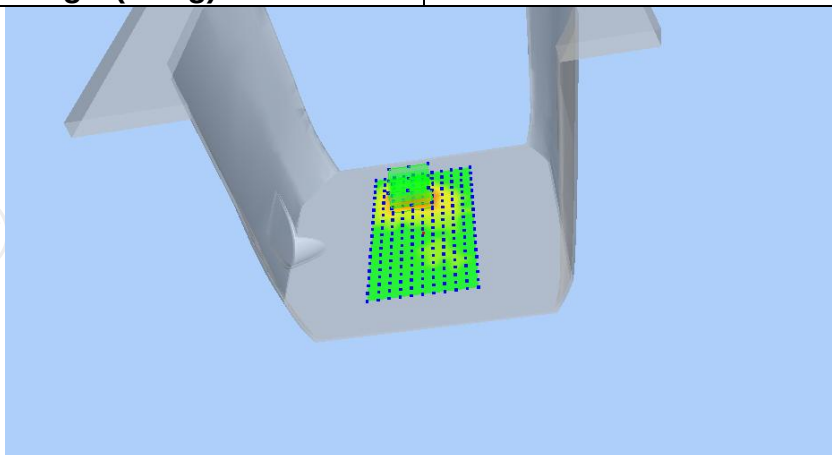


VOLUME SAR

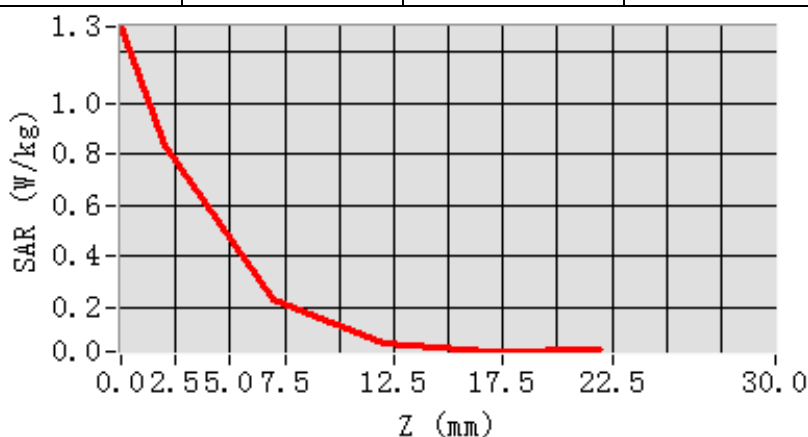


Maximum location: X=-2.00, Y=43.00 SAR Peak: 1.33 W/kg

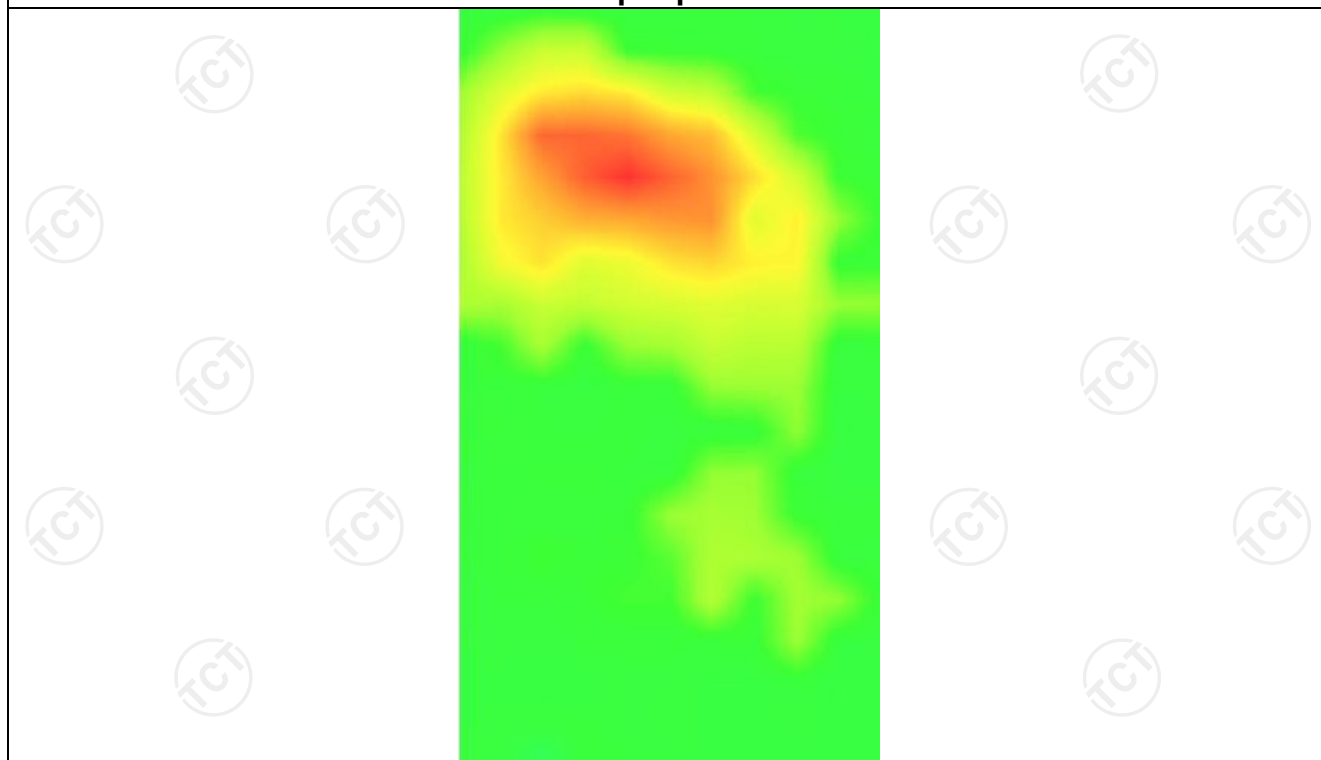
SAR 10g (W/Kg)	0.230642
SAR 1g (W/Kg)	0.518531



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



WLAN 5.3G

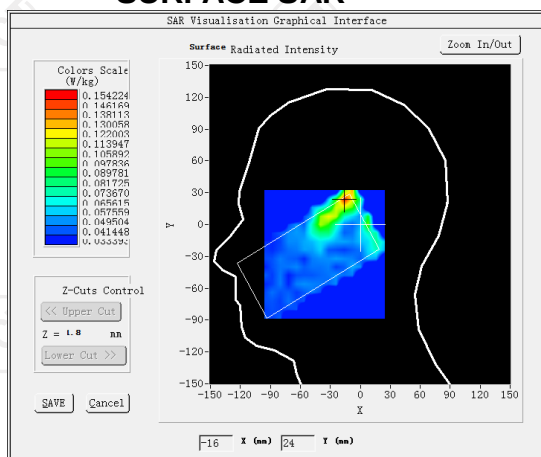
MEASUREMENT 1

SAR (Channel 58):

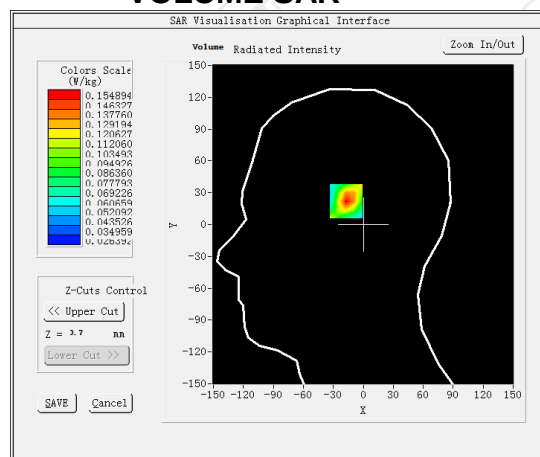
Date: 09/23/2022

Frequency (MHz)	5290.000000
Relative permittivity (real part)	35.968832
Relative permittivity (imaginary part)	16.165000
Conductivity (S/m)	4.690788
Variation (%)	-8.780000
Crest Factor	1.0
Probe Conversion factor	1.94
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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	Right head
Device Position	Cheek
Band	IEEE 802.11ac HT80 ISM

SURFACE SAR

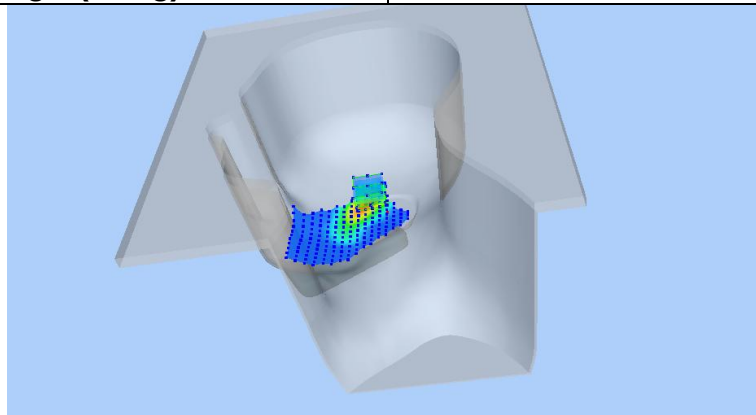


VOLUME SAR

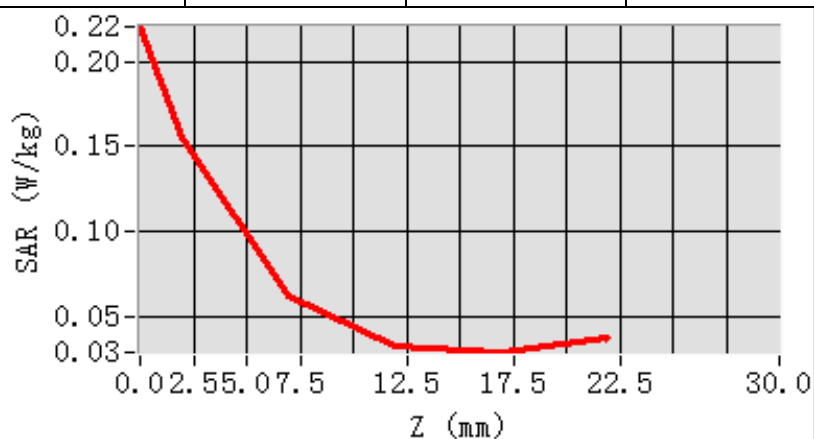


Maximum location: X=-16.00, Y=24.00 SAR Peak: 0.31 W/kg

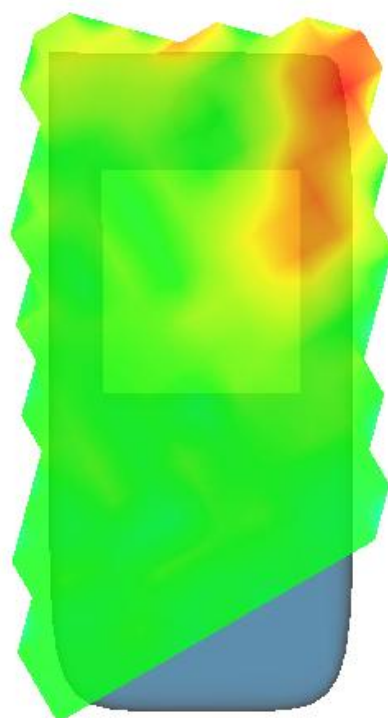
SAR 10g (W/Kg)	0.071251
SAR 1g (W/Kg)	0.148821



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8020	0.4203	0.1872	0.0762	0.0311



Hot spot position



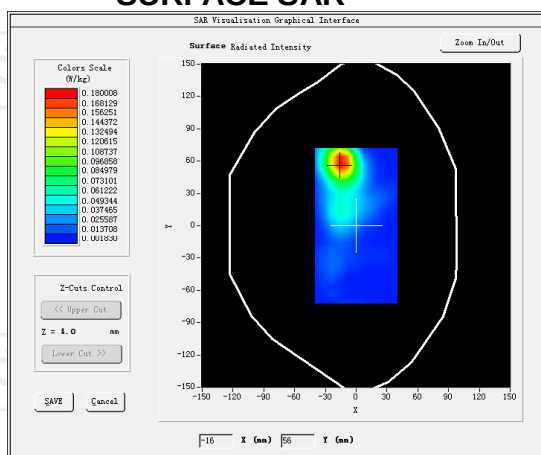
MEASUREMENT 2

SAR (Channel 58):

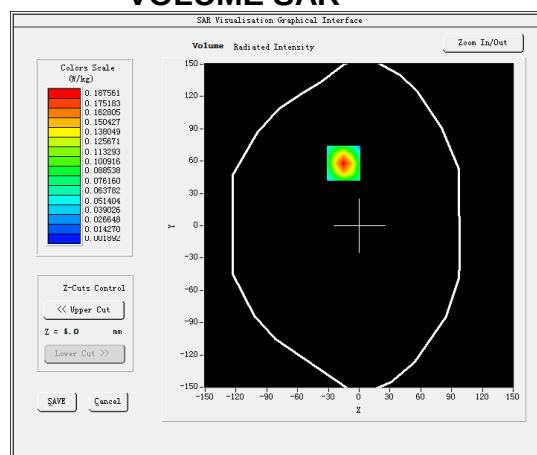
Date: 09/23/2022

Frequency (MHz)	5290.000000
Relative permittivity (real part)	35.968832
Relative permittivity (imaginary part)	16.165000
Conductivity (S/m)	4.690788
Variation (%)	2.010000
Crest Factor	1.0
Probe Conversion factor	1.94
E-Field Probe:	SSE2 (SN 36/20 EPGO346)
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 802.11ac HT80 ISM</u>

SURFACE SAR

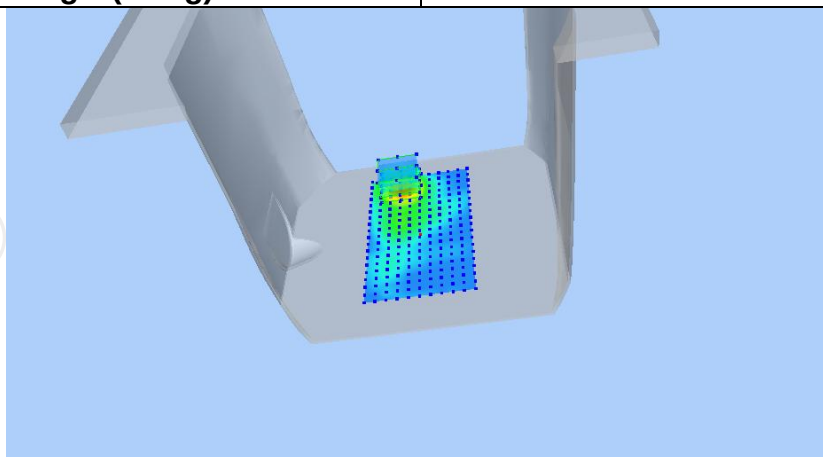


VOLUME SAR

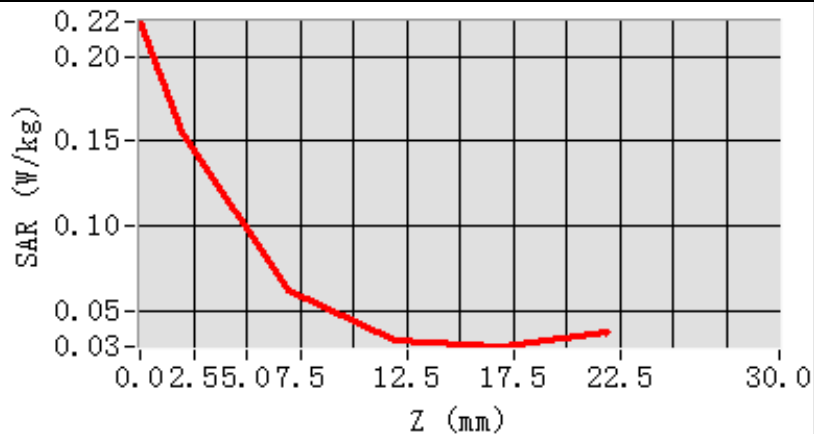


Maximum location: X=-11.00, Y=57.00 SAR Peak: 0.34 W/kg

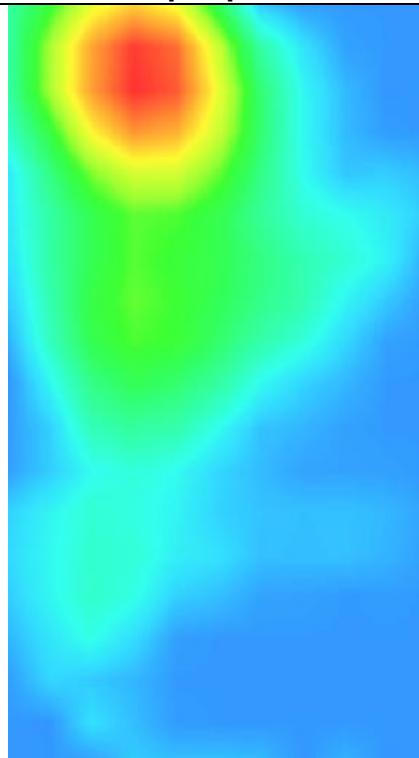
SAR 10g (W/Kg)	0.128131
SAR 1g (W/Kg)	0.184304



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3401	0.1882	0.0824	0.0321	0.0110



Hot spot position



WLAN 5.8G

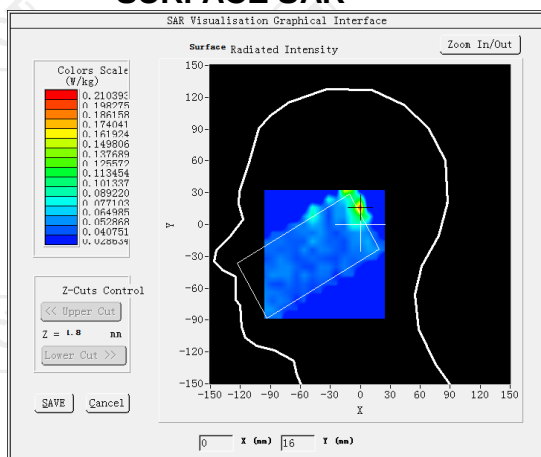
MEASUREMENT 1

SAR (Channel 155):

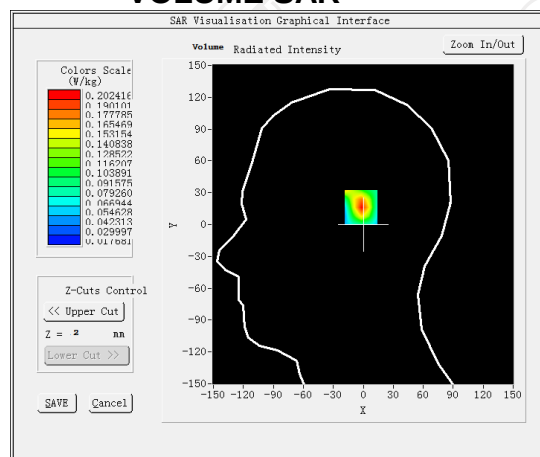
Date: 09/29/2022

Frequency (MHz)	5775.000000
Relative permittivity (real part)	35.314999
Relative permittivity (imaginary part)	16.355499
Conductivity (S/m)	5.256476
Variation (%)	-4.920000
Crest Factor	1.0
Probe Conversion factor	2.06
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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>Left head</u>
Device Position	<u>Cheek</u>
Band	<u>IEEE 802.11ac HT80 ISM</u>

SURFACE SAR

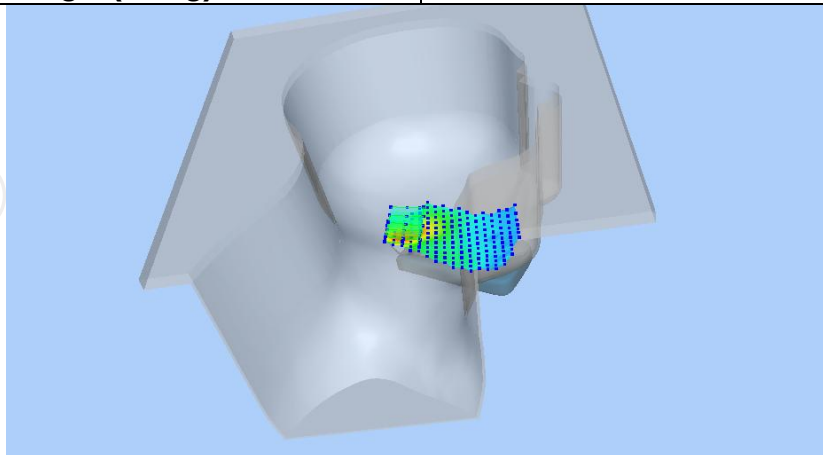


VOLUME SAR

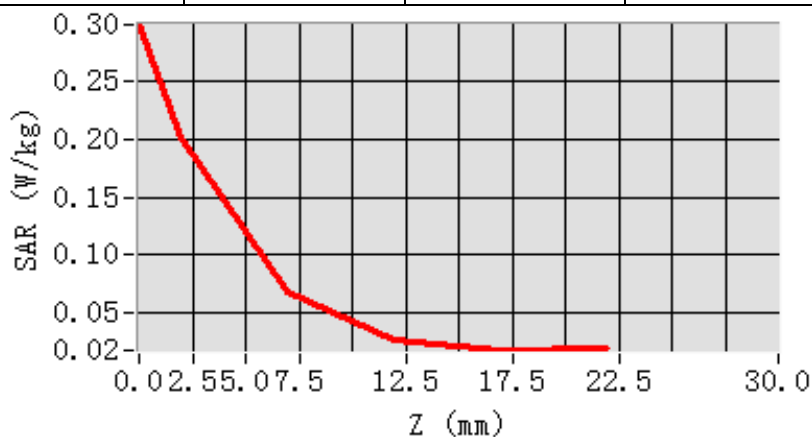


Maximum location: X=1.00, Y=-16.00 SAR Peak: 0.43 W/kg

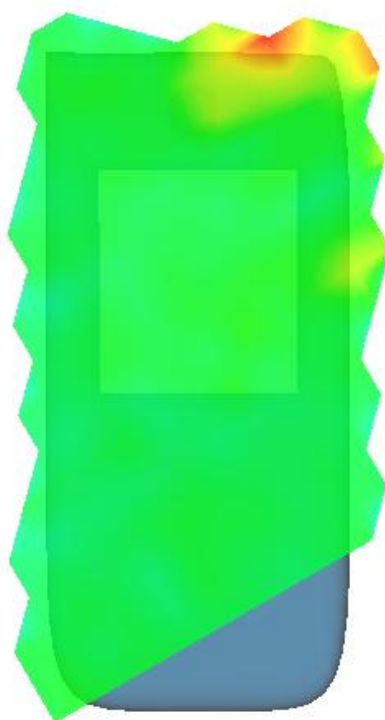
SAR 10g (W/Kg)	0.073032
SAR 1g (W/Kg)	0.194051



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1421	0.0830	0.0422	0.0220	0.0130



Hot spot position



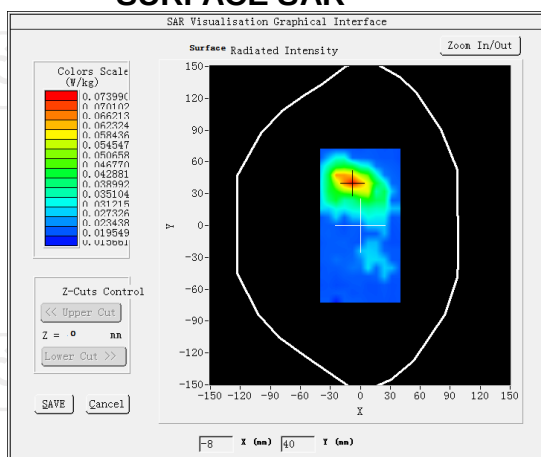
MEASUREMENT 2

SAR (Channel 155):

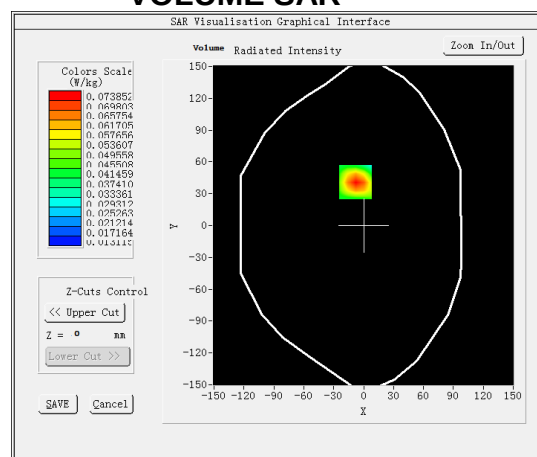
Date: 09/29/2022

Frequency (MHz)	5775.000000
Relative permittivity (real part)	35.314999
Relative permittivity (imaginary part)	16.355499
Conductivity (S/m)	5.256476
Variation (%)	-1.450000
Crest Factor	1.0
Probe Conversion factor	2.06
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(10mm)
Band	<u>IEEE 802.11ac HT80 ISM</u>

SURFACE SAR

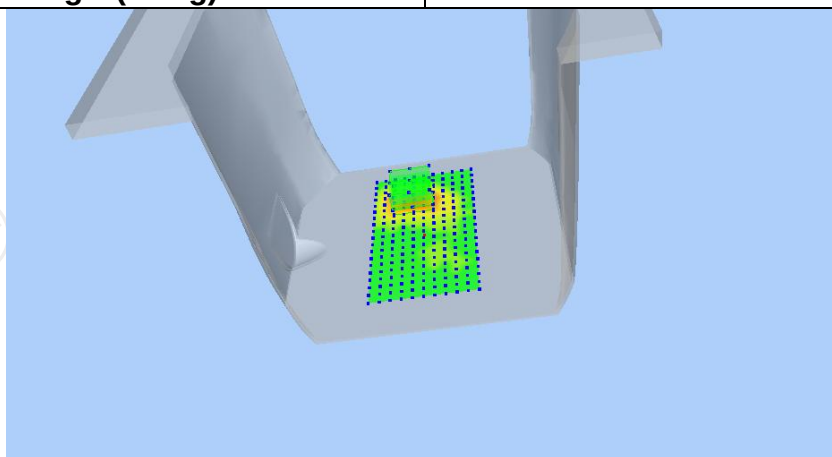


VOLUME SAR

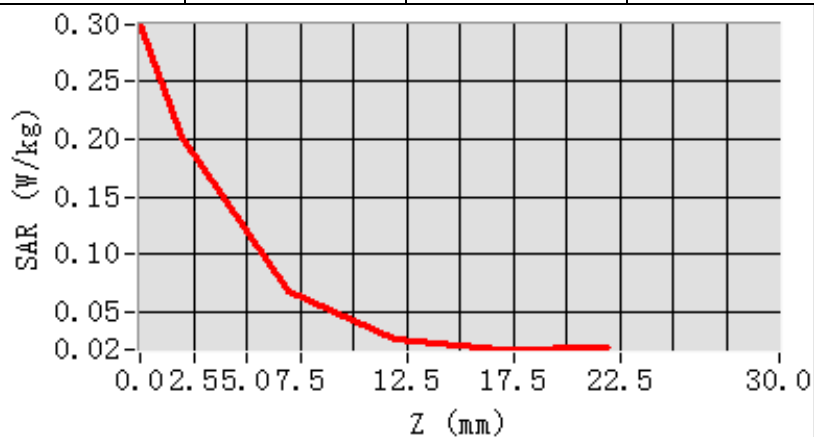


Maximum location: X=15.00, Y=60.00 SAR Peak: 0.34 W/kg

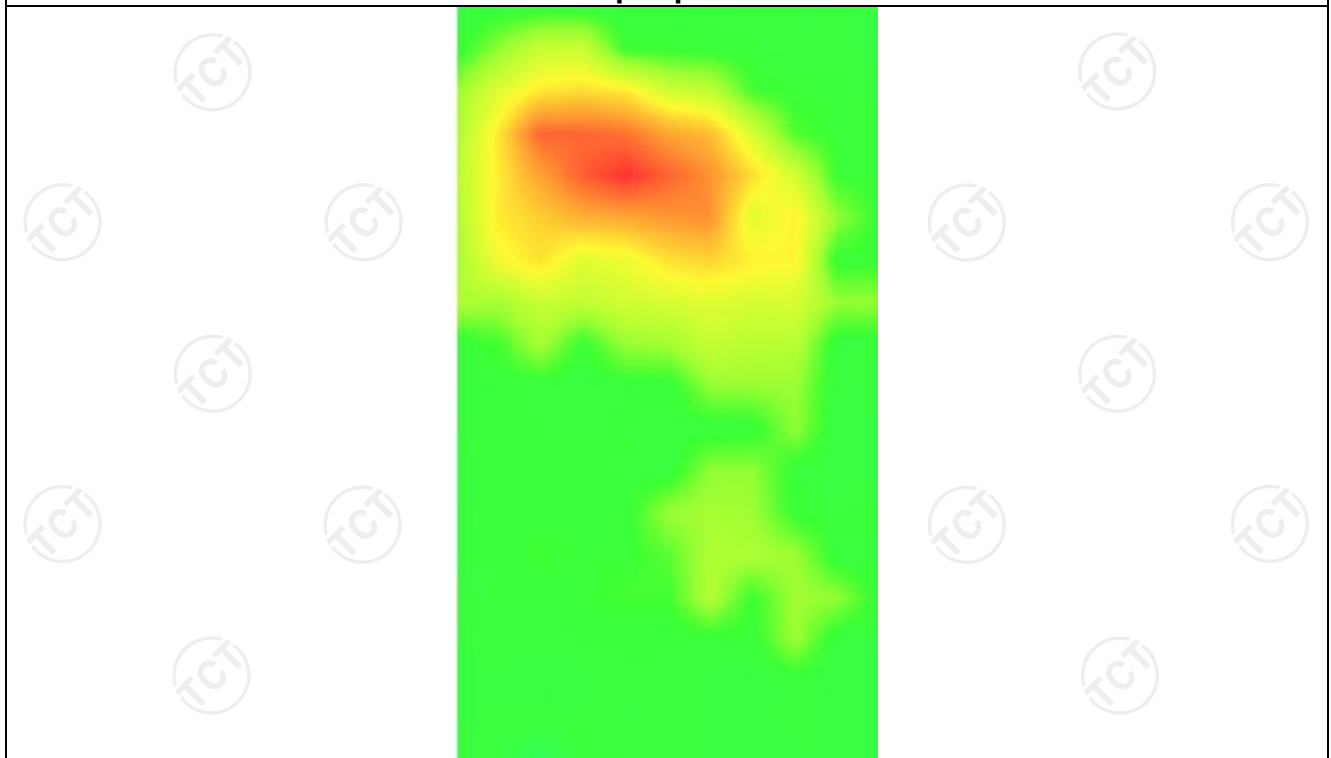
SAR 10g (W/Kg)	0.151431
SAR 1g (W/Kg)	0.205420



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



BT

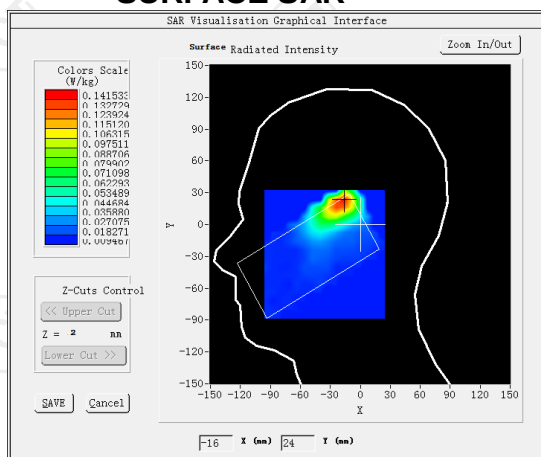
MEASUREMENT 1

Lower Band SAR (Channel 0):

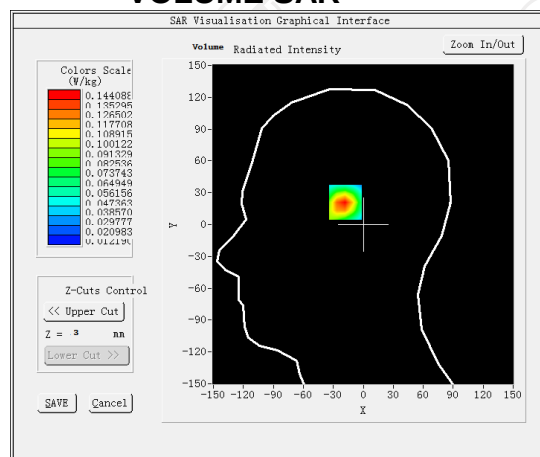
Date: 09/16/2022

Frequency (MHz)	2402.000000
Relative permittivity (real part)	37.821613
Relative permittivity (imaginary part)	13.546980
Conductivity (S/m)	1.834111
Variation (%)	0.270000
Crest Factor	1.0
Probe Conversion factor	2.31
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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>Left head</u>
Device Position	<u>Cheek</u>
Band	<u>GFSK</u>

SURFACE SAR

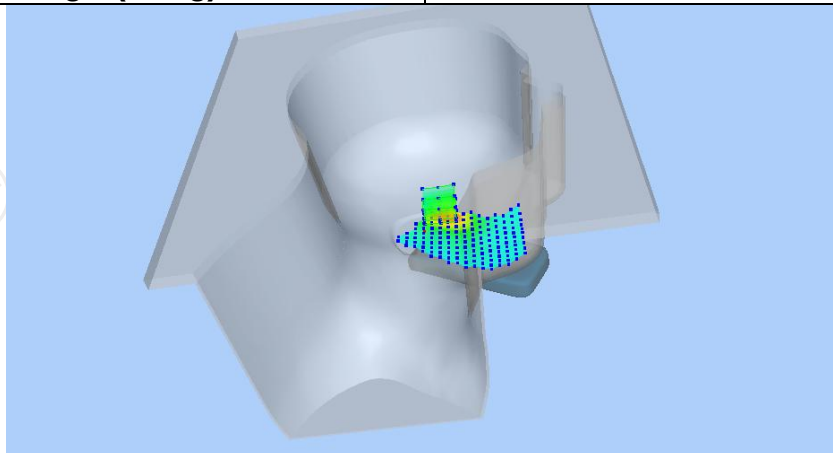


VOLUME SAR

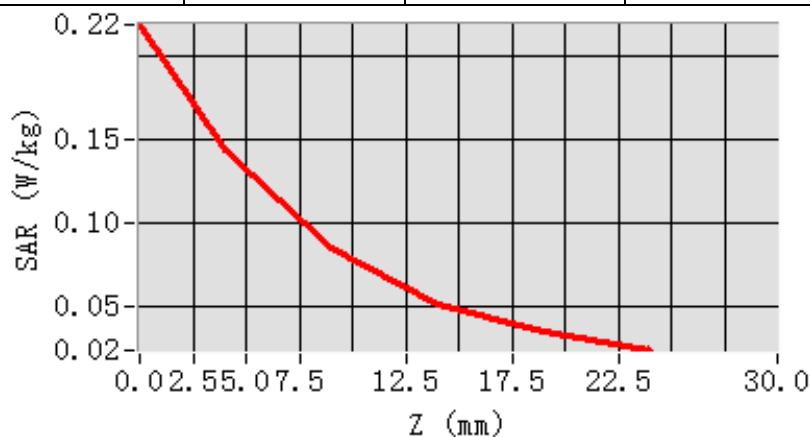


Maximum location: X=-17.00, Y=23.00 SAR Peak: 0.22 W/kg

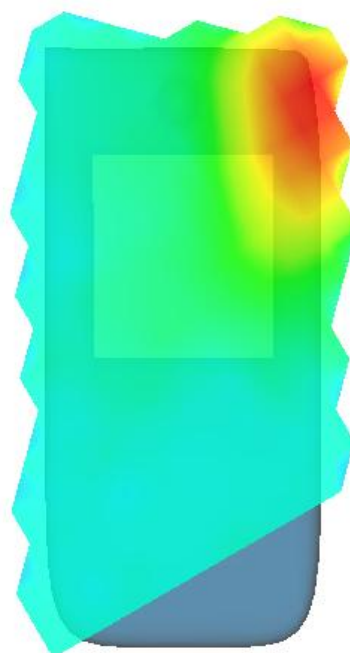
SAR 10g (W/Kg)	0.135117
SAR 1g (W/Kg)	0.077325



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2186	0.1441	0.0851	0.0523	0.0350



Hot spot position



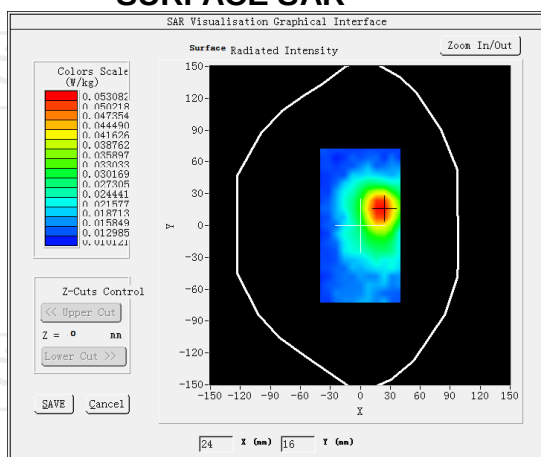
MEASUREMENT 2

Lower Band SAR (Channel 0):

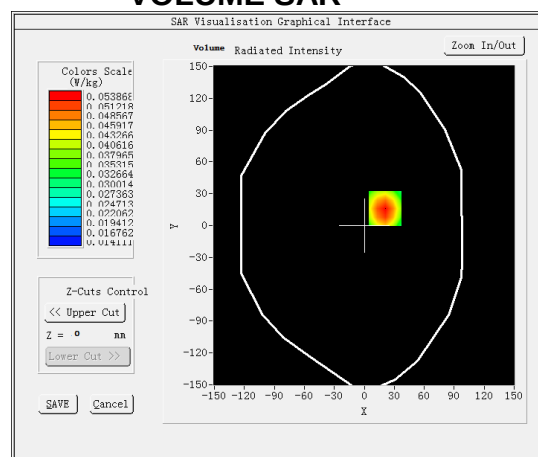
Date: 09/16/2022

Frequency (MHz)	2402.000000
Relative permittivity (real part)	37.821613
Relative permittivity (imaginary part)	13.546980
Conductivity (S/m)	1.834111
Variation (%)	1.050000
Crest Factor	1.0
Probe Conversion factor	2.31
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
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(10mm)
Band	<u>GFSK</u>

SURFACE SAR

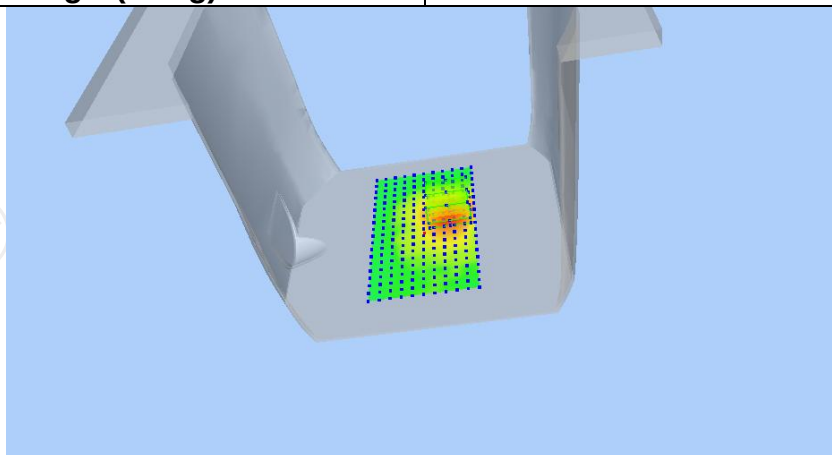


VOLUME SAR

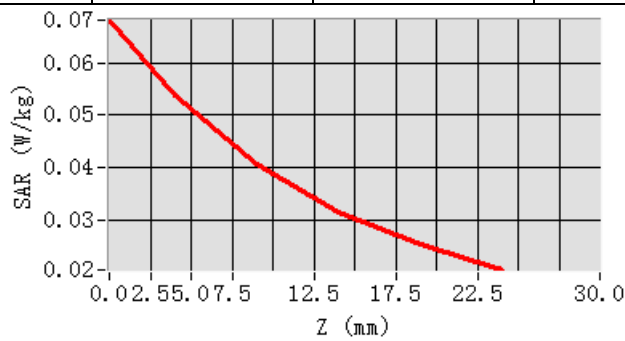


Maximum location: X=21.00, Y=16.00 SAR Peak: 0.07 W/kg

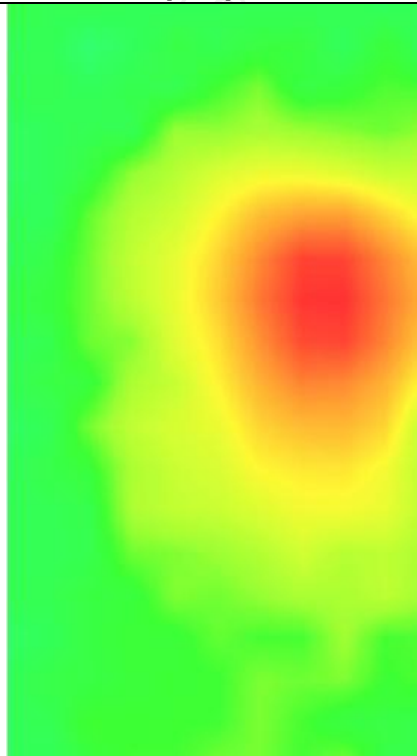
SAR 10g (W/Kg)	0.037096
SAR 1g (W/Kg)	0.051684



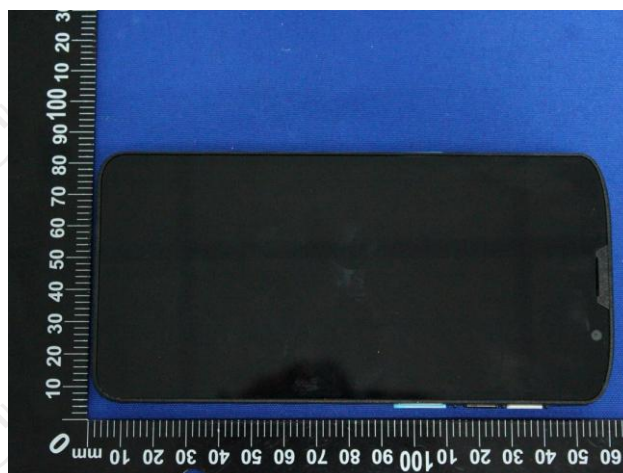
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0681	0.0539	0.0406	0.0315	0.0252



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 2600MHz (16.5cm)

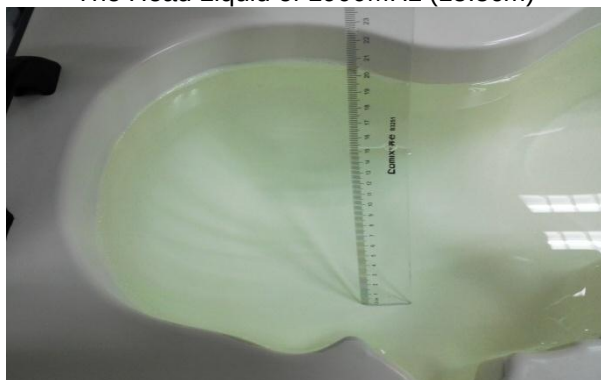
The Body Liquid of 5000-6000MHz (16.5cm)



The Head Liquid of 1900MHz (15.5cm)



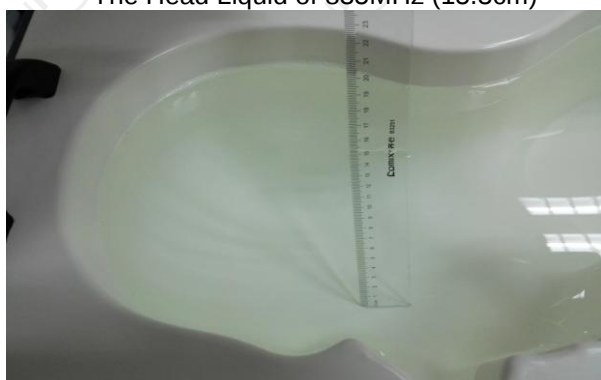
The Head Liquid of 2450MHz (15.6cm)



The Head Liquid of 835MHz (15.3cm)



The Head Liquid of 1800MHz (15.2cm)



The Head Liquid of 2600MHz (15.1cm)



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

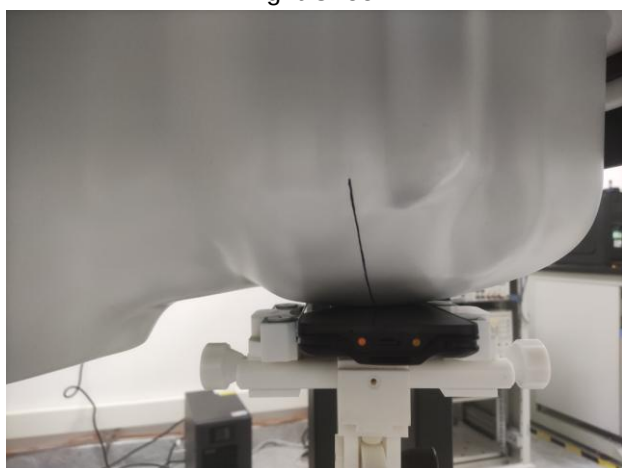
Appendix B: Test Setup Photos



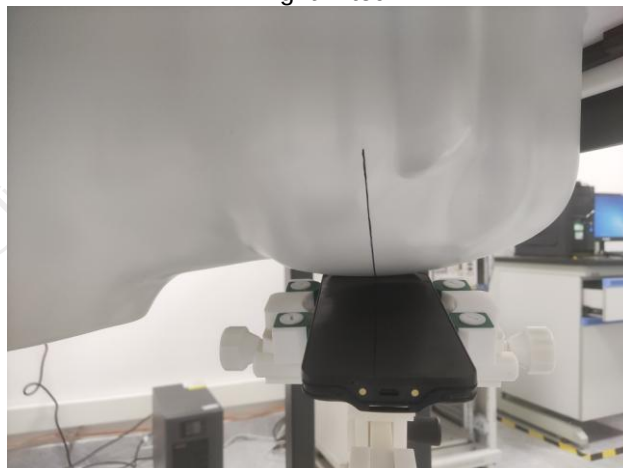
Right Cheek



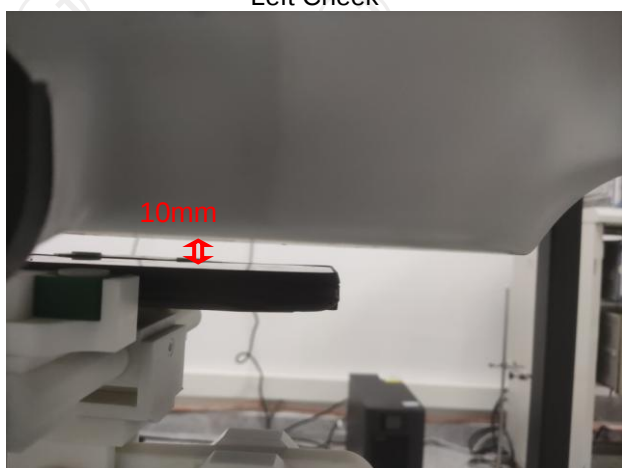
Right Tilted



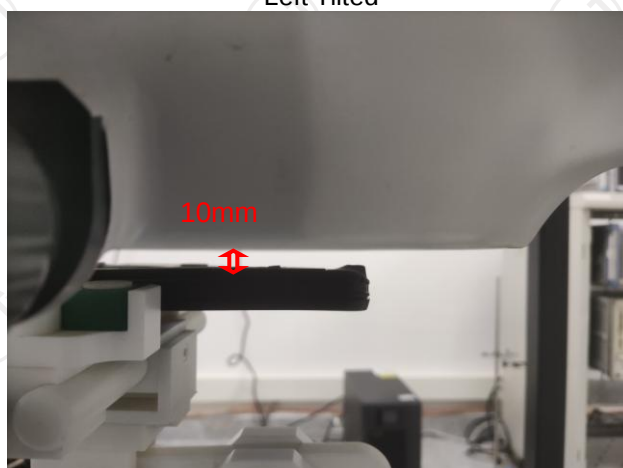
Left Cheek



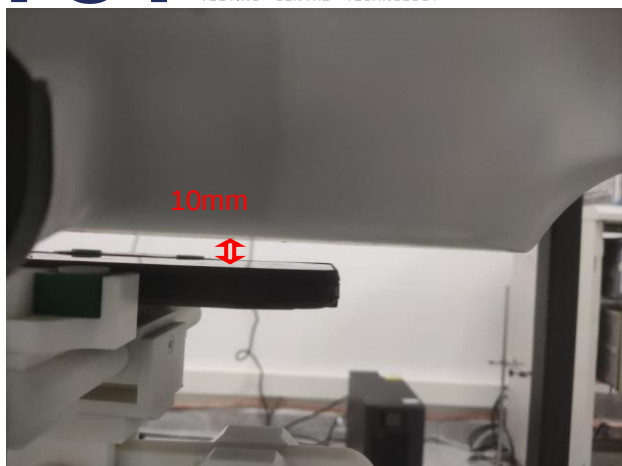
Left Tilted



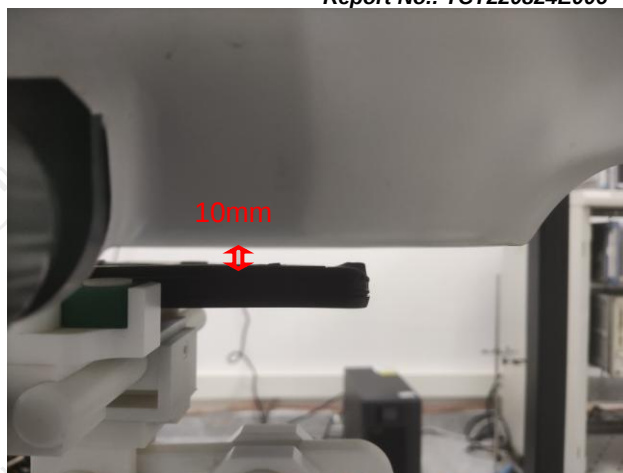
Body worn – Front (10mm)



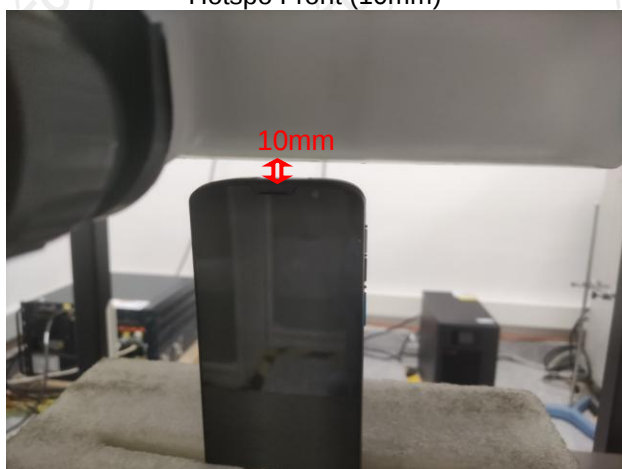
Body worn – Back (10mm)



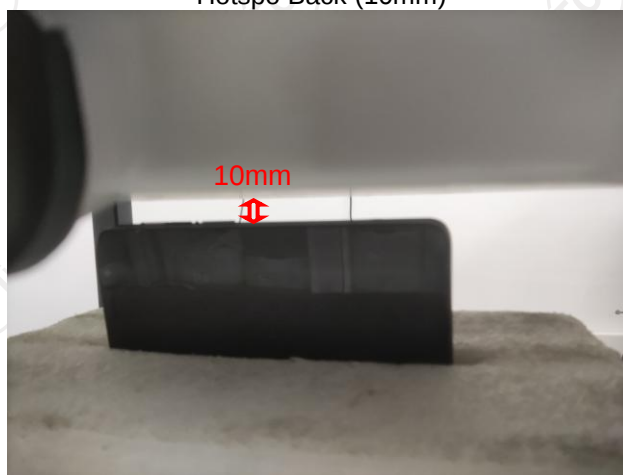
Hotspo Front (10mm)



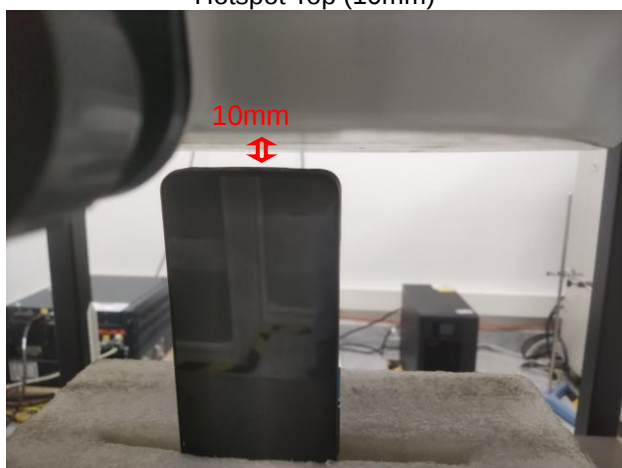
Hotspo Back (10mm)



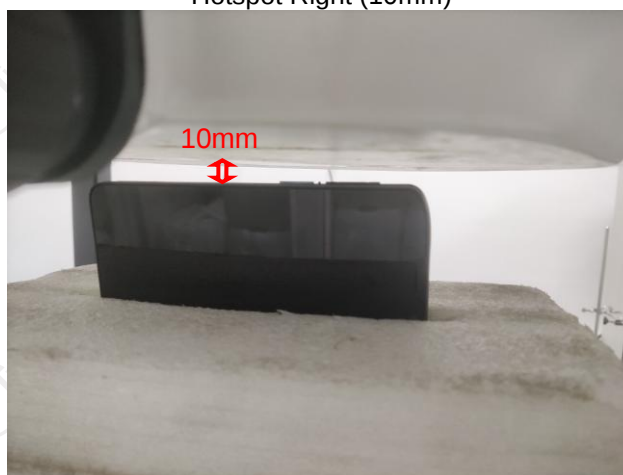
Hotspot Top (10mm)



Hotspot Right (10mm)



Hotspot Bottom (10mm)



Hotspot Left (10mm)

Appendix C: Probe Calibration Certificate

COMOSAR E-FIELD Probe



COMOSAR E-Field Probe Calibration Report

Ref : ACR.297.1.20.MVGB.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
SERIAL NO.: SN 36/20 EPG0346

Calibrated at MVG

Z.I. de la pointe du diable

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

Calibration date: 10/08/2021



Accreditations #2-6789 and #2-6814
Scope available on www.cofrac.fr

Summary:

This document presents the method and results from an accredited COMOSAR 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.297.1.20.MVGB.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Technical Manager	10/08/2021	<i>JS</i>
Checked by :	Jérôme LUC	Technical Manager	10/08/2021	<i>JS</i>
Approved by :	Yann Toutain	Laboratory Director	10/11/2021	<i>Yann Toutain</i>

	Customer Name
Distribution :	SHENHEN TONGCE TESTING LAB.

Issue	Name	Date	Modifications
A	Jérôme LUC	10/08/2021	Initial release



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.297.1.20.MVGB.A

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.297.1.20.MVGB.A

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	SN 36/20 EPGO346
Product Condition (new / used)	New
Frequency Range of Probe	0.15 GHz-6GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.217 MΩ Dipole 2: R2=0.245 MΩ Dipole 3: R3=0.219 MΩ

2 PRODUCT DESCRIPTION

2.1 GENERAL INFORMATION

MVG's COMOSAR E field Probes are built in accordance to the IEEE 1528, FCC KDB865664 D01, CENELEC EN62209 and CEI/IEC 62209 standards.



Figure 1 – MVG COMOSAR Dosimetric E field Dipole

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 IEEE 1528, FCC KDB865664 D01, CENELEC EN62209 and CEI/IEC 62209 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.

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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.

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:

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

where

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

d_{be} is the distance between the surface and the closest *zoom-scan* measurement point, in millimetre

Δ_{step} is the separation distance between the first and second measurement points that are closest to the phantom surface, in millimetre, assuming the boundary effect at the second location is negligible

δ is the minimum penetration depth in millimetres of the head tissue-equivalent liquids defined in this standard, i.e., $\delta \approx 14$ mm at 3 GHz;

ΔSAR_{be} in percent of SAR is the deviation between the measured SAR value, at the distance d_{be} from the boundary, and the analytical SAR value.



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.297.1.20.MVGB.A

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

4 MEASUREMENT UNCERTAINTY

The guidelines outlined in the IEEE 1528, OET 65 Bulletin C, CENELEC EN50361 and CEI/IEC 62209 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	30-80 %

5.1 SENSITIVITY IN AIR

Normx dipole 1 (μV/(V/m) ²)	Normy dipole 2 (μV/(V/m) ²)	Normz dipole 3 (μV/(V/m) ²)
0.81	0.71	0.80

DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
115	112	112

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

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

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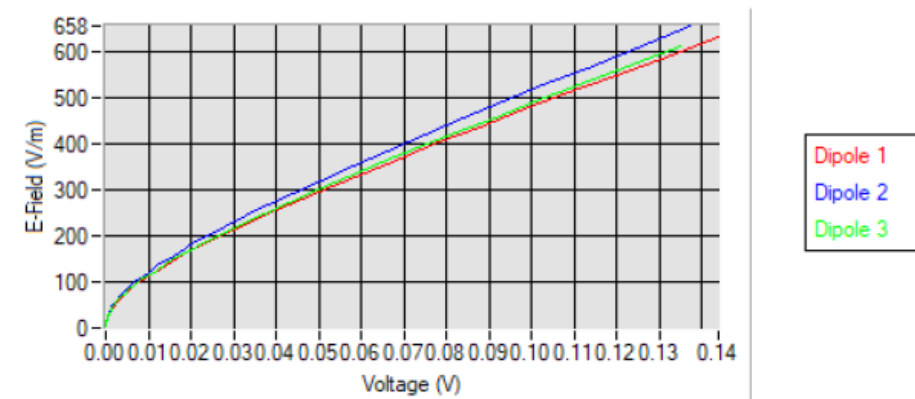
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COMOSAR E-FIELD PROBE CALIBRATION REPORT

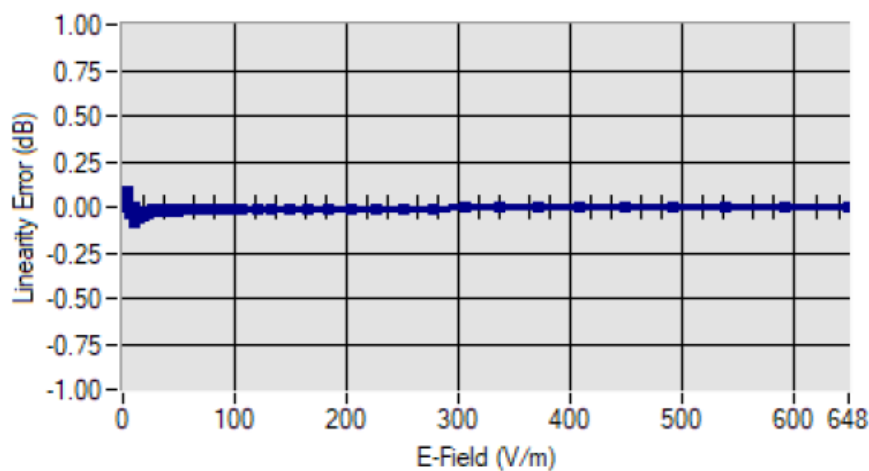
Ref: ACR.297.1.20.MVGB.A

Calibration curves



5.2 LINEARITY

Linearity



Linearity: $\pm 1.97\%$ ($\pm 0.09\text{dB}$)



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.297.1.20.MVGB.A

5.3 SENSITIVITY IN LIQUID

Liquid	Frequency (MHz +/- 100MHz)	ConvF	Epsilon (S/m)	Permittivity
HL750	750	1.71	0.93	40.76
BL750	750	1.78	0.98	56.70
HL900	900	1.91	0.93	41.94
BL900	900	1.96	0.98	54.62
HL1800	1800	2.08	1.29	40.86
BL1800	1800	2.16	1.47	52.27
HL2000	2000	2.03	1.42	38.37
BL2000	2000	2.10	1.52	52.03
HL2450	2450	2.31	1.80	38.72
BL2450	2450	2.37	1.97	54.91
HL2600	2600	2.16	1.89	39.98
BL2600	2600	2.23	2.18	54.42
HL5200	5200	2.01	4.45	36.68
BL5200	5200	2.08	5.46	49.02
HL5800	5800	2.06	5.08	34.81
BL5800	5800	2.13	6.12	47.81

LOWER DETECTION LIMIT: 8mW/kg

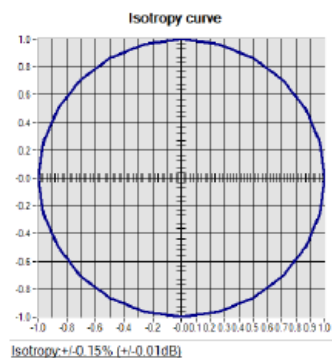


COMOSAR E-FIELD PROBE CALIBRATION REPORT

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5.4 ISOTROPY

HL1800 MHz





COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.297.1.20.MVGB.A

6 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	Manufacturer / Model	Identification No.	Current Calibration Date	Next Calibration Date
Flat Phantom	MVG	SN-20/09-SAM71	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	05/2019	05/2022
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	05/2019	05/2022
Multimeter	Keithley 2000	1160271	02/2020	02/2023
Signal Generator	Rohde & Schwarz SMB	106589	04/2019	04/2022
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	NI-USB 5680	170100013	05/2019	05/2022
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Waveguide	Mega Industries	069Y7-158-13-712	Validated. No cal required.	Validated. No cal required.
Waveguide Transition	Mega Industries	069Y7-158-13-701	Validated. No cal required.	Validated. No cal required.
Waveguide Termination	Mega Industries	069Y7-158-13-701	Validated. No cal required.	Validated. No cal required.
Temperature / Humidity Sensor	Testo 184 H1	44220687	05/2020	05/2023

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