

LTE Band 4

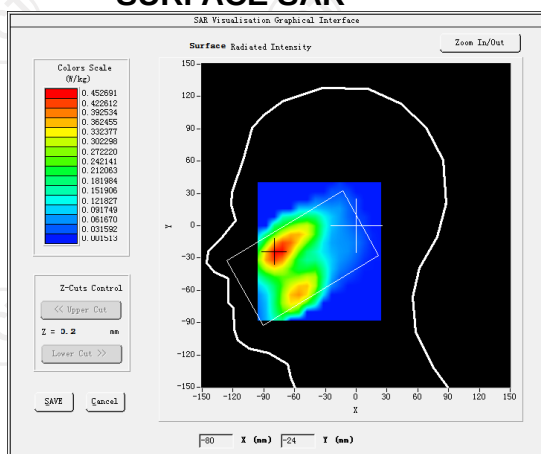
MEASUREMENT 1

Hight Band SAR (Channel 20300):

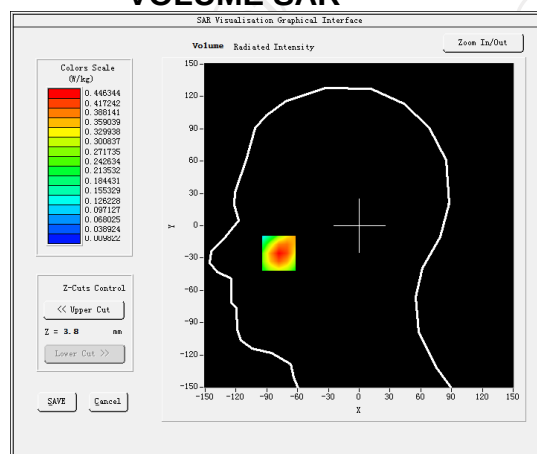
Date: 10/21/2022

Frequency (MHz)	1745.000000
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#49)</u>

SURFACE SAR



VOLUME SAR



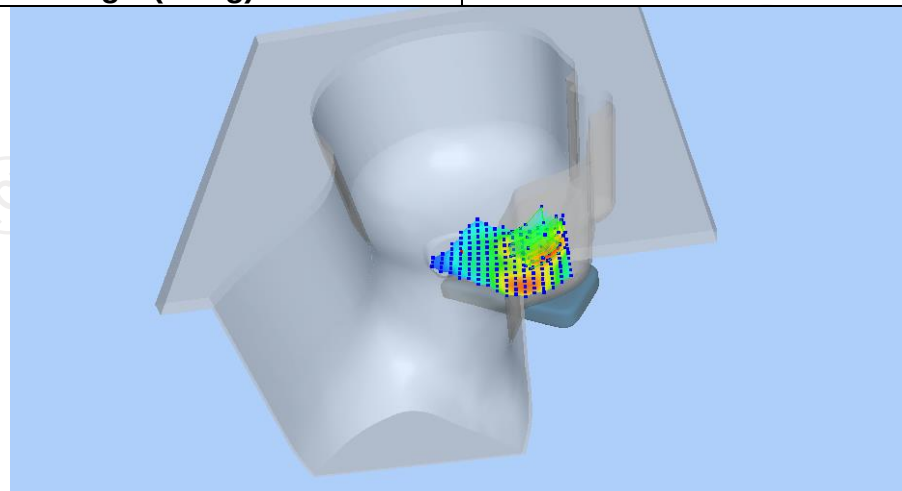
Maximum location: X=-67.00, Y=-15.00 SAR Peak: 0.51 W/kg

SAR 10g (W/Kg)

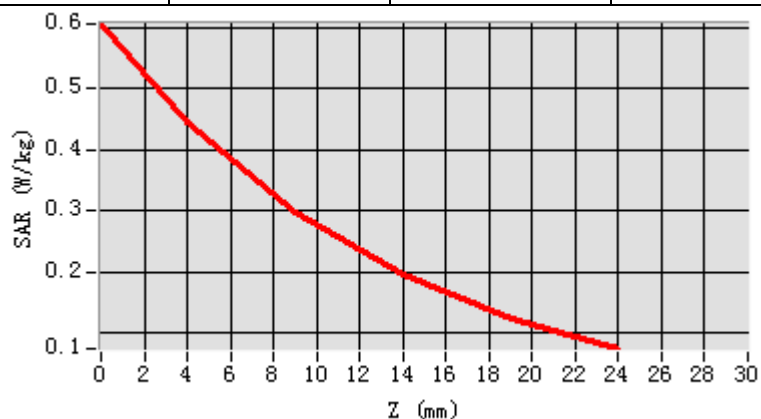
0.155039

SAR 1g (W/Kg)

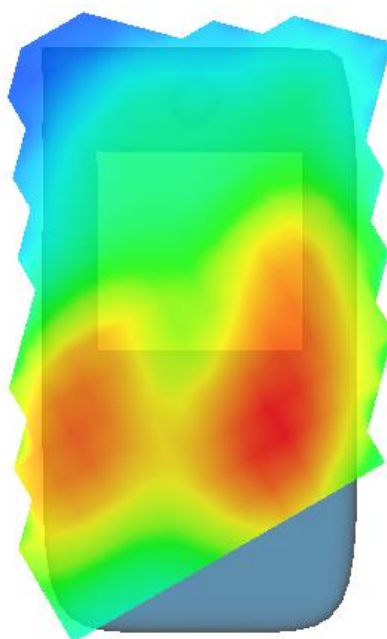
0.321117



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



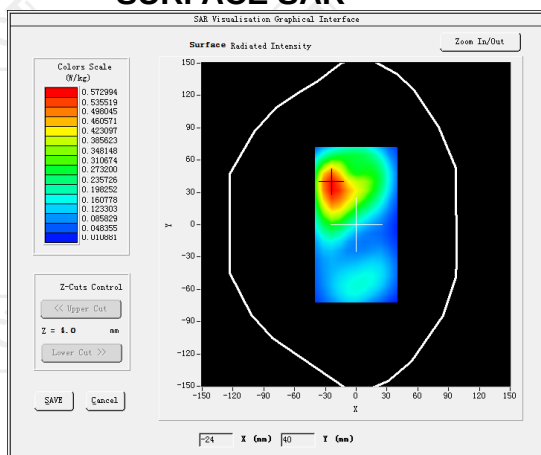
MEASUREMENT 2

Hight Band SAR (Channel 20300):

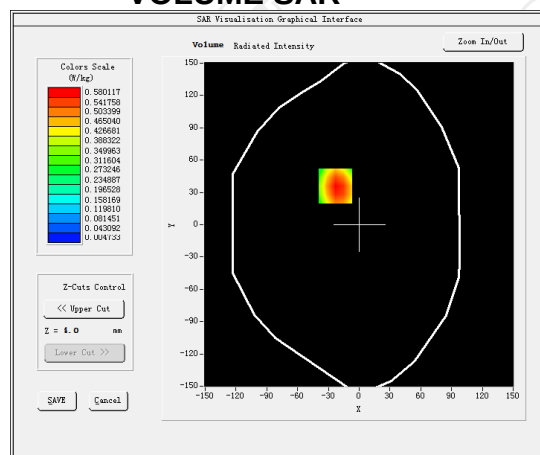
Date: 10/21/2022

Frequency (MHz)	1745.000000
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	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-open(10mm)
Band	LTE band 4(1 RB#49)

SURFACE SAR

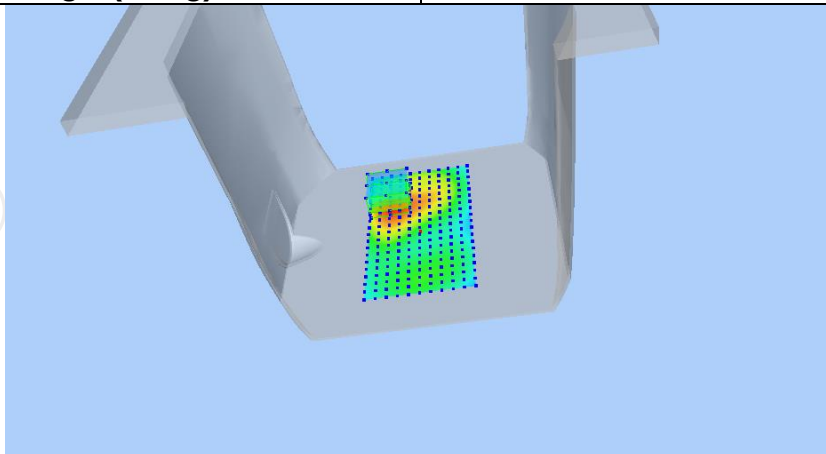


VOLUME SAR

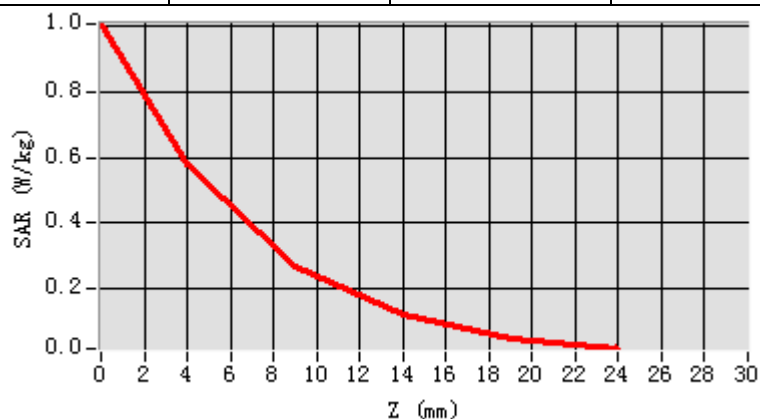


Maximum location: X=-23.00, Y=36.00 SAR Peak: 1.01 W/kg

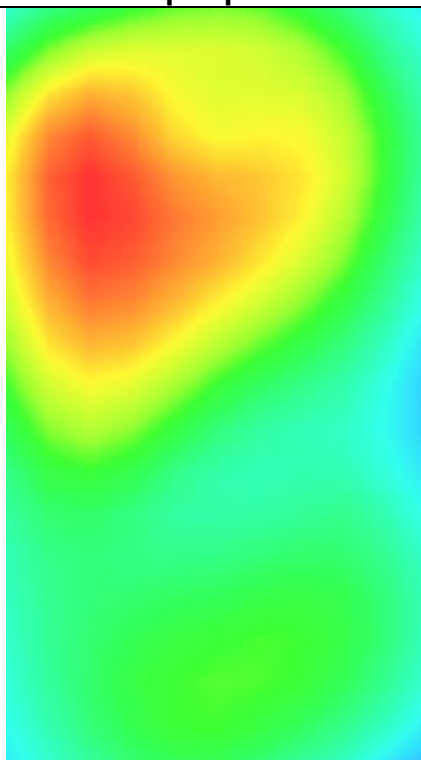
SAR 10g (W/Kg)	0.289505
SAR 1g (W/Kg)	0.556694



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



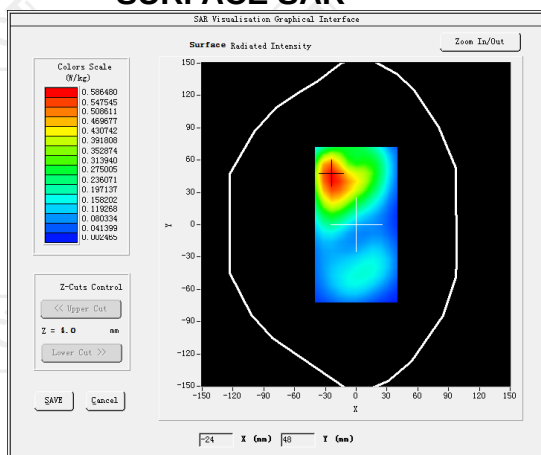
MEASUREMENT 3

Hight Band SAR (Channel 20300):

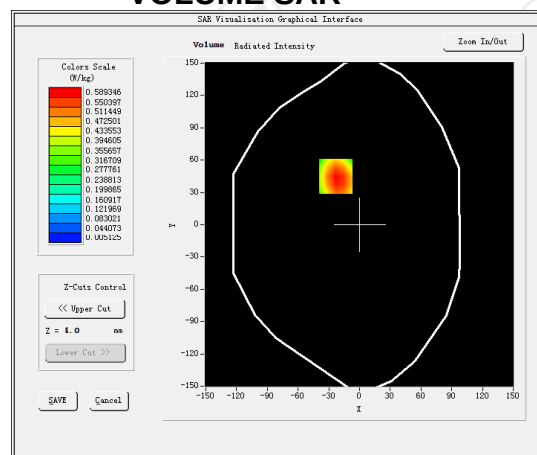
Date: 10/21/2022

Frequency (MHz)	1745.000000
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	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-open(hotspot 10mm)
Band	LTE band 4(1 RB#49)

SURFACE SAR

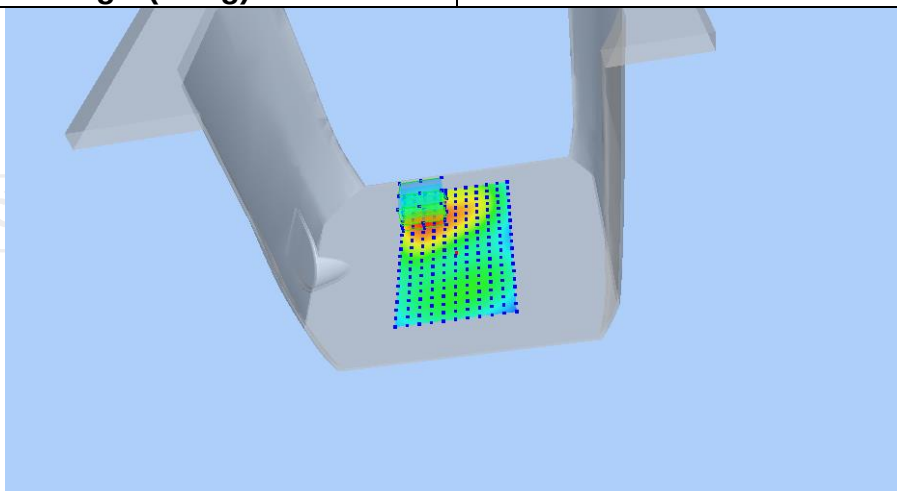


VOLUME SAR

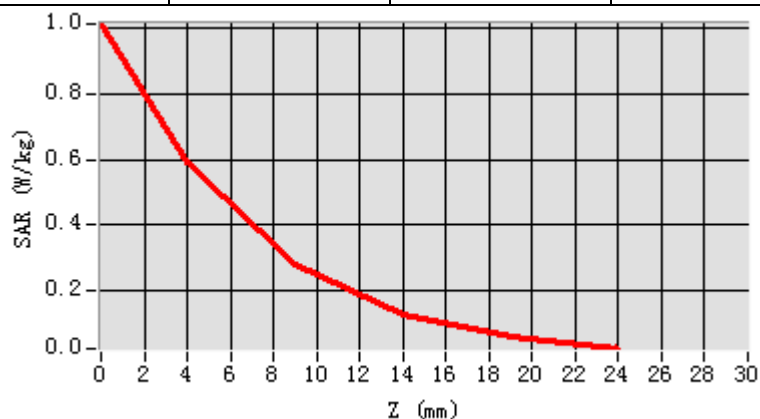


Maximum location: X=-21.00, Y=40.00 SAR Peak: 1.00 W/kg

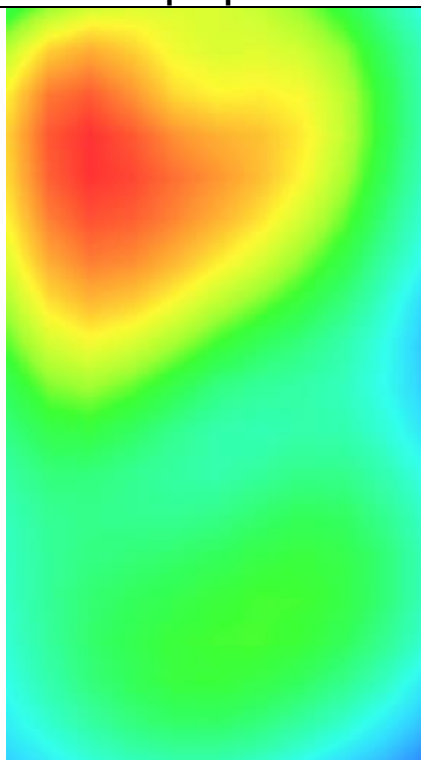
SAR 10g (W/Kg)	0.297565
SAR 1g (W/Kg)	0.566932



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

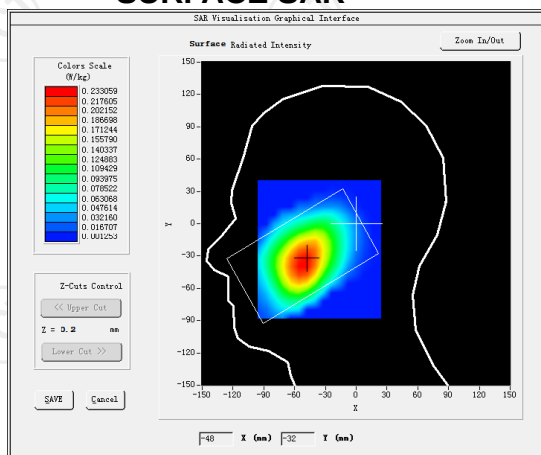
MEASUREMENT 1

Lower Band SAR (Channel 20450):

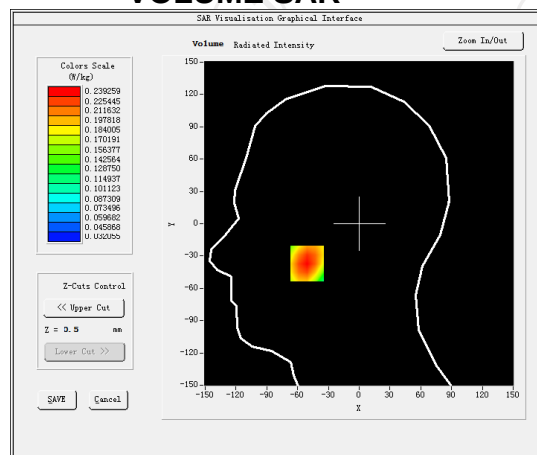
Date: 10/19/2022

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#24)</u>

SURFACE SAR



VOLUME SAR



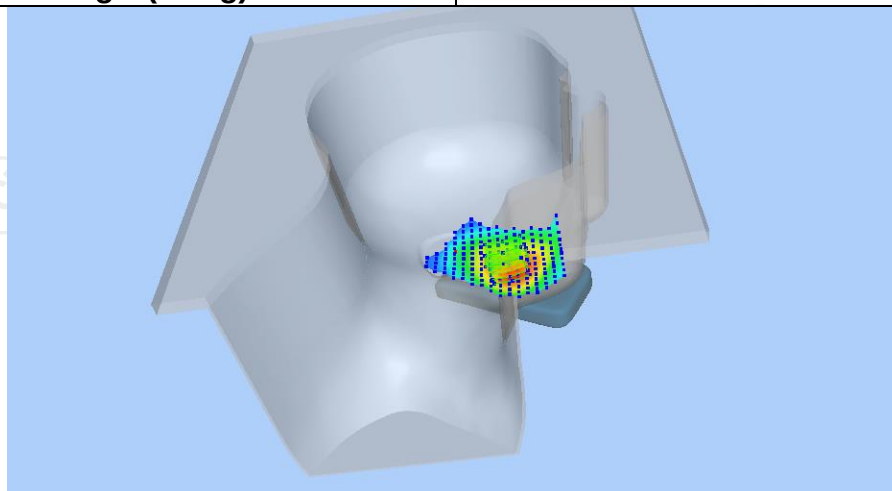
Maximum location: X=-51.00, Y=-37.00 SAR Peak: 0.29 W/kg

SAR 10g (W/Kg)

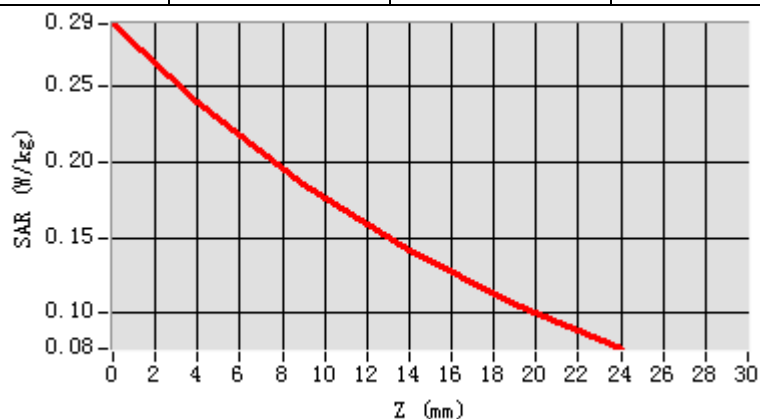
0.163789

SAR 1g (W/Kg)

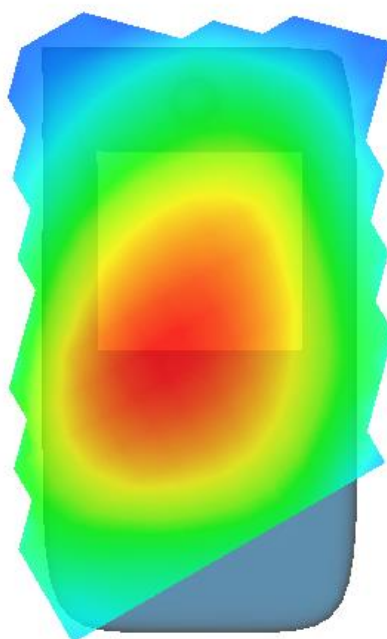
0.229156



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



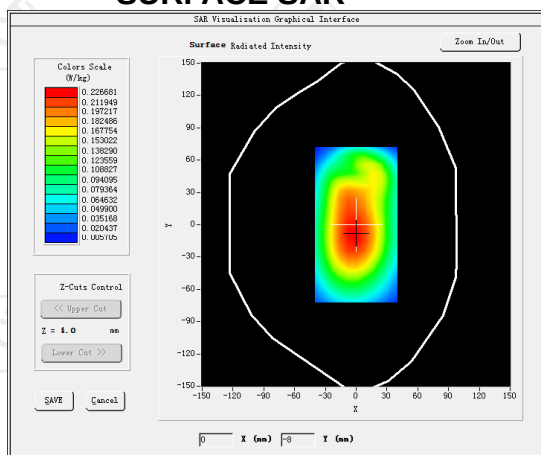
MEASUREMENT 2

Lower Band SAR (Channel 20450):

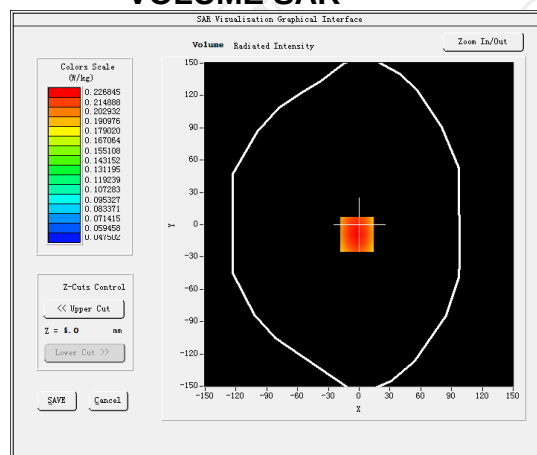
Date: 10/19/2022

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	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-open(10mm)
Band	LTE band 5(1 RB#24)

SURFACE SAR

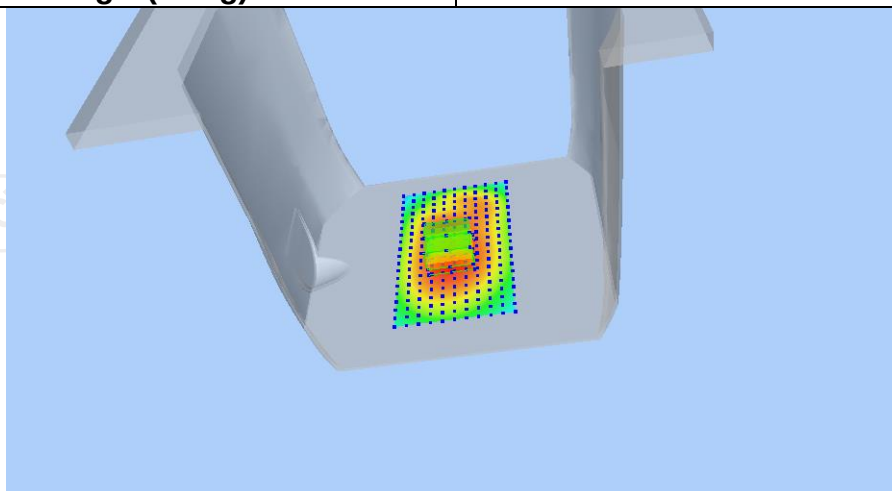


VOLUME SAR

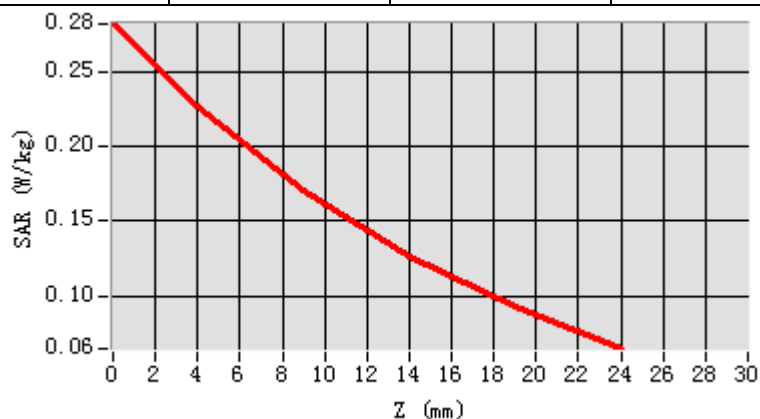


Maximum location: X=-2.00, Y=-9.00 SAR Peak: 0.28 W/kg

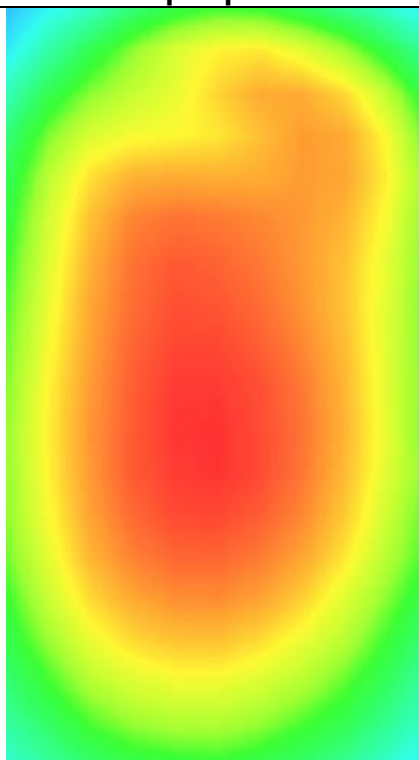
SAR 10g (W/Kg)	0.157407
SAR 1g (W/Kg)	0.218518



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



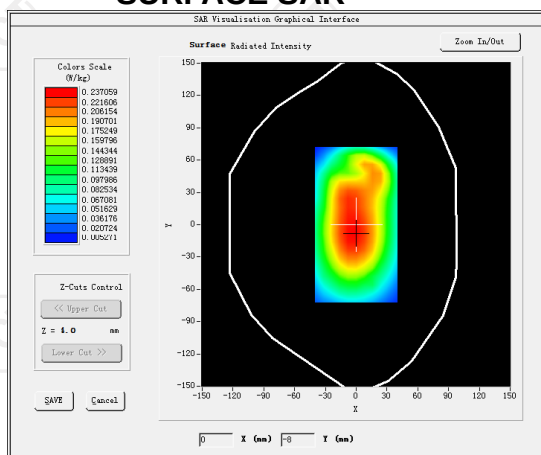
MEASUREMENT 3

Lower Band SAR (Channel 20450):

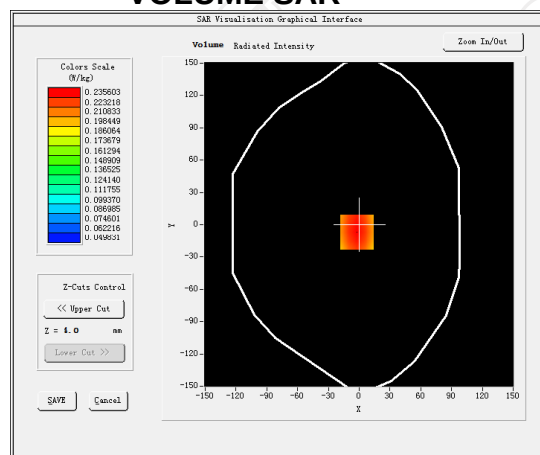
Date: 10/19/2022

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	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-open((hotspot 10mm)
Band	LTE band 5(1 RB#24)

SURFACE SAR

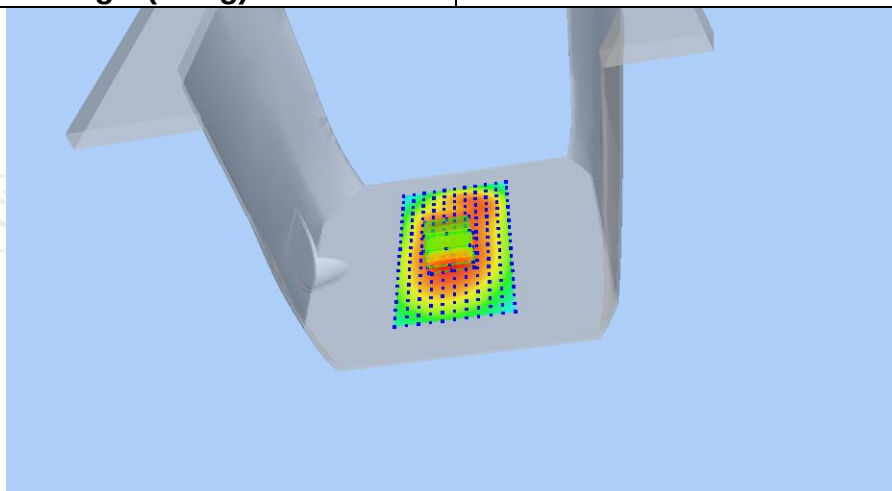


VOLUME SAR

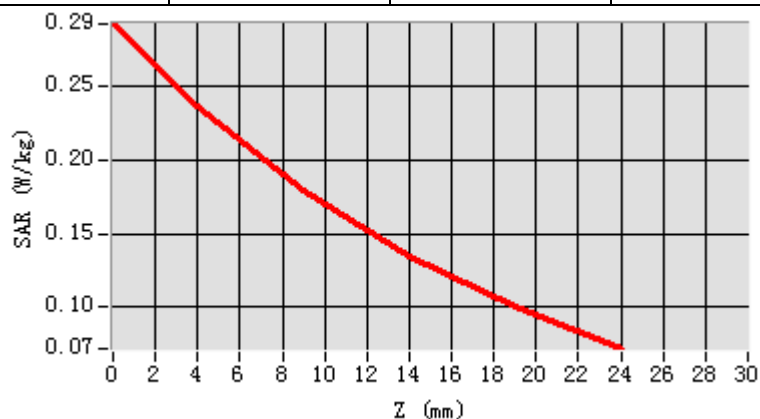


Maximum location: X=-2.00, Y=-7.00 SAR Peak: 0.29 W/kg

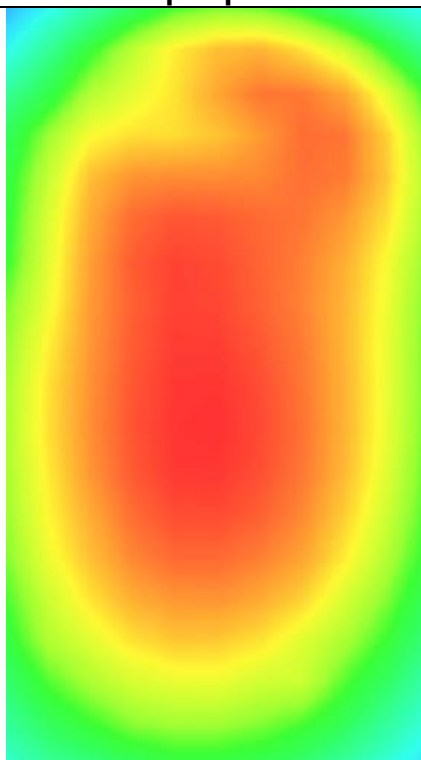
SAR 10g (W/Kg)	0.165419
SAR 1g (W/Kg)	0.227376



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



Hot spot position



LTE Band 7

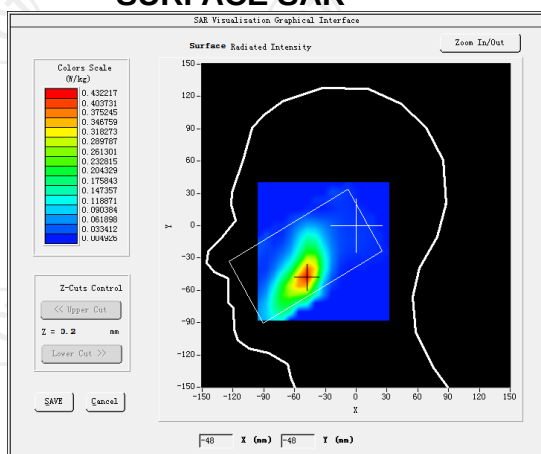
MEASUREMENT 1

Lower Band SAR (Channel 20850):

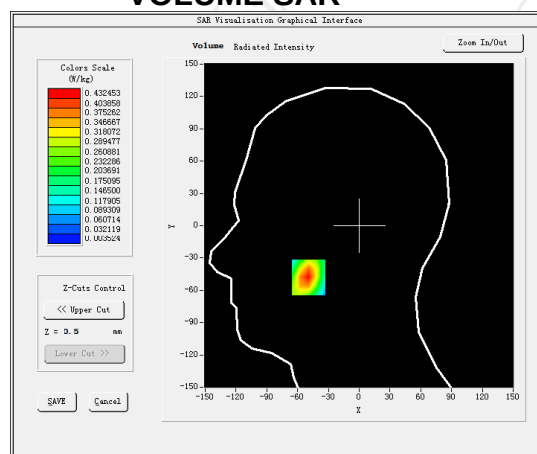
Date: 11/02/2022

Frequency (MHz)	2510.000000
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#49)

SURFACE SAR



VOLUME SAR



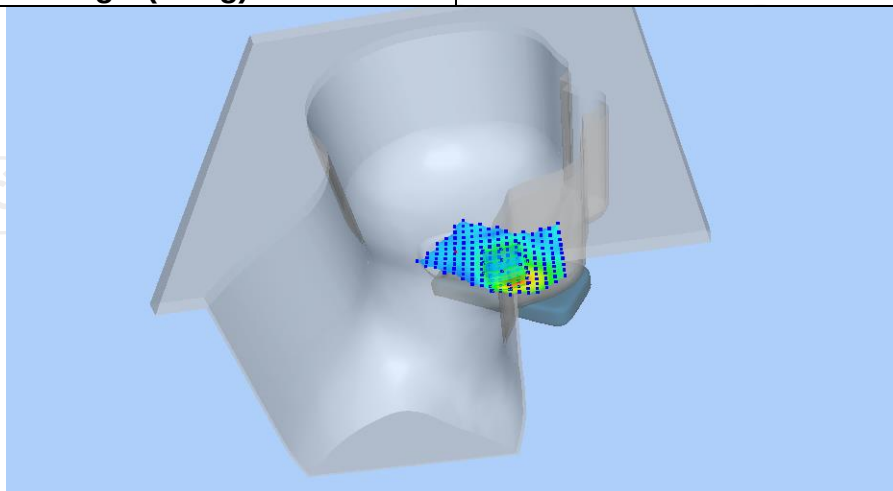
Maximum location: X=-49.00, Y=-48.00 SAR Peak: 0.88 W/kg

SAR 10g (W/Kg)

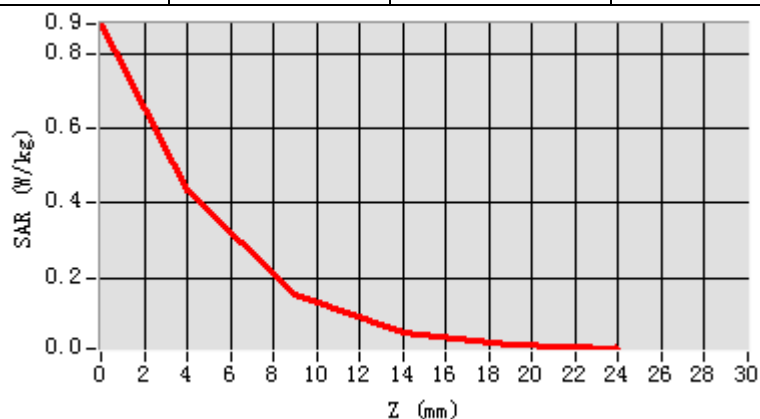
0.184588

SAR 1g (W/Kg)

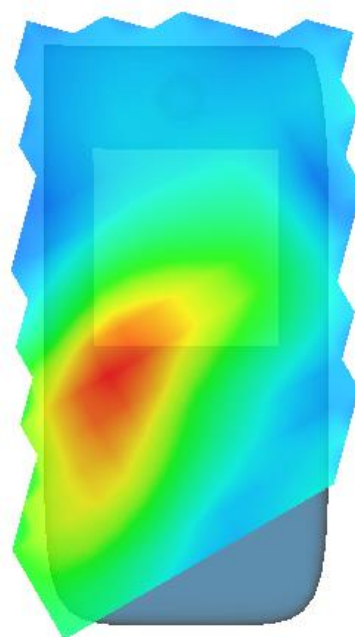
0.420219



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8804	0.4325	0.1545	0.0508	0.0199



Hot spot position



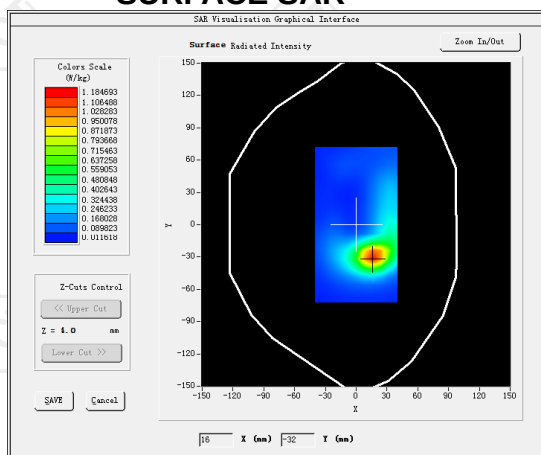
MEASUREMENT 2

Lower Band SAR (Channel 20850):

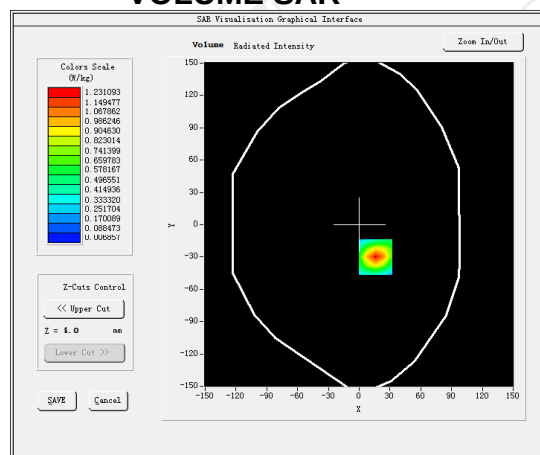
Date: 11/02/2022

Frequency (MHz)	2510.000000
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	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-open(10mm)
Band	LTE band 7(1 RB#49)

SURFACE SAR

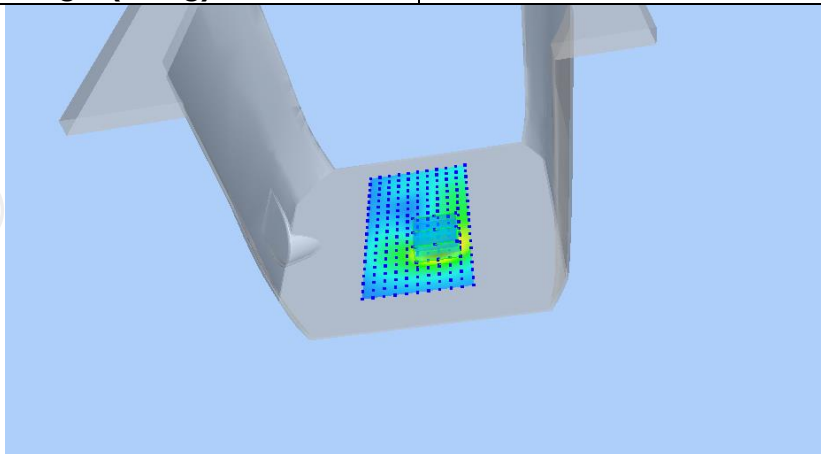


VOLUME SAR

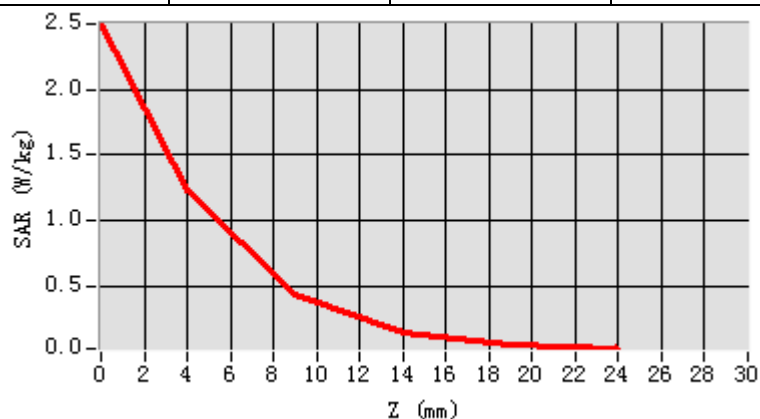


Maximum location: X=16.00, Y=-30.00 SAR Peak: 2.49 W/kg

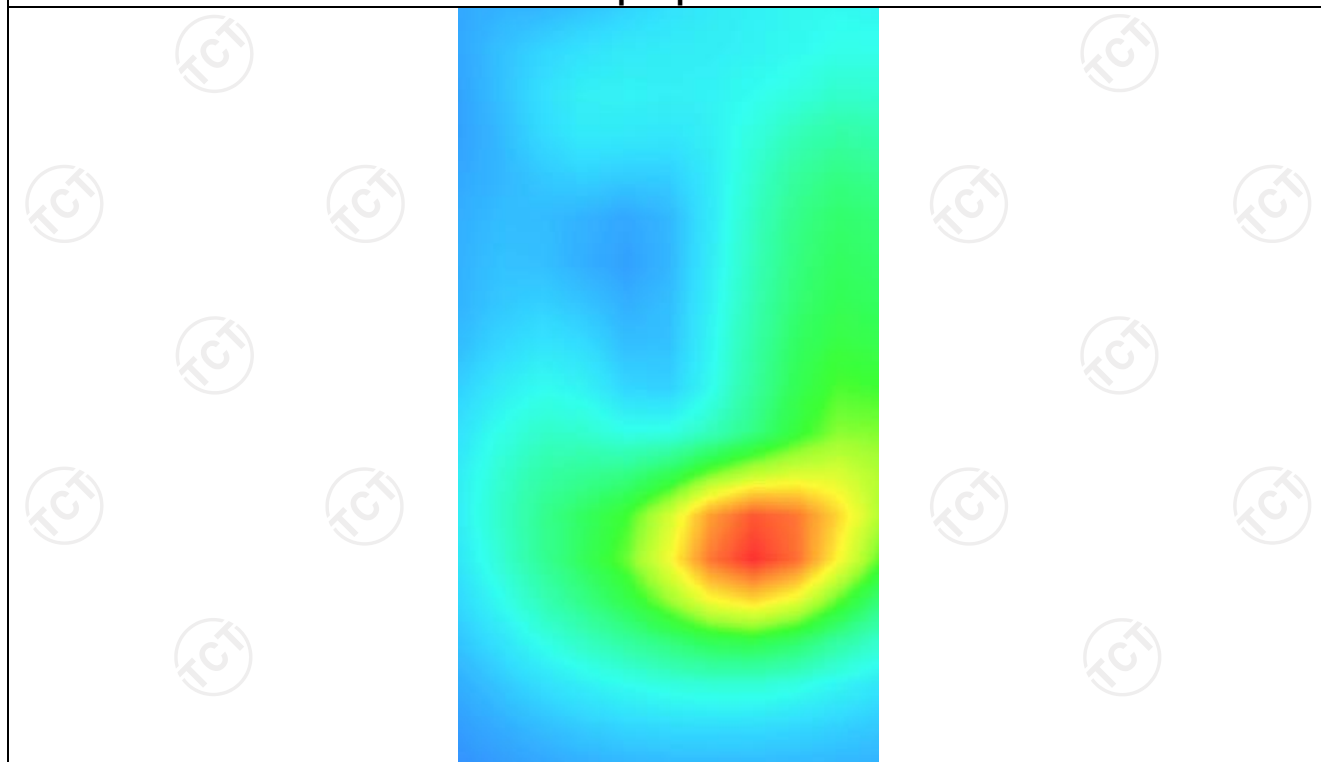
SAR 10g (W/Kg)	0.985495
SAR 1g (W/Kg)	0.429891



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



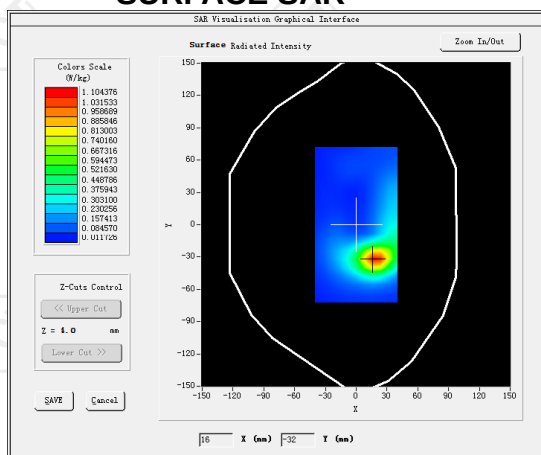
MEASUREMENT 3

Lower Band SAR (Channel 20850):

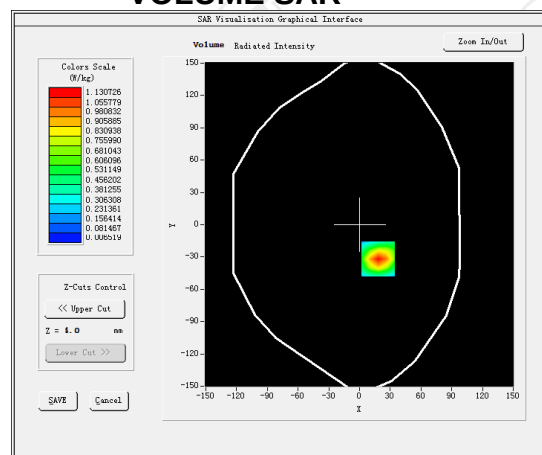
Date: 11/02/2022

Frequency (MHz)	2510.000000
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	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-open(hotspot 10mm)
Band	LTE band 7(1 RB#0)

SURFACE SAR

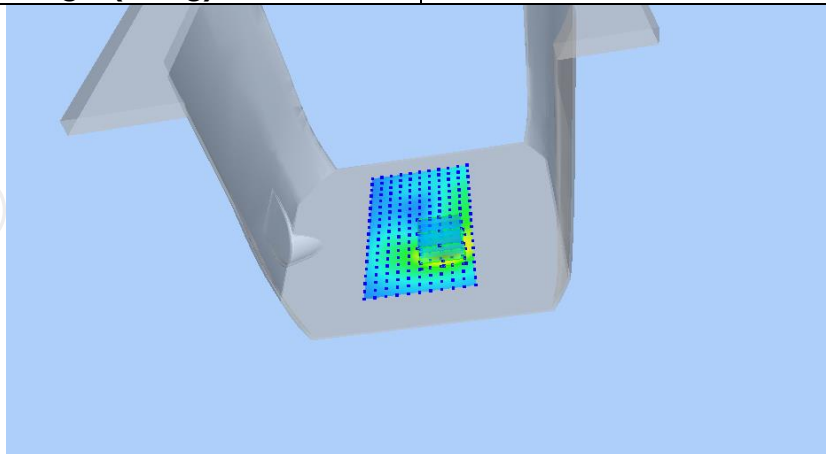


VOLUME SAR

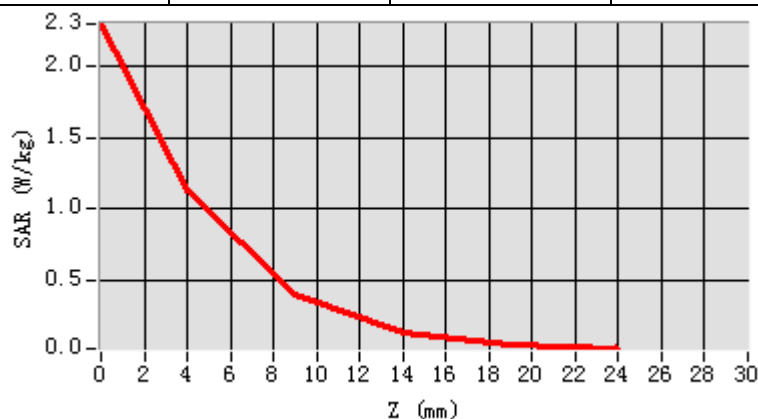


Maximum location: X=18.00, Y=-32.00 SAR Peak: 2.29 W/kg

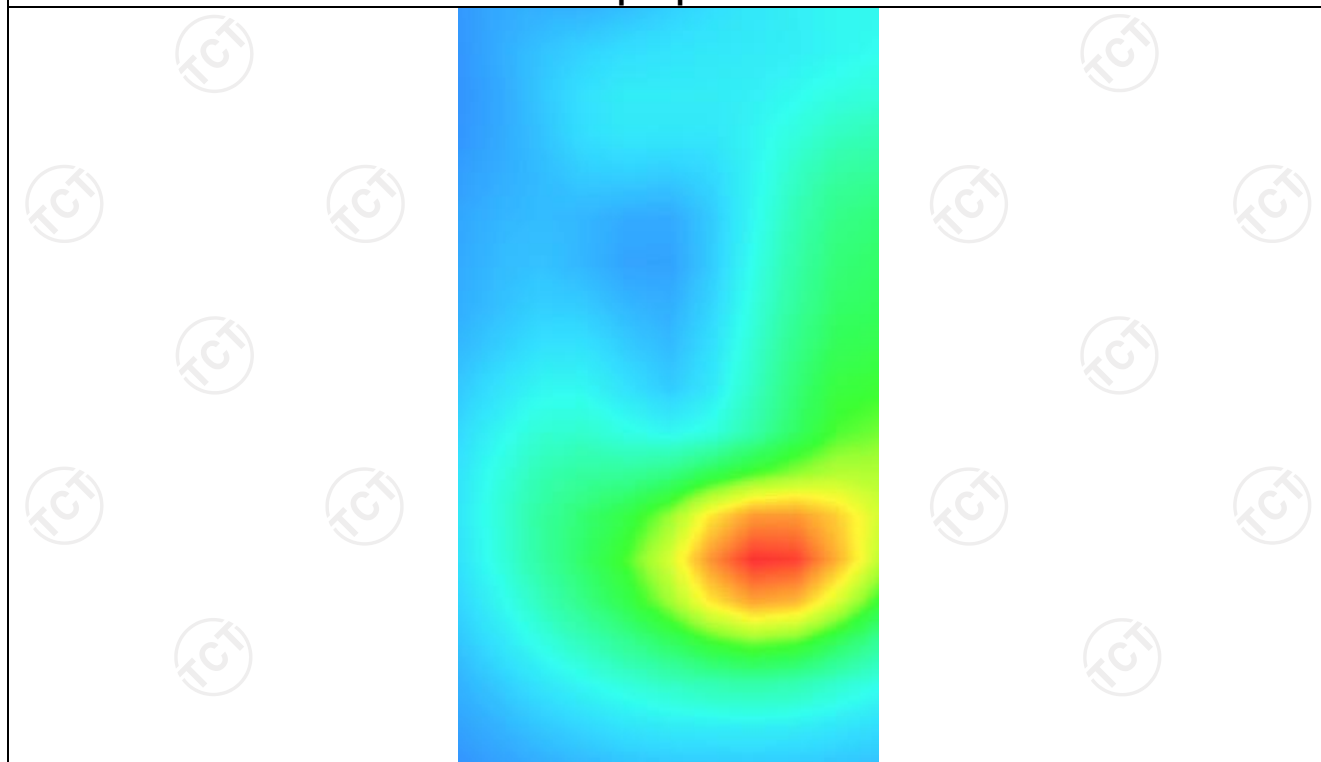
SAR 10g (W/Kg)	0.970208
SAR 1g (W/Kg)	0.459411



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

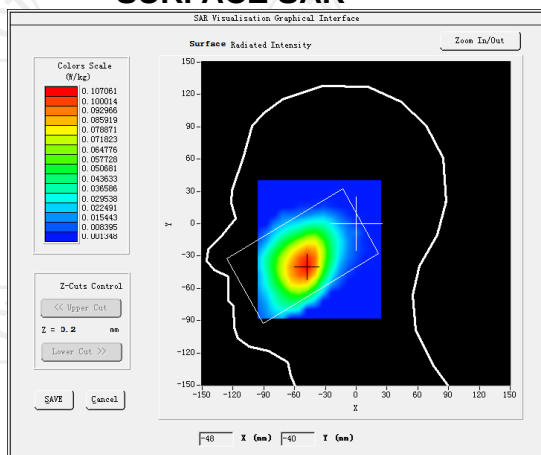
MEASUREMENT 1

Lower Band SAR (Channel 23060):

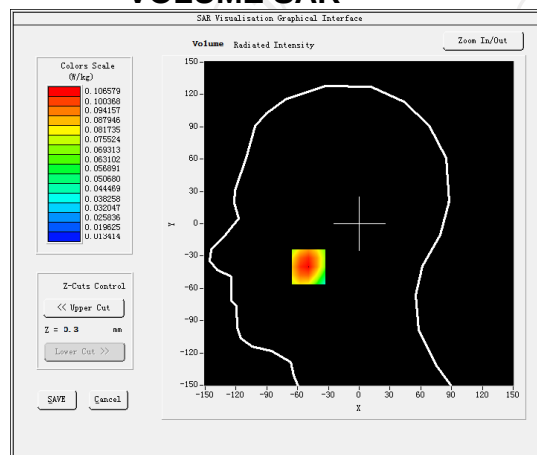
Date: 10/17/2022

Frequency (MHz)	704.000000
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#24)</u>

SURFACE SAR



VOLUME SAR



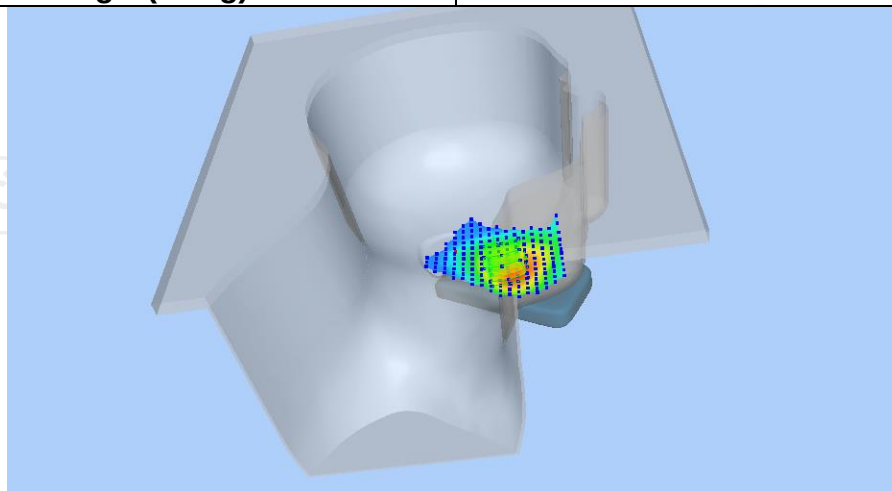
Maximum location: X=-39.00, Y=-41.00 SAR Peak: 0.11 W/kg

SAR 10g (W/Kg)

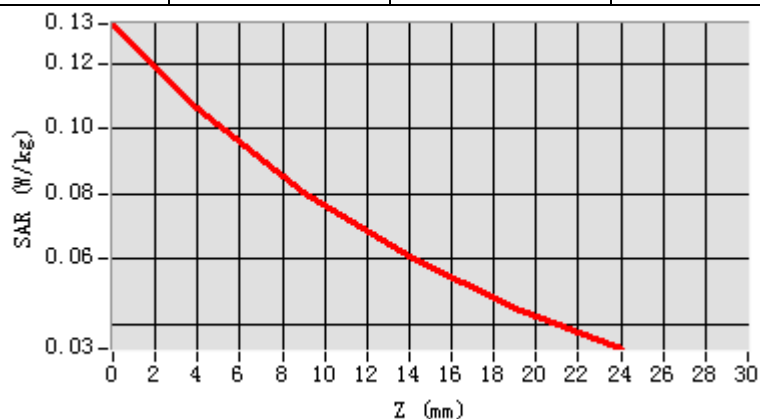
0.072366

SAR 1g (W/Kg)

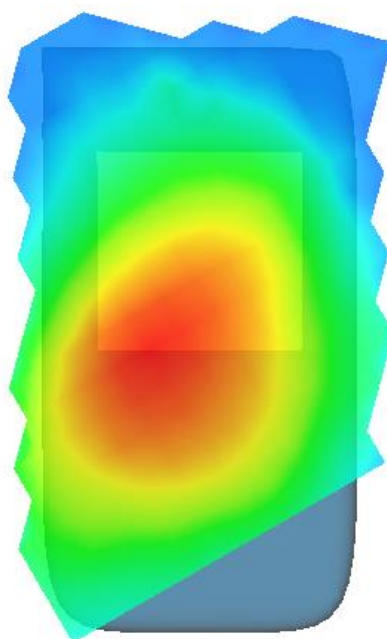
0.103483



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



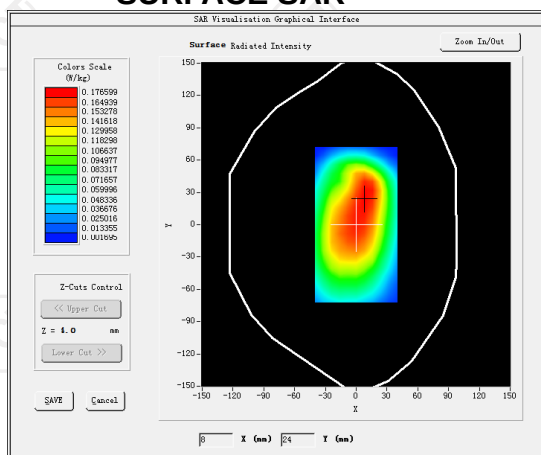
MEASUREMENT 2

Lower Band SAR (Channel 23060):

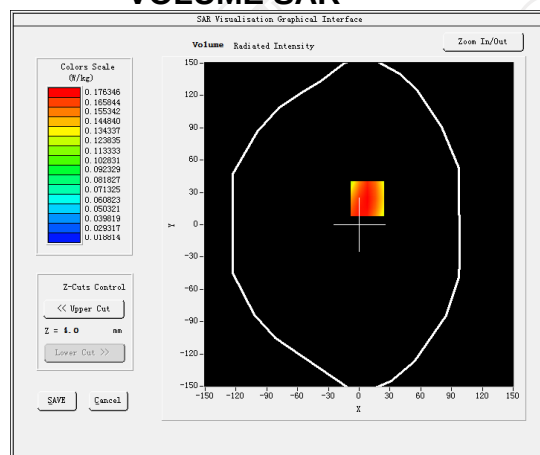
Date: 10/17/2022

Frequency (MHz)	704.000000
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	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-open(10mm)
Band	LTE band 12(1 RB#0)

SURFACE SAR

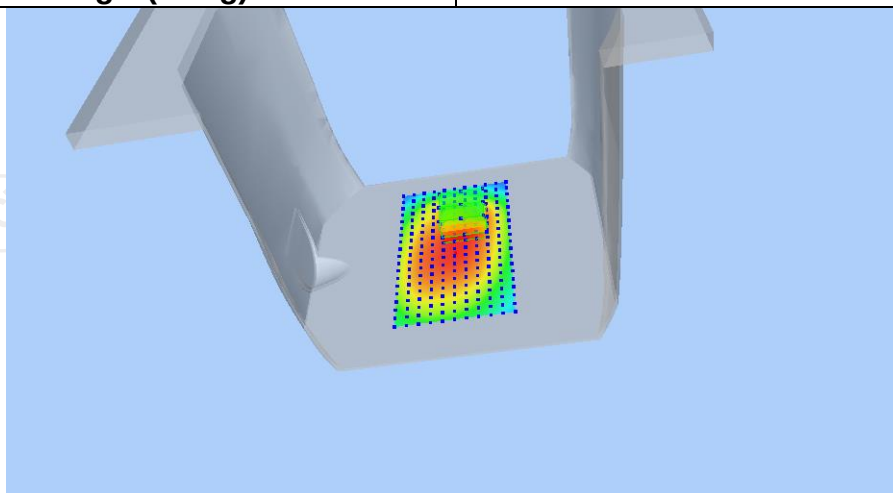


VOLUME SAR

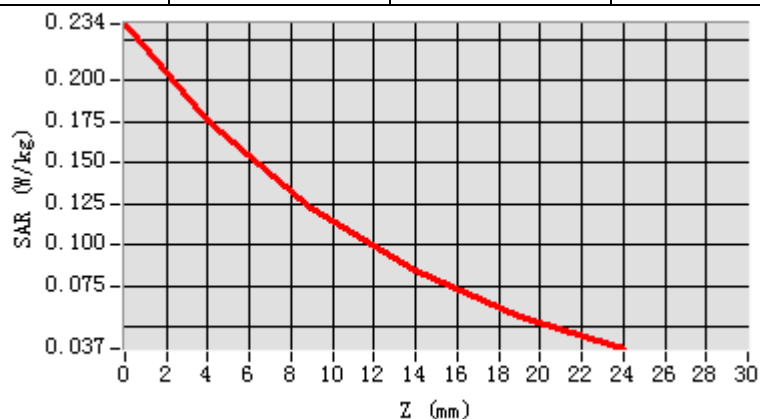


Maximum location: X=6.00, Y=14.00 SAR Peak: 0.15 W/kg

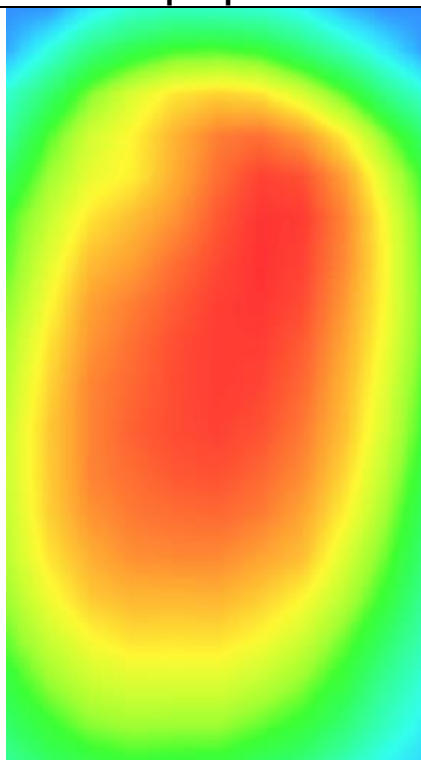
SAR 10g (W/Kg)	0.023666
SAR 1g (W/Kg)	0.280840



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



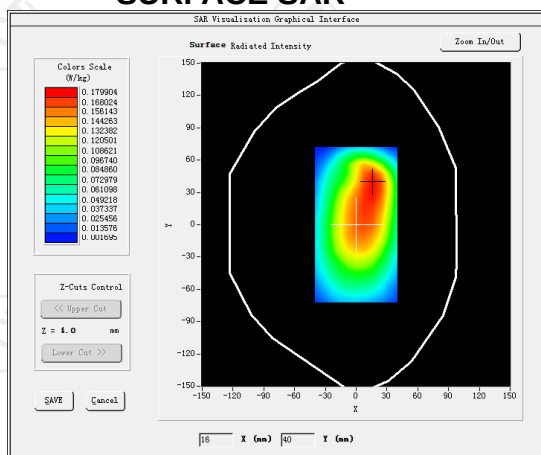
MEASUREMENT 3

Lower Band SAR (Channel 23060):

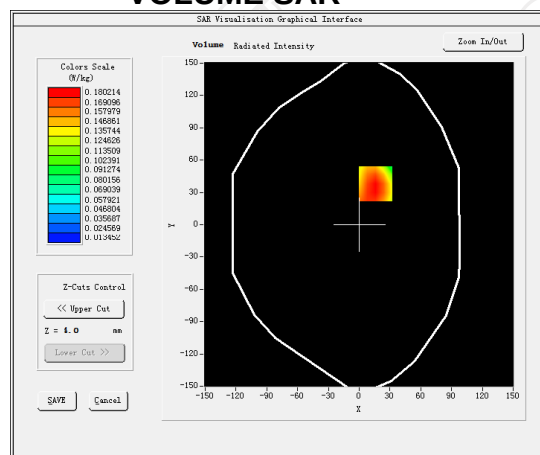
Date: 10/17/2022

Frequency (MHz)	704.000000
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	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-open(hotspot 10mm)
Band	LTE band 12(1 RB#24)

SURFACE SAR

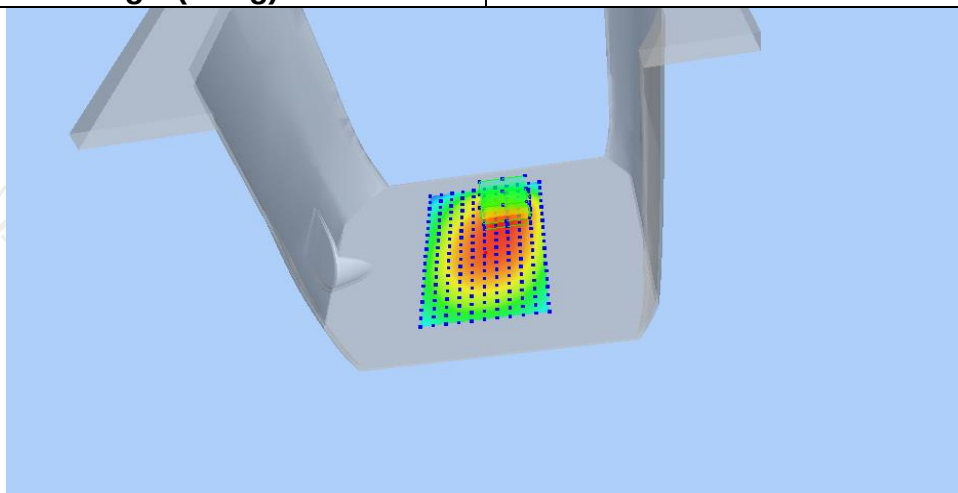


VOLUME SAR

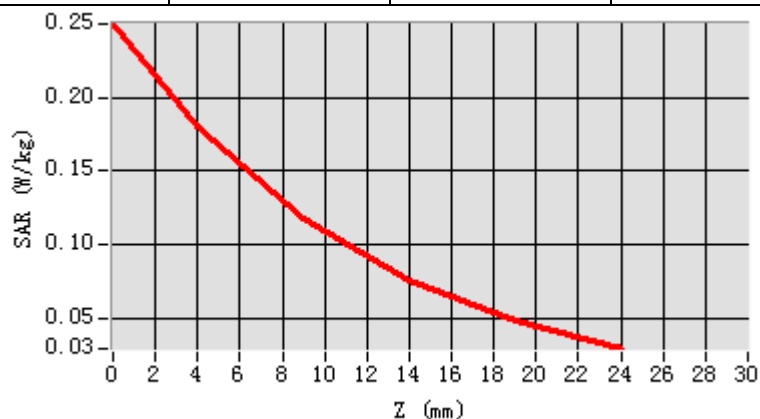


Maximum location: X=6.00, Y=28.00 SAR Peak: 0.15 W/kg

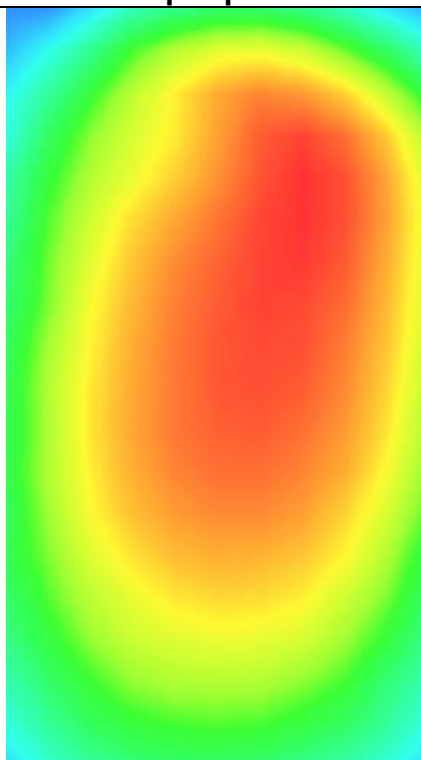
SAR 10g (W/Kg)	0.119621
SAR 1g (W/Kg)	0.382340



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 13

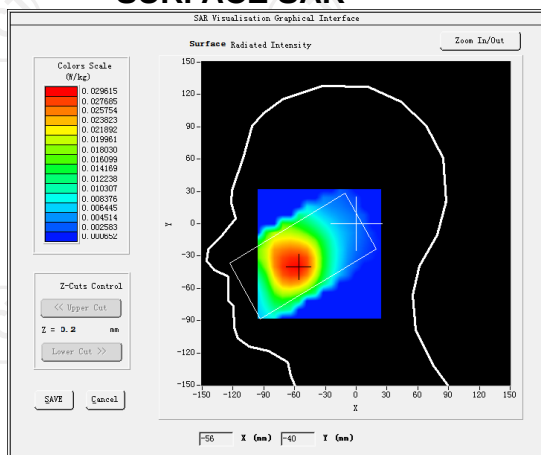
MEASUREMENT 1

Middle Band SAR (Channel 23230):

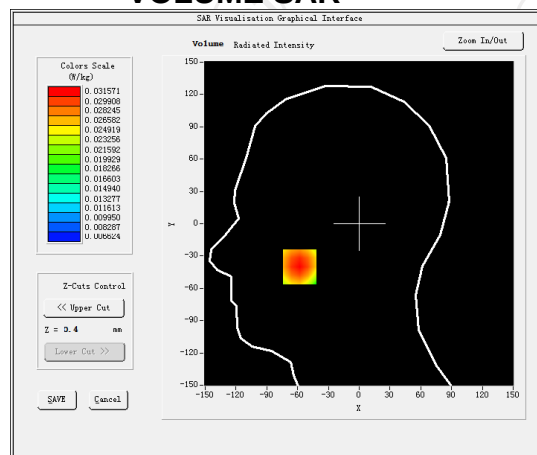
Date: 10/17/2022

Frequency (MHz)	782.000000
Relative permittivity (real part)	40.761260
Relative permittivity (imaginary part)	17.130904
Conductivity (S/m)	0.931220
Variation (%)	-1.460000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN36/20 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 13(1 RB#24)

SURFACE SAR



VOLUME SAR



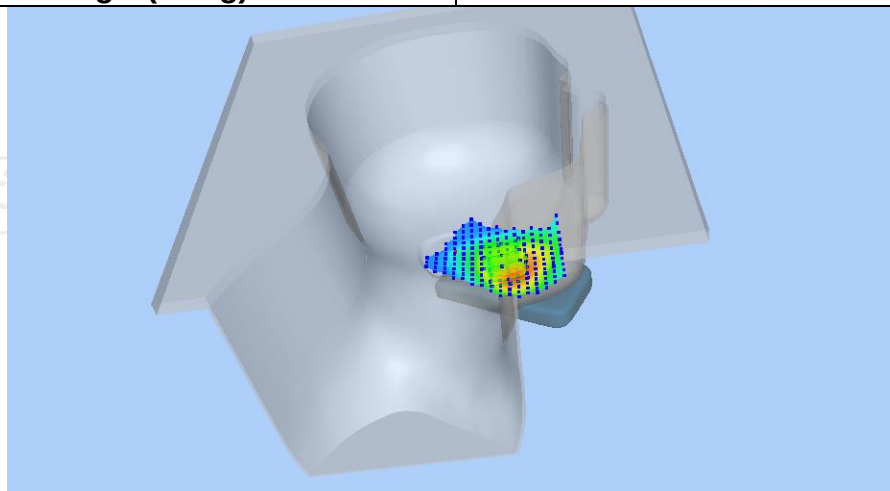
Maximum location: X=-48.00, Y=-42.00 SAR Peak: 0.13 W/kg

SAR 10g (W/Kg)

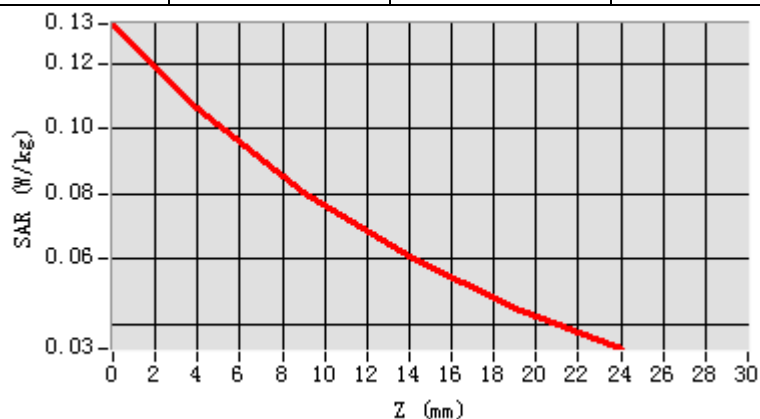
0.103470

SAR 1g (W/Kg)

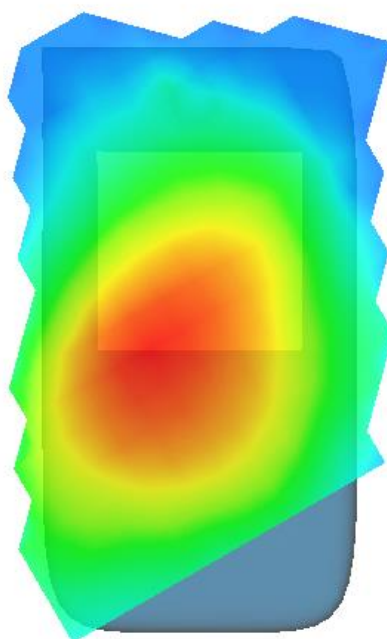
0.122601



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1343	0.1070	0.0812	0.0610	0.0450



Hot spot position



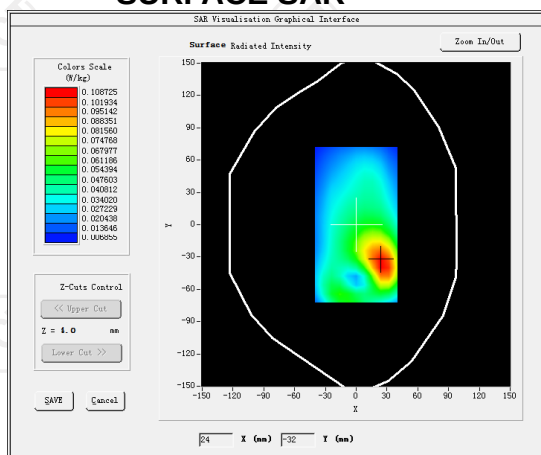
MEASUREMENT 2

Middle Band SAR (Channel 23230):

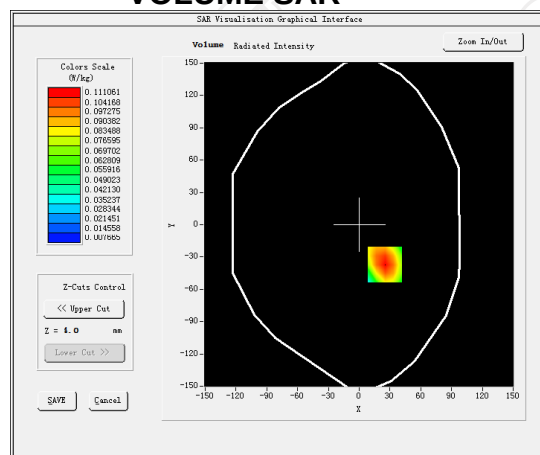
Date: 10/17/2022

Frequency (MHz)	782.000000
Relative permittivity (real part)	40.761260
Relative permittivity (imaginary part)	17.130904
Conductivity (S/m)	0.931220
Variation (%)	-1.810000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN36/20 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	Validation plane
Device Position	Body back-open(10mm)
Band	LTE band 13(1 RB#24)

SURFACE SAR

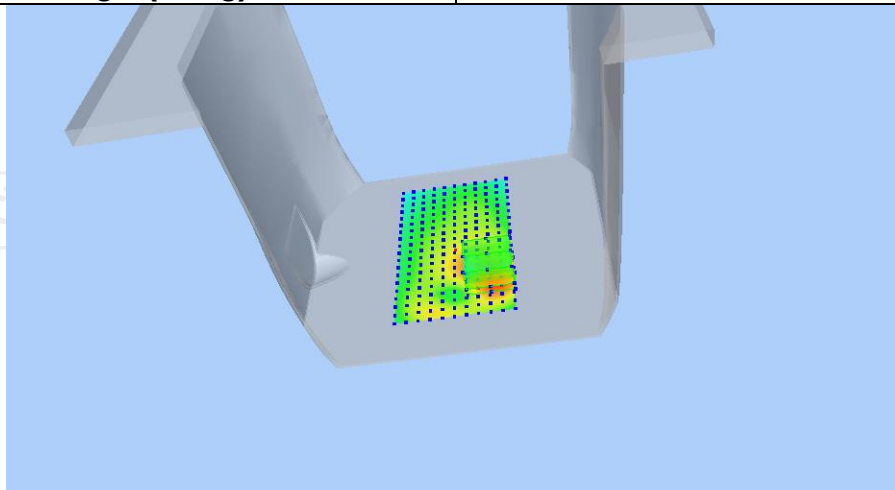


VOLUME SAR

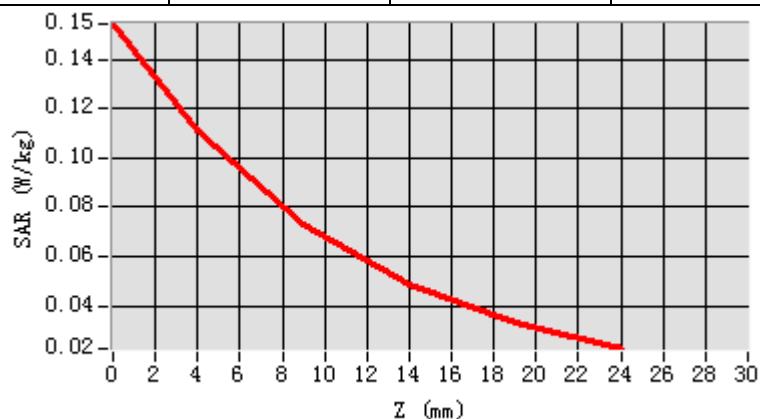


Maximum location: X=25.00, Y=-37.00 SAR Peak: 0.15 W/kg

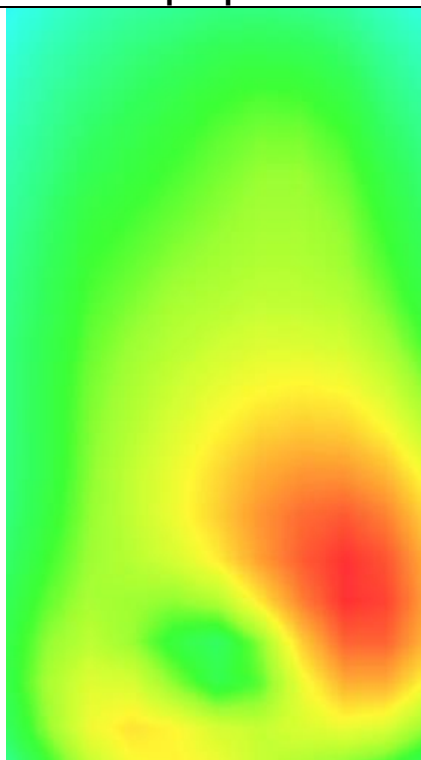
SAR 10g (W/Kg)	0.071030
SAR 1g (W/Kg)	0.103376



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1211	0.1120	0.0731	0.0490	0.0340



Hot spot position



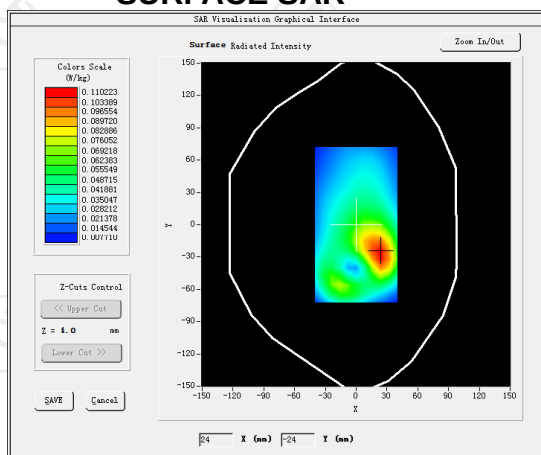
MEASUREMENT 3

Middle Band SAR (Channel 23230):

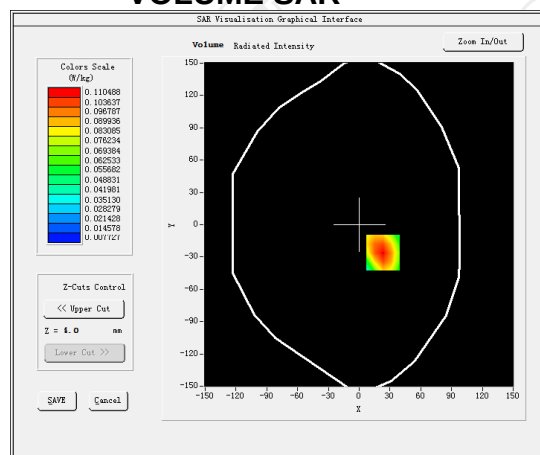
Date: 10/17/2022

Frequency (MHz)	782.000000
Relative permittivity (real part)	40.761260
Relative permittivity (imaginary part)	17.130904
Conductivity (S/m)	0.931220
Variation (%)	-2.650000
Crest Factor	1.0
Probe Conversion factor	1.71
E-Field Probe:	SSE2 (SN36/20 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	Validation plane
Device Position	Body back-open(hotspot 10mm)
Band	LTE band 13(1 RB#24)

SURFACE SAR

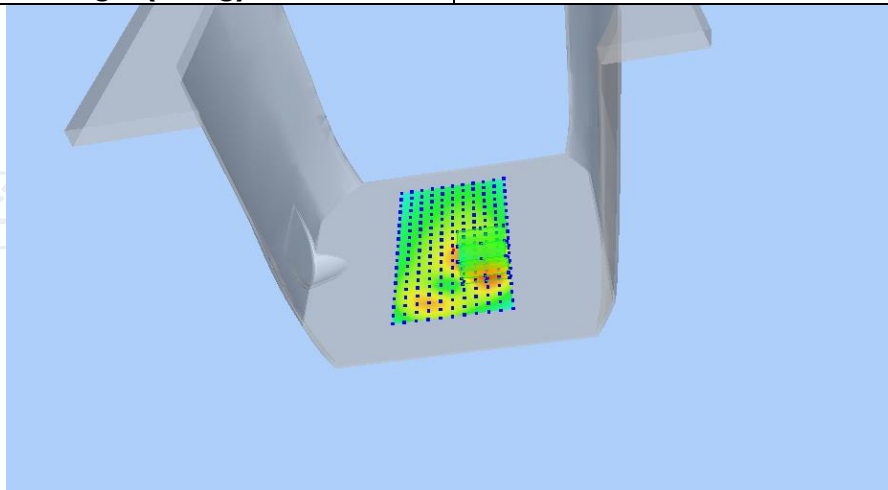


VOLUME SAR

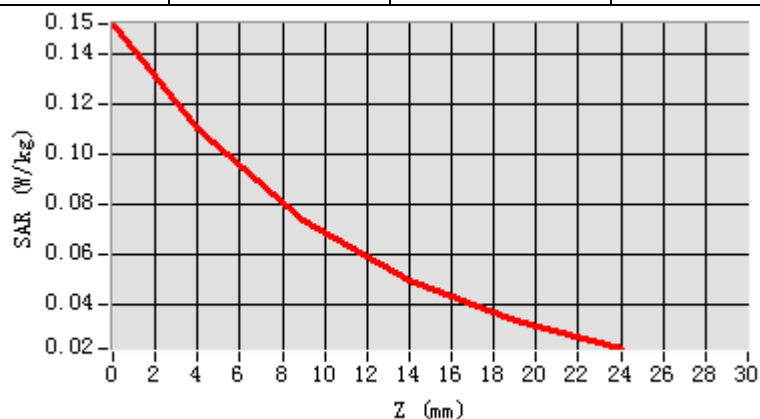


Maximum location: X=22.00, Y=-24.00 SAR Peak: 0.15 W/kg

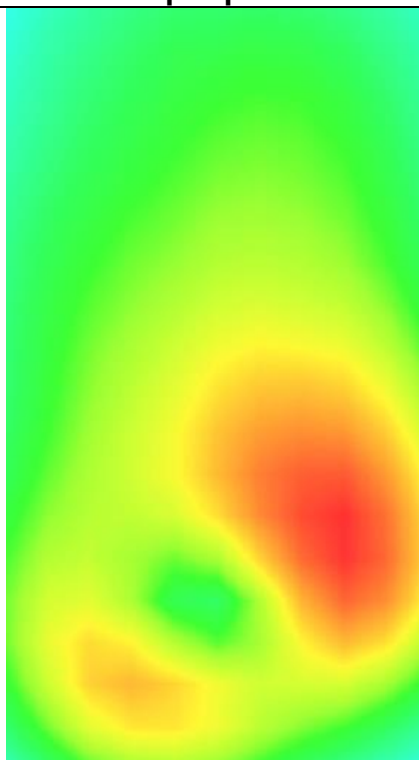
SAR 10g (W/Kg)	0.074531
SAR 1g (W/Kg)	0.151752



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1520	0.1110	0.0734	0.0492	0.0340



Hot spot position



LTE Band 17

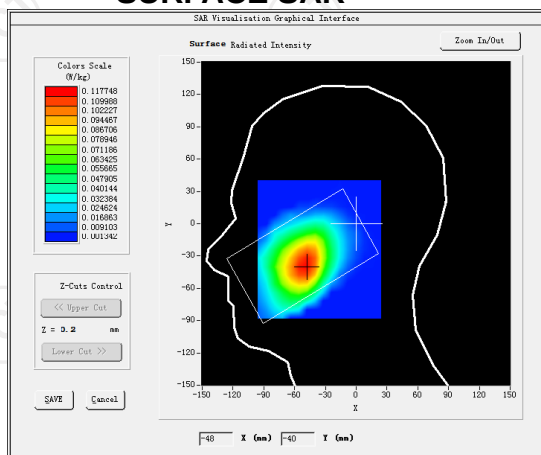
MEASUREMENT 1

Hight Band SAR (Channel 23800):

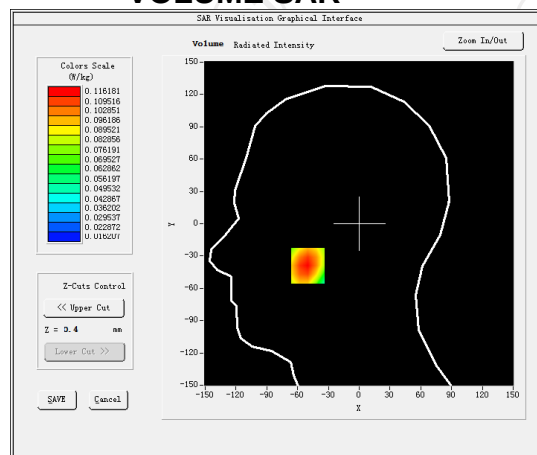
Date: 10/17/2022

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#24)

SURFACE SAR



VOLUME SAR



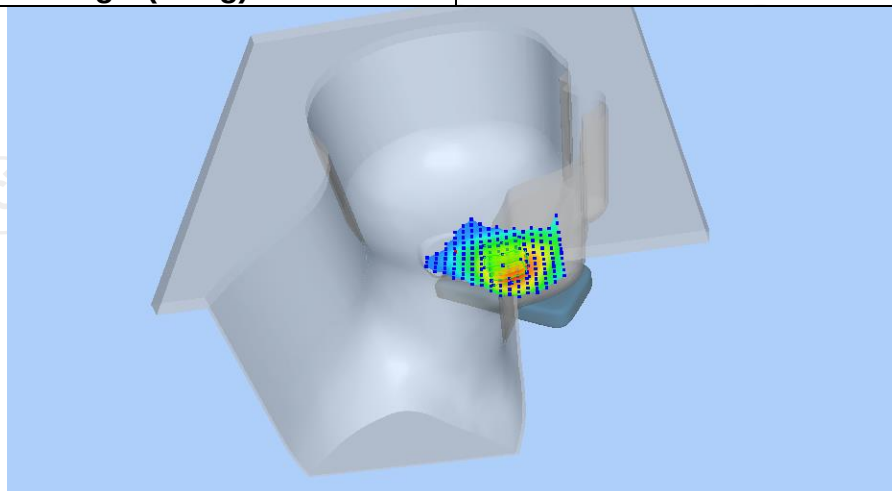
Maximum location: X=-50.00, Y=-39.00 SAR Peak: 0.14 W/kg

SAR 10g (W/Kg)

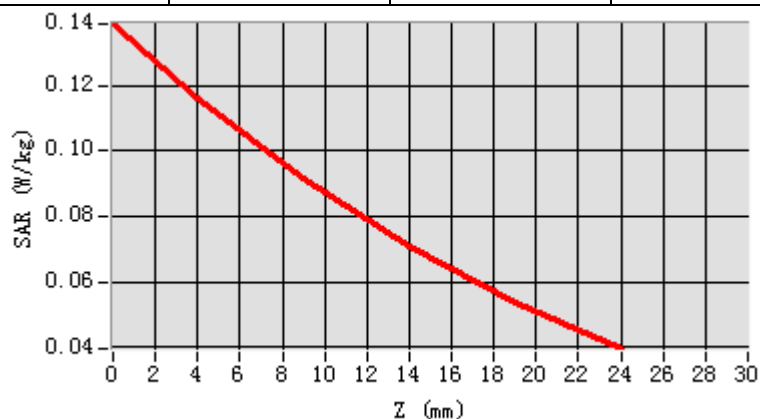
0.081643

SAR 1g (W/Kg)

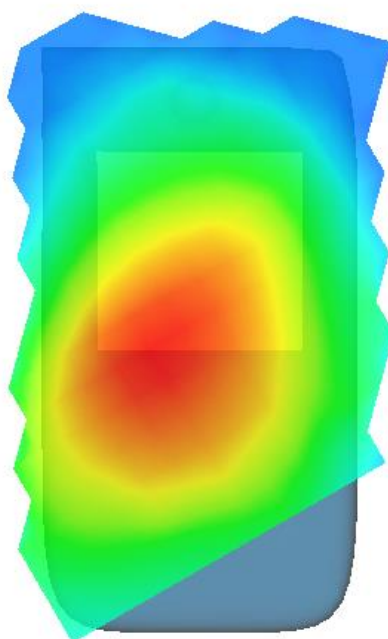
0.113733



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1390	0.1162	0.0916	0.0710	0.0539



Hot spot position



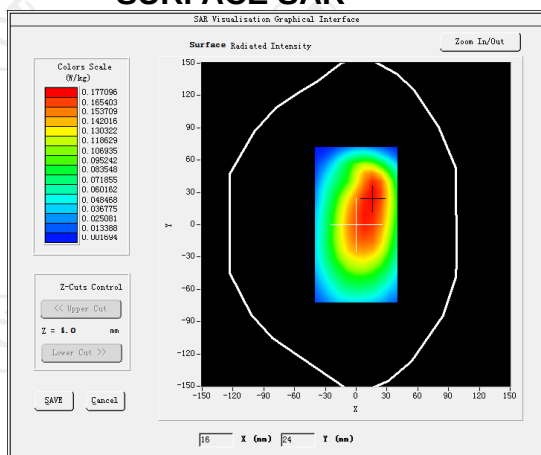
MEASUREMENT 2

Hight Band SAR (Channel 23800):

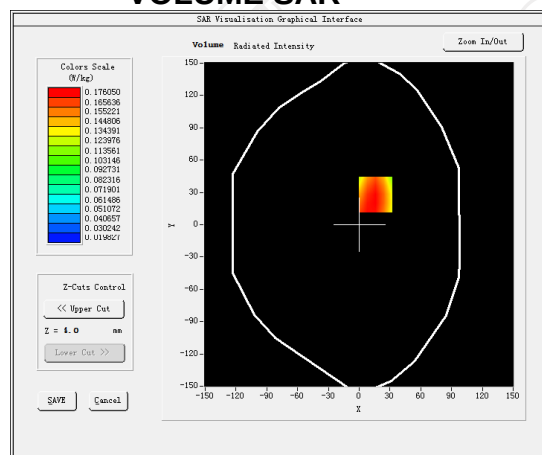
Date: 10/17/2022

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	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-open(10mm)
Band	LTE band 17(1 RB#24)

SURFACE SAR



VOLUME SAR



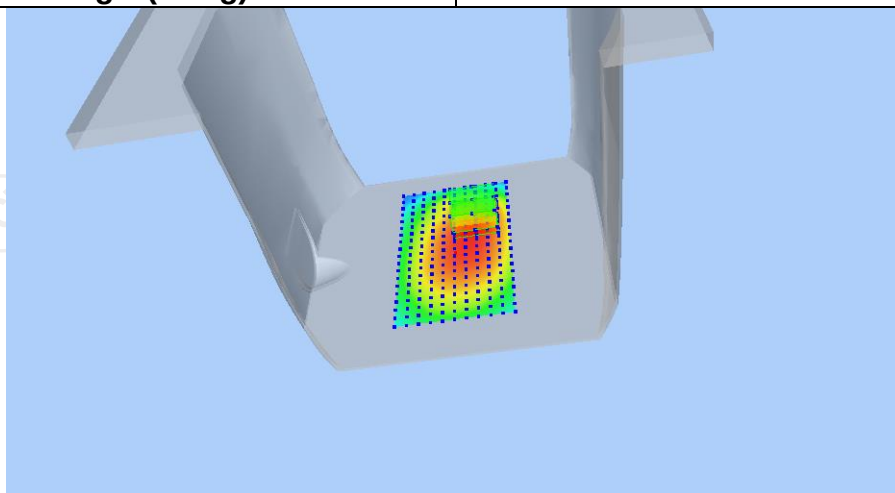
Maximum location: X=16.00, Y=28.00 SAR Peak: 0.23 W/kg

SAR 10g (W/Kg)

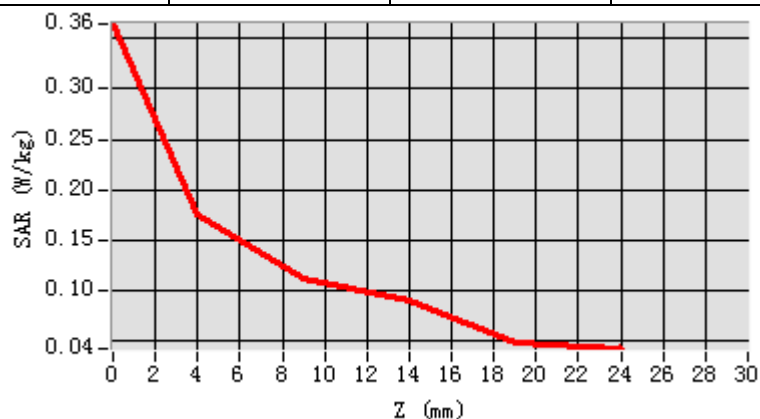
0.122715

SAR 1g (W/Kg)

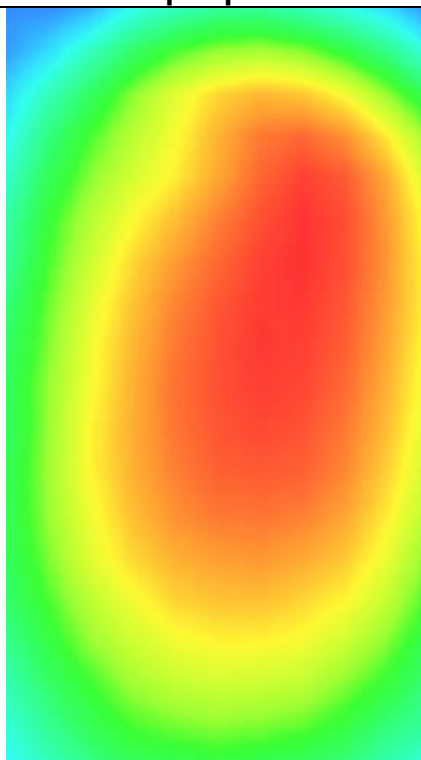
0.180877



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



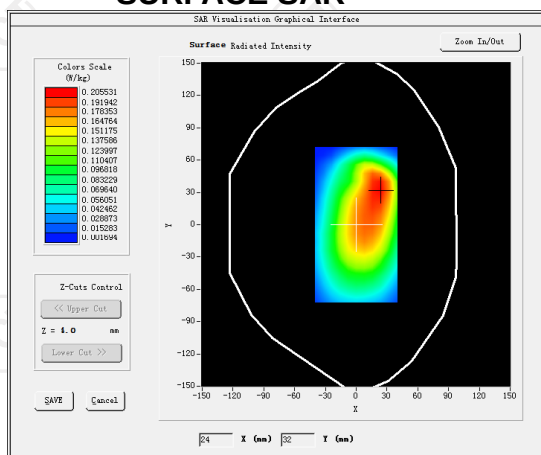
MEASUREMENT 3

Hight Band SAR (Channel 23800):

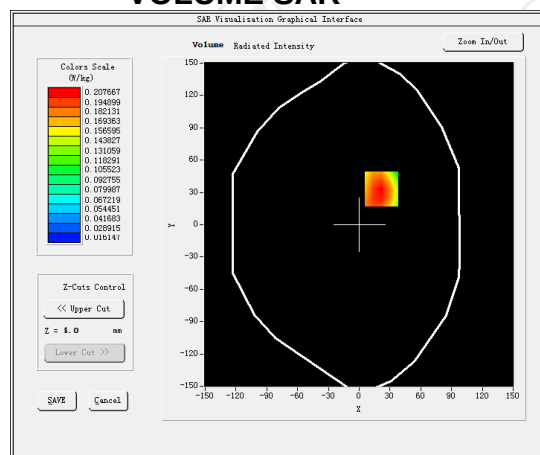
Date: 10/17/2022

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	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(hotspot 10mm)
Band	LTE band 17(1 RB#0)

SURFACE SAR



VOLUME SAR



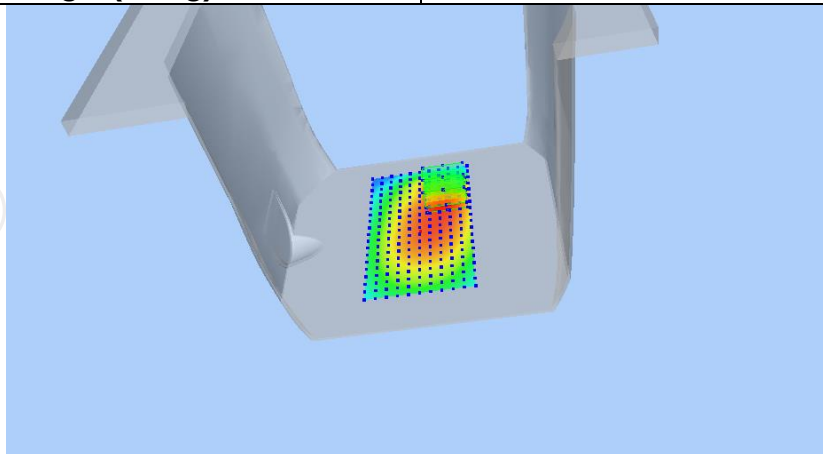
Maximum location: X=22.00, Y=33.00 SAR Peak: 0.29 W/kg

SAR 10g (W/Kg)

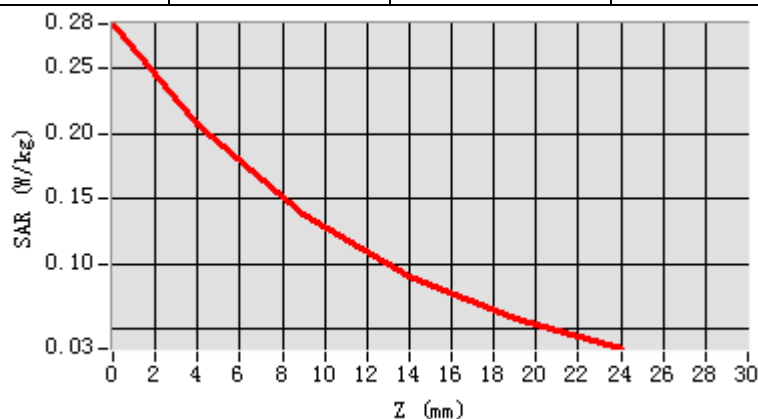
0.138321

SAR 1g (W/Kg)

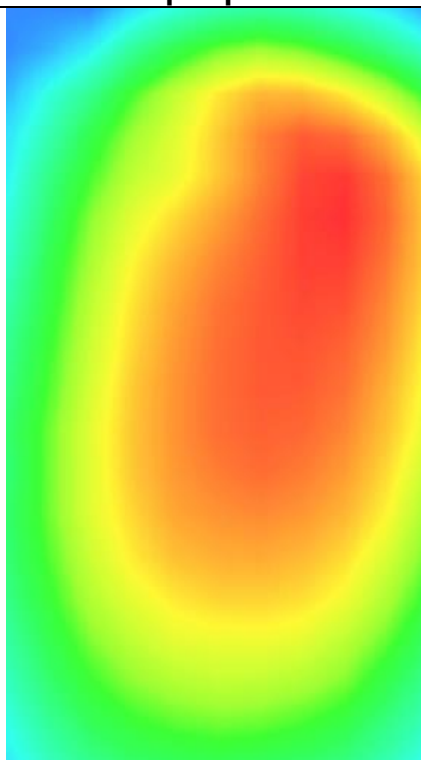
0.211390



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2842	0.2077	0.1378	0.0901	0.0578



Hot spot position



WLAN 2.4G

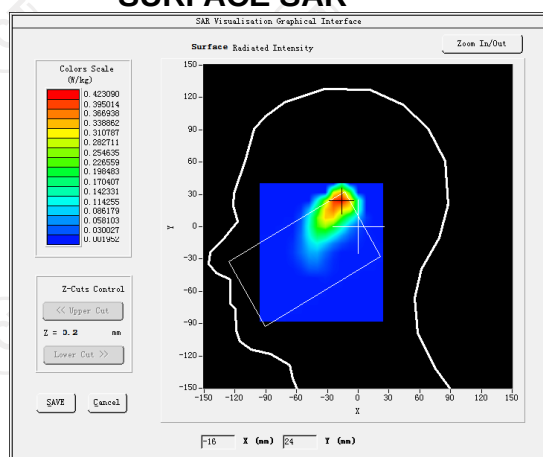
MEASUREMENT 1

Hight Band SAR (Channel 11):

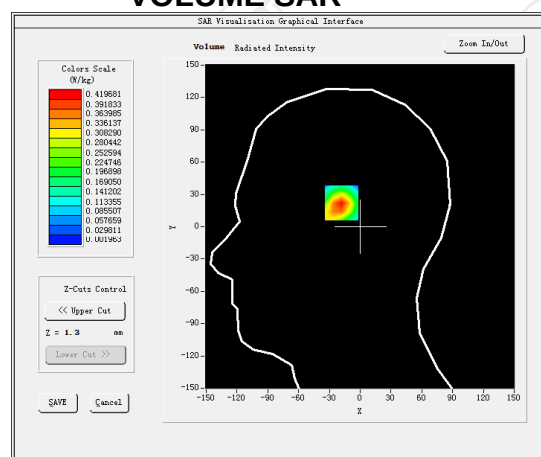
Date: 10/26/2022

Frequency (MHz)	2462.000000
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	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 802.11b ISM

SURFACE SAR

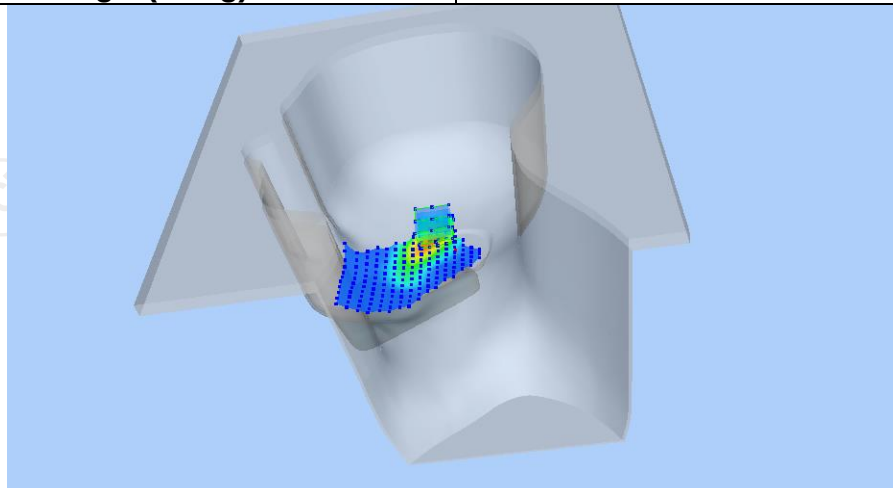


VOLUME SAR

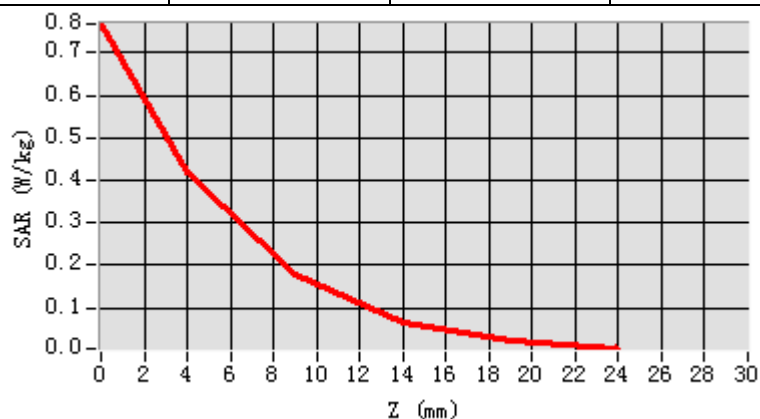


Maximum location: X=-17.00, Y=24.00 SAR Peak: 0.78 W/kg

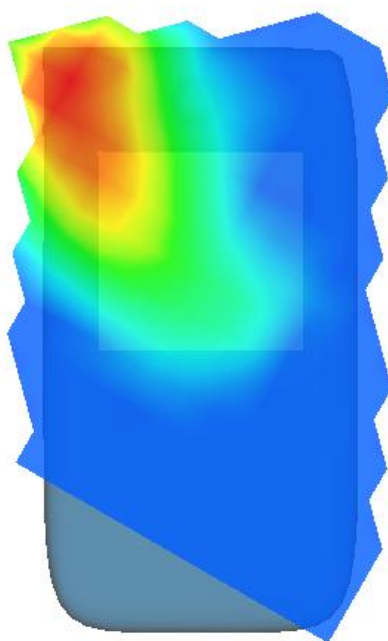
SAR 10g (W/Kg)	0.080066
SAR 1g (W/Kg)	0.255053



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



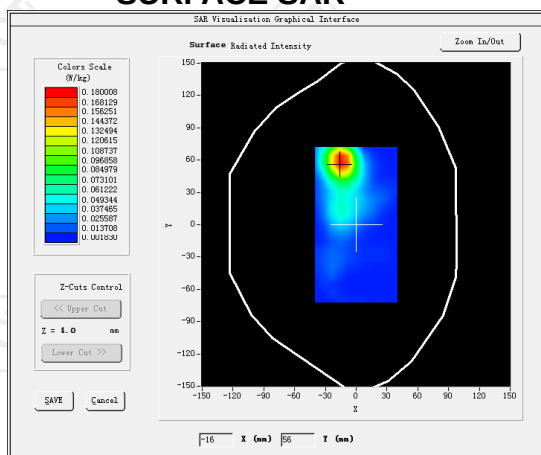
MEASUREMENT 2

Hight Band SAR (Channel 11):

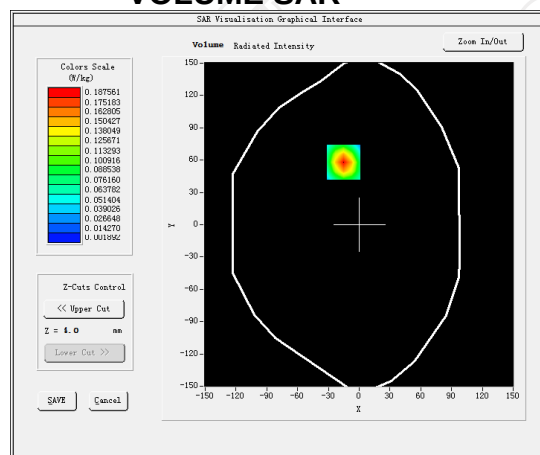
Date: 10/26/2022

Frequency (MHz)	2462.000000
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	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-open(10mm)
Band	IEEE 802.11b ISM

SURFACE SAR

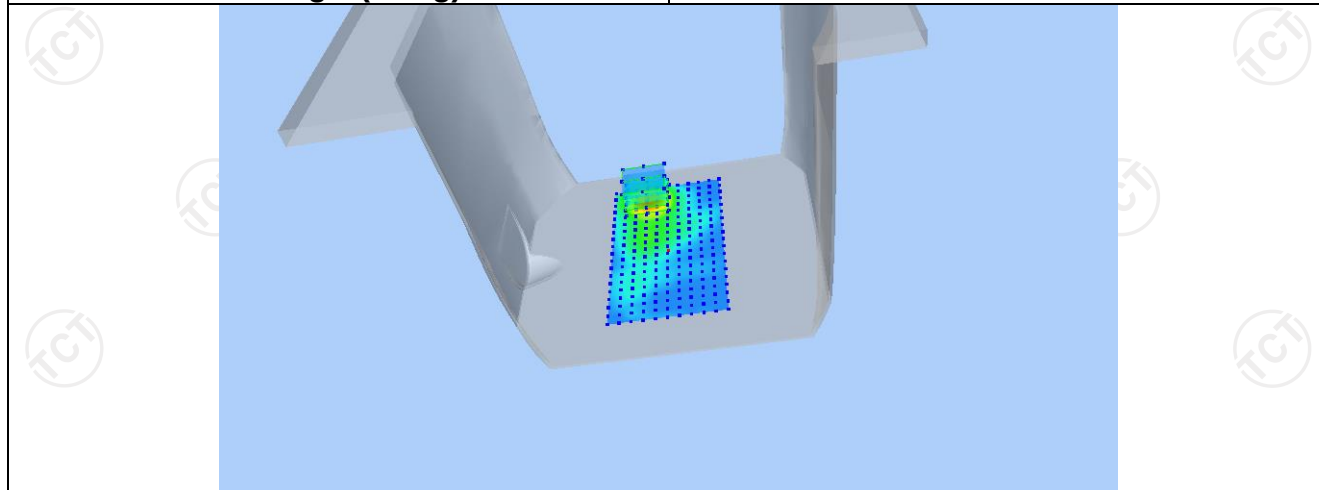


VOLUME SAR

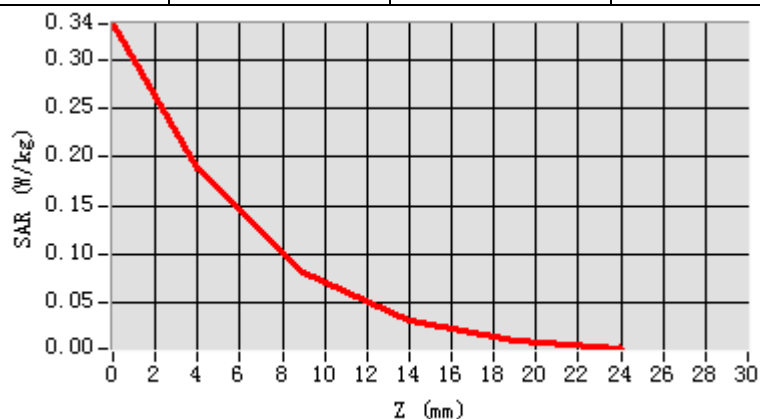


Maximum location: X=-15.00, Y=58.00 SAR Peak: 0.34 W/kg

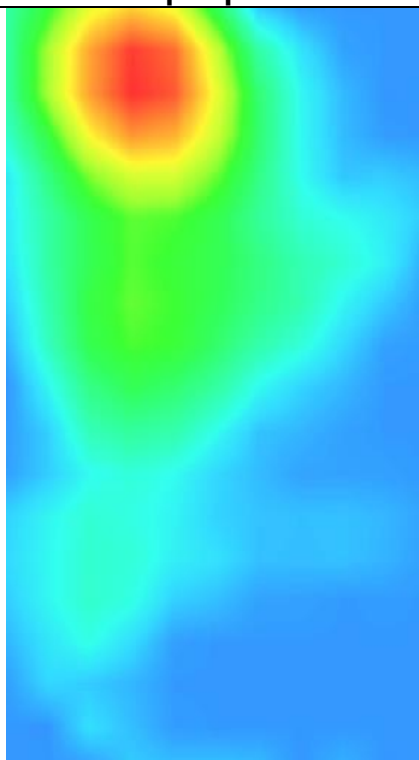
SAR 10g (W/Kg)	0.077530
SAR 1g (W/Kg)	0.293292



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



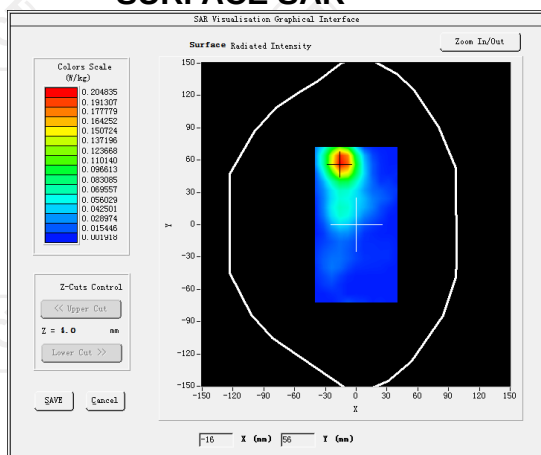
MEASUREMENT 3

Hight Band SAR (Channel 11):

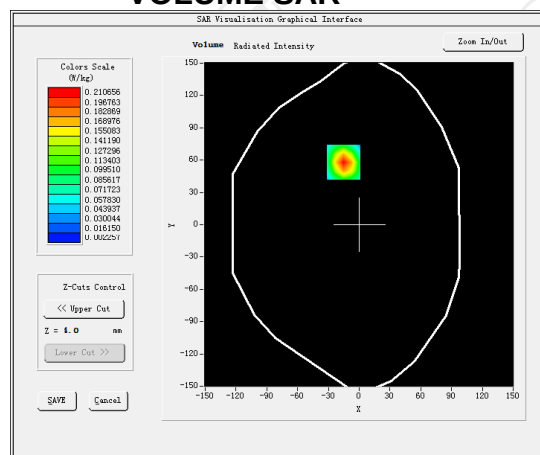
Date: 10/26/2022

Frequency (MHz)	2462.000000
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	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-open(10mm)
Band	IEEE 802.11b ISM(hotspot)

SURFACE SAR

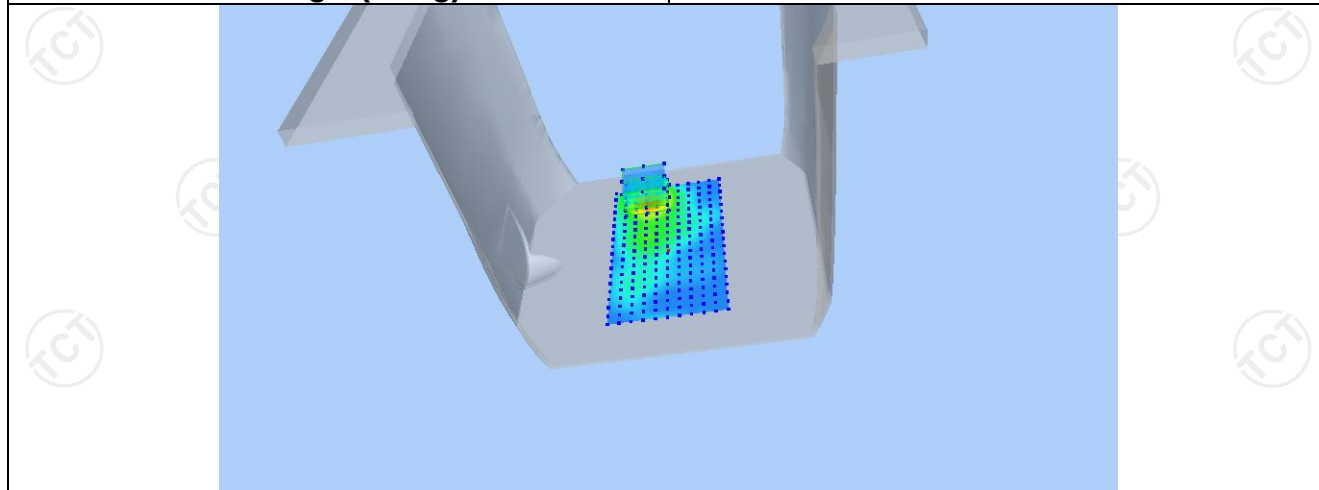


VOLUME SAR

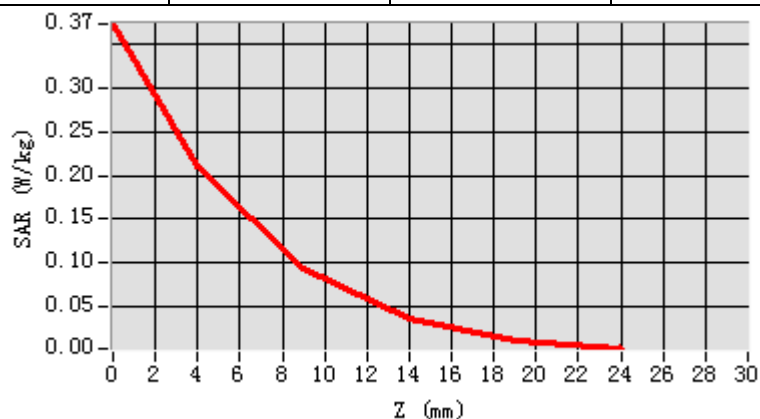


Maximum location: X=-15.00, Y=58.00 SAR Peak: 0.37 W/kg

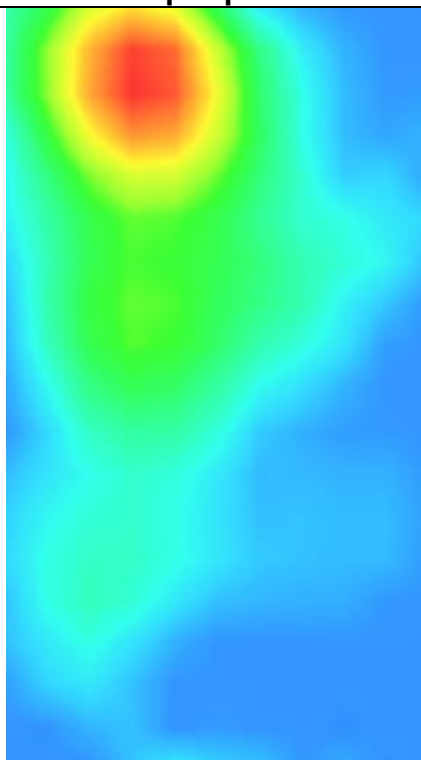
SAR 10g (W/Kg)	0.087182
SAR 1g (W/Kg)	0.323788



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

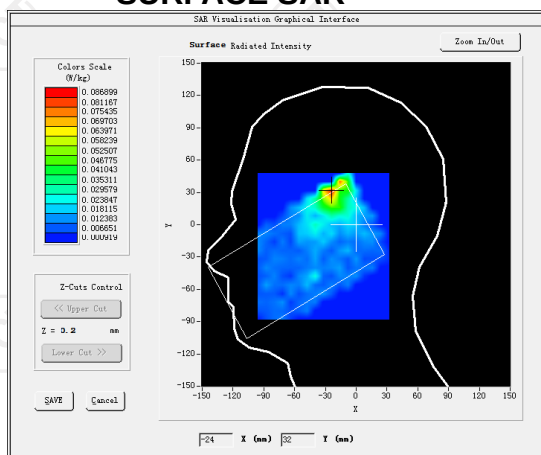
MEASUREMENT 1

SAR (Channel 48):

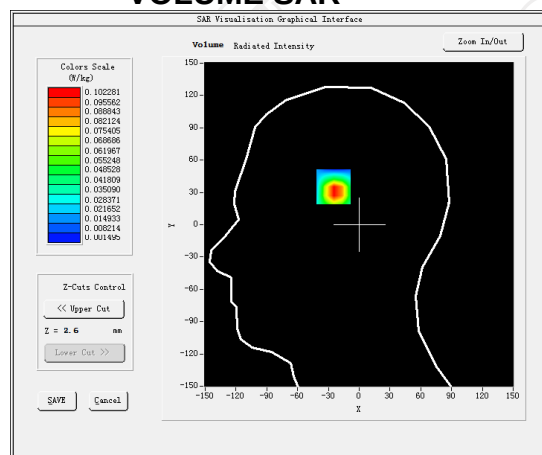
Date: 11/08/2022

Frequency (MHz)	5240.000000
Relative permittivity (real part)	35.068832
Relative permittivity (imaginary part)	13.679428
Conductivity (S/m)	5.220788
Variation (%)	1.210000
Crest Factor	1.0
Probe Conversion factor	2.01
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 HT20 ISM

SURFACE SAR

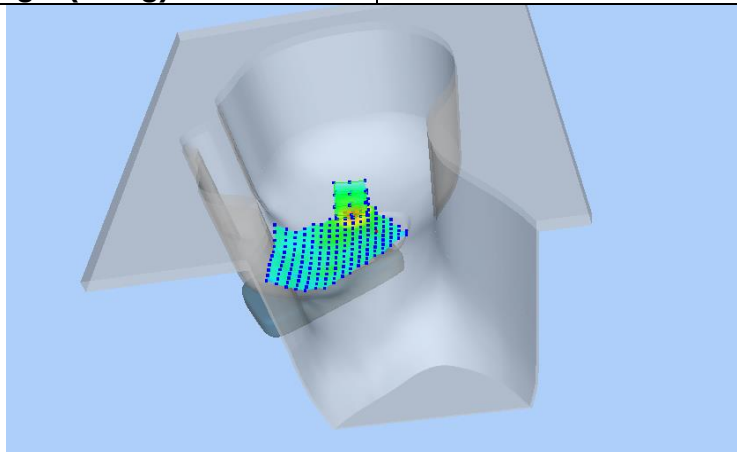


VOLUME SAR

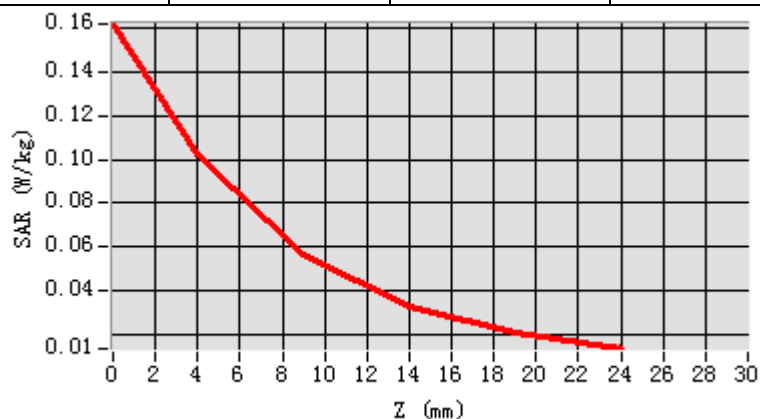


Maximum location: X=-25.00, Y=40.00 SAR Peak: 0.18 W/kg

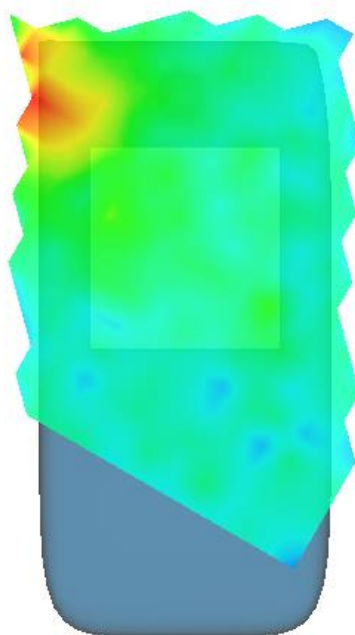
SAR 10g (W/Kg)	0.062740
SAR 1g (W/Kg)	0.133952



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



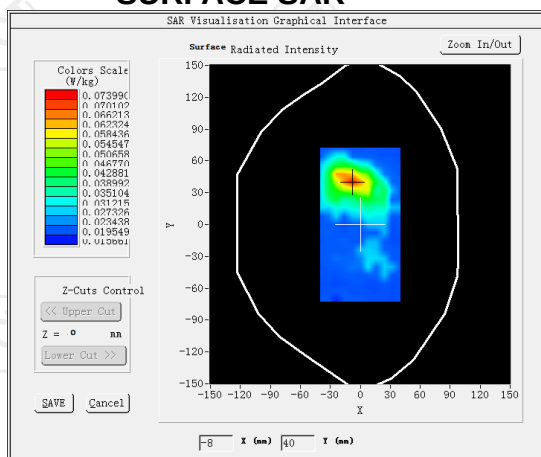
MEASUREMENT 2

SAR (Channel 48):

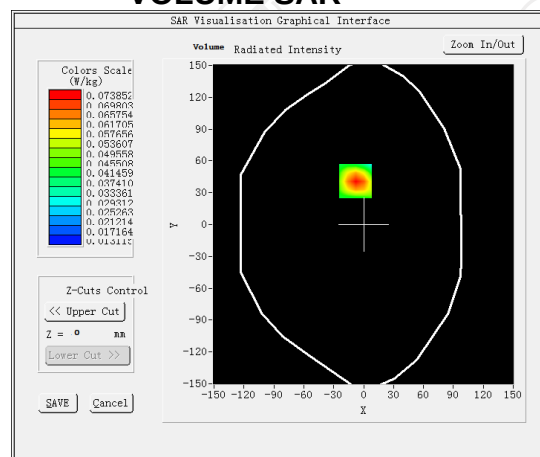
Date: 11/08/2022

Frequency (MHz)	5240.000000
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	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-open(10mm)
Band	IEEE 802.11ac HT20 ISM

SURFACE SAR

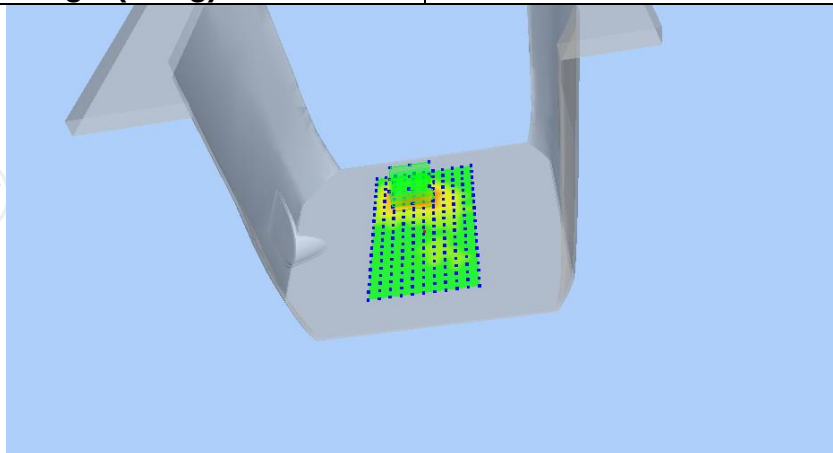


VOLUME SAR

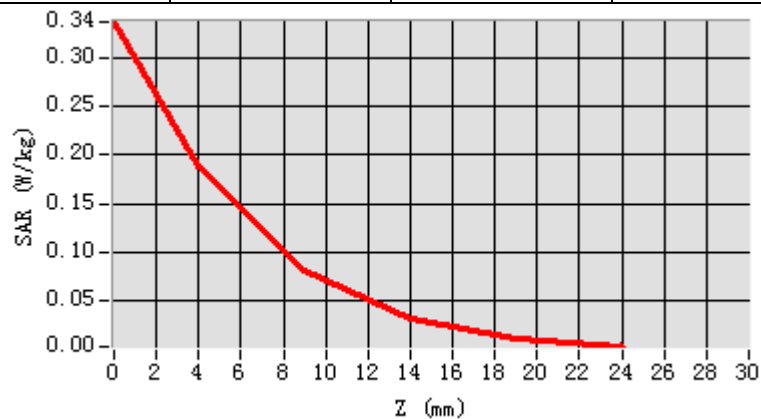


Maximum location: X=16.00, Y=63.00 SAR Peak: 0.10 W/kg

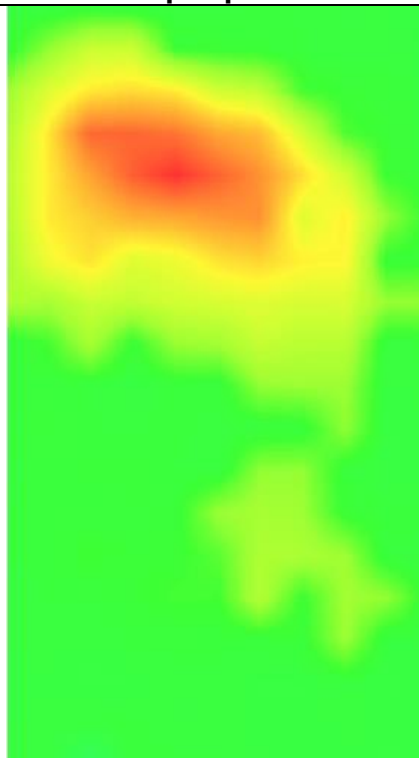
SAR 10g (W/Kg)	0.140642
SAR 1g (W/Kg)	0.238531



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



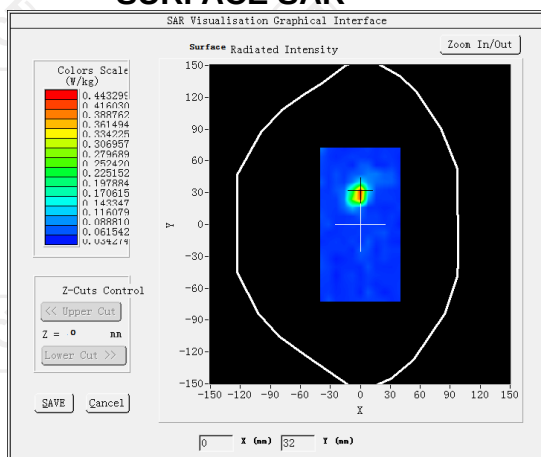
MEASUREMENT 3

SAR (Channel 48):

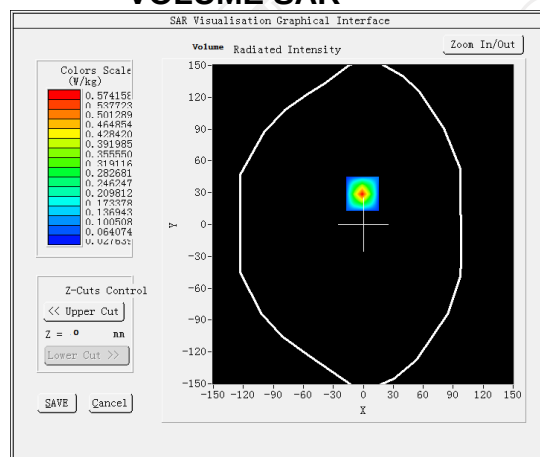
Date: 11/08/2022

Frequency (MHz)	5240.000000
Relative permittivity (real part)	35.068832
Relative permittivity (imaginary part)	13.679428
Conductivity (S/m)	5.220788
Variation (%)	-2.670000
Crest Factor	1.0
Probe Conversion factor	2.01
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	Validation plane
Device Position	Body back-open(10mm)
Band	IEEE 802.11ac HT20 ISM(hotspot)

SURFACE SAR

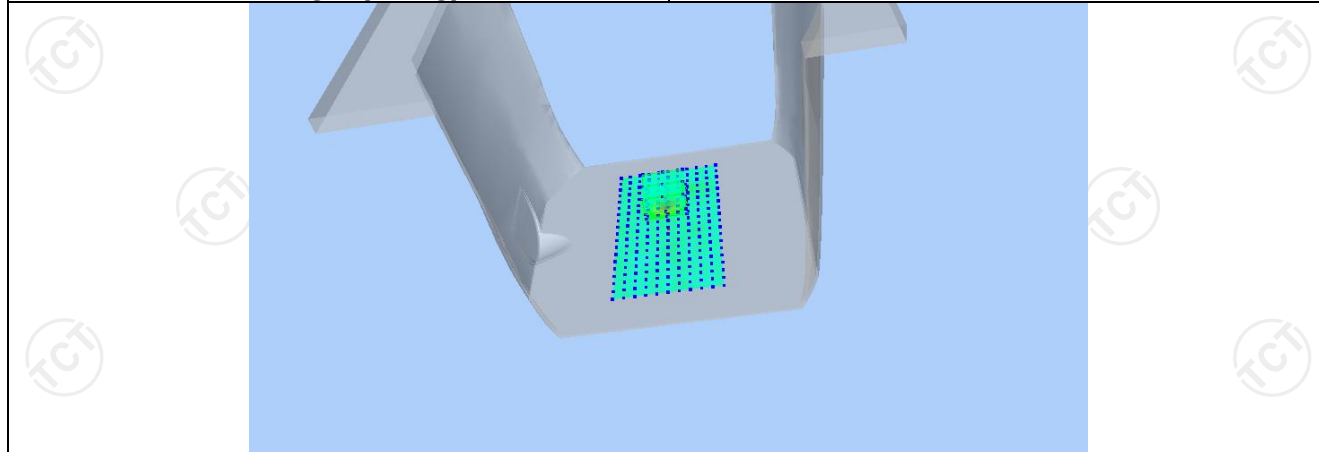


VOLUME SAR

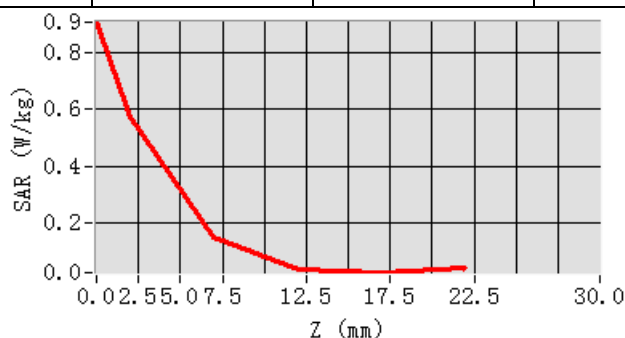


Maximum location: X=-1.00, Y=29.00 SAR Peak: 0.93 W/kg

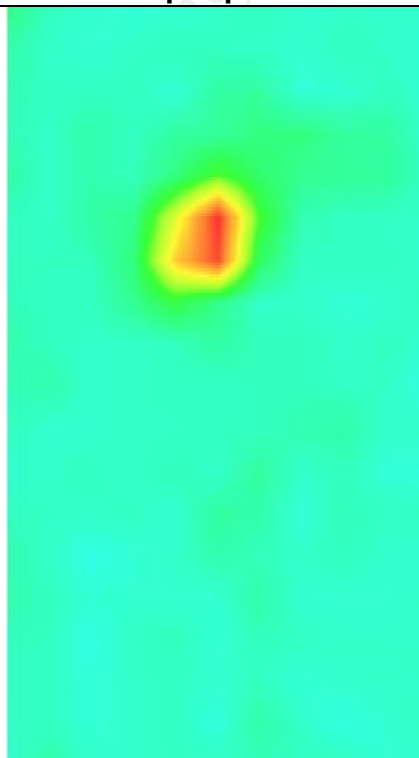
SAR 10g (W/Kg)	0.129222
SAR 1g (W/Kg)	0.257517



Z (mm)	0.00	2.00	7.00	12.00	17.00
SAR (W/Kg)	0.9068	0.5742	0.1505	0.0398	0.0276



Hot spot position



BT

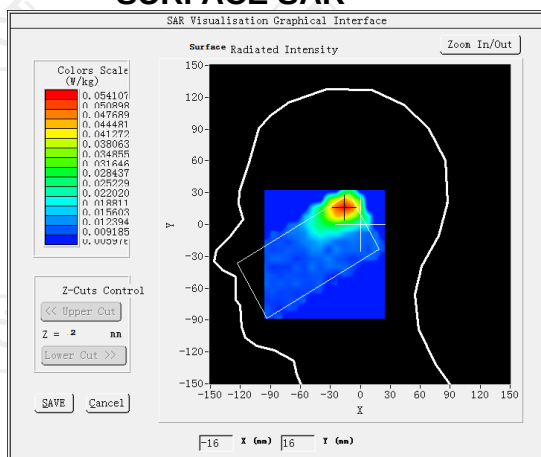
MEASUREMENT 1

Hight Band SAR (Channel 78):

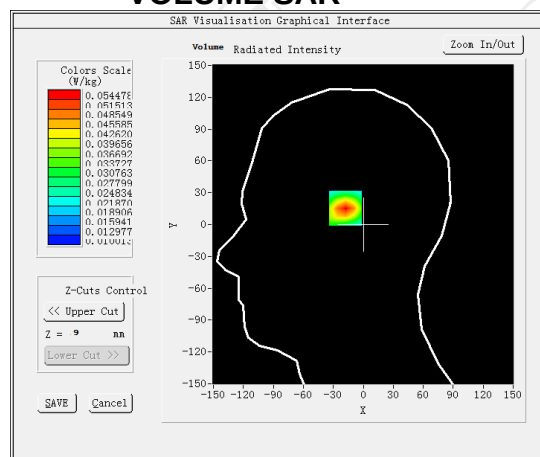
Date: 10/26/2022

Frequency (MHz)	2480.000000
Relative permittivity (real part)	37.821613
Relative permittivity (imaginary part)	13.546980
Conductivity (S/m)	1.834111
Variation (%)	-2.440000
Crest Factor	1.0
Probe Conversion factor	2.31
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	8DPSK

SURFACE SAR

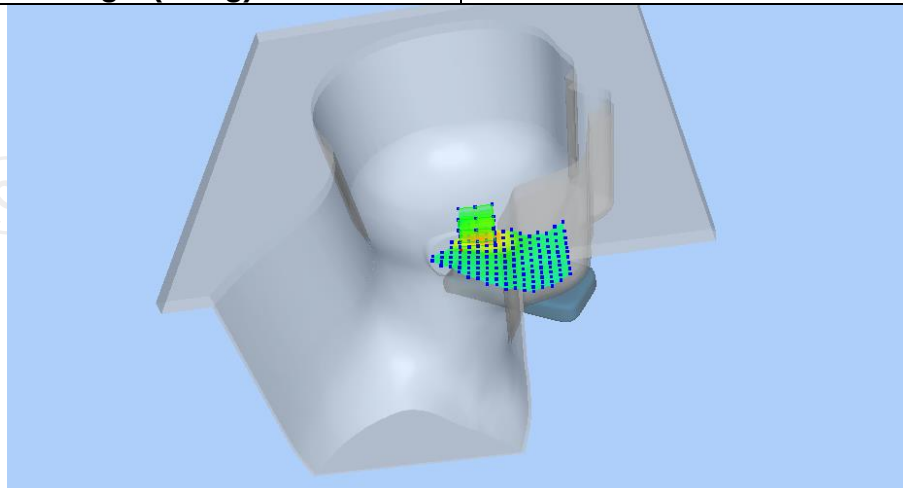


VOLUME SAR

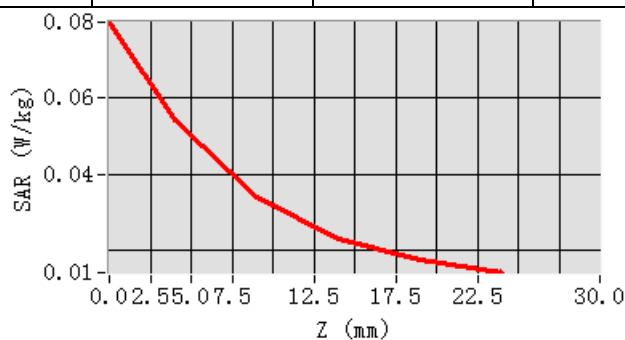


Maximum location: X=-16.00, Y=17.00 SAR Peak: 0.08 W/kg

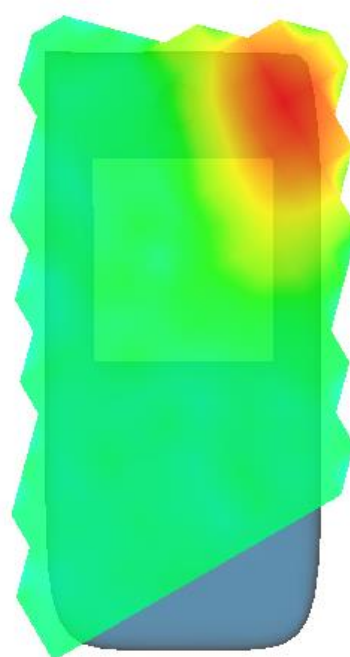
SAR 10g (W/Kg)	0.031752
SAR 1g (W/Kg)	0.051109



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0800	0.0545	0.0342	0.0231	0.0175



Hot spot position



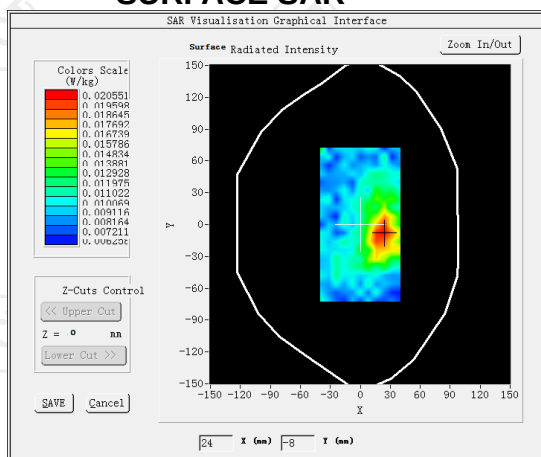
MEASUREMENT 2

Hight Band SAR (Channel 78):

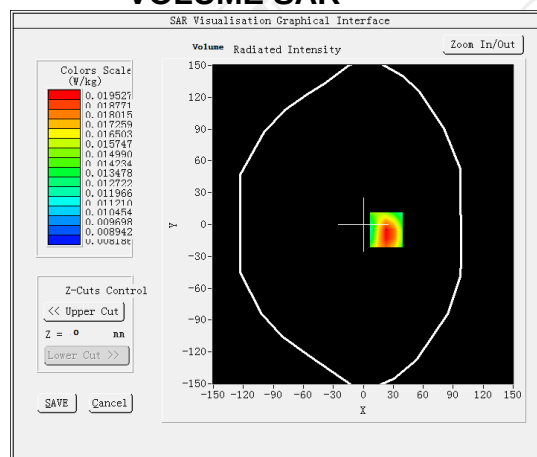
Date: 10/26/2022

Frequency (MHz)	2480.000000
Relative permittivity (real part)	37.821613
Relative permittivity (imaginary part)	13.546980
Conductivity (S/m)	1.834111
Variation (%)	-1.520000
Crest Factor	1.0
Probe Conversion factor	2.31
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	Validation plane
Device Position	Body back-open(10mm)
Band	8DPSK

SURFACE SAR

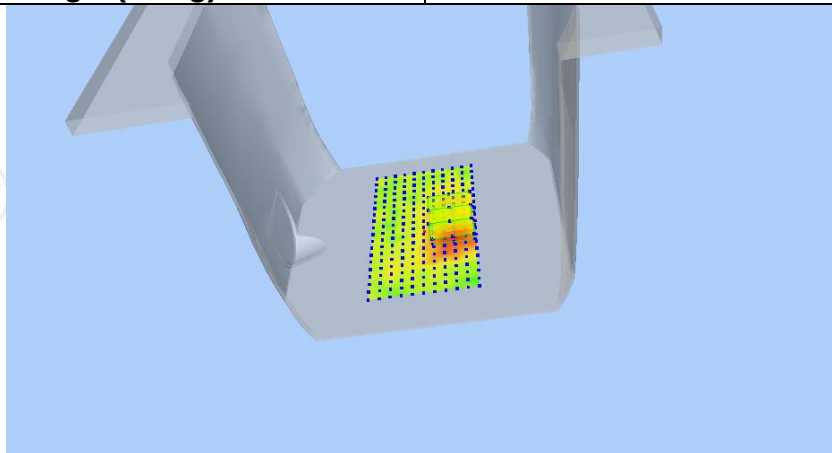


VOLUME SAR

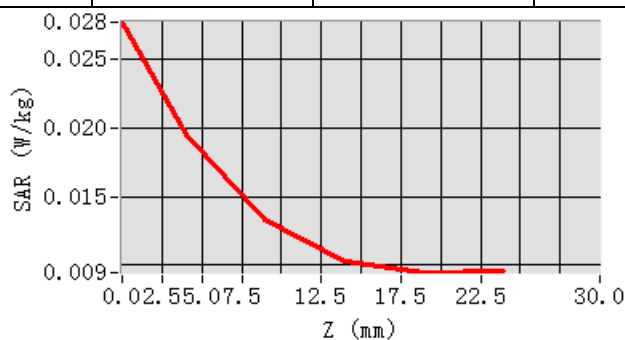


Maximum location: X=23.00, Y=-5.00 SAR Peak: 0.03 W/kg

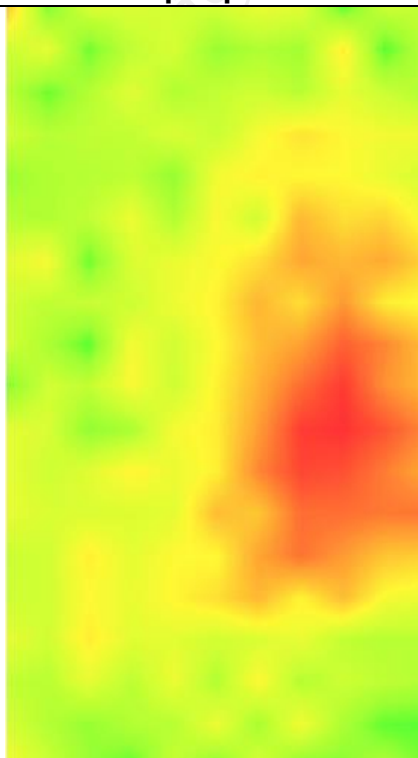
SAR 10g (W/Kg)	0.013832
SAR 1g (W/Kg)	0.019946



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0277	0.0195	0.0133	0.0103	0.0095



Hot spot position



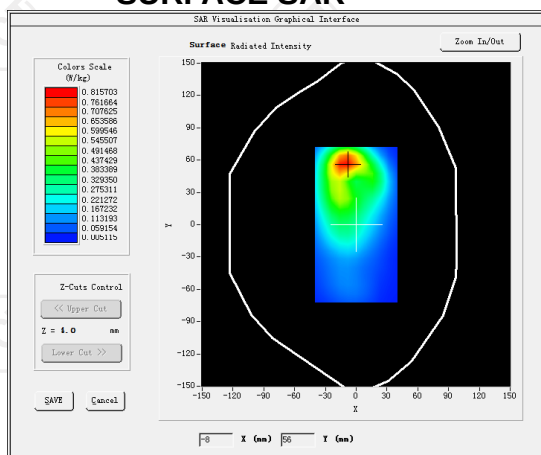
MEASUREMENT 3

Hight Band SAR (Channel 78):

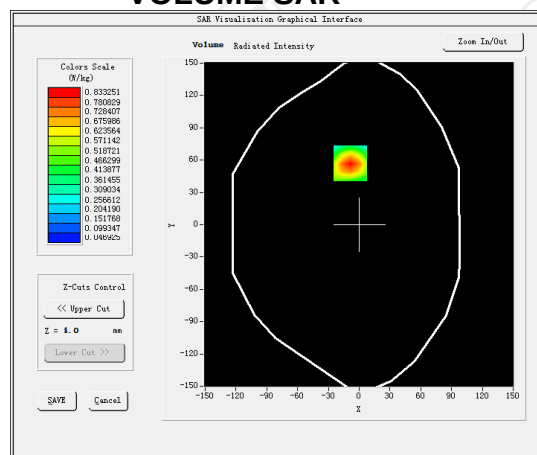
Date: 10/26/2022

Frequency (MHz)	2480.000000
Relative permittivity (real part)	37.821613
Relative permittivity (imaginary part)	13.546980
Conductivity (S/m)	1.834111
Variation (%)	-1.570000
Crest Factor	1.0
Probe Conversion factor	2.37
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-open(10mm)
Band	<u>8DPSK (hotspot)</u>

SURFACE SAR

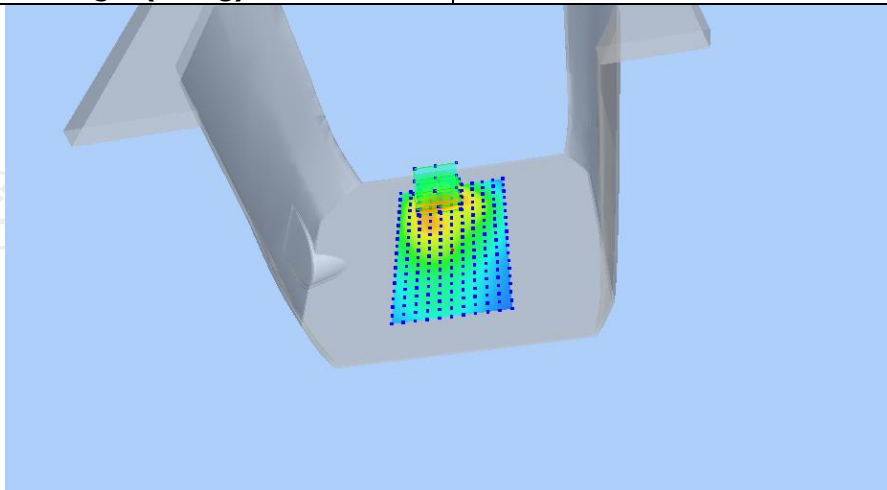


VOLUME SAR

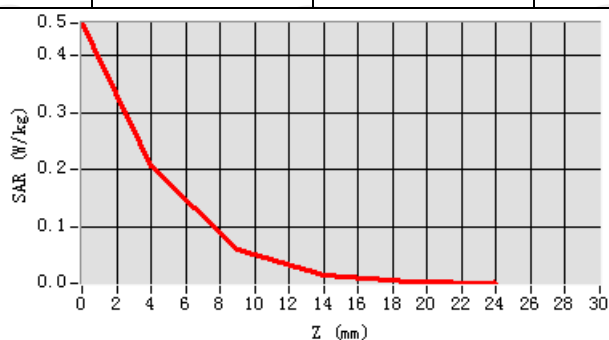


Maximum location: X=8.00, Y=-7.00 SAR Peak: 0.48 W/kg

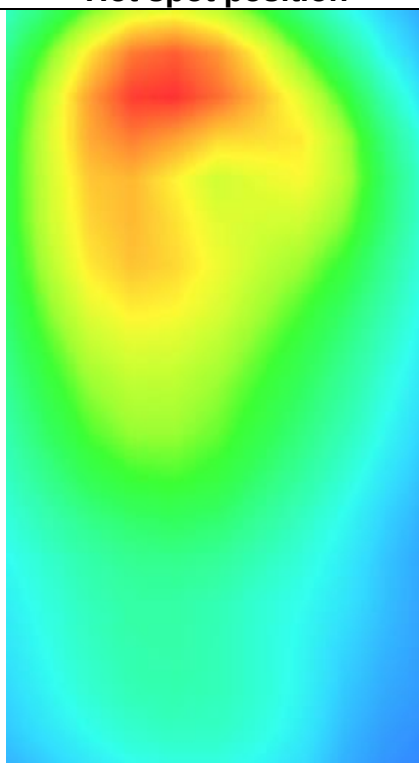
SAR 10g (W/Kg)	0.053679
SAR 1g (W/Kg)	0.040945



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4557	0.2059	0.0618	0.0155	0.0049



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)

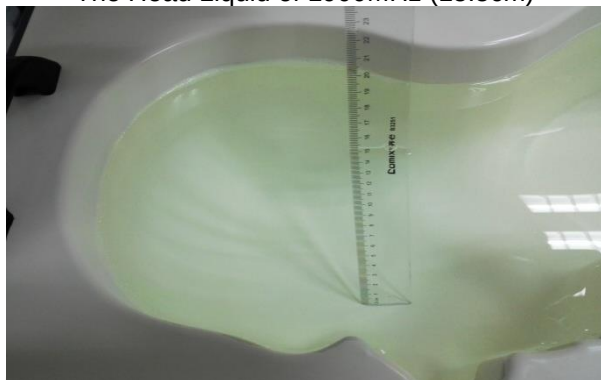
The Body Liquid of 5000-6000MHz (16.5cm)



The Head Liquid of 1900MHz (15.5cm)



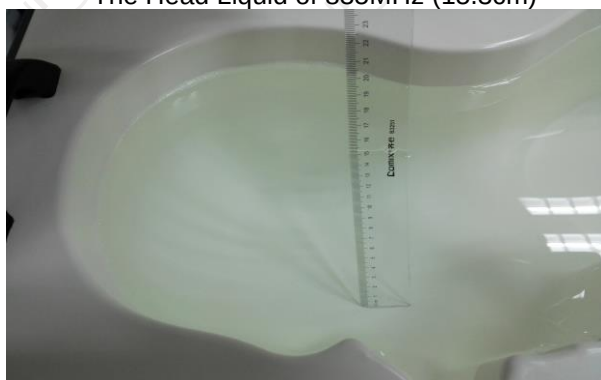
The Head Liquid of 2450MHz (15.6cm)



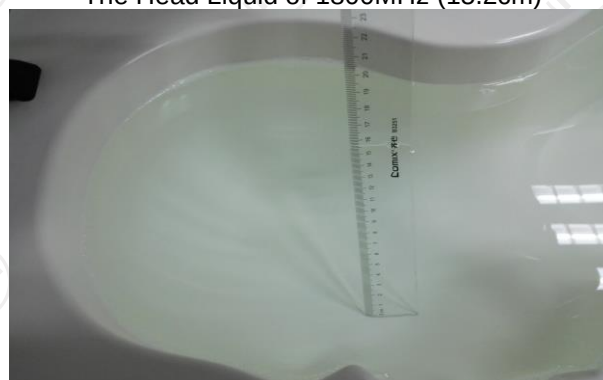
The Head Liquid of 835MHz (15.3cm)



The Head Liquid of 1800MHz (15.2cm)



The Head Liquid of 2600MHz (15.1cm)



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

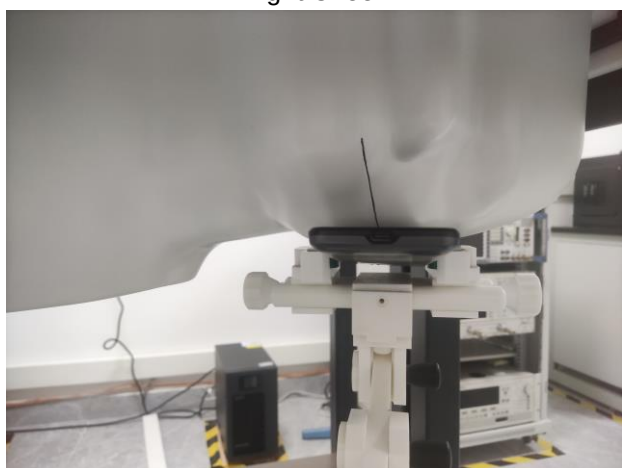
Appendix B: Test Setup Photos



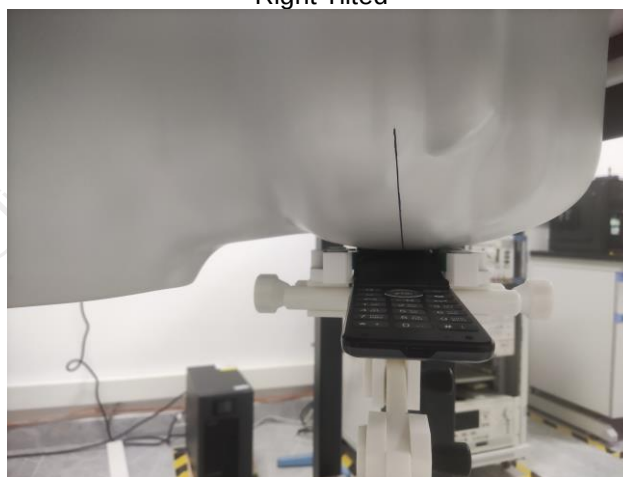
Right Cheek



Right Tilted



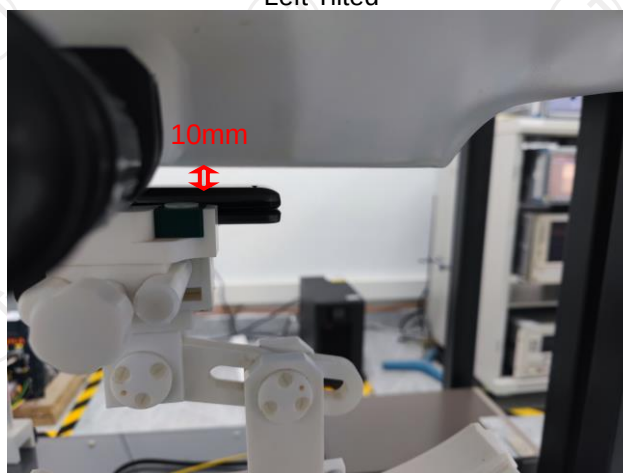
Left Cheek



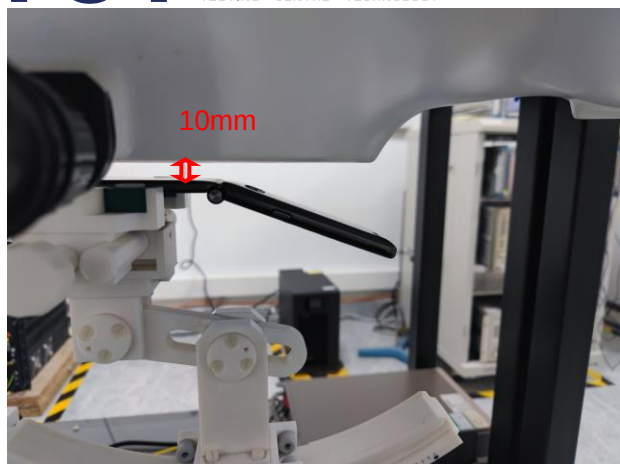
Left Tilted



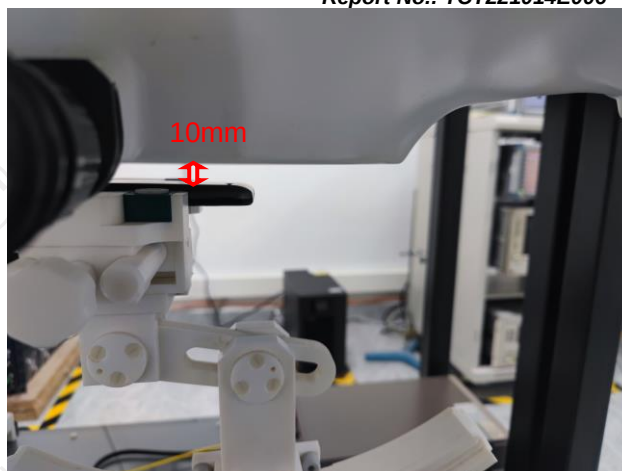
Body worn – Front close (10mm)



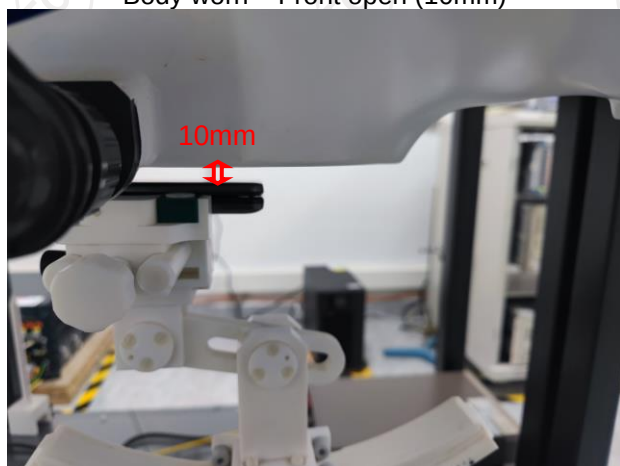
Body worn – Back close (10mm)



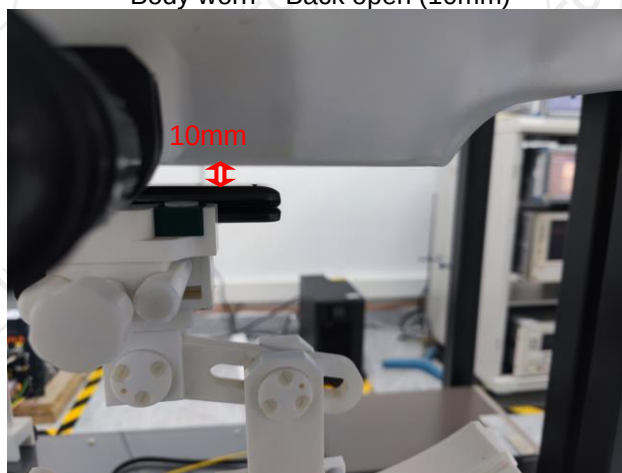
Body worn – Front open (10mm)



Body worn – Back open (10mm)



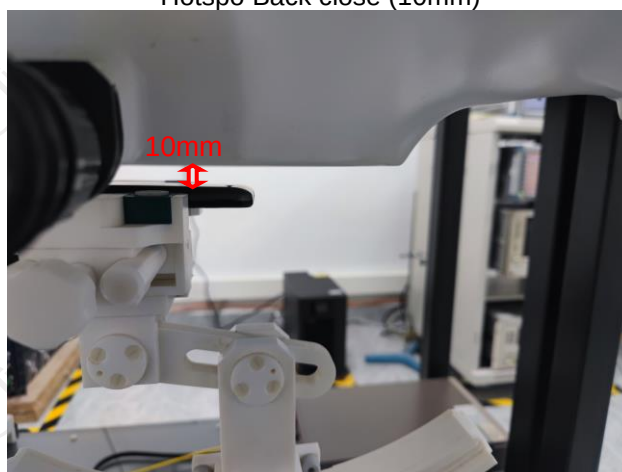
Hotspo Front close (10mm)



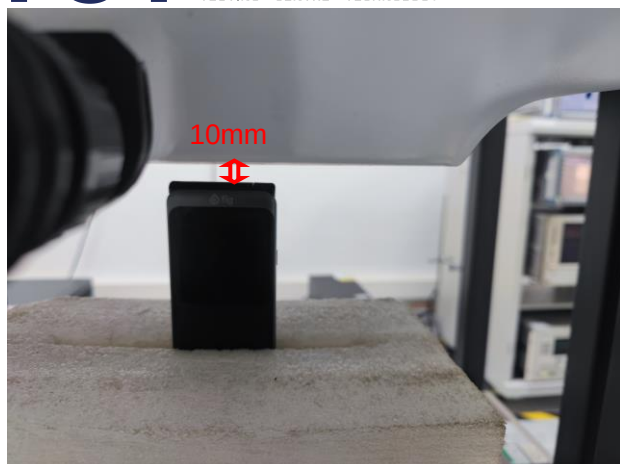
Hotspo Back close (10mm)



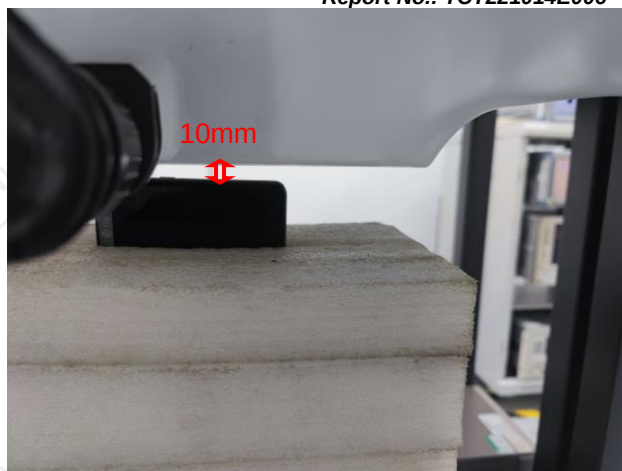
Hotspo Front open (10mm)



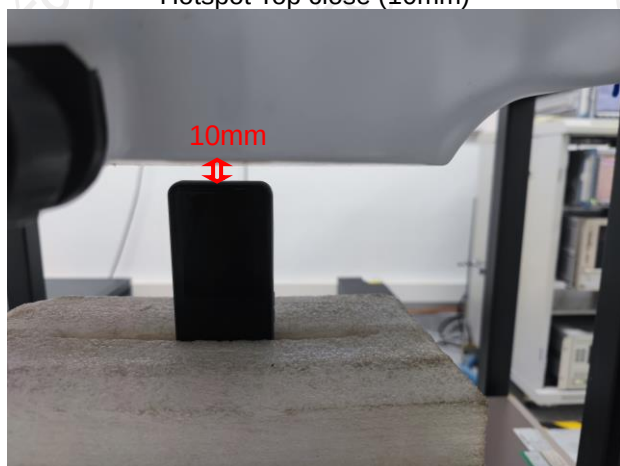
Hotspo Back open (10mm)



Hotspot Top close (10mm)



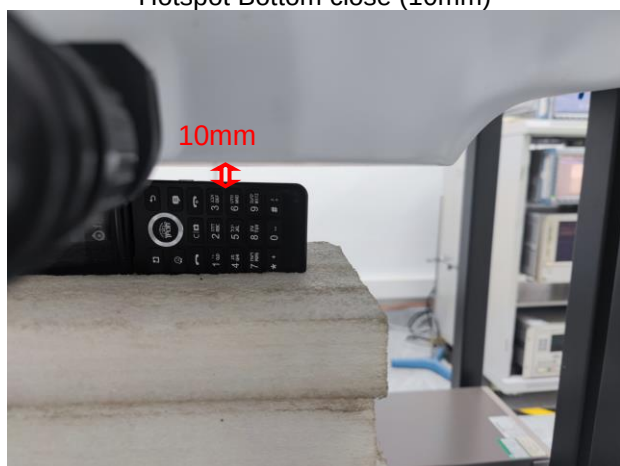
Hotspot Right close (10mm)



Hotspot Bottom close (10mm)



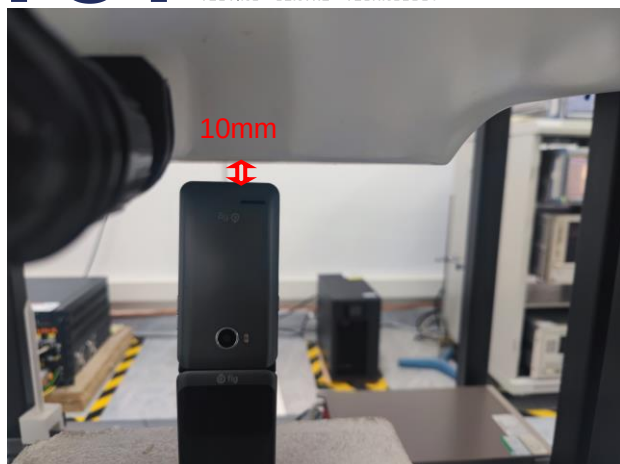
Hotspot Left close (10mm)



Hotspot Right open (10mm)



Hotspot Left open (10mm)



Hotspot Bottom open (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: 10/08/2022



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	10/08/2022	<i>JS</i>
Checked by :	Jérôme LUC	Technical Manager	10/08/2022	<i>JS</i>
Approved by :	Yann Toutain	Laboratory Director	10/11/2022	<i>Yann Toutain</i>

	Customer Name
Distribution :	SHENHEN TCT TESTING TECHNOLOGY CO., LTD

Issue	Name	Date	Modifications
A	Jérôme LUC	10/11/2022	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.

Page: 4/10

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

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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:

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

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.



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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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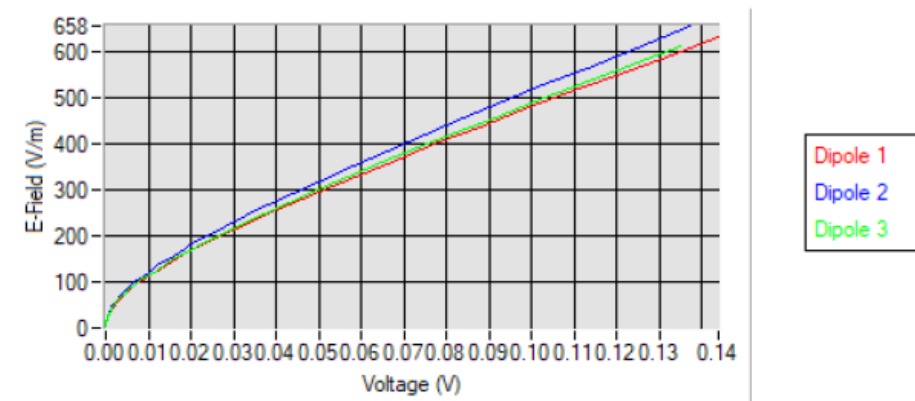
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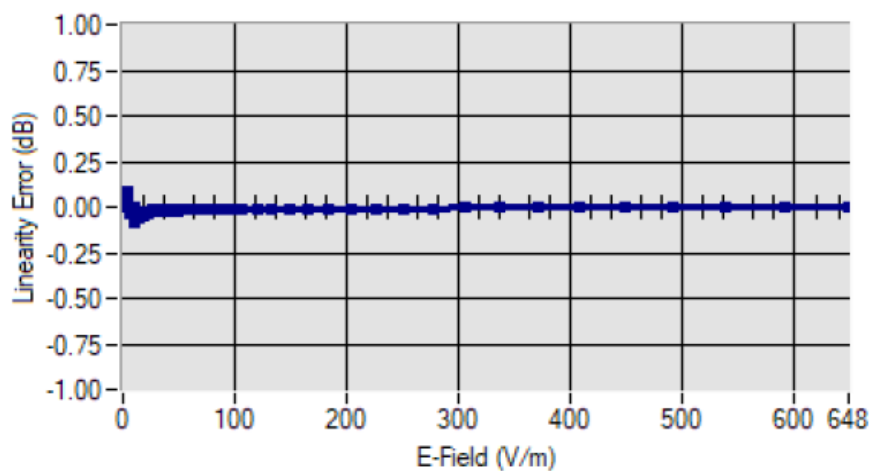
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Calibration curves



5.2 LINEARITY

Linearity



Linearity: +/- 1.97% (+/- 0.09dB)