

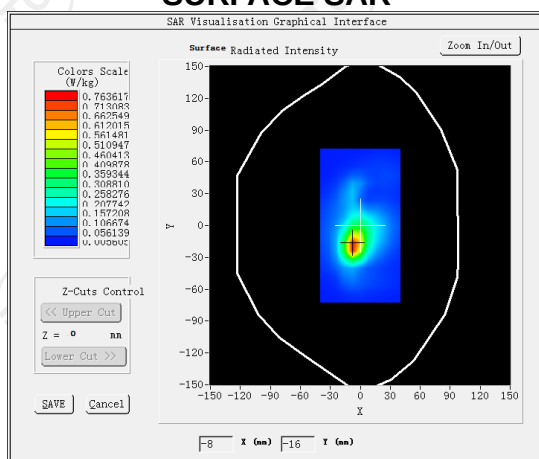
WCDMA Band II MEASUREMENT 1

Middle Band SAR (Channel 9400): Date: 10/27/2022

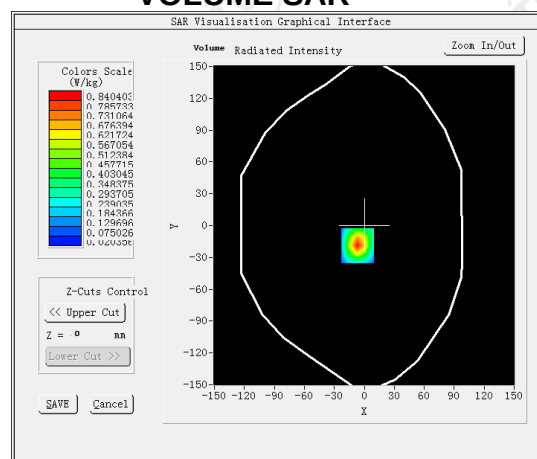
Frequency (MHz)	1880.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.408000
Conductivity (S/m)	1.400391
Variation (%)	0.080000
Crest Factor	1.0
Probe Conversion factor	2.23
E-Field Probe:	SSE2 (SN 36/20 EPGO346)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<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	BAND2 WCDMA1900

SURFACE SAR

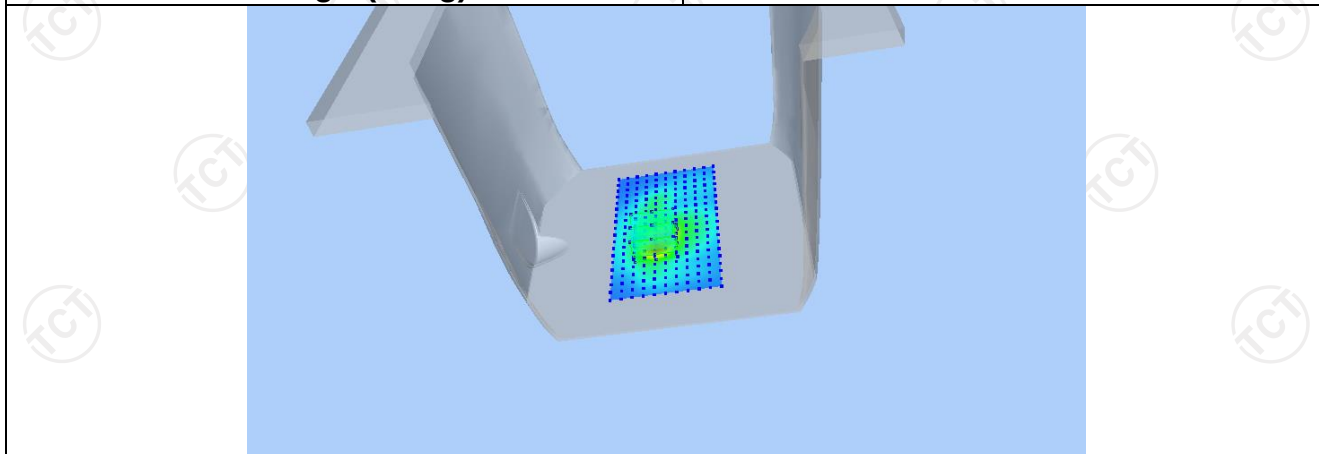


VOLUME SAR

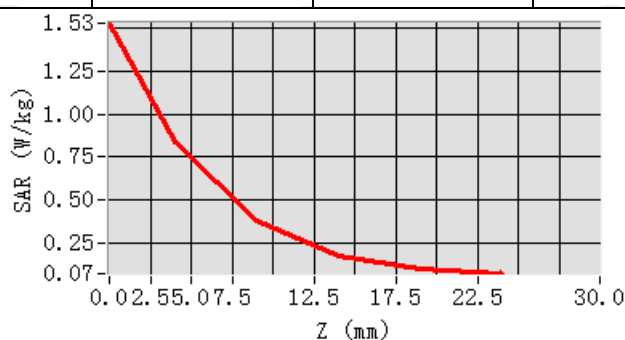


Maximum location: X=-7.00, Y=-19.00 SAR Peak: 1.53 W/kg

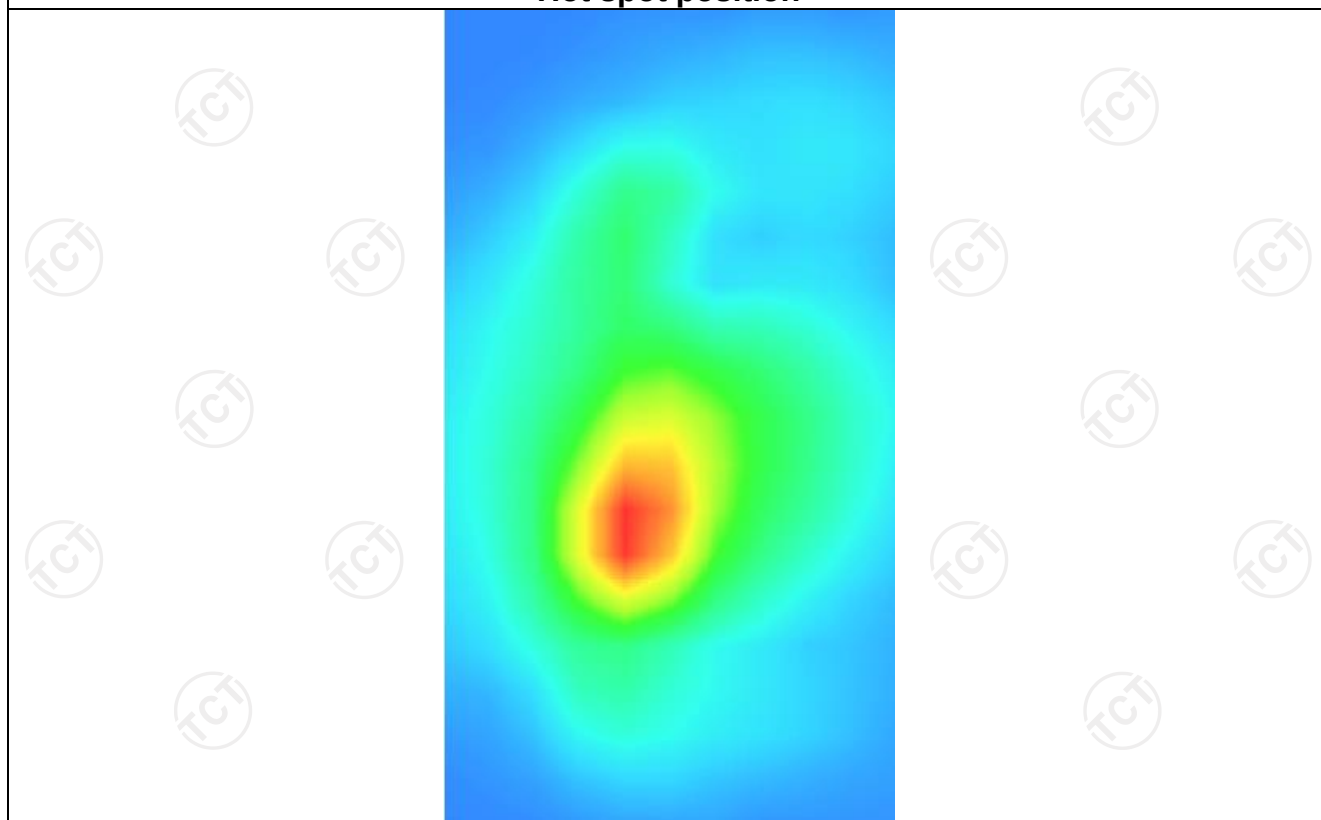
SAR 10g (W/Kg)	0.354008
SAR 1g (W/Kg)	0.770253



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.5266	0.8404	0.3774	0.1776	0.1039



Hot spot position



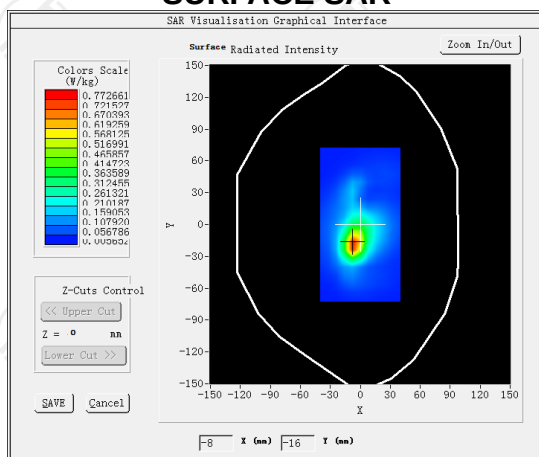
MEASUREMENT 2

Middle Band SAR (Channel 9400):

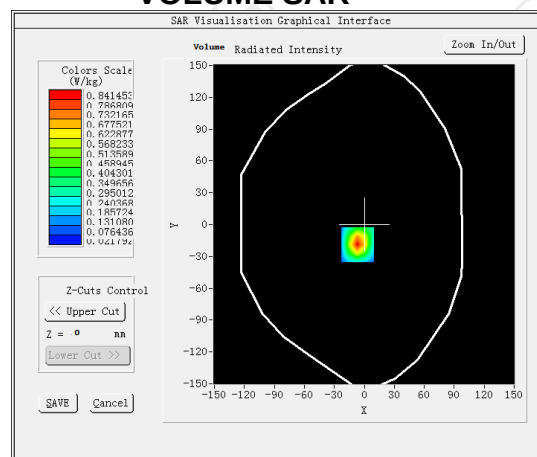
Date: 10/27/2022

Frequency (MHz)	1880.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.408000
Conductivity (S/m)	1.400391
Variation (%)	-0.910000
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(0mm)</u>
Band	<u>BAND2_WCDMA1900(hotspot)</u>

SURFACE SAR

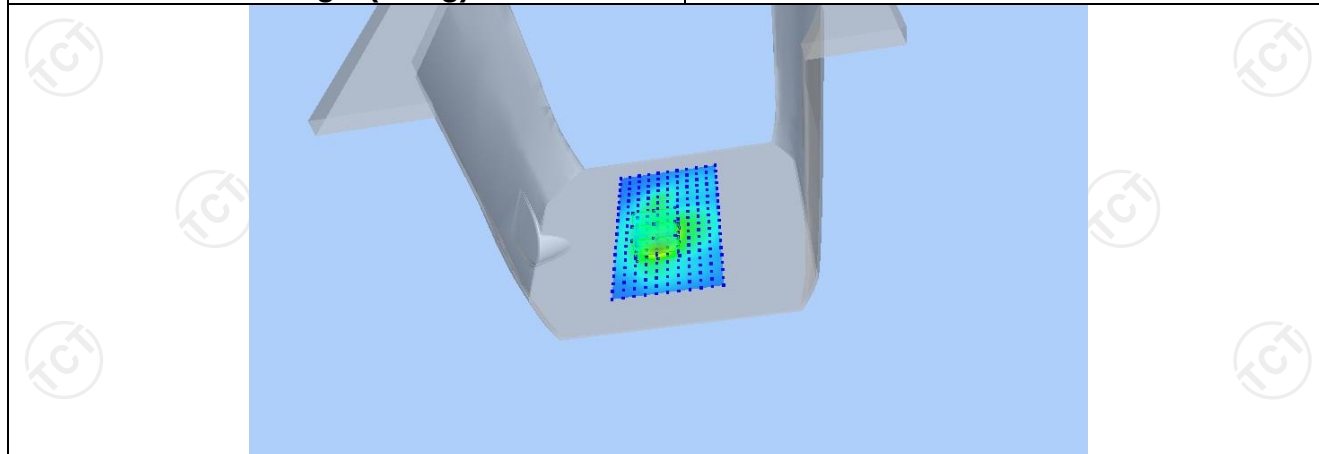


VOLUME SAR

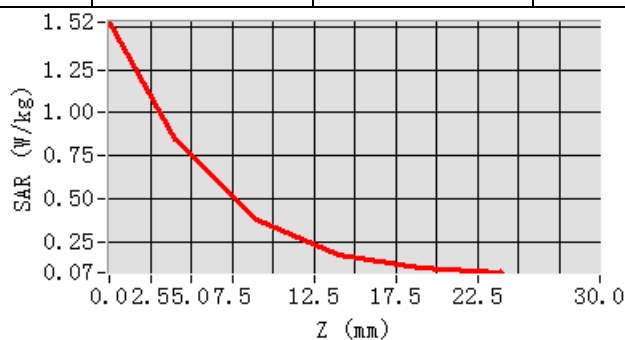


Maximum location: X=-7.00, Y=-19.00 SAR Peak: 1.53 W/kg

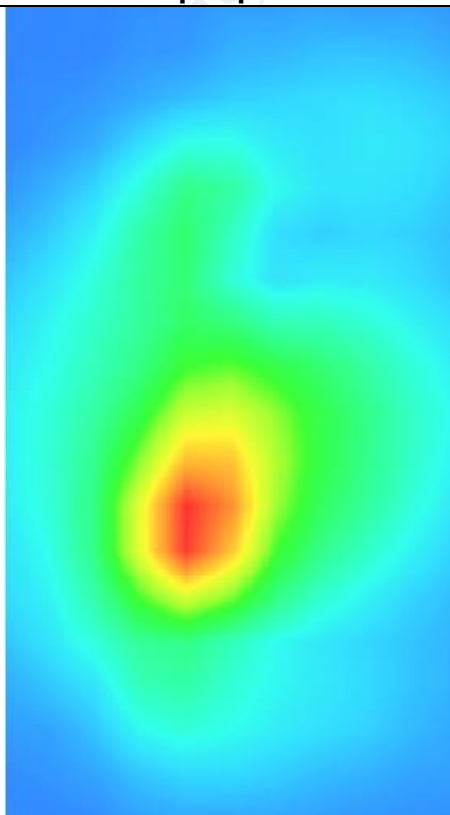
SAR 10g (W/Kg)	0.355557
SAR 1g (W/Kg)	0.771222



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.5248	0.8415	0.3794	0.1792	0.1050



Hot spot position



WCDMA Band IV

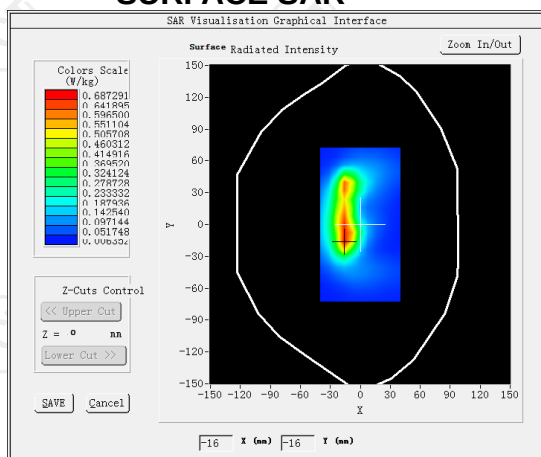
MEASUREMENT 1

Middle Band SAR (Channel 1413):

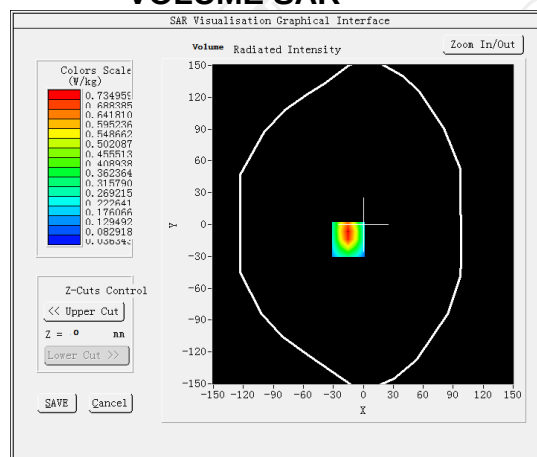
Date: 10/19/2022

Frequency (MHz)	1732.600000
Relative permittivity (real part)	40.116364
Relative permittivity (imaginary part)	14.137455
Conductivity (S/m)	1.360337
Variation (%)	0.830000
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(0mm)
Band	BAND4 WCDMA1700

SURFACE SAR



VOLUME SAR



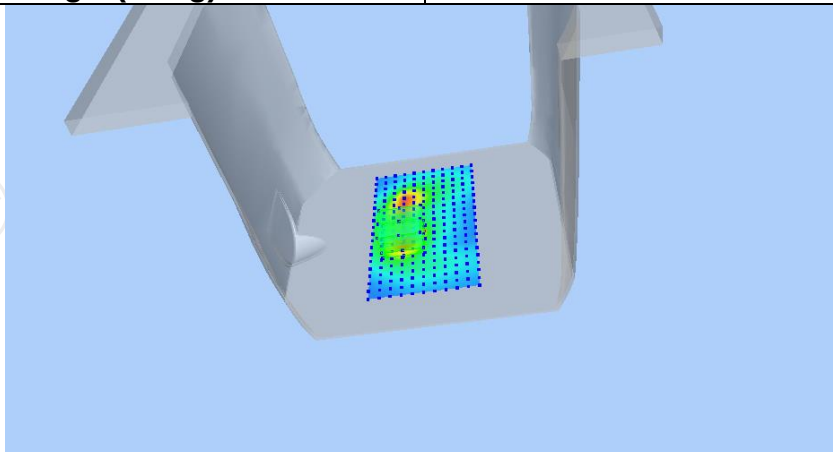
Maximum location: X=-15.00, Y=-14.00 SAR Peak:1.21 W/kg

SAR 10g (W/Kg)

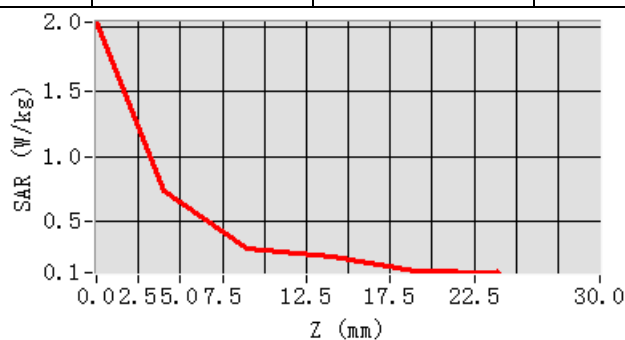
1.183260

SAR 1g (W/Kg)

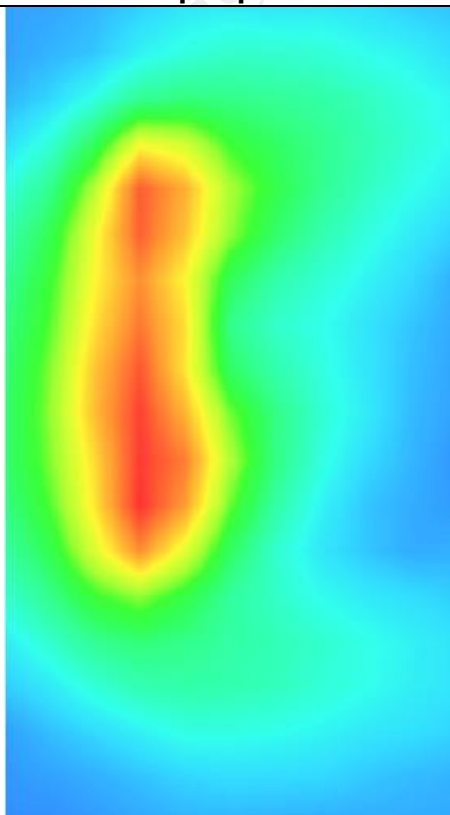
0.667300



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	2.0352	0.7350	0.2897	0.2270	0.1134



Hot spot position



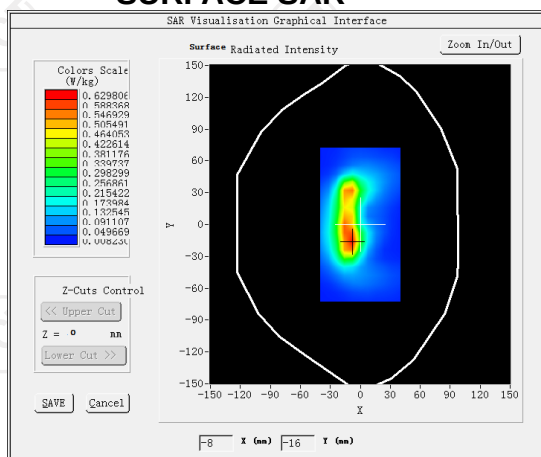
MEASUREMENT 2

Middle Band SAR (Channel 1413):

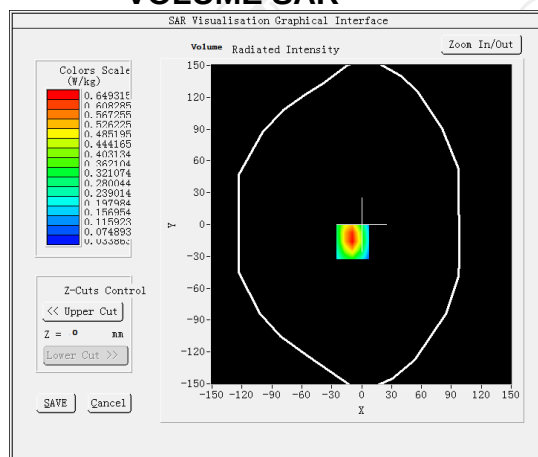
Date: 10/19/2022

Frequency (MHz)	1732.600000
Relative permittivity (real part)	40.116364
Relative permittivity (imaginary part)	14.137455
Conductivity (S/m)	1.360337
Variation (%)	-0.290000
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(hotspot 0mm)
Band	BAND4 WCDMA1700

SURFACE SAR

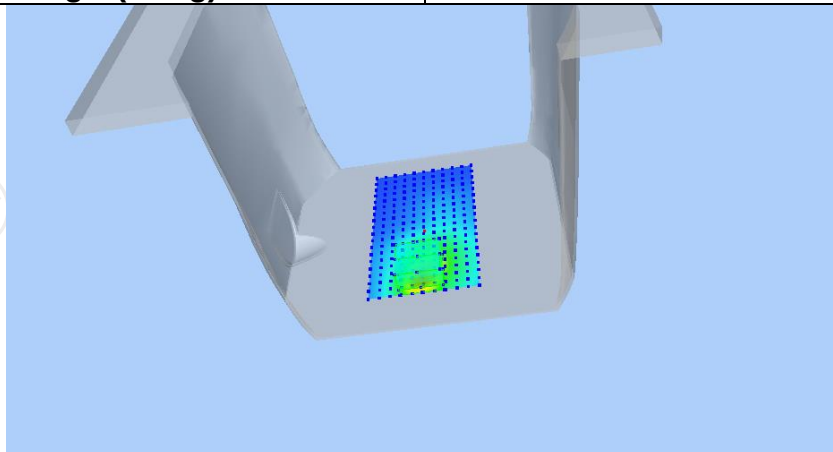


VOLUME SAR

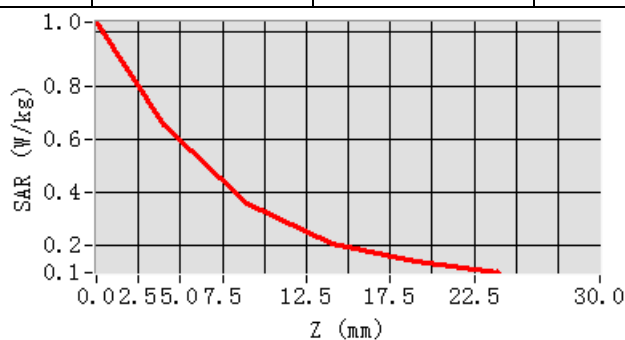


Maximum location: X=-9.00, Y=-16.00 SAR Peak: 1.06 W/kg

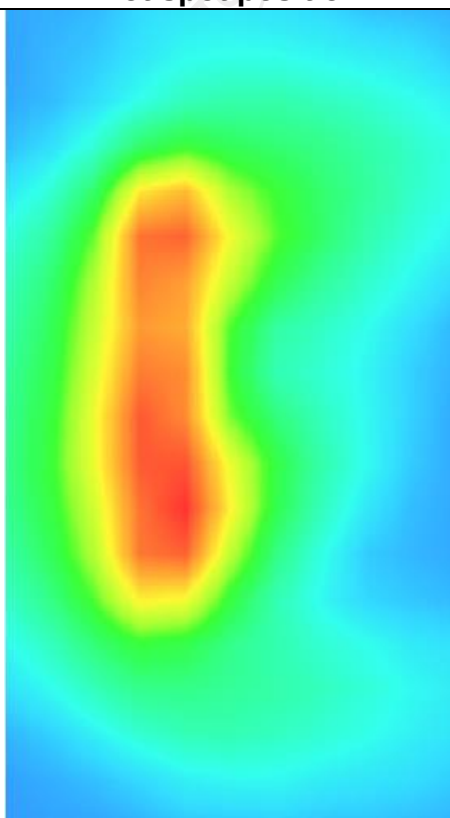
SAR 10g (W/Kg)	0.328101
SAR 1g (W/Kg)	0.610943



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.0392	0.6493	0.3564	0.2060	0.1349



Hot spot position

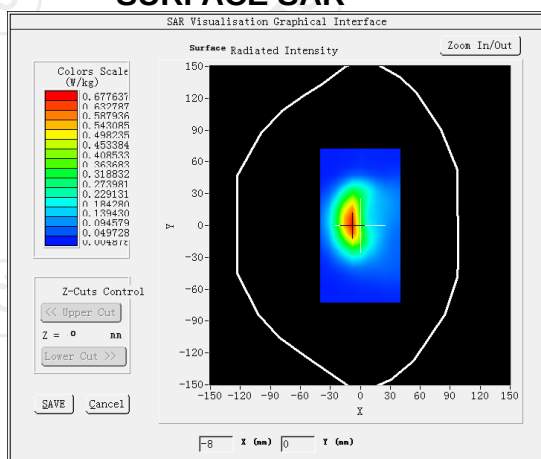


WCDMA Band V MEASUREMENT 1

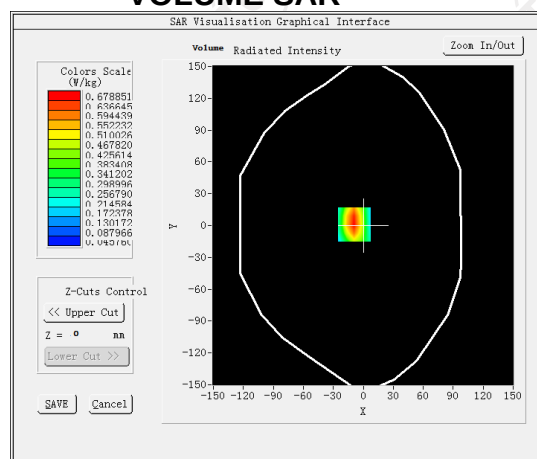
Middle Band SAR (Channel 4182): Date: 10/14/2022

Frequency (MHz)	836.400000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.901453
Variation (%)	-0.030000
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	Validation plane
Device Position	Body back(0mm)
Band	BAND5 WCDMA850

SURFACE SAR



VOLUME SAR



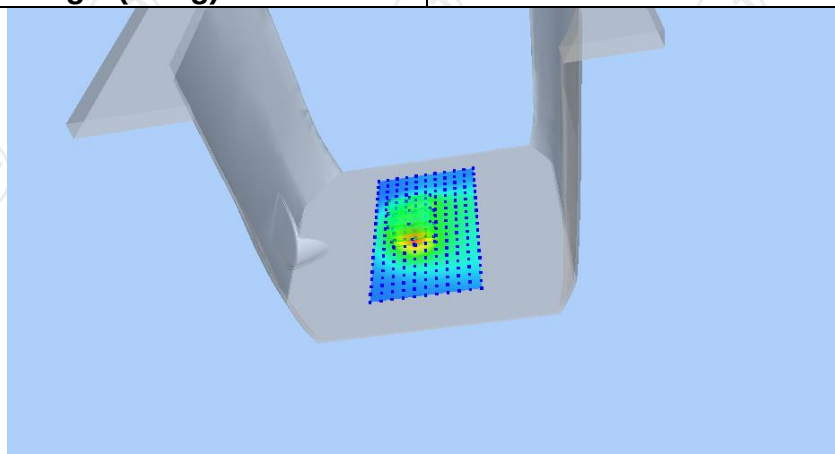
Maximum location: X=-9.00, Y=1.00 SAR Peak: 1.10 W/kg

SAR 10g (W/Kg)

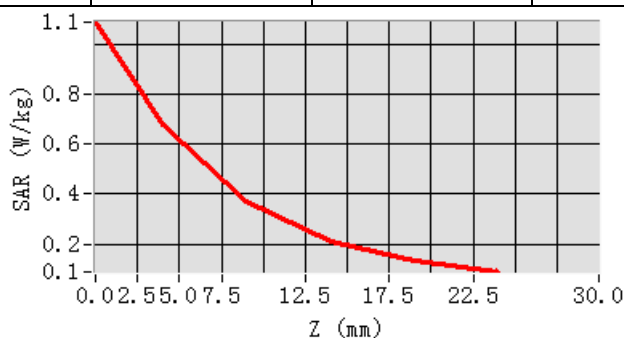
0.342691

SAR 1g (W/Kg)

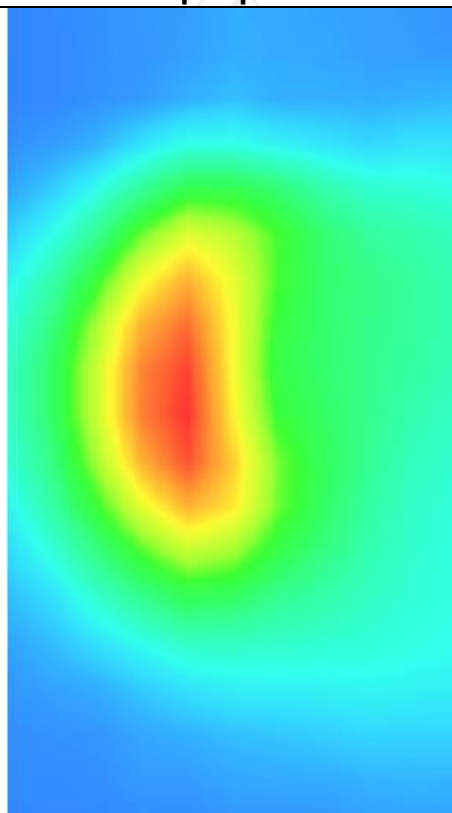
0.635203



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.0881	0.6789	0.3698	0.2094	0.1319



Hot spot position



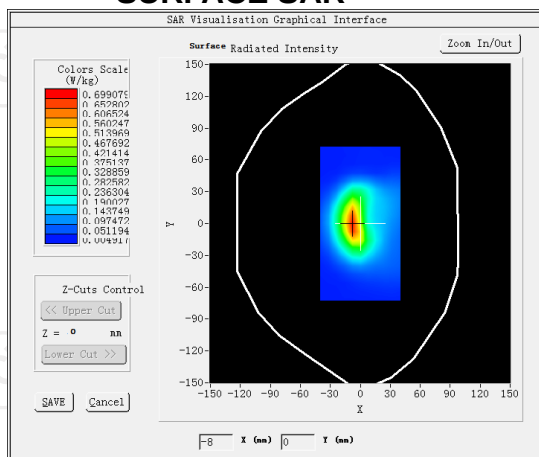
MEASUREMENT 2

Middle Band SAR (Channel 4182):

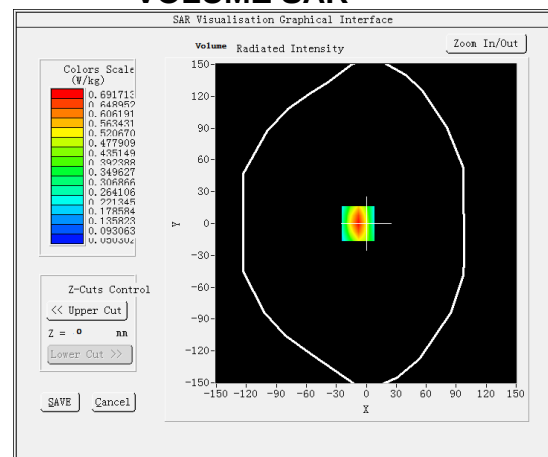
Date: 10/14/2022

Frequency (MHz)	836.400000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.901453
Variation (%)	-0.780000
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(0mm)</u>
Band	<u>BAND5 WCDMA850(hotspot)</u>

SURFACE SAR

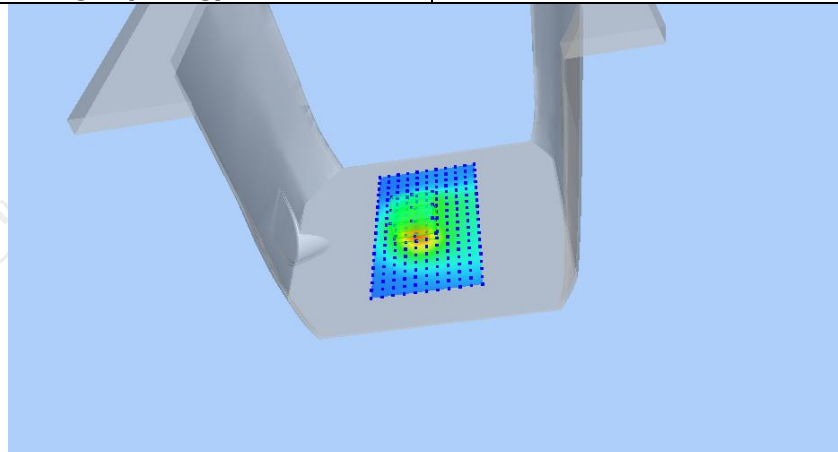


VOLUME SAR

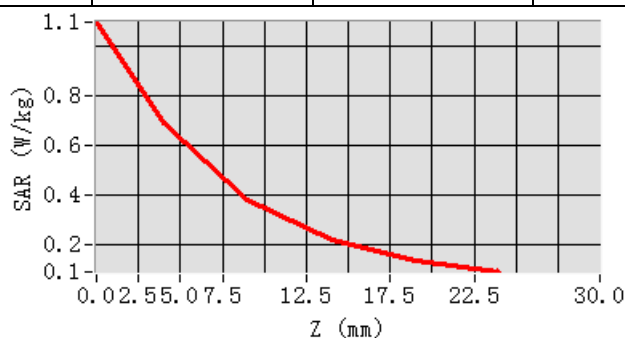


Maximum location: X=-8.00, Y=0.00 SAR Peak:1.10 W/kg

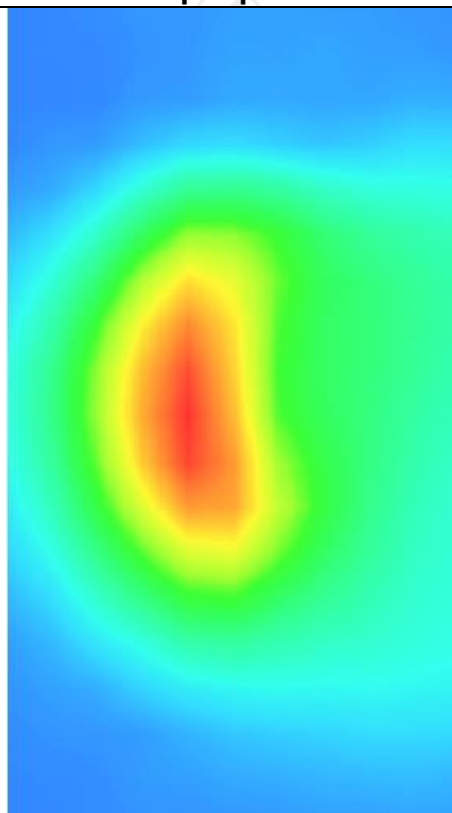
SAR 10g (W/Kg)	0.347275
SAR 1g (W/Kg)	0.641492



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

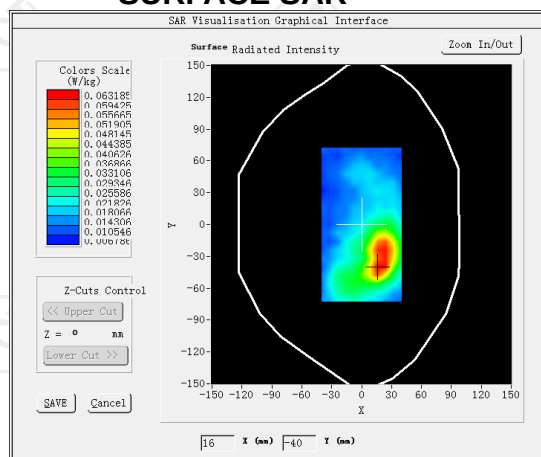
MEASUREMENT 1

Lower Band SAR (Channel 18700):

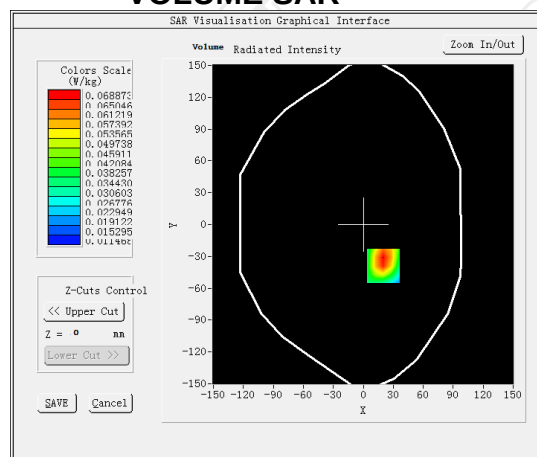
Date: 10/27/2022

Frequency (MHz)	1860.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.411700
Conductivity (S/m)	1.400405
Variation (%)	-1.050000
Crest Factor	1.0
Probe Conversion factor	2.23
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(0mm)
Band	LTE band 2 (1 RB#0)

SURFACE SAR

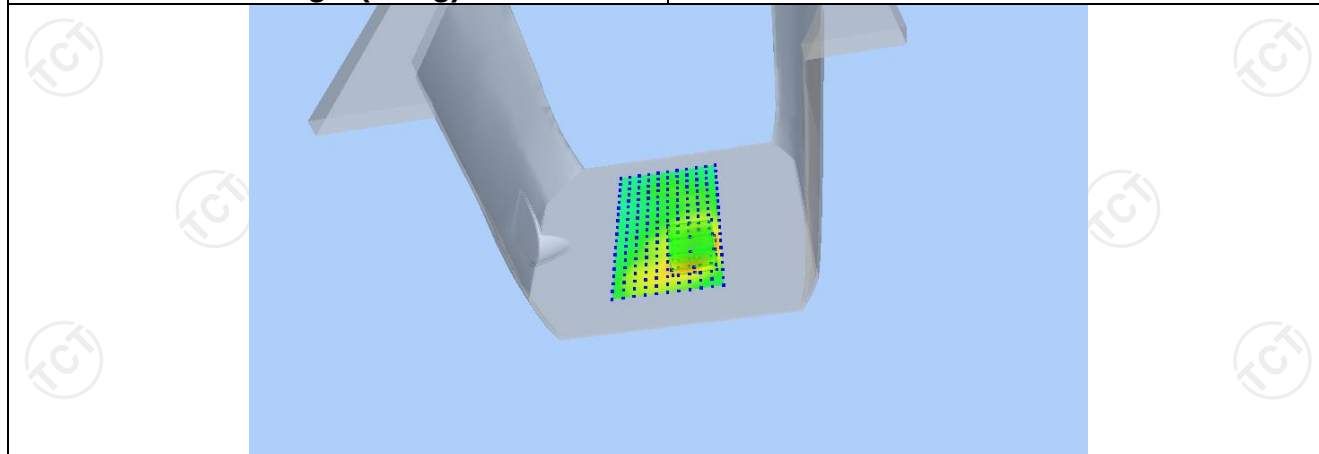


VOLUME SAR

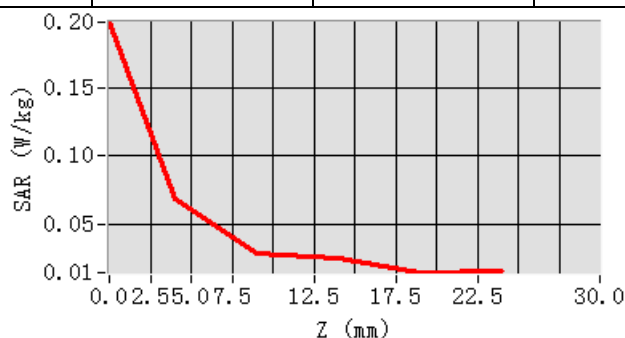


Maximum location: X=-6.00, Y=-21.00 SAR Peak: 1.20 W/kg

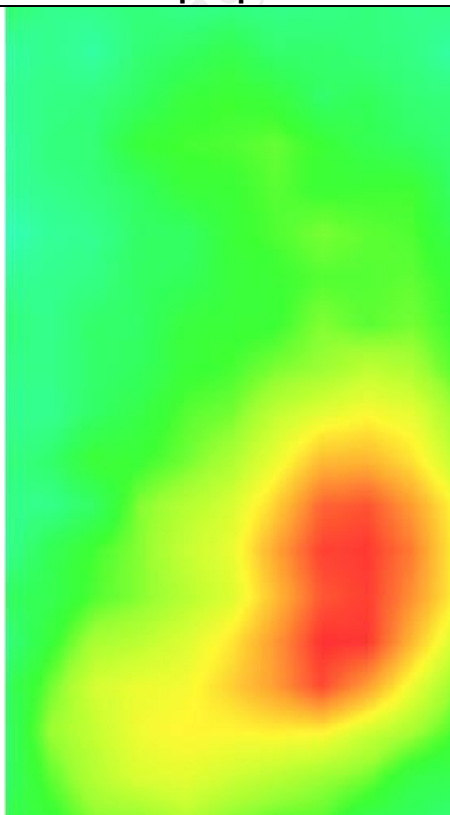
SAR 10g (W/Kg)	0.258237
SAR 1g (W/Kg)	0.582663



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.1895	0.6338	0.2684	0.1175	0.0652



Hot spot position



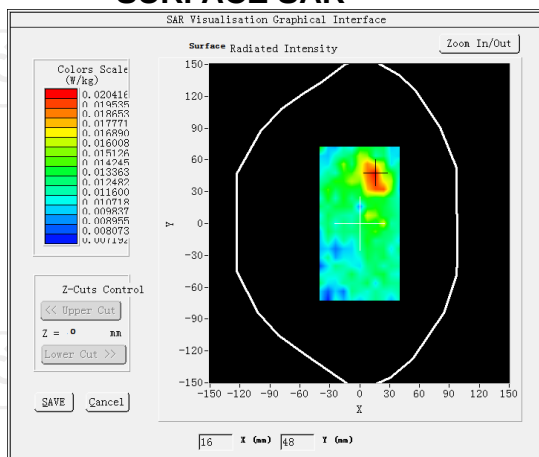
MEASUREMENT 2

Lower Band SAR (Channel 18700):

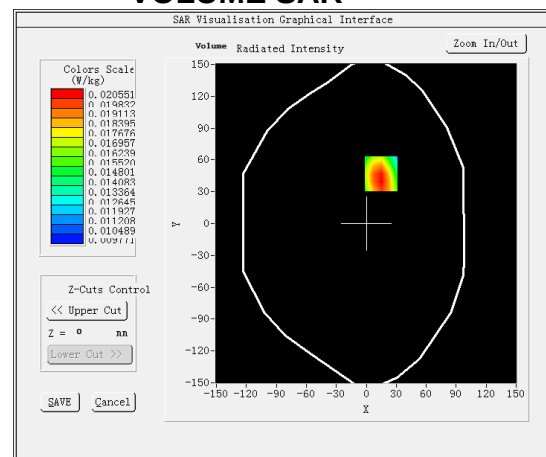
Date: 10/27/2022

Frequency (MHz)	1860.000000
Relative permittivity (real part)	40.000000
Relative permittivity (imaginary part)	13.411700
Conductivity (S/m)	1.400405
Variation (%)	-0.960000
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 0mm)</u>
Band	<u>LTE band 2 (1 RB#0)</u>

SURFACE SAR



VOLUME SAR



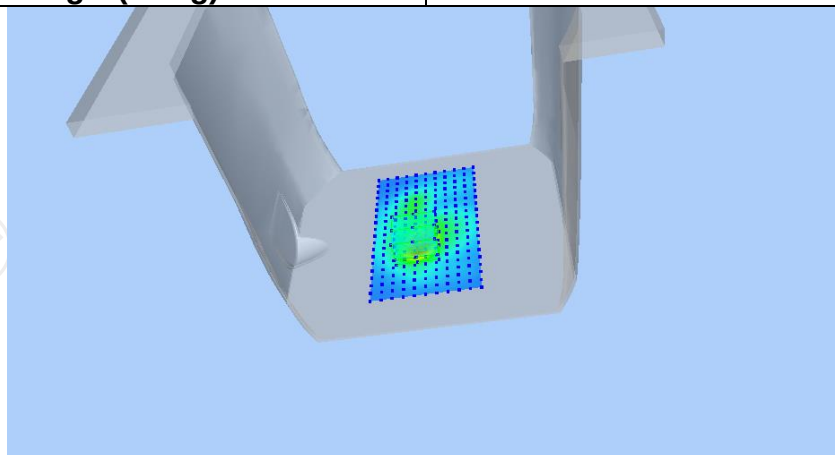
Maximum location: X=-6.00, Y=-21.00 SAR Peak: 1.20 W/kg

SAR 10g (W/Kg)

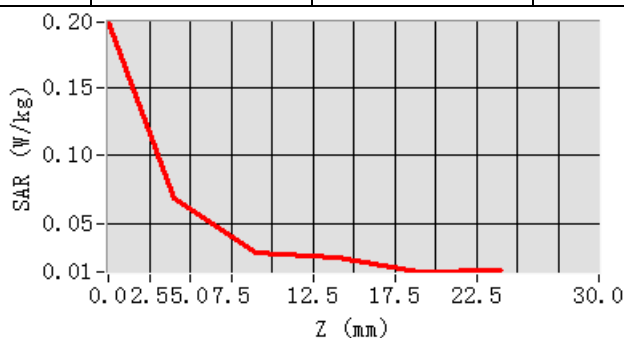
0.257646

SAR 1g (W/Kg)

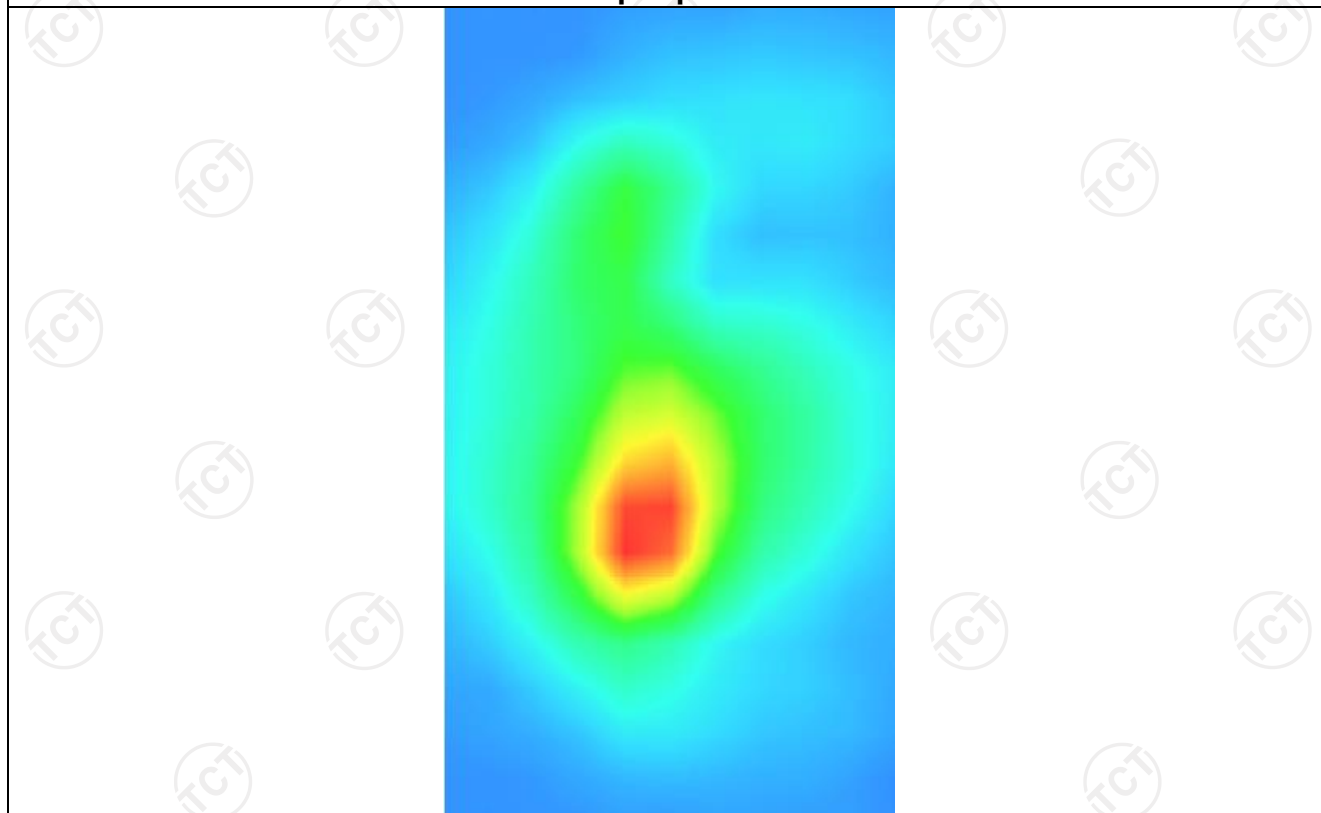
0.582843



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.1917	0.6343	0.2680	0.1166	0.0641



Hot spot position



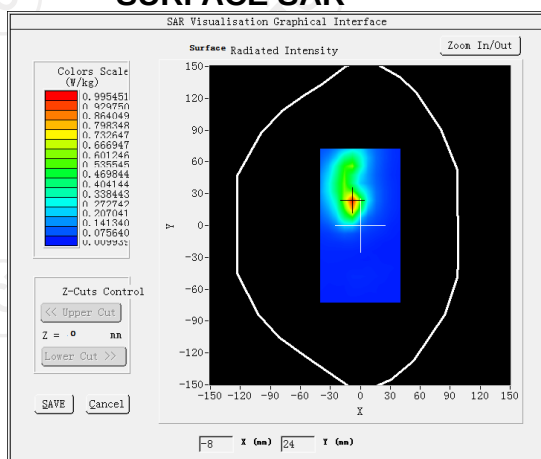
LTE Band 4

MEASUREMENT 1

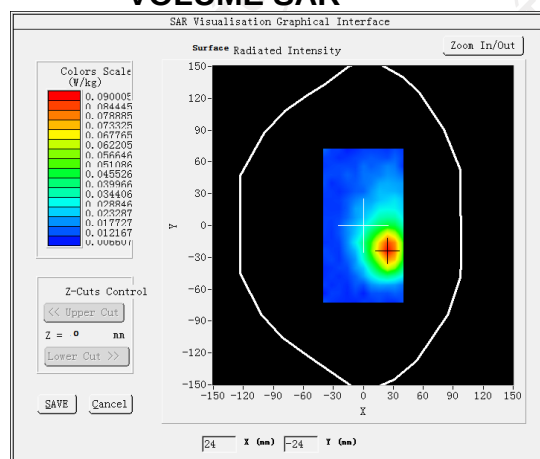
Middle Band SAR (Channel 20175): Date: 10/19/2022

Frequency (MHz)	1732.500000
Relative permittivity (real part)	40.115910
Relative permittivity (imaginary part)	14.136136
Conductivity (S/m)	1.360603
Variation (%)	-0.110000
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(0mm)</u>
Band	<u>LTE band 4(1 RB#49)</u>

SURFACE SAR



VOLUME SAR



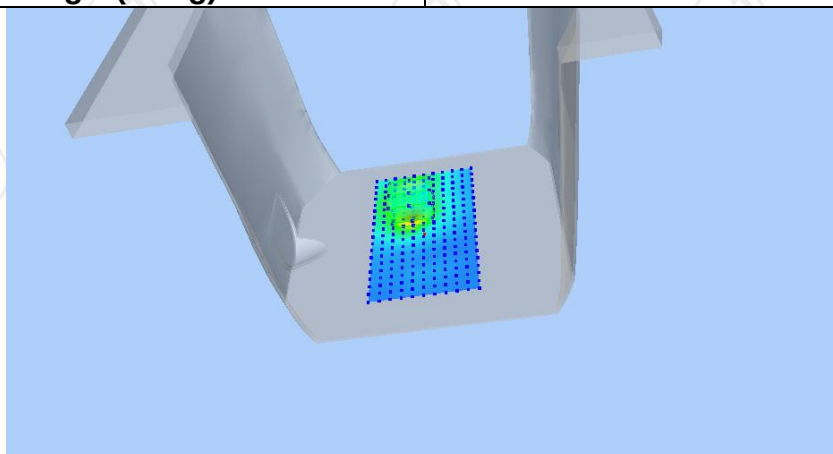
Maximum location: X=-18.00, Y=-21.00 SAR Peak: 1.42 W/kg

SAR 10g (W/Kg)

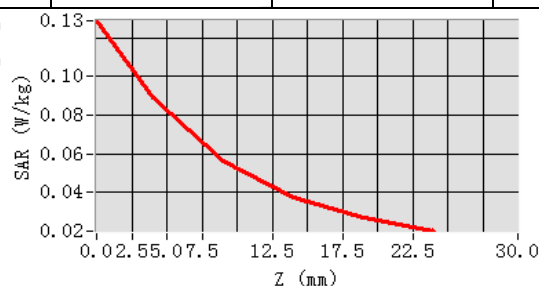
0.445388

SAR 1g (W/Kg)

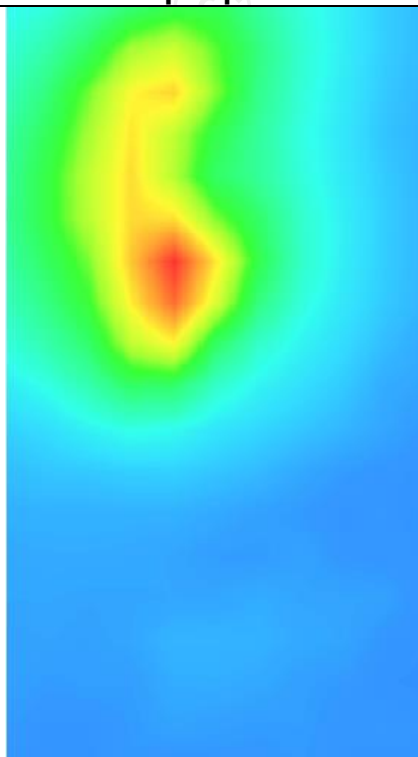
0.723479



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.3762	0.8667	0.4814	0.2818	0.1861



Hot spot position



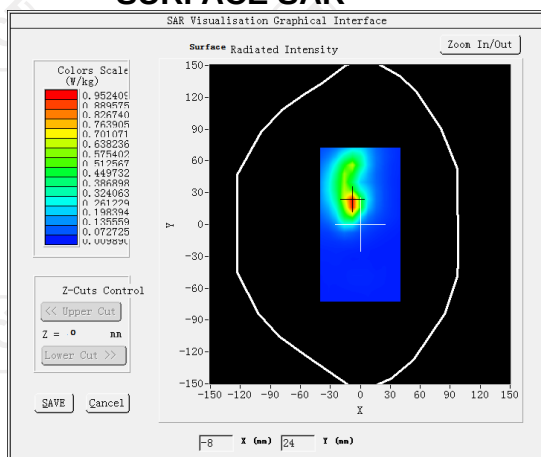
MEASUREMENT 2

Middle Band SAR (Channel 20175):

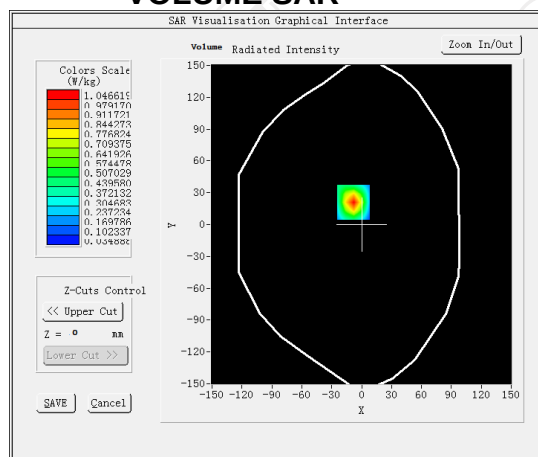
Date: 10/19/2022

Frequency (MHz)	1732.500000
Relative permittivity (real part)	40.115910
Relative permittivity (imaginary part)	14.136136
Conductivity (S/m)	1.360603
Variation (%)	0.330000
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(hotspot 0mm)
Band	LTE band 4(1 RB#49)

SURFACE SAR

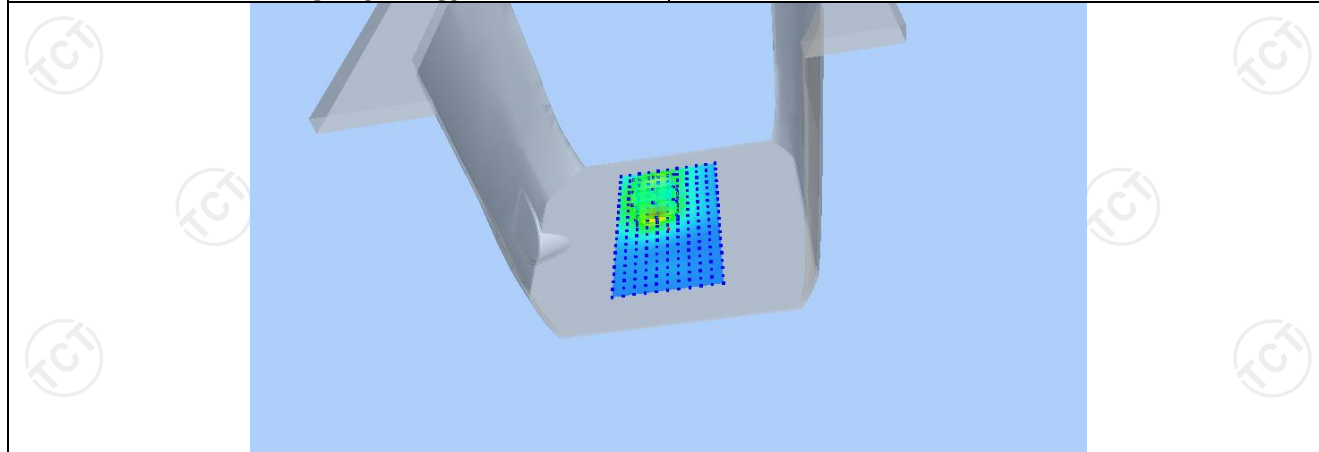


VOLUME SAR

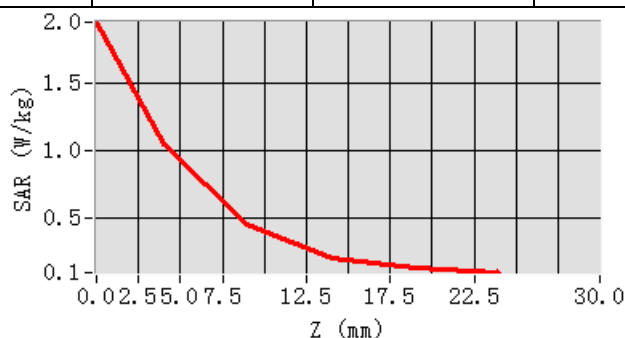


Maximum location: X=-8.00, Y=21.00 SAR Peak: 1.94 W/kg

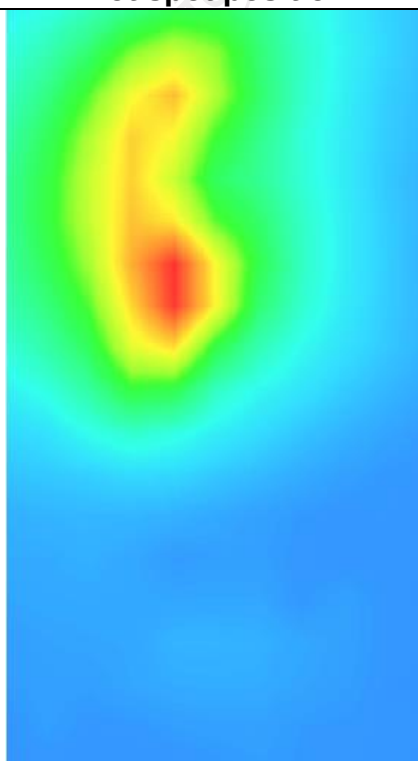
SAR 10g (W/Kg)	0.443812
SAR 1g (W/Kg)	0.619885



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.9510	1.0466	0.4519	0.2071	0.1242



Hot spot position



LTE Band 5

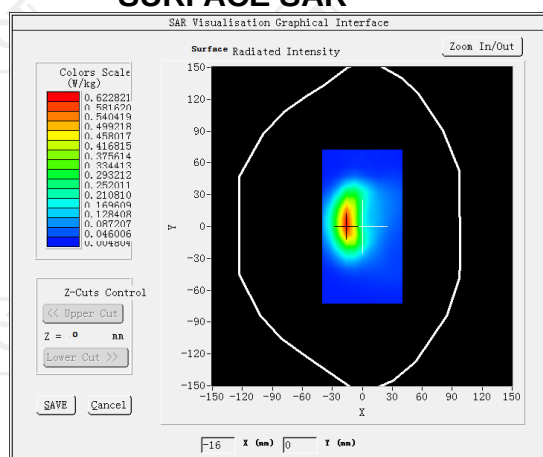
MEASUREMENT 1

Lower Band SAR (Channel 20450):

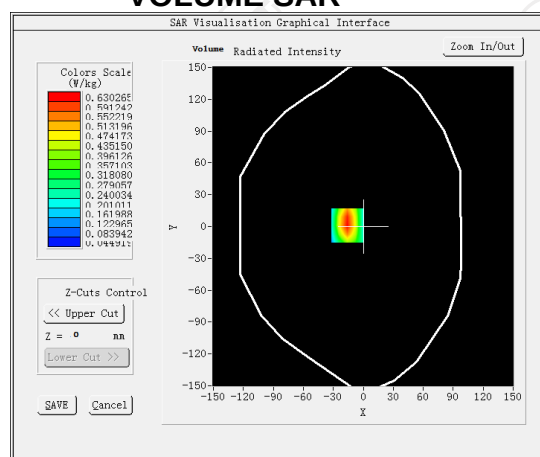
Date: 10/14/2022

Frequency (MHz)	829.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.901561
Variation (%)	-0.620000
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(0mm)
Band	LTE band 7(1 RB#24)

SURFACE SAR

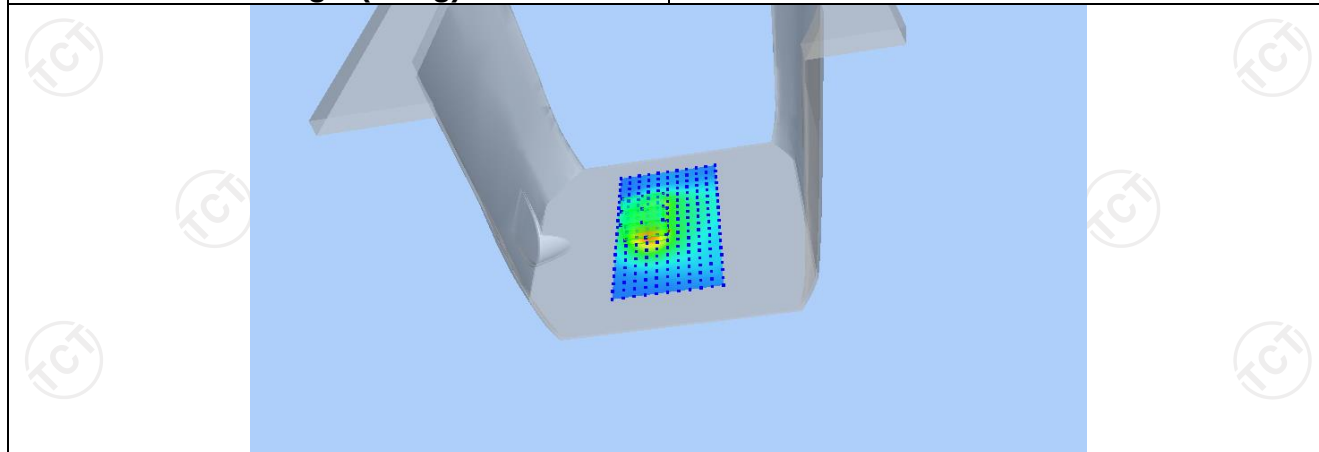


VOLUME SAR

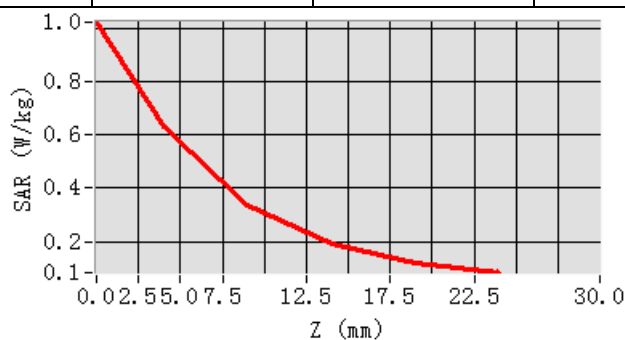


Maximum location: X=-16.00, Y=1.00 SAR Peak: 1.03 W/kg

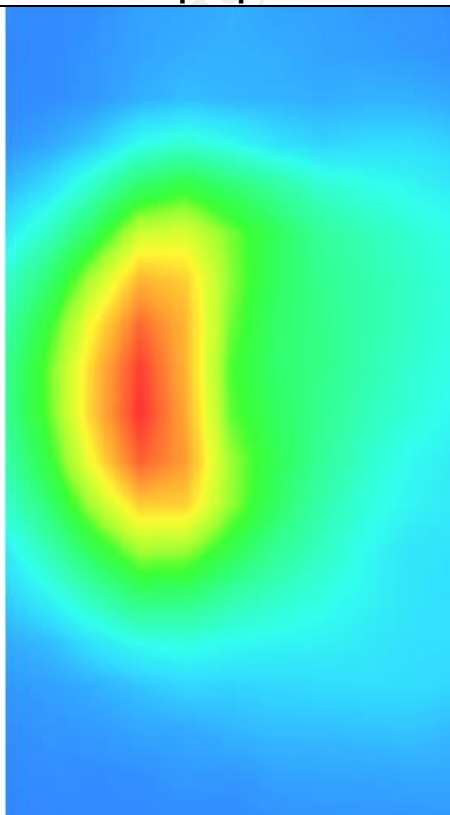
SAR 10g (W/Kg)	0.312768
SAR 1g (W/Kg)	0.587298



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.0245	0.6303	0.3372	0.1891	0.1202



Hot spot position



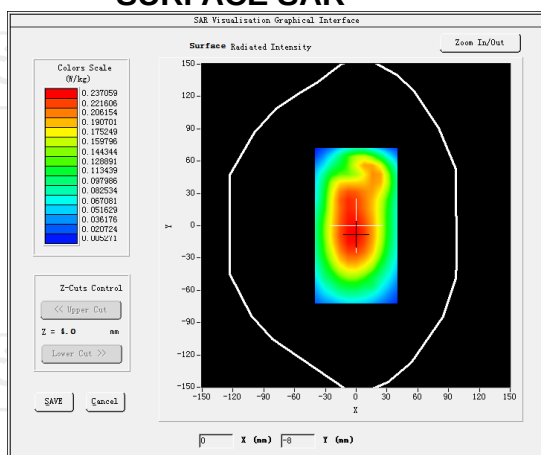
MEASUREMENT 2

Lower Band SAR (Channel 20450):

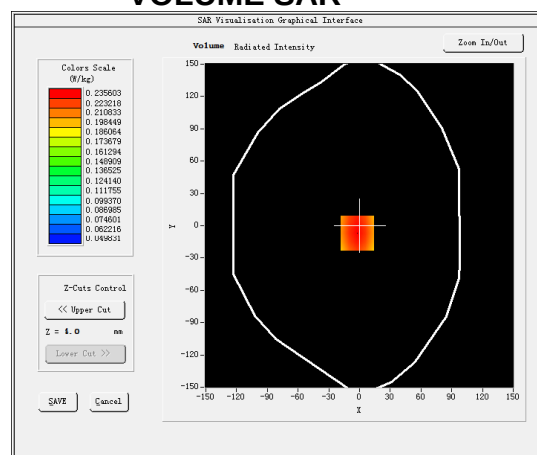
Date: 08/26/2022

Frequency (MHz)	829.000000
Relative permittivity (real part)	41.500000
Relative permittivity (imaginary part)	19.400000
Conductivity (S/m)	0.901561
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 0mm)</u>
Band	<u>LTE band 7(1 RB#24)</u>

SURFACE SAR

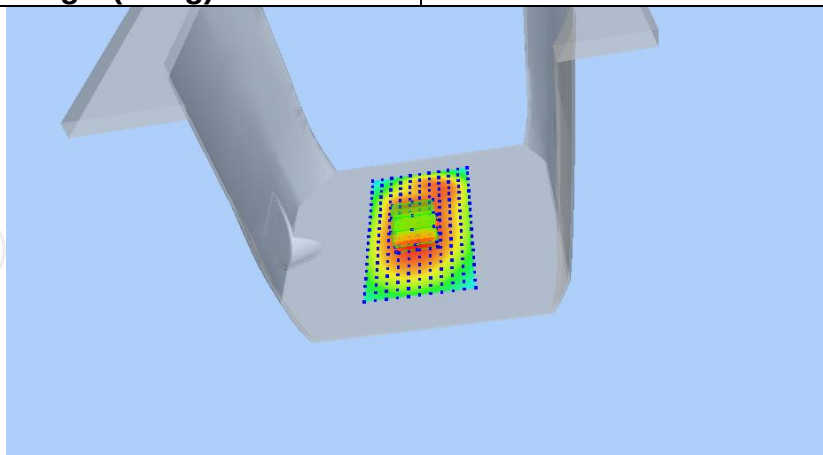


VOLUME SAR

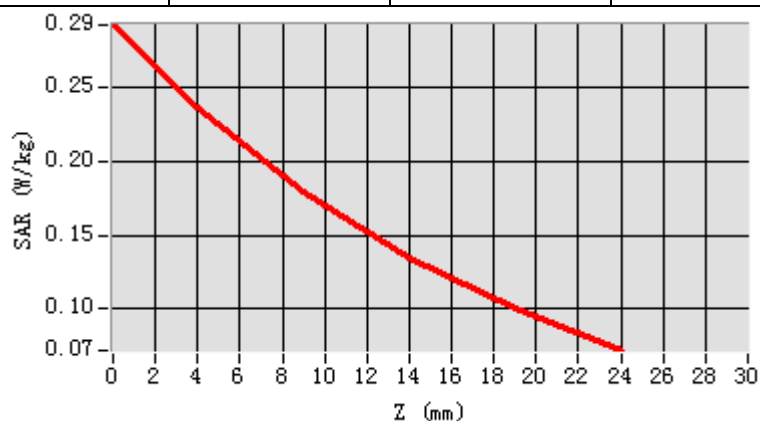


Maximum location: X=-2.00, Y=-7.00 SAR Peak: 0.29 W/kg

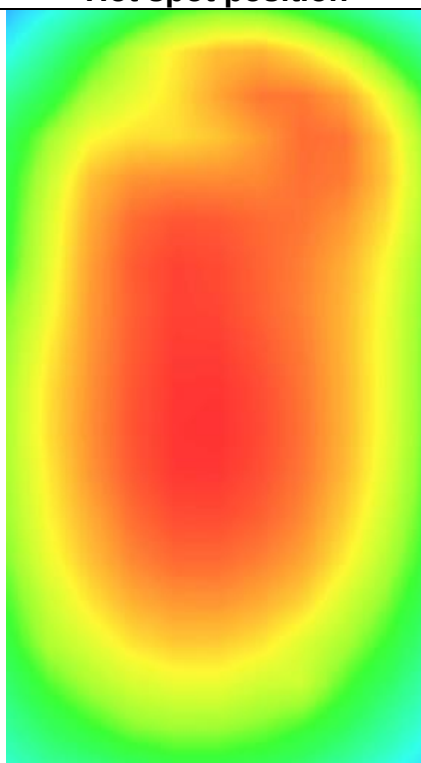
SAR 10g (W/Kg)	0.165419
SAR 1g (W/Kg)	0.227376



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



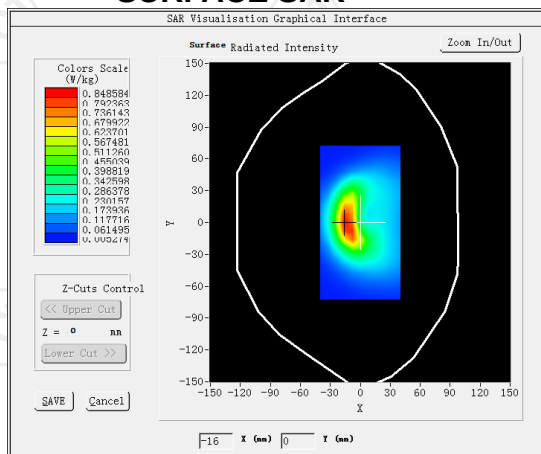
LTE Band 12

MEASUREMENT 1

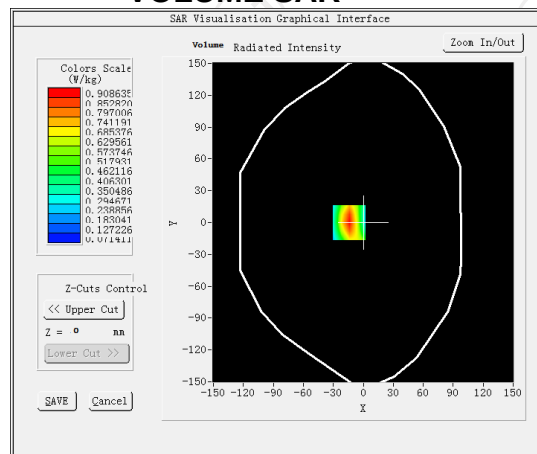
High Band SAR (Channel 23130):		Date: 10/11/2022
Frequency (MHz)	711.000000	
Relative permittivity (real part)	42.126667	
Relative permittivity (imaginary part)	23.264000	
Conductivity (S/m)	0.914404	
Variation (%)	0.110000	
Crest Factor	1.0	
Probe Conversion factor	1.71	
E-Field Probe:	SSE2 (SN 36/20 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(0mm)
Band	LTE band 12(1 RB#0)

SURFACE SAR

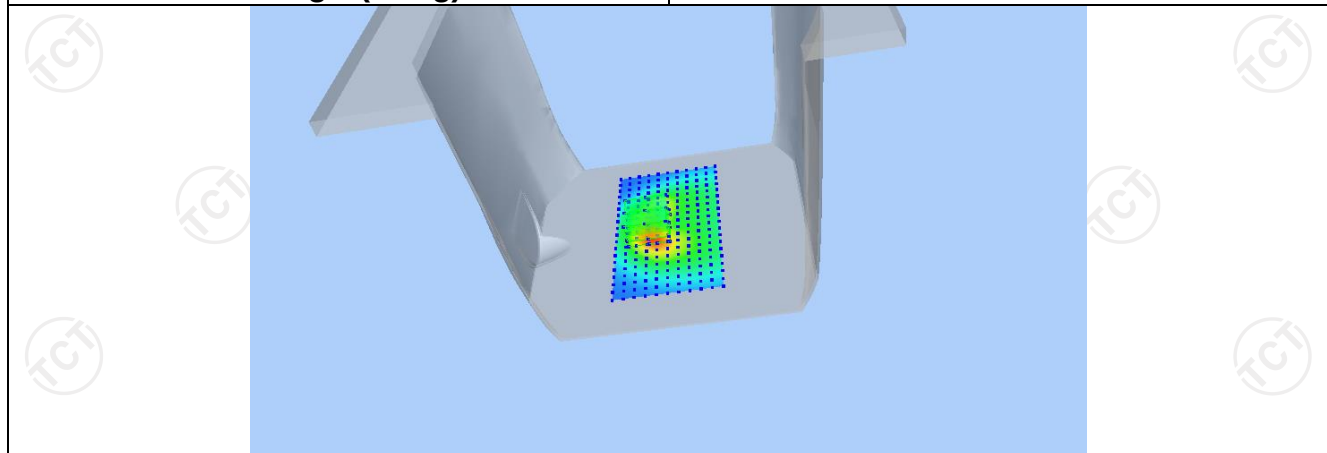


VOLUME SAR

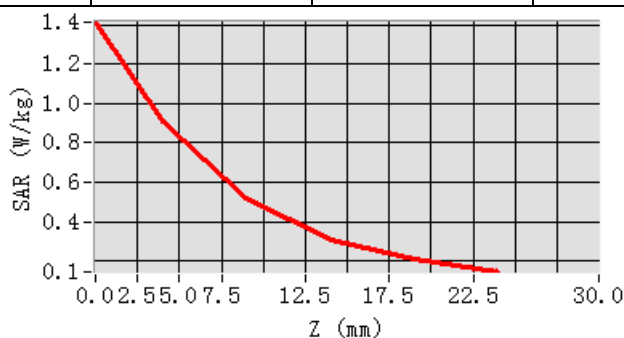


Maximum location: X=-14.00, Y=0.00 SAR Peak:1.42 W/kg

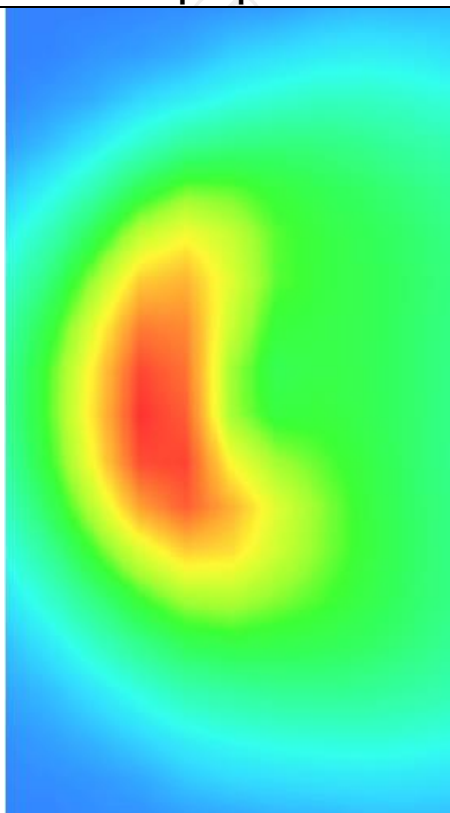
SAR 10g (W/Kg)	0.477668
SAR 1g (W/Kg)	0.660501



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.4143	0.9086	0.5186	0.3101	0.2057



Hot spot position



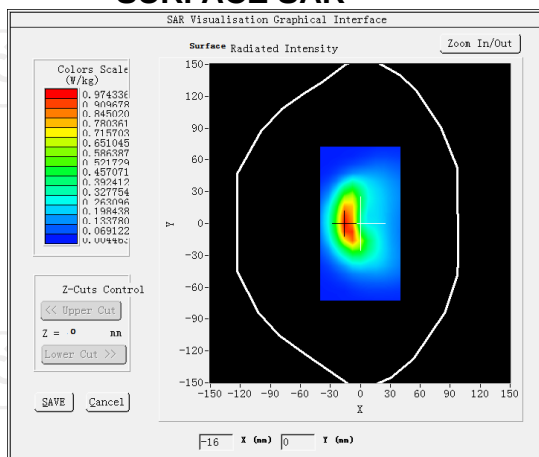
MEASUREMENT 2

High Band SAR (Channel 23130):

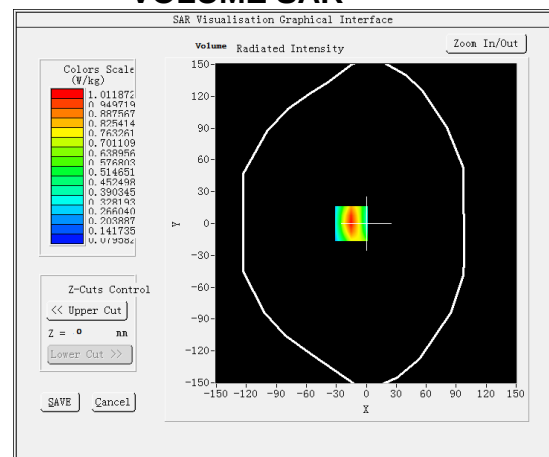
Date: 10/11/2022

Frequency (MHz)	711.000000
Relative permittivity (real part)	42.126667
Relative permittivity (imaginary part)	23.264000
Conductivity (S/m)	0.914404
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 0mm)</u>
Band	<u>LTE band 12(1 RB#0)</u>

SURFACE SAR

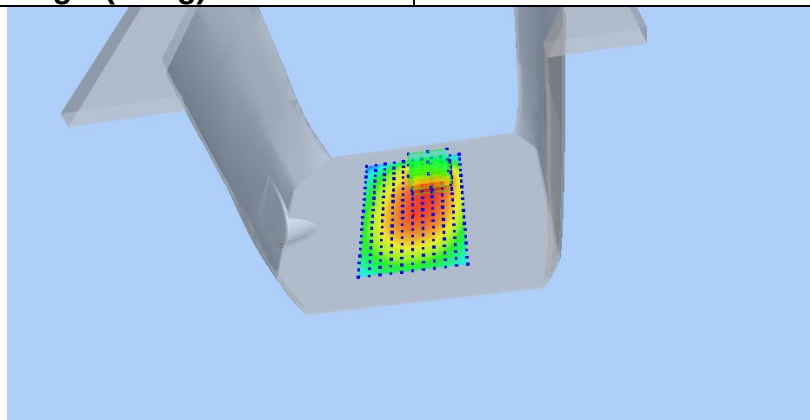


VOLUME SAR

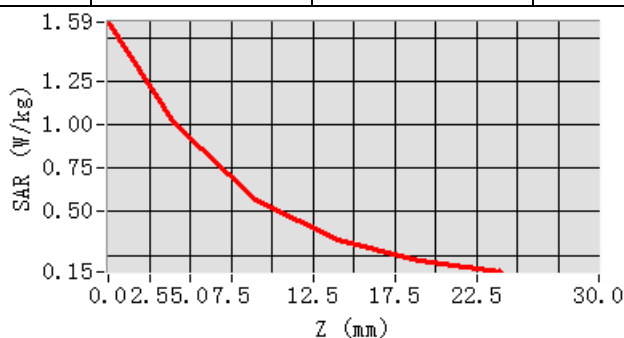


Maximum location: X=-15.00, Y=0.00 SAR Peak: 1.60W/kg

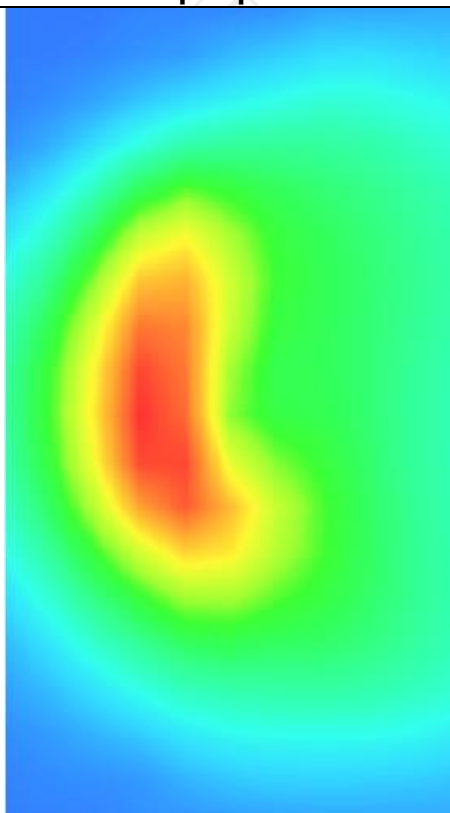
SAR 10g (W/Kg)	0.525998
SAR 1g (W/Kg)	0.559447



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.5912	1.0119	0.5689	0.3354	0.2204



Hot spot position



LTE Band 66

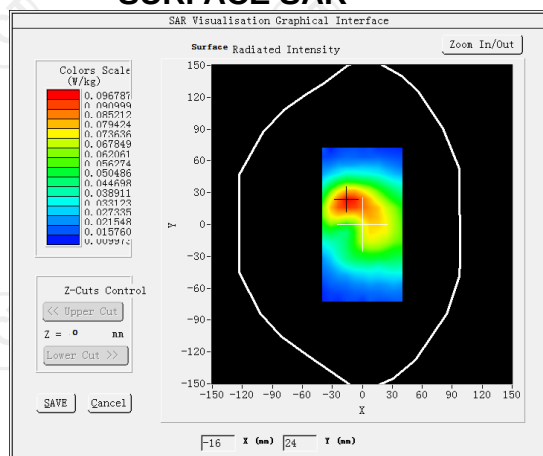
MEASUREMENT 1

Middle Band SAR (Channel132322):

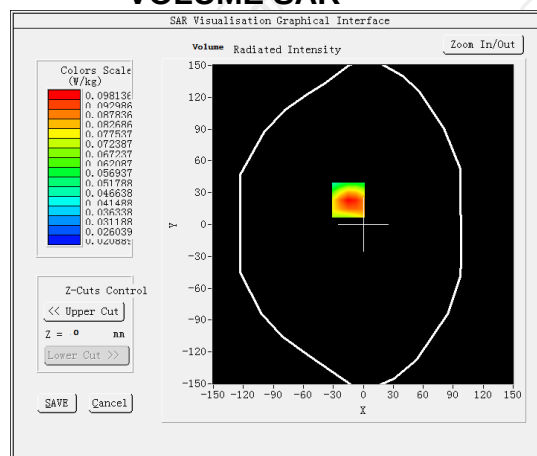
Date: 10/19/2022

Frequency (MHz)	1745.000000
Relative permittivity (real part)	40.115910
Relative permittivity (imaginary part)	14.136136
Conductivity (S/m)	1.360603
Variation (%)	-0.200000
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 black(0mm)</u>
Band	<u>LTE band 66(1 RB#49)</u>

SURFACE SAR



VOLUME SAR



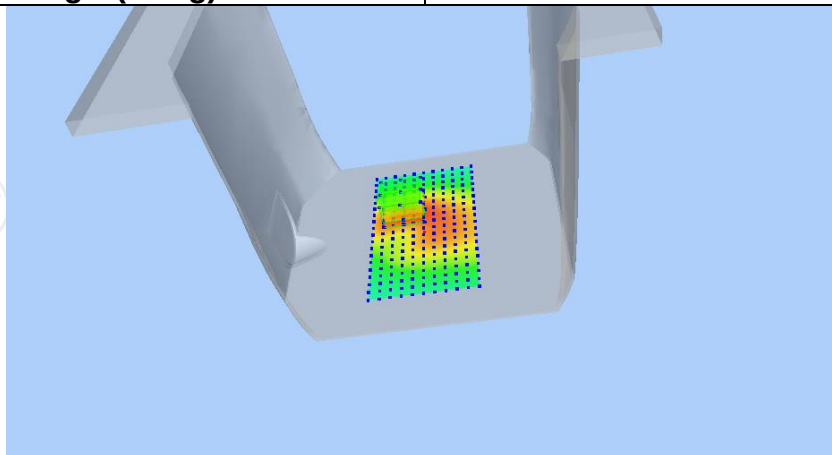
Maximum location: X=-15.00, Y=23.00 SAR Peak: 0.14 W/kg

SAR 10g (W/Kg)

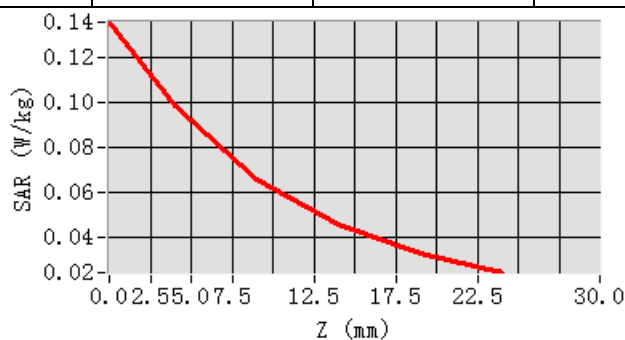
0.062830

SAR 1g (W/Kg)

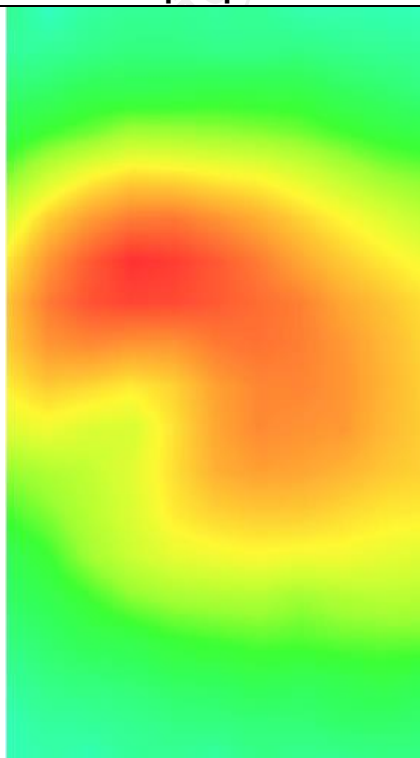
0.115407



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1355	0.0981	0.0658	0.0455	0.0330



Hot spot position



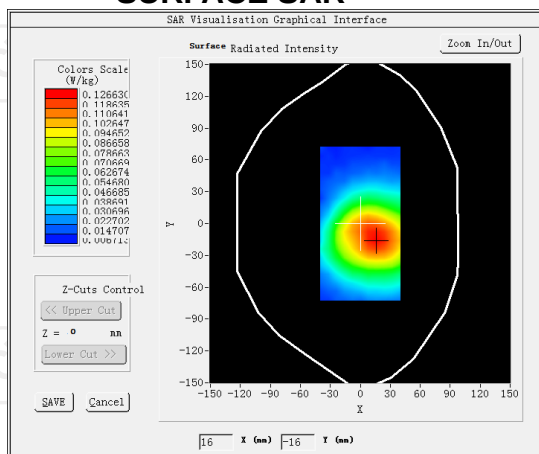
MEASUREMENT 2

Middle Band SAR (Channel132322):

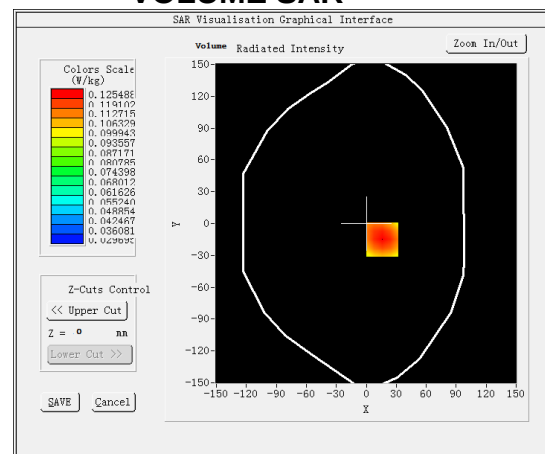
Date: 10/19/2022

Frequency (MHz)	1745.000000
Relative permittivity (real part)	40.115910
Relative permittivity (imaginary part)	14.136136
Conductivity (S/m)	1.360603
Variation (%)	0.1500000
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 0mm)
Band	LTE band 66(1 RB#49)

SURFACE SAR



VOLUME SAR



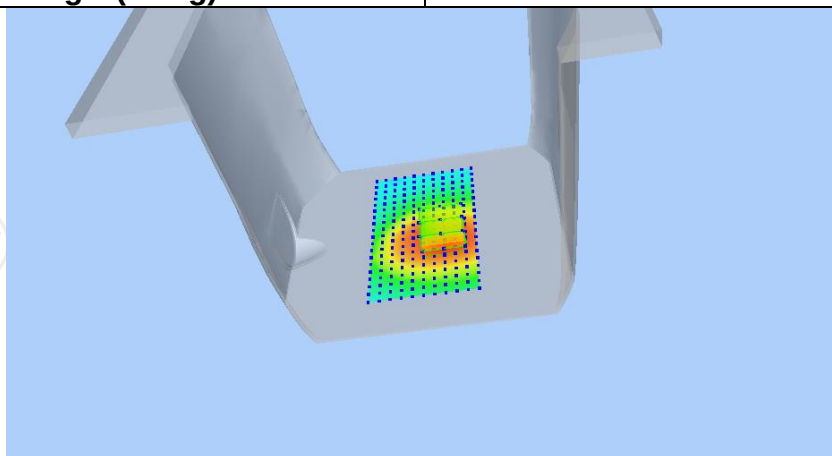
Maximum location: X=16.00, Y=-15.00 SAR Peak: 0.26 W/kg

SAR 10g (W/Kg)

0.092926

SAR 1g (W/Kg)

0.163802



LTE Band 71

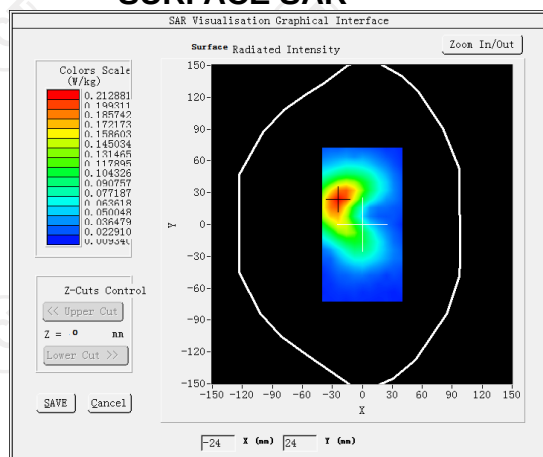
MEASUREMENT 1

Lower Band SAR (Channel 133222):

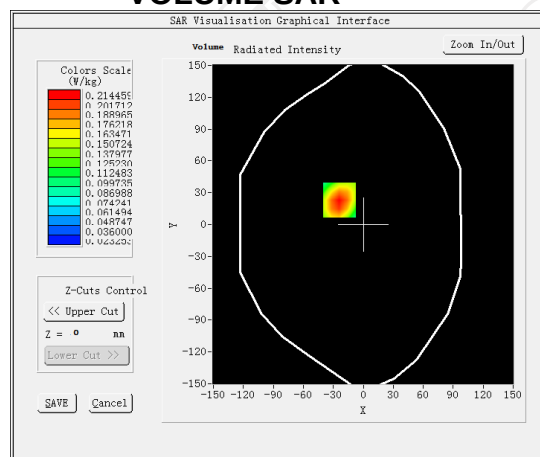
Date: 10/11/2022

Frequency (MHz)	683.000000
Relative permittivity (real part)	42.126667
Relative permittivity (imaginary part)	23.264000
Conductivity (S/m)	0.914404
Variation (%)	0.490000
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(0mm)
Band	LTE band 71(1 RB#0)

SURFACE SAR

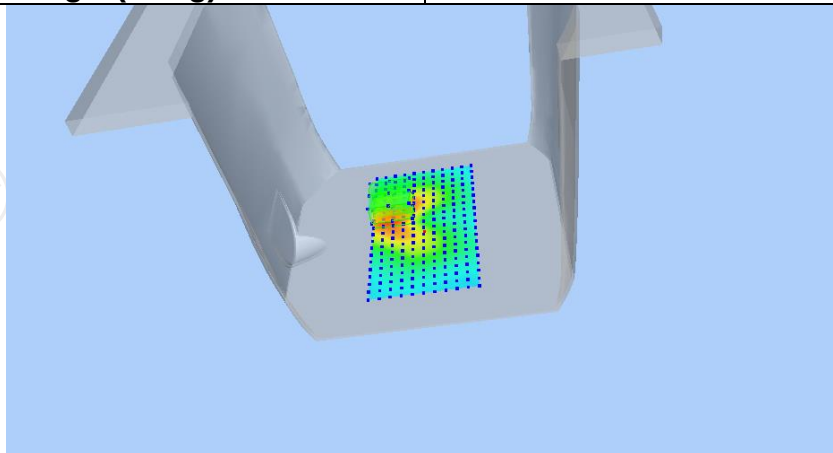


VOLUME SAR

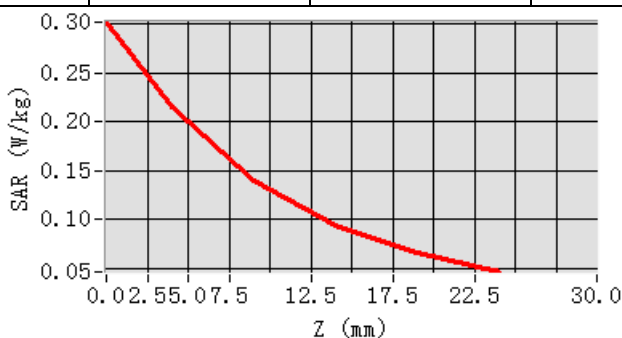


Maximum location: X=-24.00, Y=23.00 SAR Peak: 0.30 W/kg

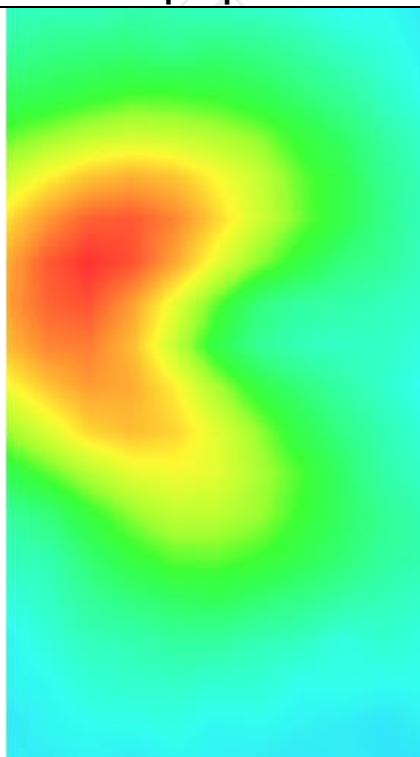
SAR 10g (W/Kg)	0.128515
SAR 1g (W/Kg)	0.203815



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3017	0.2145	0.1399	0.0936	0.0655



Hot spot position



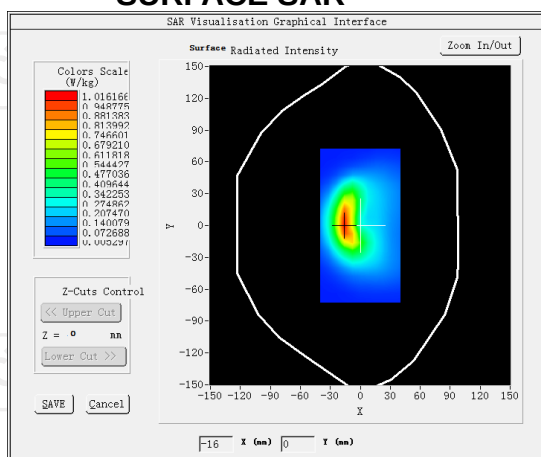
MEASUREMENT 2

Lower Band SAR (Channel 133222):

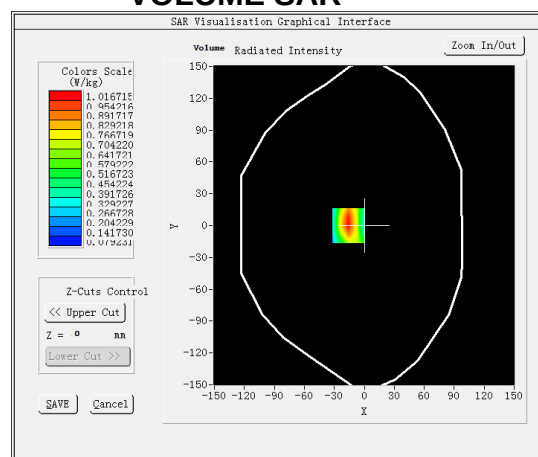
Date: 10/11/2022

Frequency (MHz)	683.000000
Relative permittivity (real part)	42.126667
Relative permittivity (imaginary part)	23.264000
Conductivity (S/m)	0.914404
Variation (%)	-0.710000
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(hotspot_0mm)
Band	<u>LTE band 71(1 RB#0)</u>

SURFACE SAR

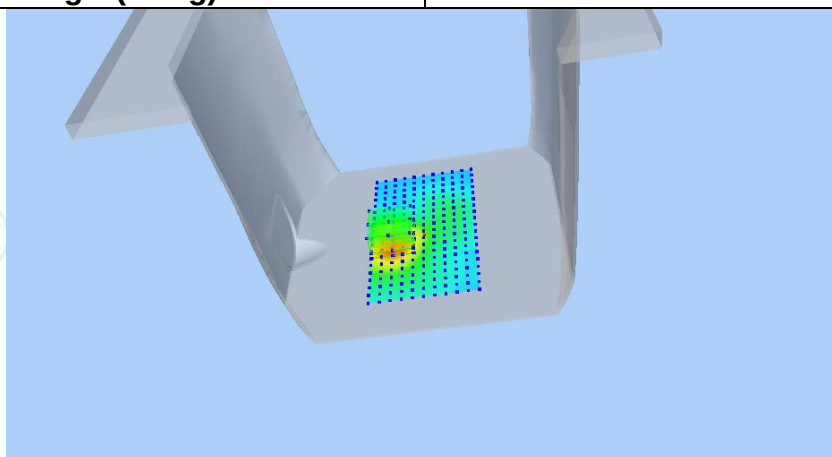


VOLUME SAR

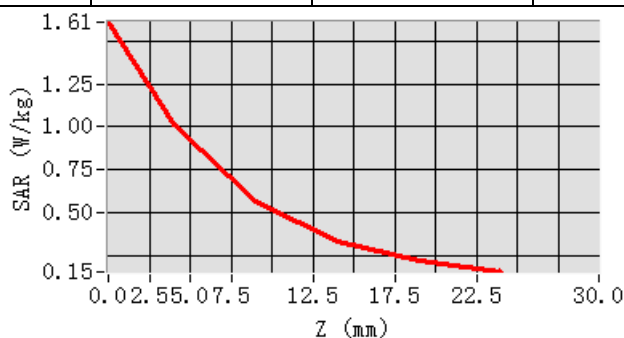


Maximum location: X=-16.00, Y=0.00 SAR Peak: 1.63 W/kg

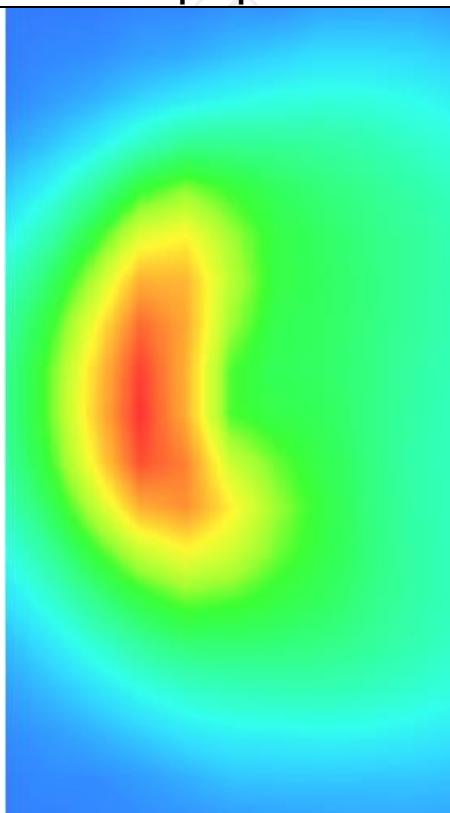
SAR 10g (W/Kg)	0.528009
SAR 1g (W/Kg)	0.567987



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



Hot spot position

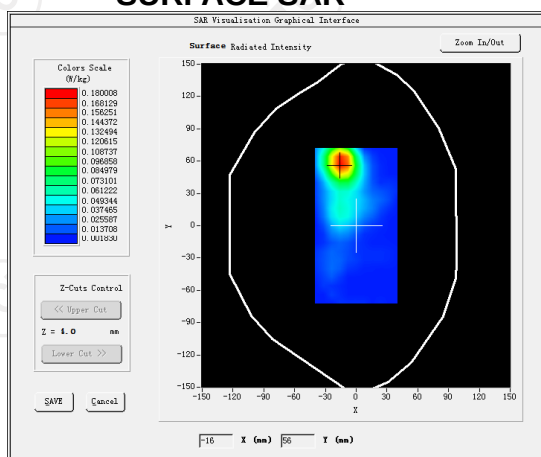


WLAN 2.4G

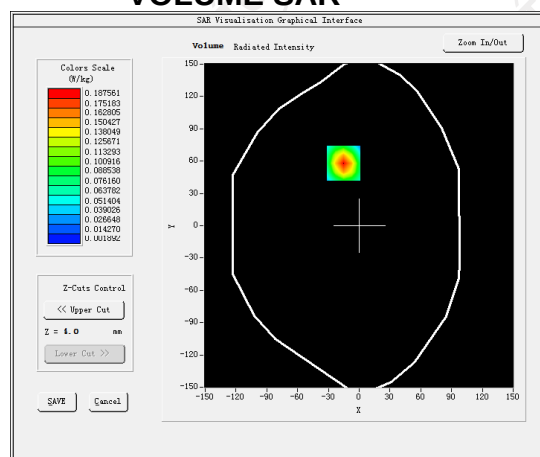
MEASUREMENT 1

Middle Band SAR (Channel 06):		Date: 11/07/2022
Frequency (MHz)	2437.000000	
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(0mm)	
Band	IEEE 802.11b ISM	

SURFACE SAR



VOLUME SAR



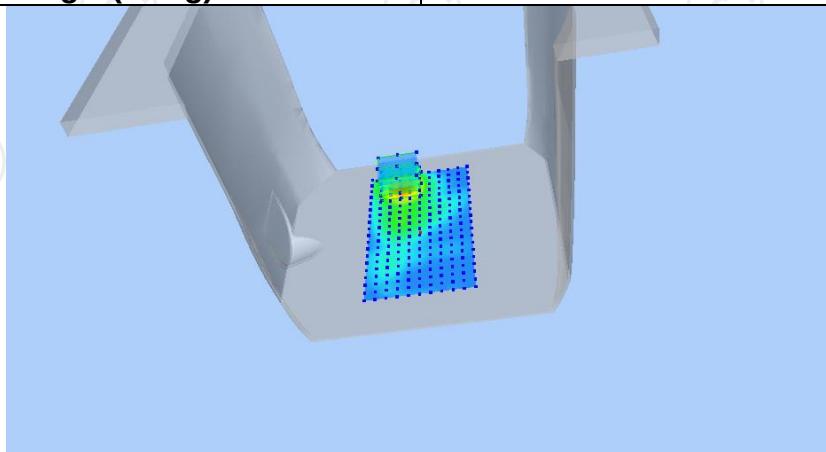
Maximum location: X=-15.00, Y=58.00 SAR Peak: 0.34 W/kg

SAR 10g (W/Kg)

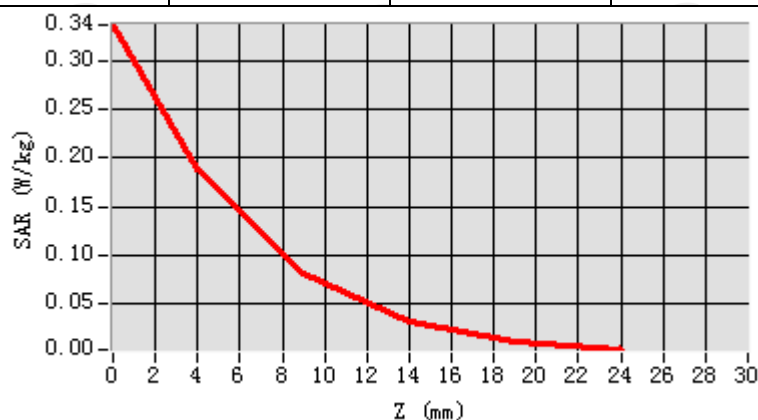
0.077530

SAR 1g (W/Kg)

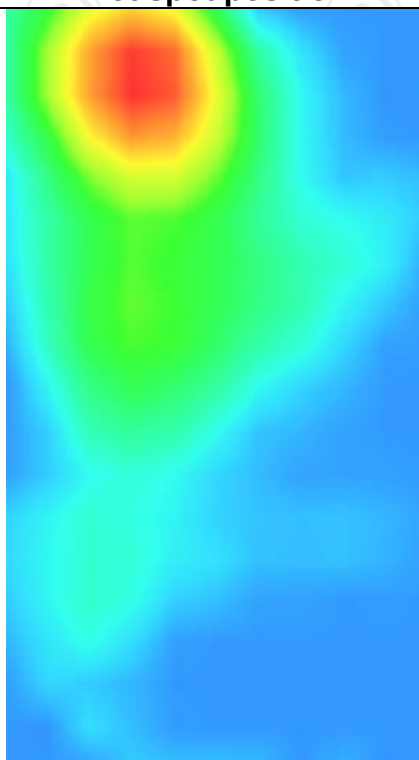
0.293292



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



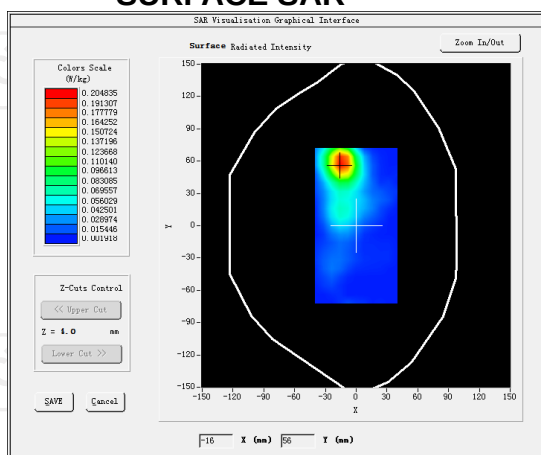
MEASUREMENT 2

Middle Band SAR (Channel 06):

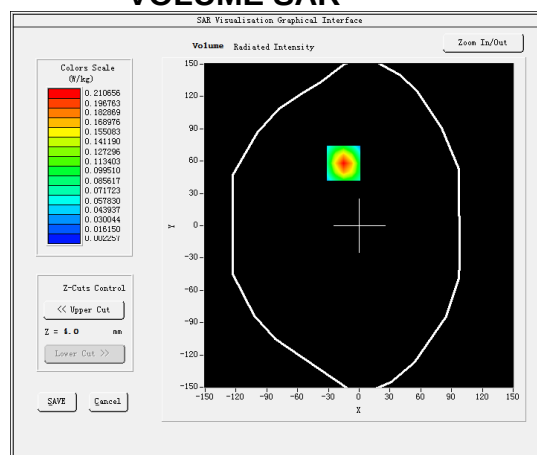
Date: 11/07/2022

Frequency (MHz)	2437.000000
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(0mm)
Band	<u>IEEE 802.11b ISM(hotspot)</u>

SURFACE SAR

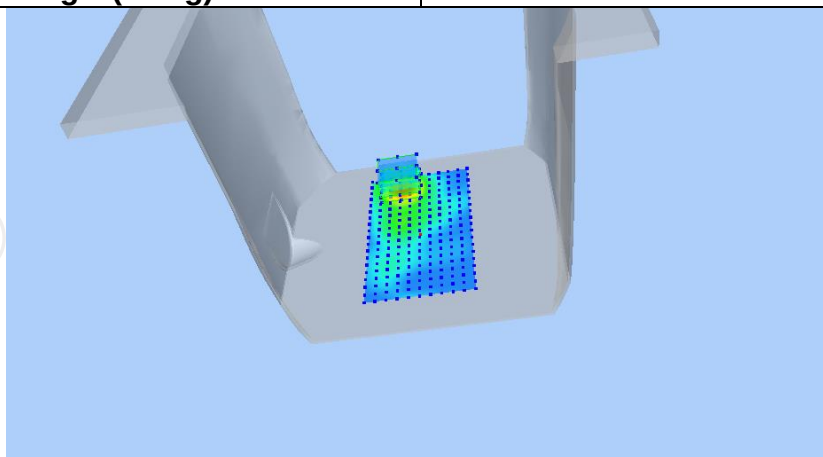


VOLUME SAR

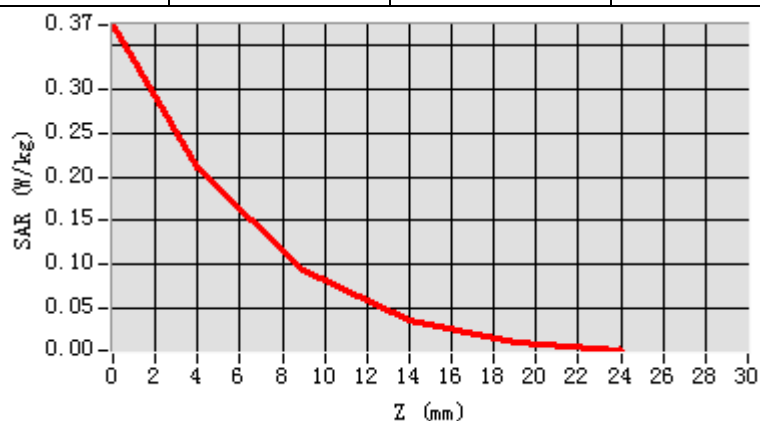


Maximum location: X=-15.00, Y=58.00 SAR Peak: 0.37 W/kg

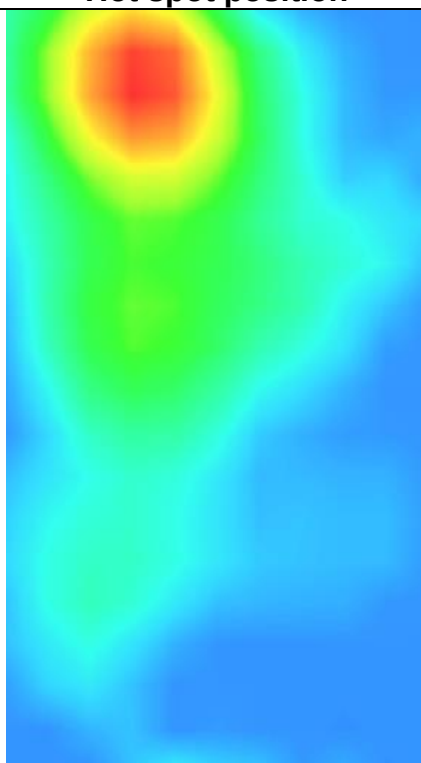
SAR 10g (W/Kg)	0.087182
SAR 1g (W/Kg)	0.323788



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

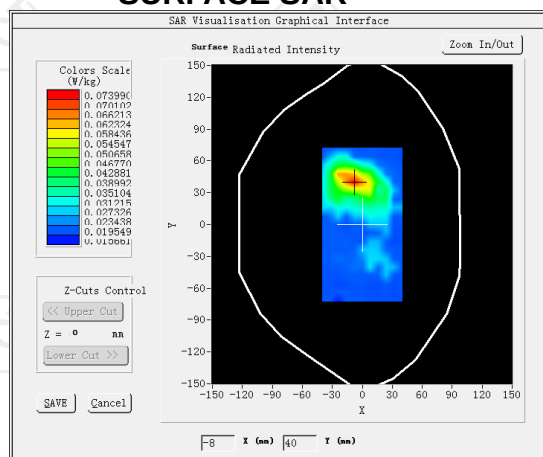
MEASUREMENT 1

SAR (Channel 48):

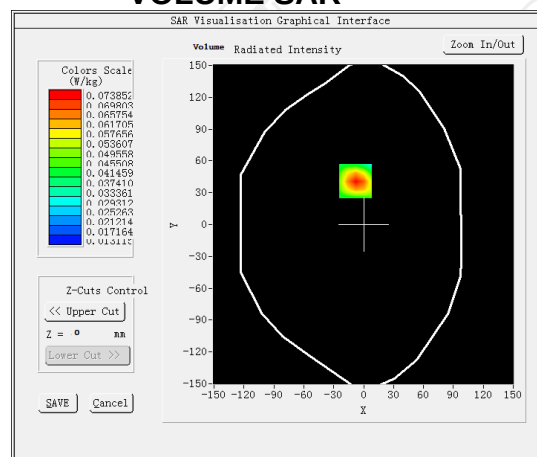
Date: 11/11/2022

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(0mm)
Band	IEEE 802.11n HT20 ISM

SURFACE SAR

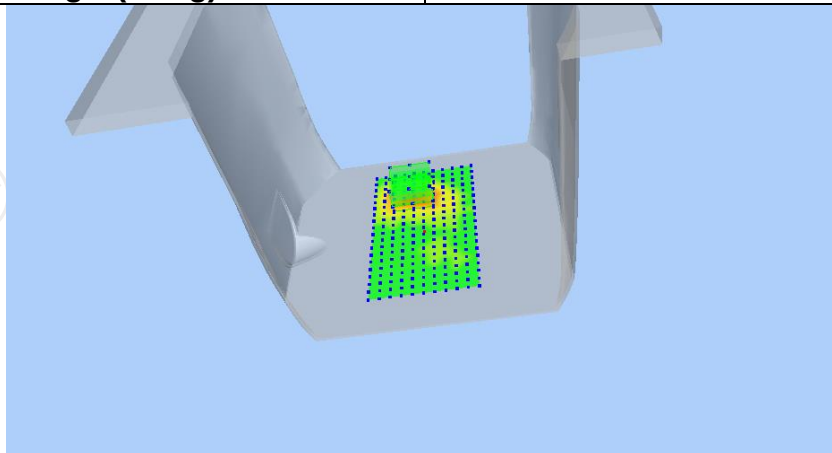


VOLUME SAR

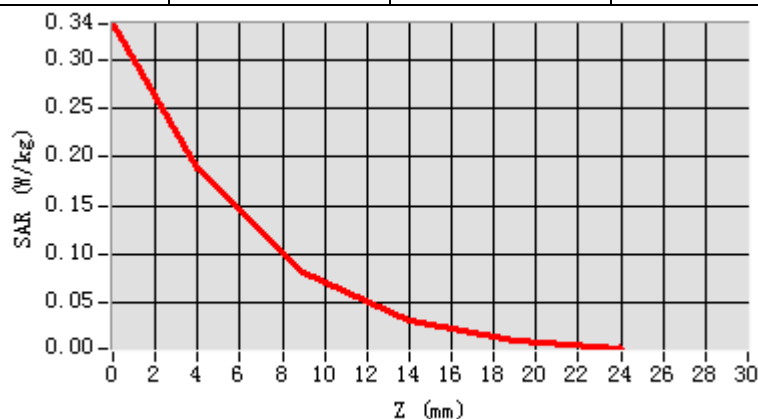


Maximum location: X=16.00, Y=63.00 SAR Peak: 0.10 W/kg

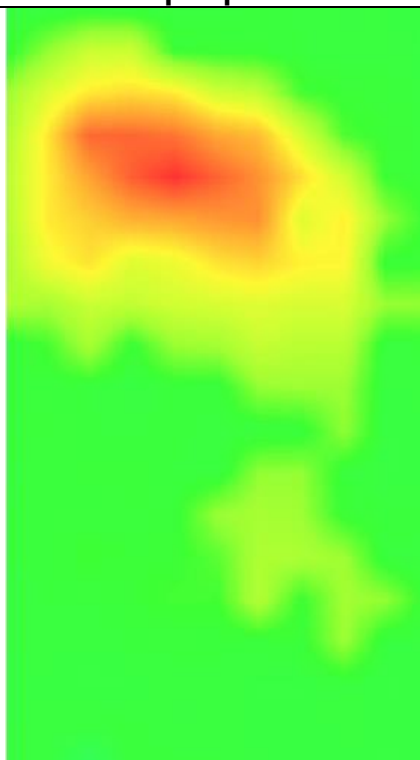
SAR 10g (W/Kg)	0.140642
SAR 1g (W/Kg)	0.268531



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



Hot spot position



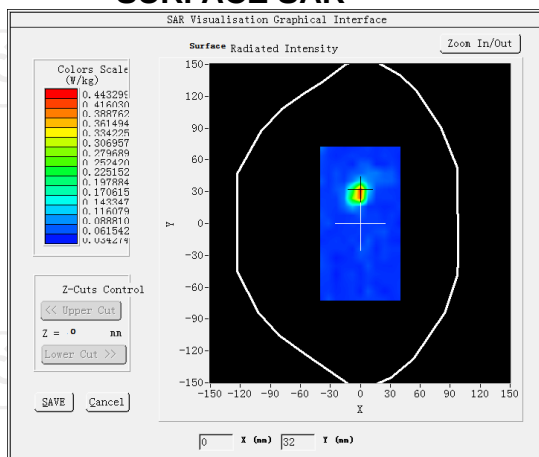
MEASUREMENT 2

SAR (Channel 48):

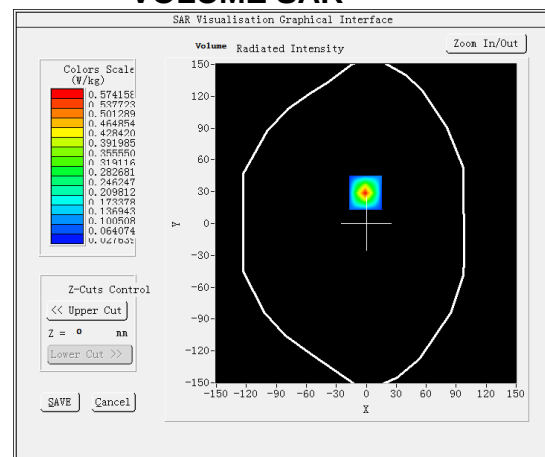
Date: 11/11/2022

Frequency (MHz)	5210.000000
Relative permittivity (real part)	35.068832
Relative permittivity (imaginary part)	13.679428
Conductivity (S/m)	5.220788
Variation (%)	2.280000
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(0mm)
Band	<u>IEEE 802.11n HT20 ISM (hotspot)</u>

SURFACE SAR

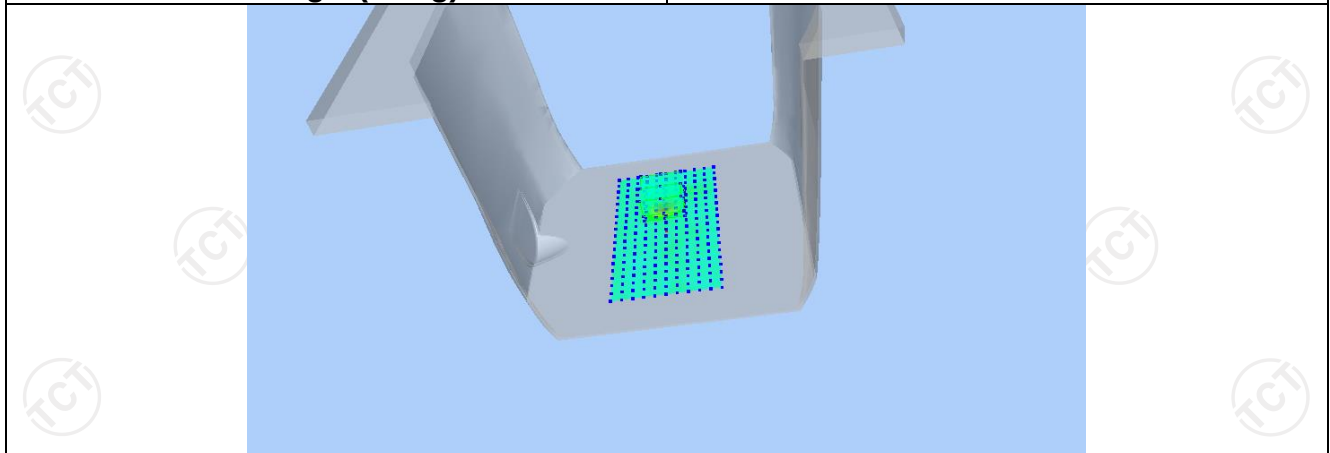


VOLUME SAR

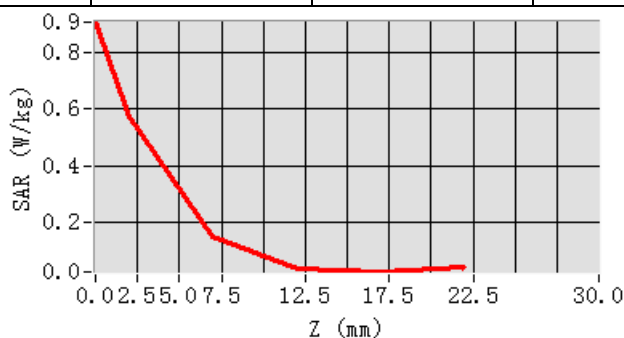


Maximum location: X=-1.00, Y=29.00 SAR Peak: 0.93 W/kg

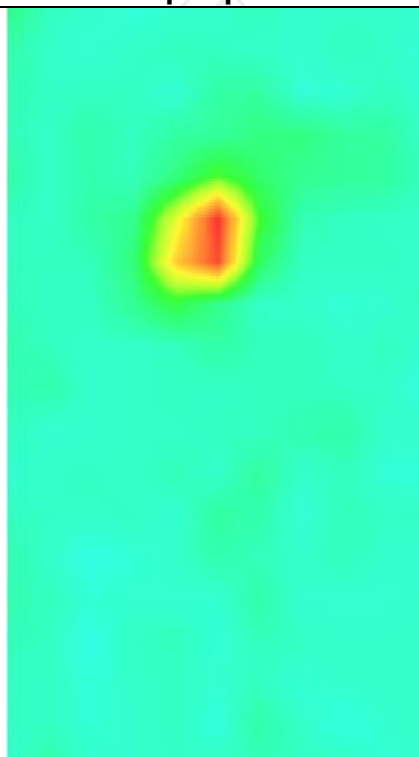
SAR 10g (W/Kg)	0.179222
SAR 1g (W/Kg)	0.277517



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



WLAN 5.8G

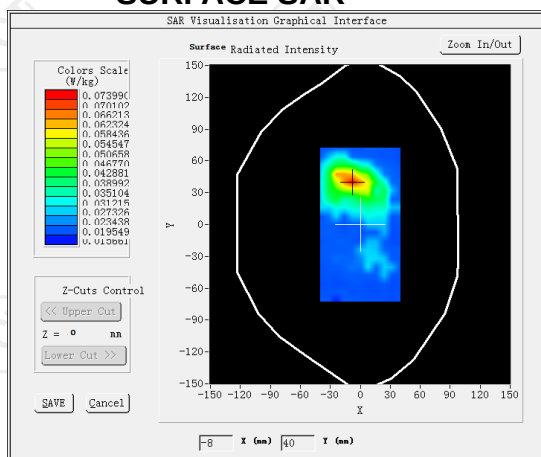
MEASUREMENT 1

SAR (Channel 149):

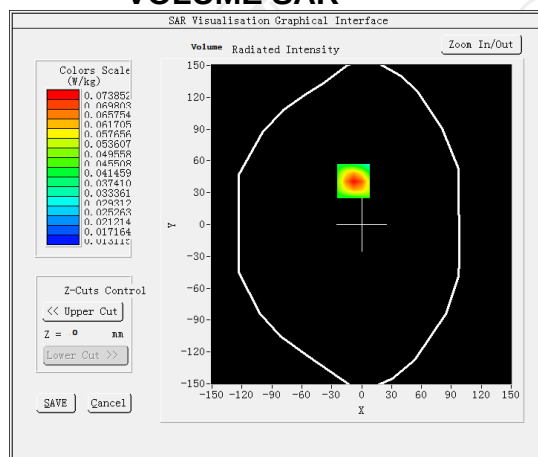
Date: 11/16/2022

Frequency (MHz)	5745.000000
Relative permittivity (real part)	38.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	5.430828
Variation (%)	-1.450000
Crest Factor	1.0
Probe Conversion factor	2.06
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(0mm)
Band	IEEE 802.11a ISM

SURFACE SAR

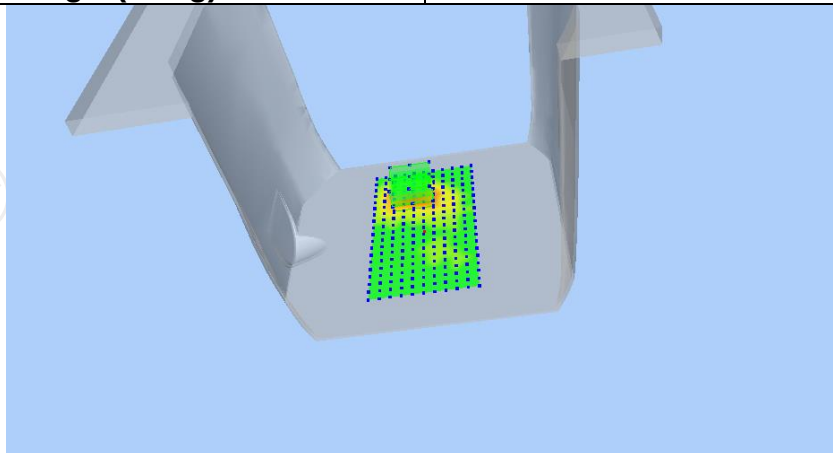


VOLUME SAR

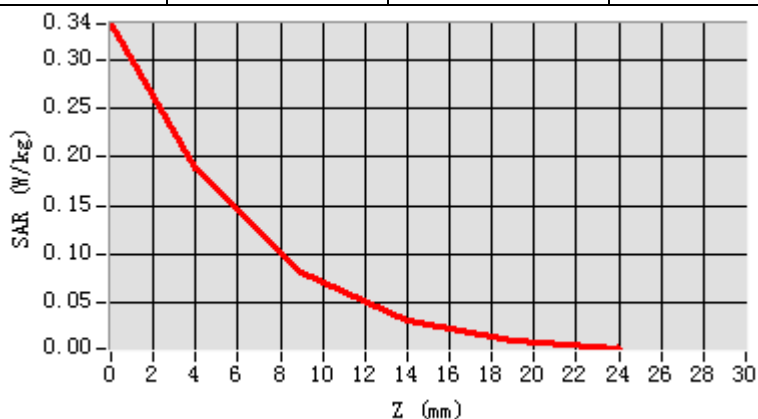


Maximum location: X=15.00, Y=60.00 SAR Peak: 0.34 W/kg

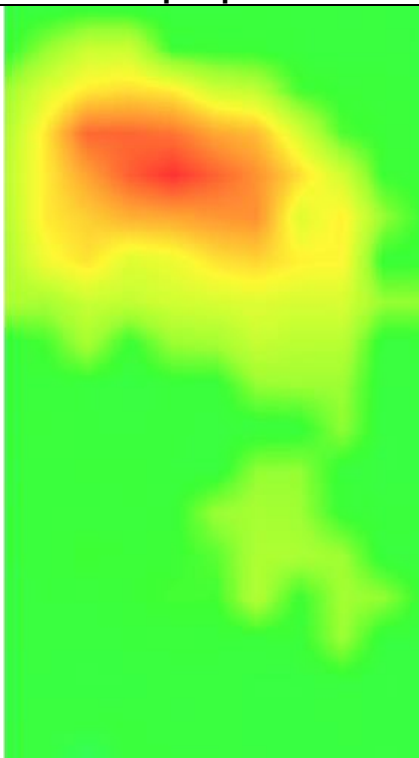
SAR 10g (W/Kg)	0.151431
SAR 1g (W/Kg)	0.205420



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



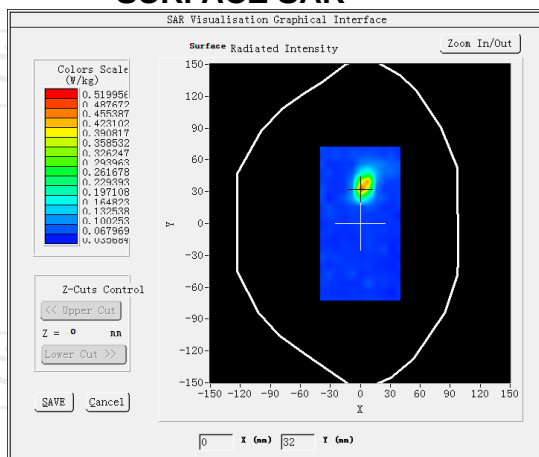
MEASUREMENT 2

SAR (Channel 149):

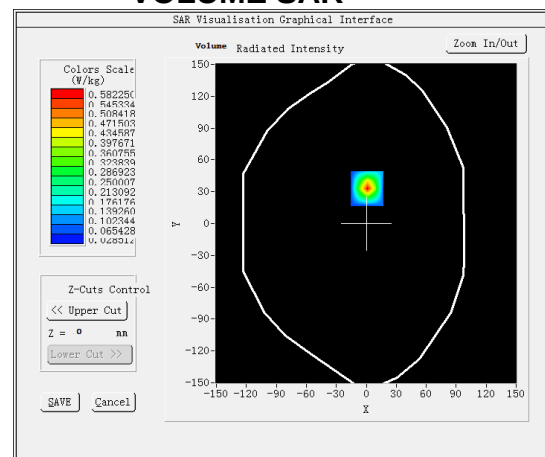
Date: 11/16/2022

Frequency (MHz)	5745.000000
Relative permittivity (real part)	38.352823
Relative permittivity (imaginary part)	13.671675
Conductivity (S/m)	5.430828
Variation (%)	2.540000
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 802.11a ISM (hotspot)</u>

SURFACE SAR

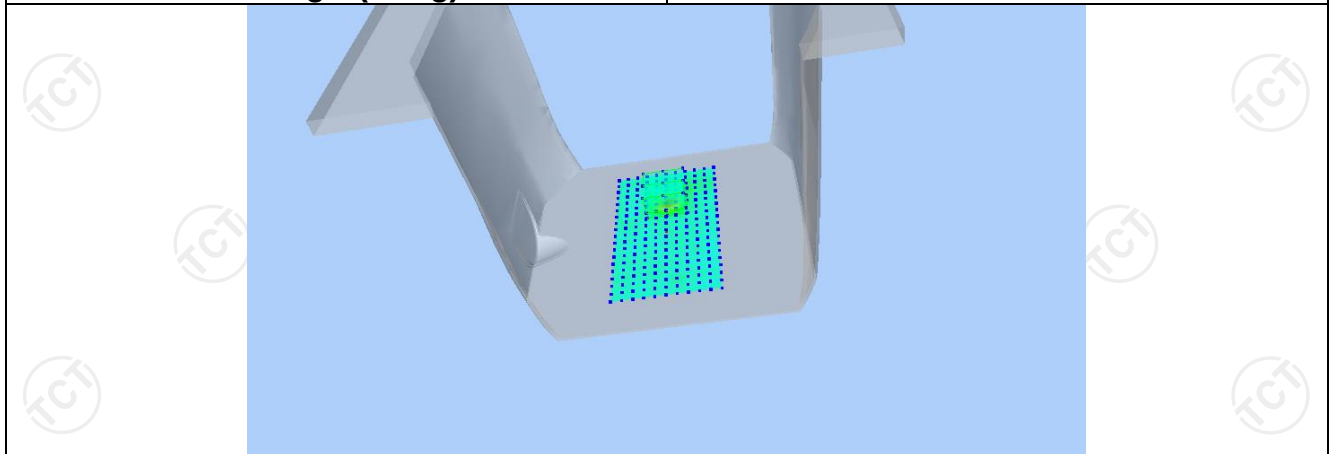


VOLUME SAR

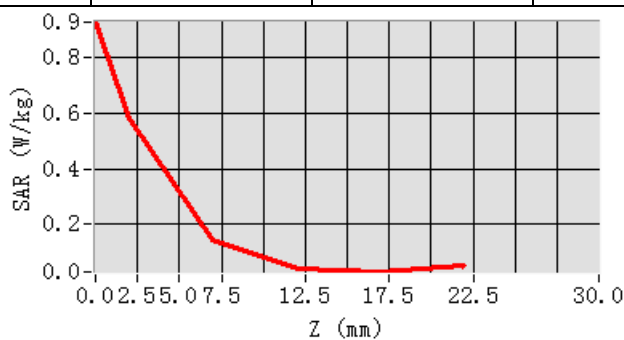


Maximum location: X=1.00, Y=33.00 SAR Peak: 0.97 W/kg

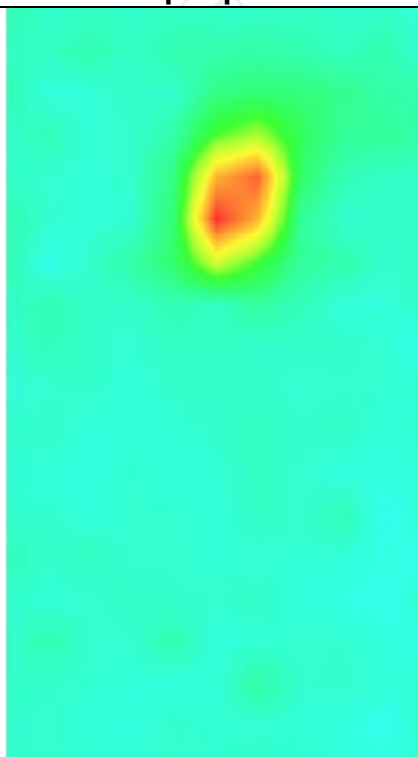
SAR 10g (W/Kg)	0.116442
SAR 1g (W/Kg)	0.226087



Z (mm)	0.00	2.00	7.00	12.00	17.00
SAR (W/Kg)	0.9300	0.5823	0.1459	0.0373	0.0285



Hot spot position



BT

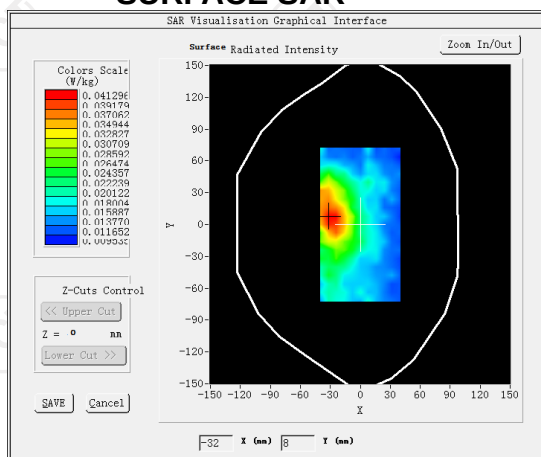
MEASUREMENT 1

Middle Band SAR (Channel 39):

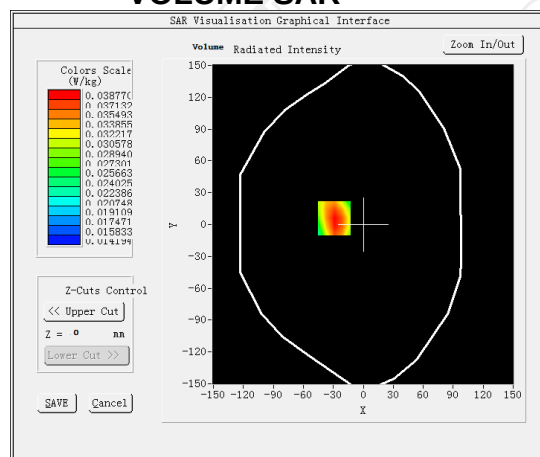
Date: 11/07/2022

Frequency (MHz)	2441.000000
Relative permittivity (real part)	37.821613
Relative permittivity (imaginary part)	13.546980
Conductivity (S/m)	1.834111
Variation (%)	1.910000
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(0mm)
Band	GFSK

SURFACE SAR

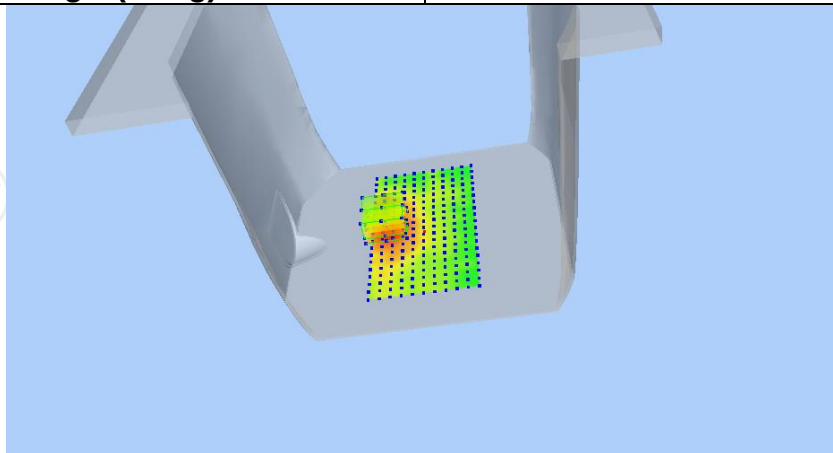


VOLUME SAR

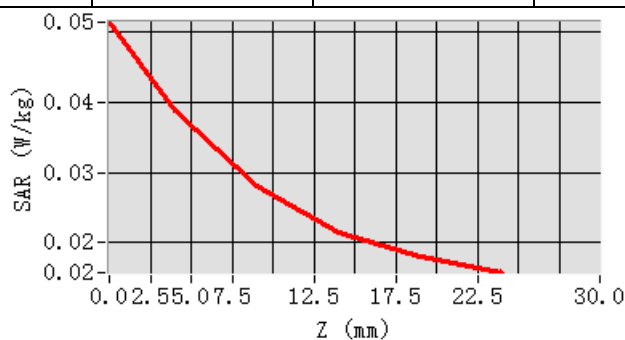


Maximum location: X=-29.00, Y=6.00 SAR Peak: 0.05 W/kg

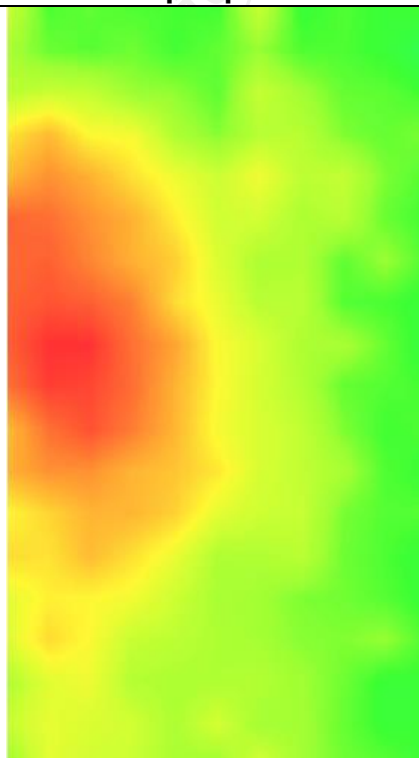
SAR 10g (W/Kg)	0.028107
SAR 1g (W/Kg)	0.037717



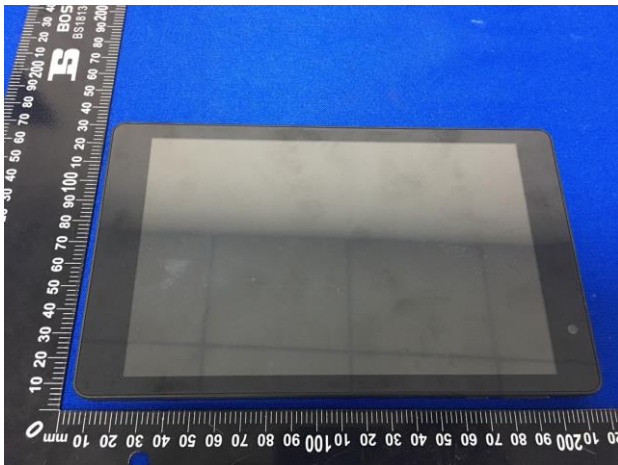
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0515	0.0388	0.0280	0.0215	0.0180



Hot spot position



Appendix A: EUT Photos



Liquid depth



The Body Liquid of 835MHz (15.4cm)



The Body Liquid of 1800MHz (15.2 cm)



The Body Liquid of 1900MHz (16.4 cm)



The Body Liquid of 2450MHz (15.3cm)



The Body Liquid of 2600MHz (16.5cm)

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



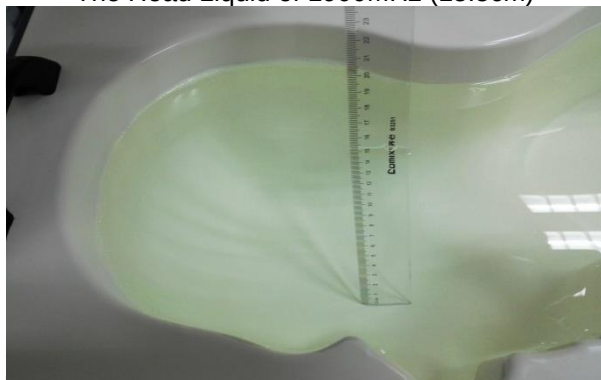
The Body Liquid of 750MHz (15.4cm)



The Head Liquid of 1900MHz (15.5cm)



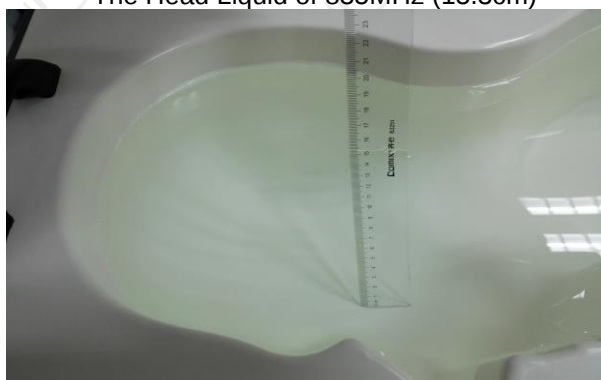
The Head Liquid of 2450MHz (15.6cm)



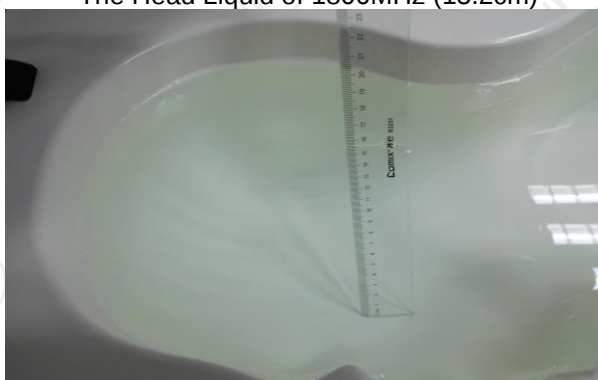
The Head Liquid of 835MHz (15.3cm)



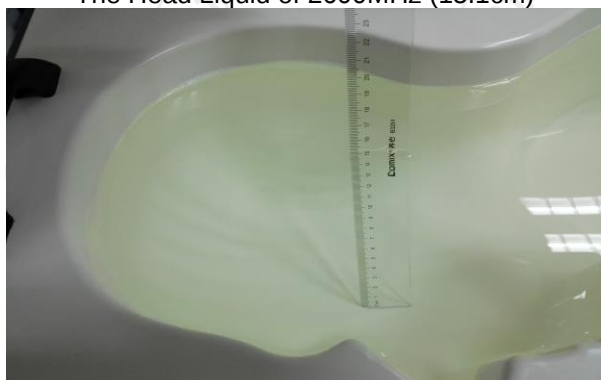
The Head Liquid of 1800MHz (15.2cm)



The Head Liquid of 2600MHz (15.1cm)



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



The Head Liquid of 750MHz (15.4cm)

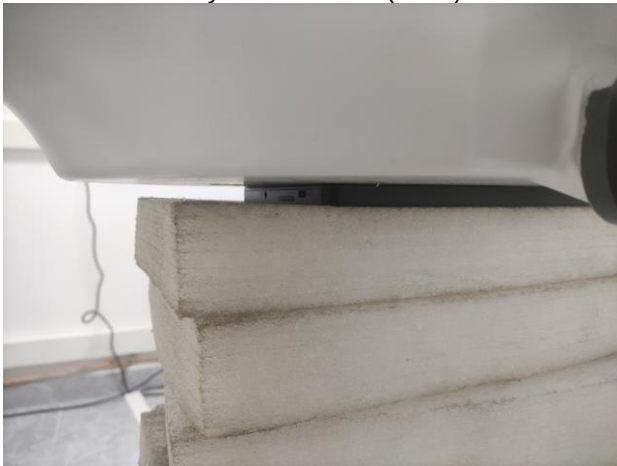
Appendix B: Test Setup Photos



Body worn – Front (0mm)



Body worn – Back (0mm)



Hotspo Front (0mm)



Hotspo Back (0mm)



Hotspot Bottom (0mm)

Appendix C: Probe Calibration Certificate

COMOSAR E-FIELD Probe



COMOSAR E-Field Probe Calibration Report

Ref : ACR.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

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

	<i>Customer Name</i>
<i>Distribution :</i>	SHENHEN TCT TESTING TECHNOLOGY CO., LTD

<i>Issue</i>	<i>Name</i>	<i>Date</i>	<i>Modifications</i>
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.

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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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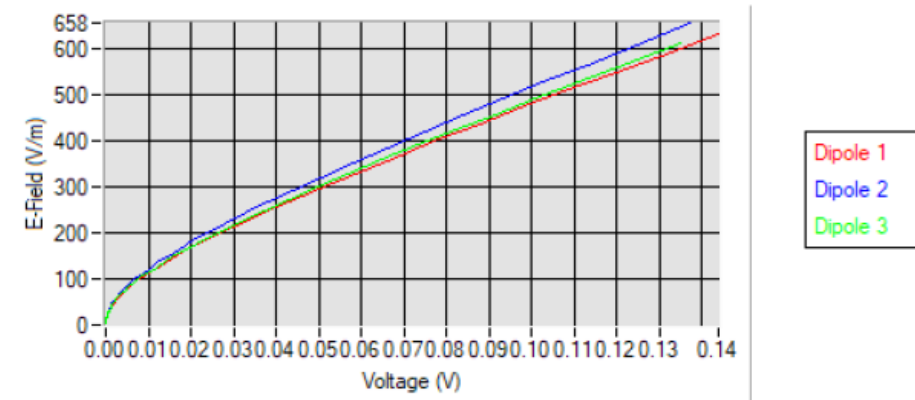
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COMOSAR E-FIELD PROBE CALIBRATION REPORT

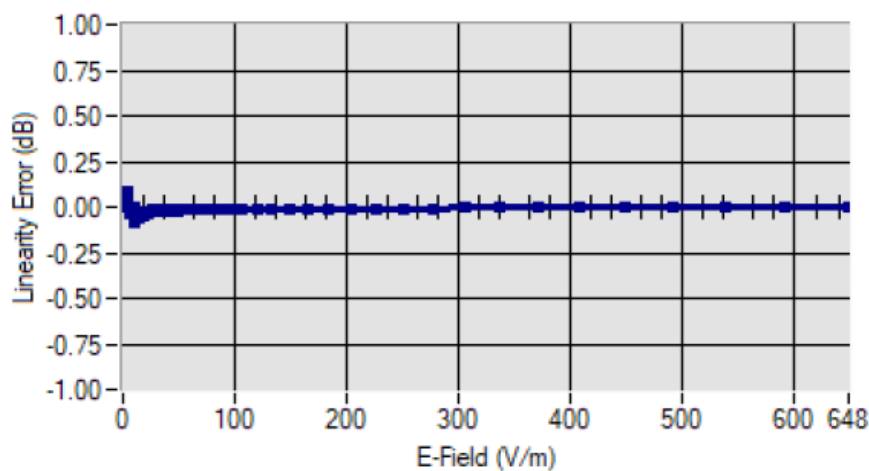
Ref: ACR.297.1.20.MVGB.A

Calibration curves



5.2 LINEARITY

Linearity



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



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

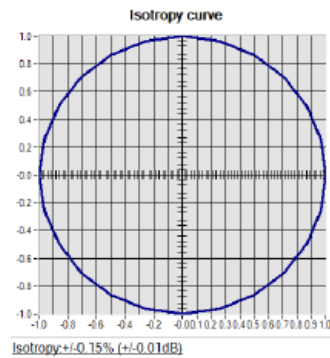


COMOSAR E-FIELD PROBE CALIBRATION REPORT

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5.4 ISOTROPY

HL1800 MHz



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COMOSAR E-FIELD PROBE CALIBRATION REPORT

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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	05/2022	05/2024
Network Analyzer – Calibration kit	Rohde & Schwarz ZV-Z235	101223	05/2022	05/2024
Multimeter	Keithley 2000	1160271	02/2020	02/2023
Signal Generator	Rohde & Schwarz SMB	106589	04/2022	04/2024
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	NI-USB 5680	170100013	05/2022	05/2024
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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Template_ACR.DDD.N.YY.MVGB.ISSUE_COMOSAR Probe vH

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Dielectric Probe Calibration Report

Ref : ACR.138.4.33.SATU.A

SHENZHEN TCT TESTING TECHNOLOGY CO., LTD
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PEOPLES REPUBLIC OF CHINA

MVG COMOSAR DOSIMETRIC E-FIELD PROBE

FREQUENCY: 0.3-6 GHZ

SERIAL NO.: SN 19/15 OCPG 71

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



Calibration Date: 06/05/2021

Summary:

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



SAR DIELECTRIC PROBE CALIBRATION REPORT

Ref: ACR.138.4.33..SATUA

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

	Customer Name
Distribution :	SHENZHEN TONGCE TESTING LAB

Issue	Date	Modifications
A	06/05/2021	Initial release

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