

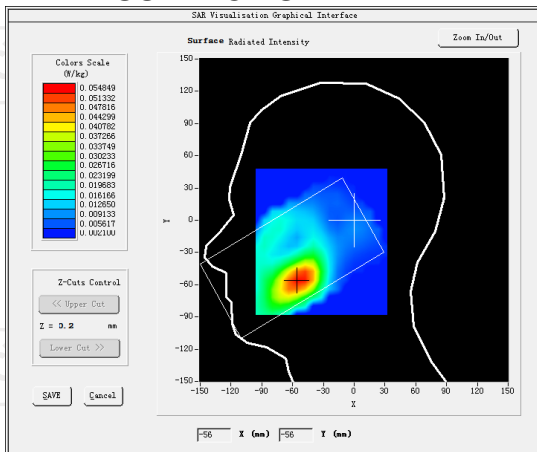
MEASUREMENT 1

Lower Band SAR (Channel 18700):

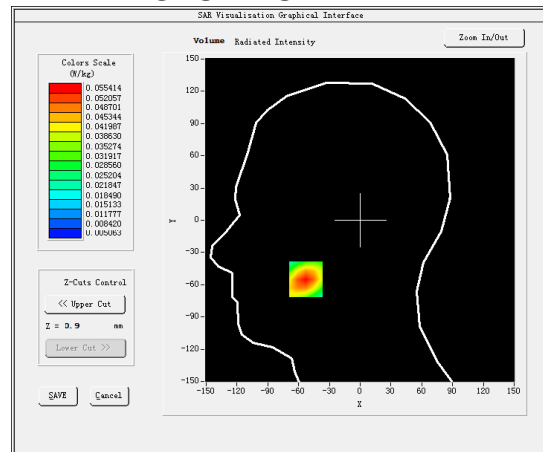
Date: 09/07/2020

Frequency (MHz)	1860.000000
Relative permittivity (real part)	39.105208
Relative permittivity (imaginary part)	12.607628
Conductivity (S/m)	1.342108
Variation (%)	-1.470000
Crest Factor	1.0
Probe Conversion factor	4.85
E-Field Probe:	SSE2 (SN 41/18 EPGO331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Right head</u>
Device Position	<u>Cheek</u>
Band	<u>LTE band 2 (1 RB#49)</u>

SURFACE SAR



VOLUME SAR



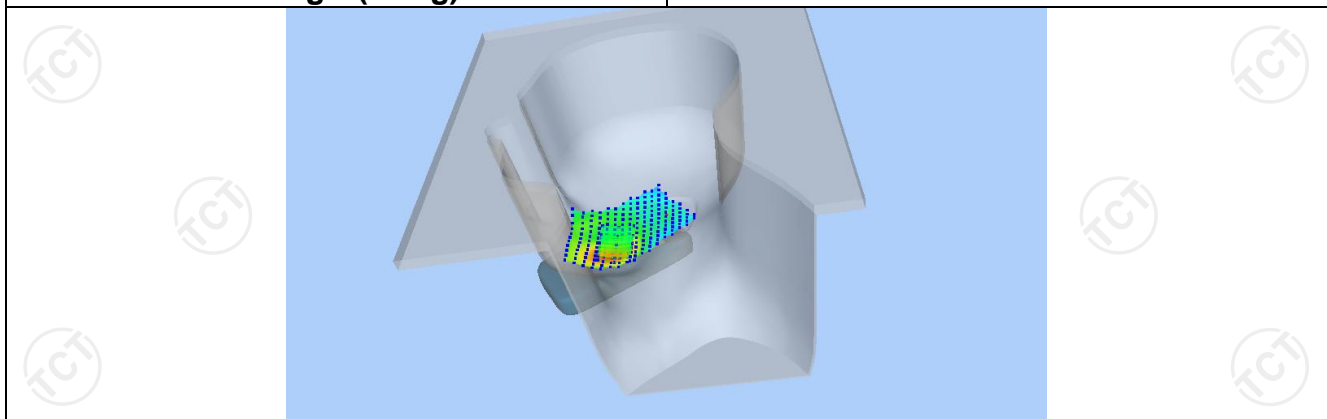
Maximum location: X=-53.00, Y=-55.00
SAR Peak: 0.08 W/kg

SAR 10g (W/Kg)

0.031134

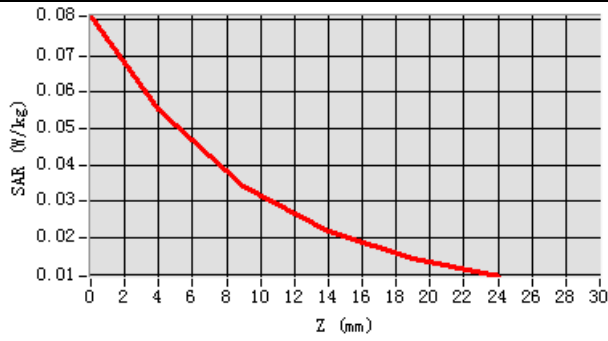
SAR 1g (W/Kg)

0.052259

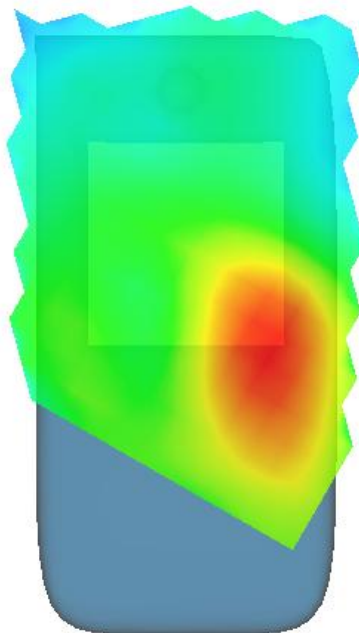


Z (mm)	0.00	4.00	9.00	14.00	19.00
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SAR (W/Kg)	0.0808	0.0554	0.0343	0.0216	0.0142
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Hot spot position

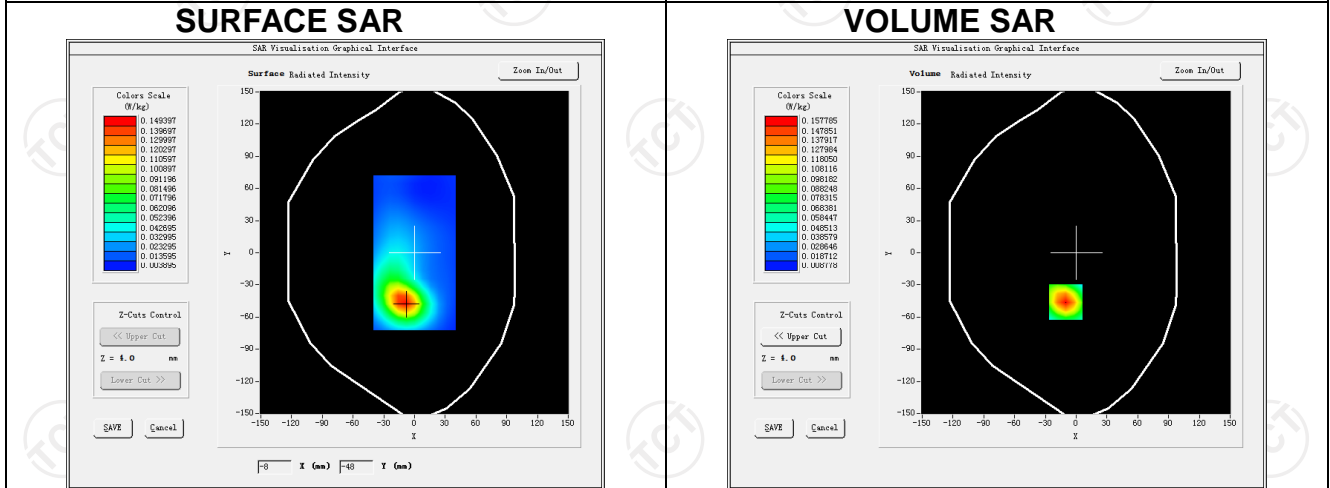


MEASUREMENT 2

Frequency (MHz)	1850.700000
Relative permittivity (real part)	53.341337
Relative permittivity (imaginary part)	14.232400
Conductivity (S/m)	1.491736
Variation (%)	-0.610000
Crest Factor	1.0
Probe Conversion factor	5.01
E-Field Probe:	SSE2 (SN 41/18 EPGO331)
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 front(10mm)</u>

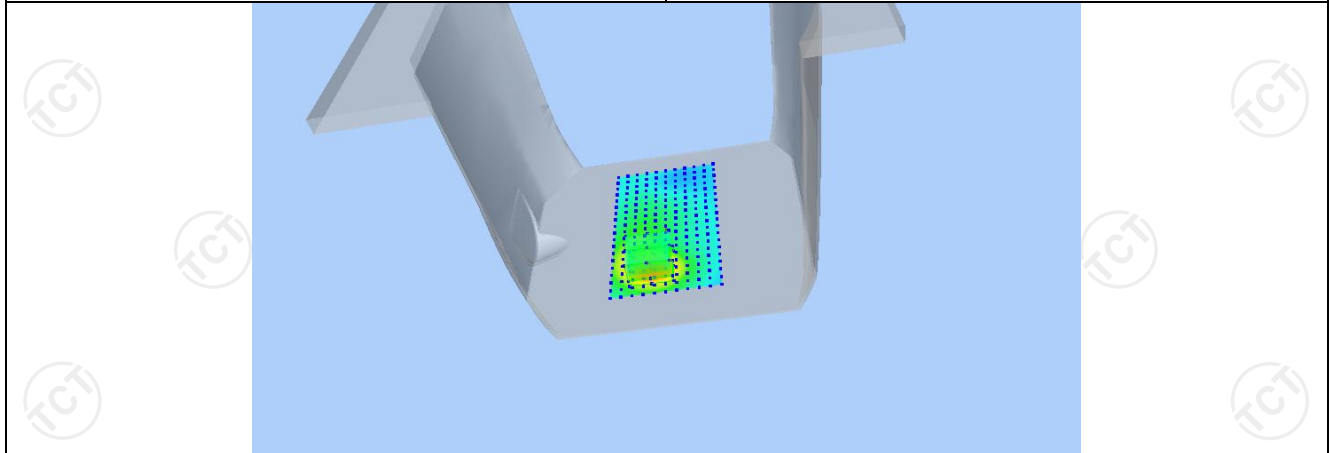
Band	<u>LTE band 2 (1 RB#49)</u>
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Maximum location: X=-10.00, Y=-46.00

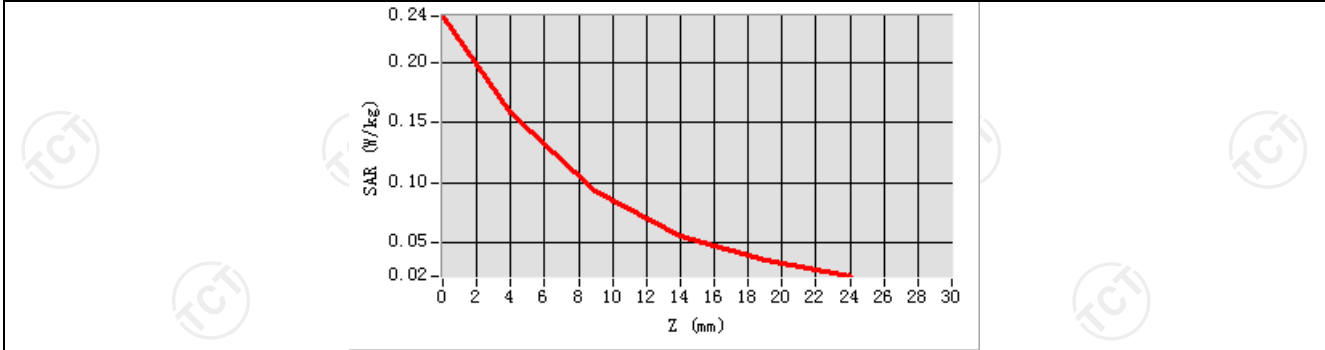
SAR Peak: 0.24 W/kg

SAR 10g (W/Kg)	0.082161
SAR 1g (W/Kg)	0.147022

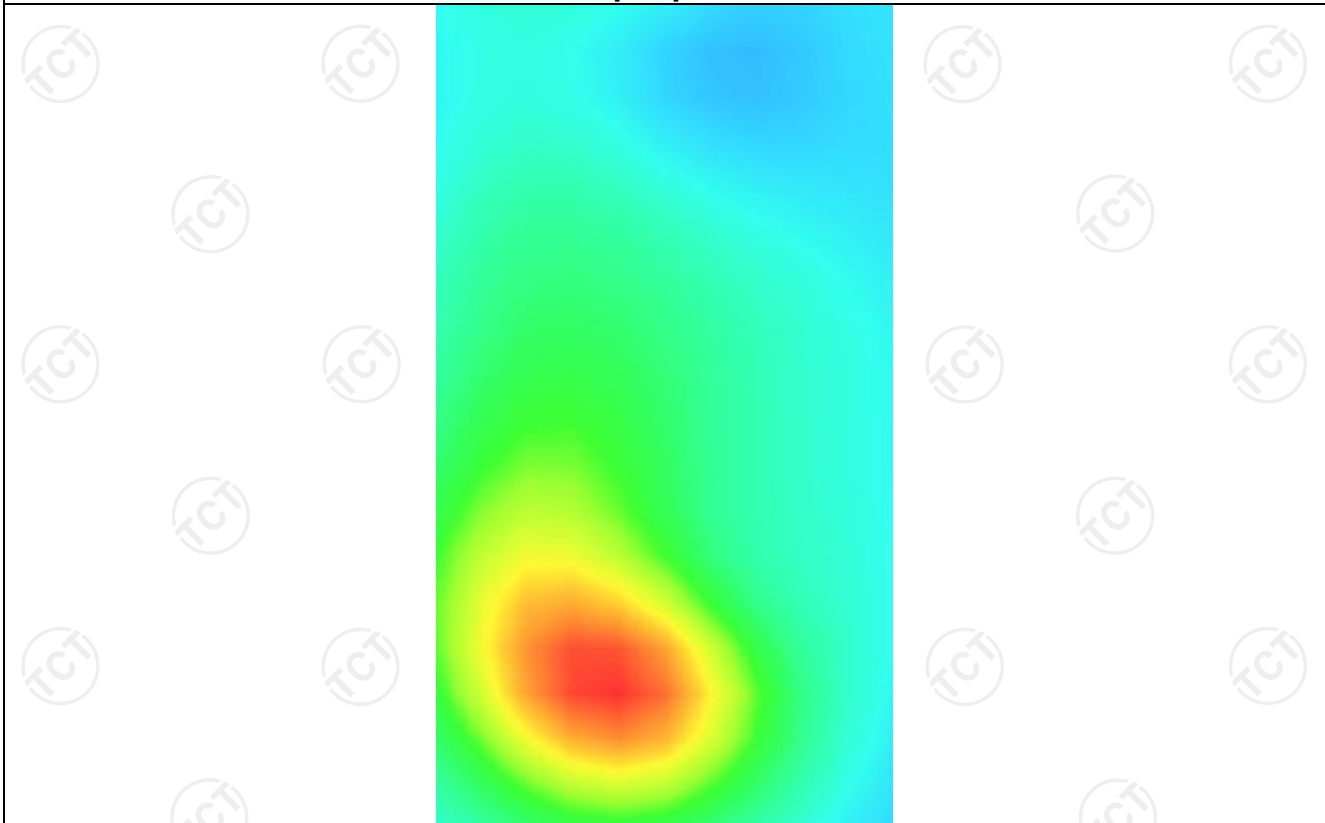


Z (mm)	0.00	4.00	9.00	14.00	19.00
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SAR (W/Kg)	0.2381	0.1578	0.0930	0.0557	0.0351
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Hot spot position



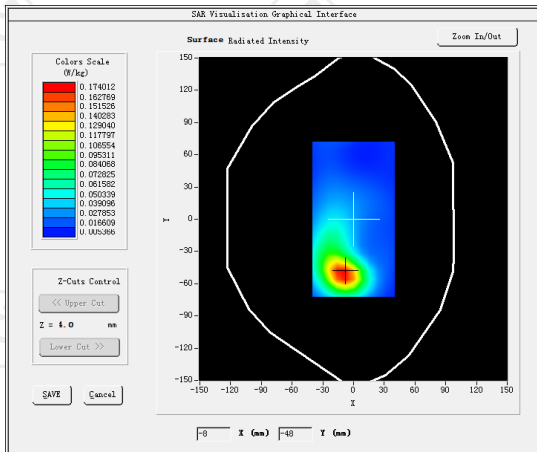
MEASUREMENT 3

Lower Band SAR (Channel 18700)::

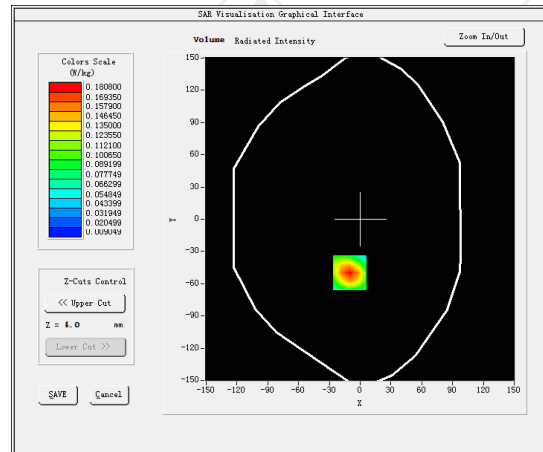
Date: 09/07/2020

Frequency (MHz)	1850.700000
Relative permittivity (real part)	53.341337
Relative permittivity (imaginary part)	14.232400
Conductivity (S/m)	1.491736
Variation (%)	-0.500000
Crest Factor	1.0
Probe Conversion factor	5.01
E-Field Probe:	SSE2 (SN 41/18 EPG0331)
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 front(hotspot 10mm)</u>
Band	<u>LTE band 2 (1 RB#49)</u>

SURFACE SAR



VOLUME SAR



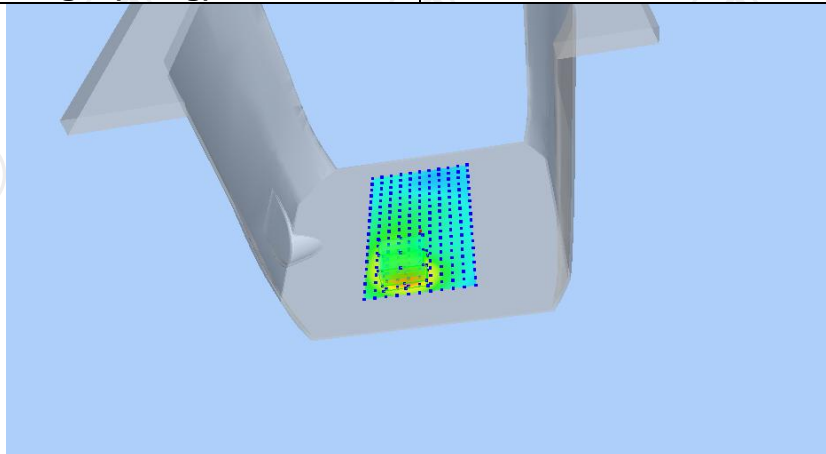
Maximum location: X=-10.00, Y=-50.00
SAR Peak: 0.26 W/kg

SAR 10g (W/Kg)

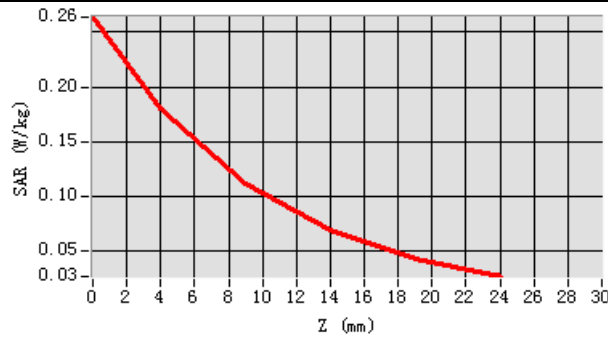
0.095597

SAR 1g (W/Kg)

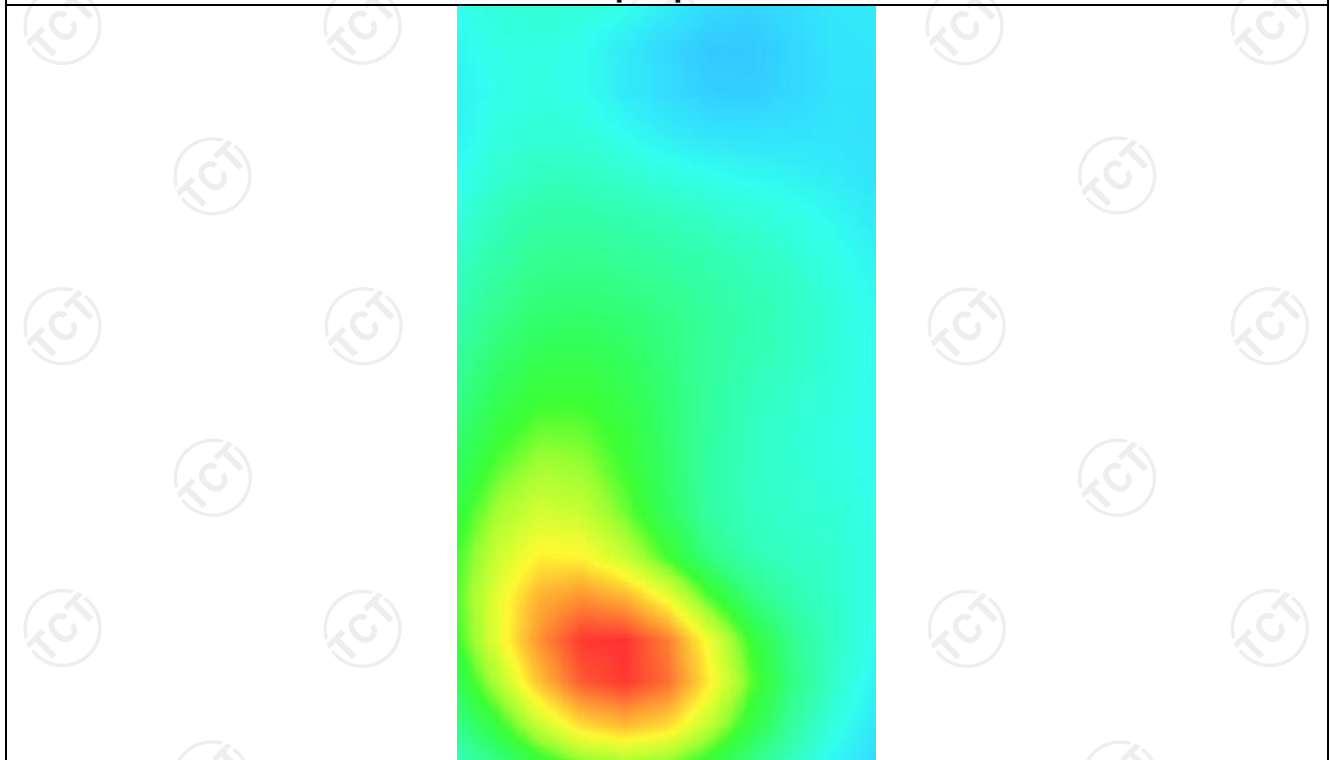
0.168270



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2638	0.1808	0.1111	0.0685	0.0432



Hot spot position



LTE Band 4

MEASUREMENT 1

Lower Band SAR (Channel 20050):	Date: 09/03/2020
Frequency (MHz)	1720.000000
Relative permittivity (real part)	39.101249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.350792
Variation (%)	1.630000
Crest Factor	1.0
Probe Conversion factor	4.38
E-Field Probe:	SSE2 (SN 41/18 EPgo331)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm

ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
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Phantom	<u>Right head</u>
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Device Position	<u>Cheek</u>
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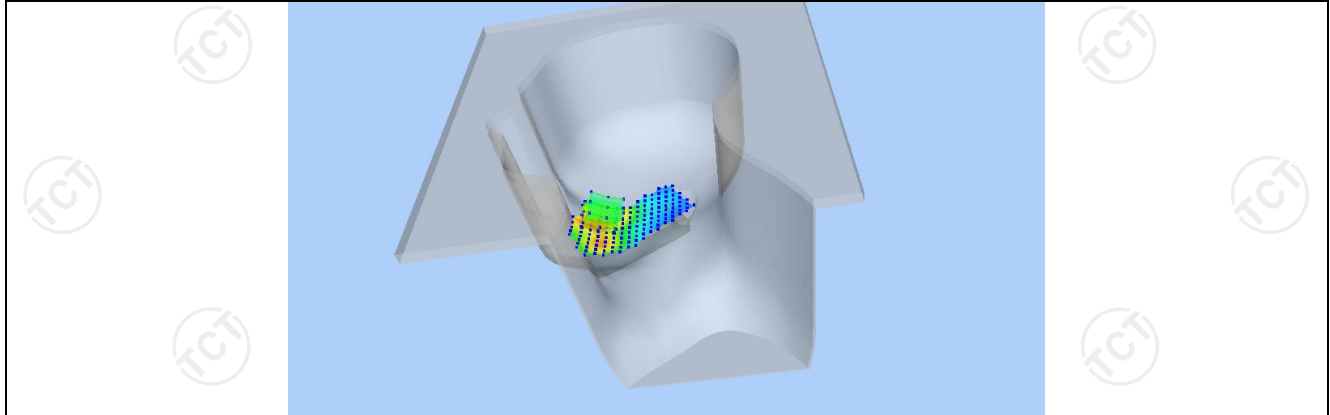
Band	<u>LTE band 4(1 RB#49)</u>
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SURFACE SAR	VOLUME SAR

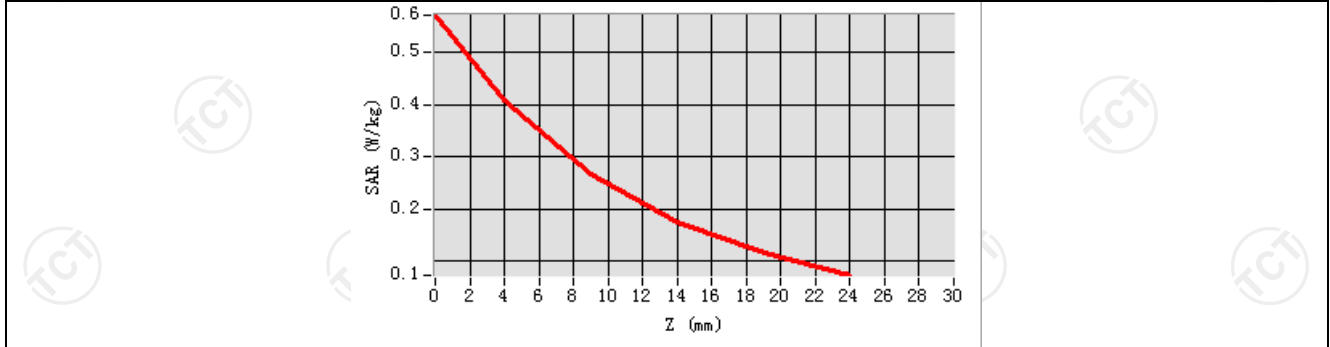
Maximum location: X=-73.00, Y=-15.00
SAR Peak: 0.57 W/kg

SAR 10g (W/Kg)	0.239200
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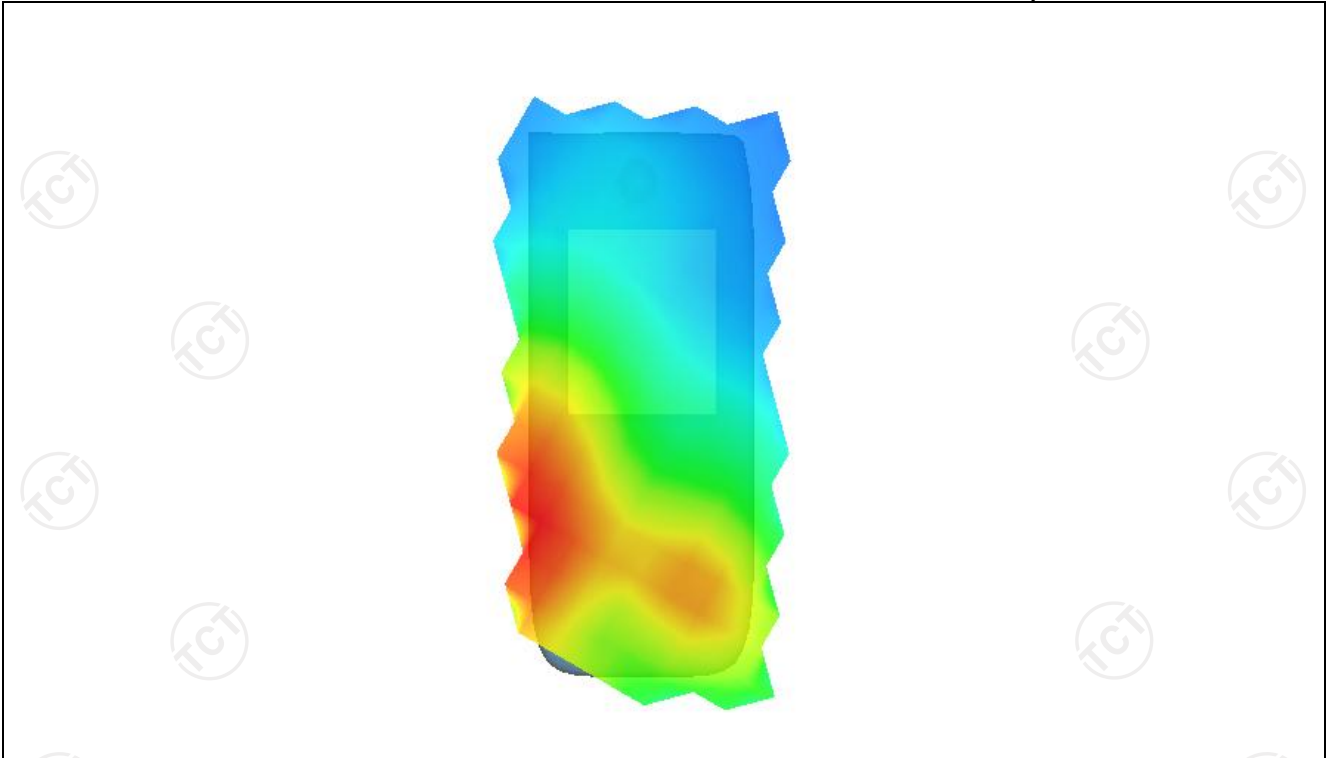
SAR 1g (W/Kg)	0.387011
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Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.5718	0.4096	0.2668	0.1740	0.1145



Hot spot position



MEASUREMENT 2

Lower Band SAR (Channel 20050):

Date: 09/03/2020

Frequency (MHz)	1720.000000
Relative permittivity (real part)	53.321249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.502592
Variation (%)	-3.540000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE2 (SN 41/18 EPgo331)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm

ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
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Phantom	<u>Validation plane</u>
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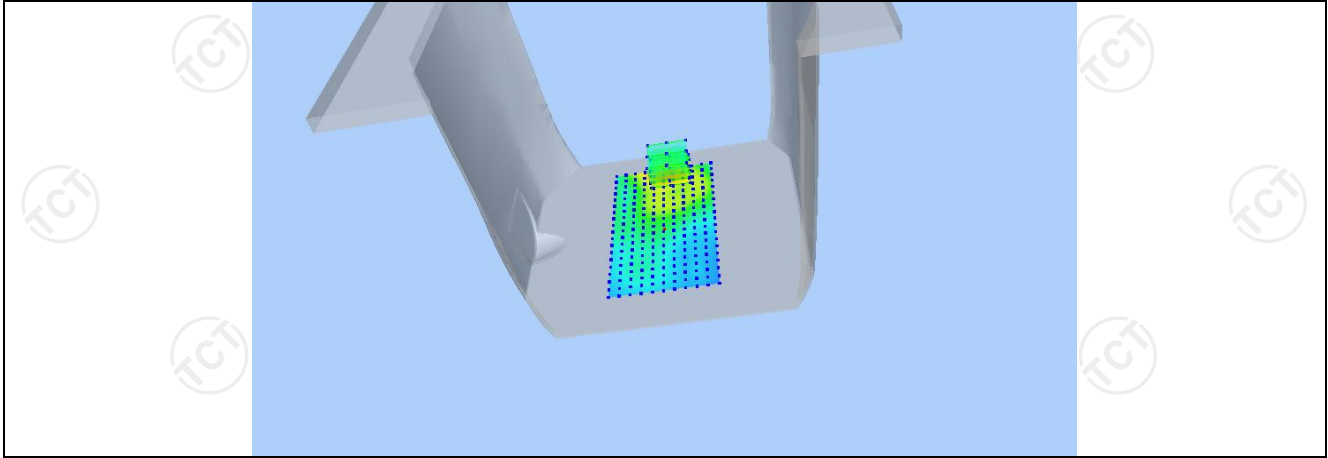
Device Position	<u>Body back(10mm)</u>
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Band	<u>LTE band 4(1 RB#49)</u>
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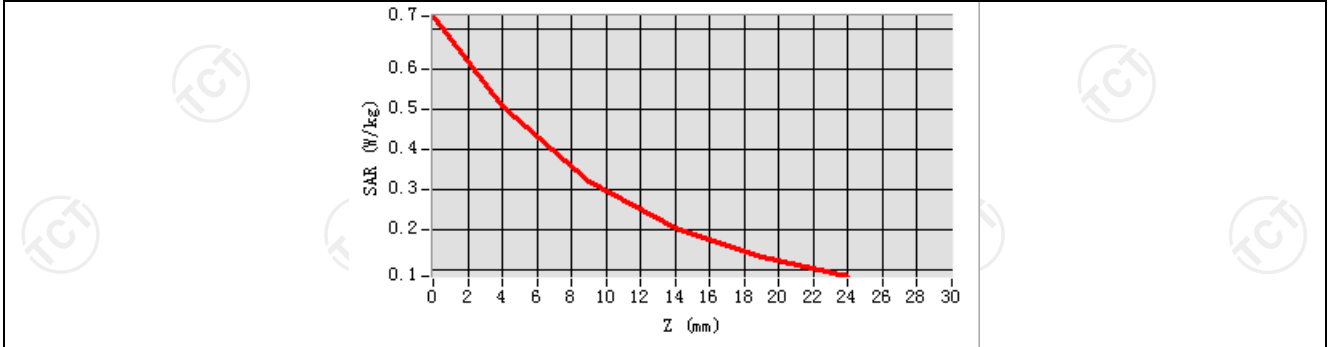
SURFACE SAR	VOLUME SAR

Maximum location: X=6.00, Y=65.00
SAR Peak: 0.74 W/kg

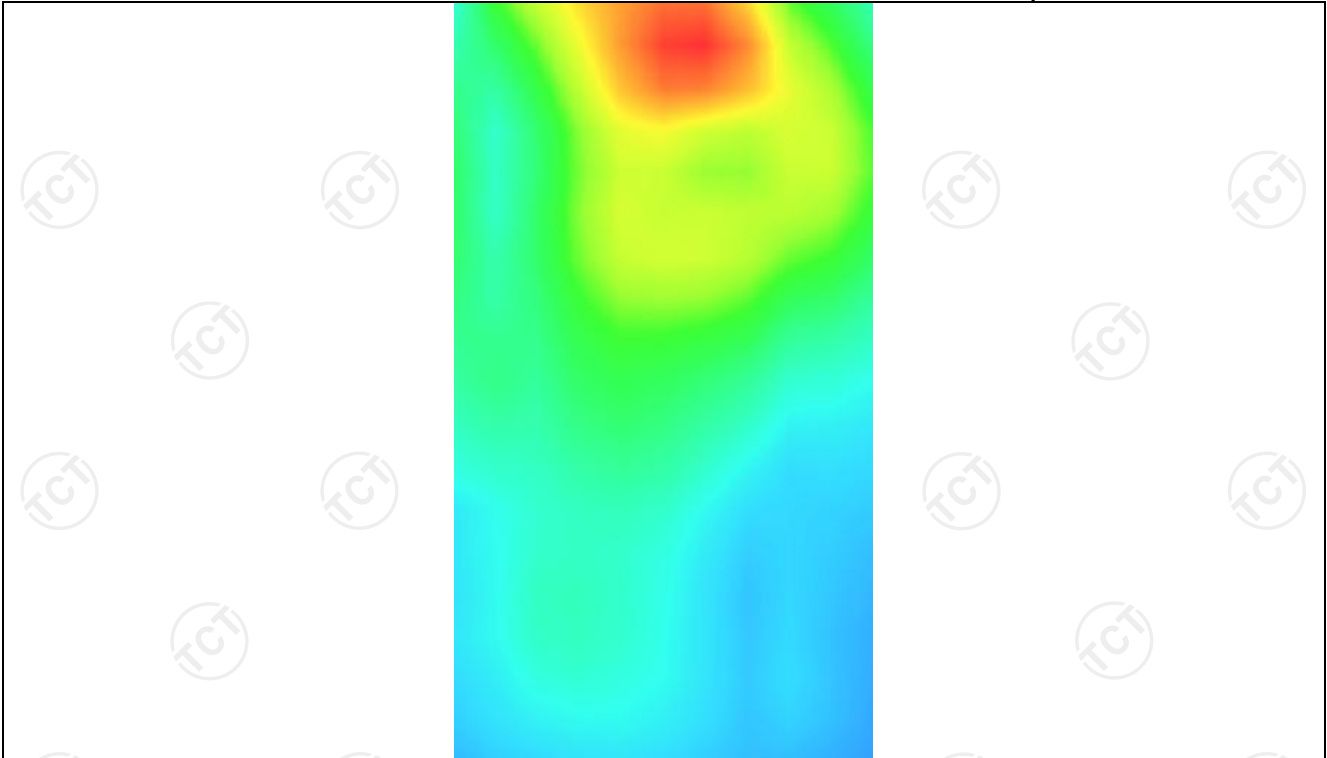
SAR 10g (W/Kg)	0.276556
SAR 1g (W/Kg)	0.476892



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7321	0.5084	0.3185	0.2012	0.1302



Hot spot position



MEASUREMENT 3

Lower Band SAR (Channel 20050):

Date: 09/03/2020

Frequency (MHz)	1720.000000
Relative permittivity (real part)	53.321249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.502592
Variation (%)	-2.360000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE2 (SN 41/18 EPgo331)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm

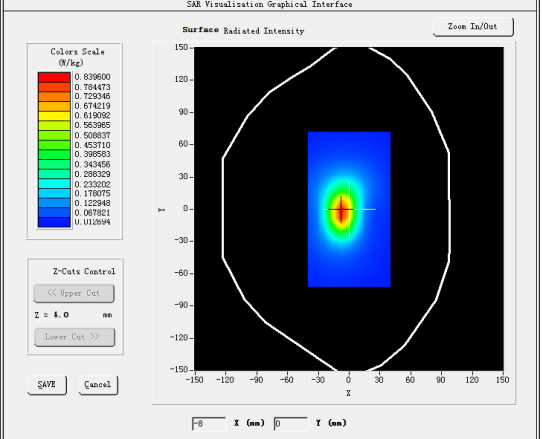
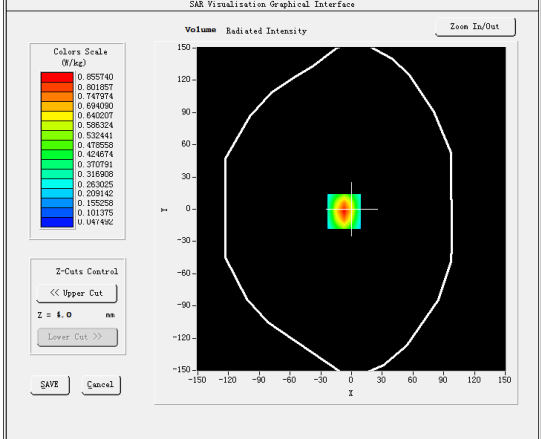
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
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Phantom	<u>Validation plane</u>
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Device Position	<u>Body back(hotspot 10mm)</u>
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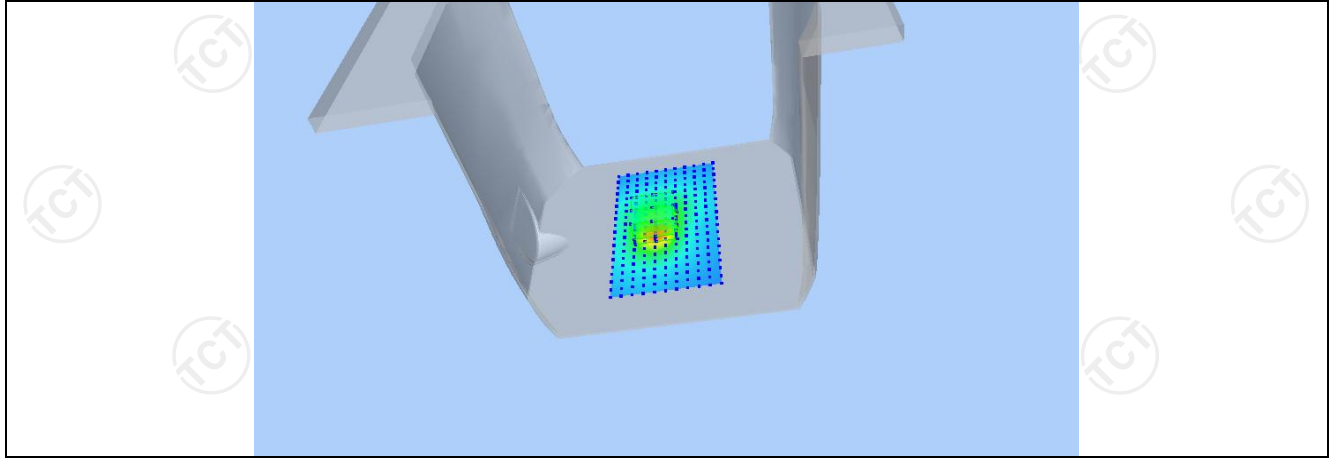
Band	<u>LTE band 4(1 RB#49)</u>
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SURFACE SAR	VOLUME SAR
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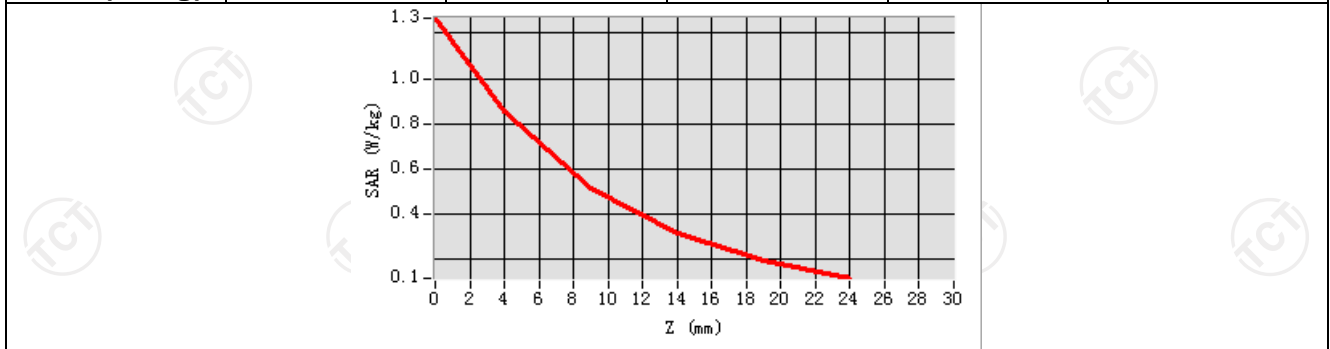



Maximum location: X=-7.00, Y=-2.00
SAR Peak: 1.27 W/kg

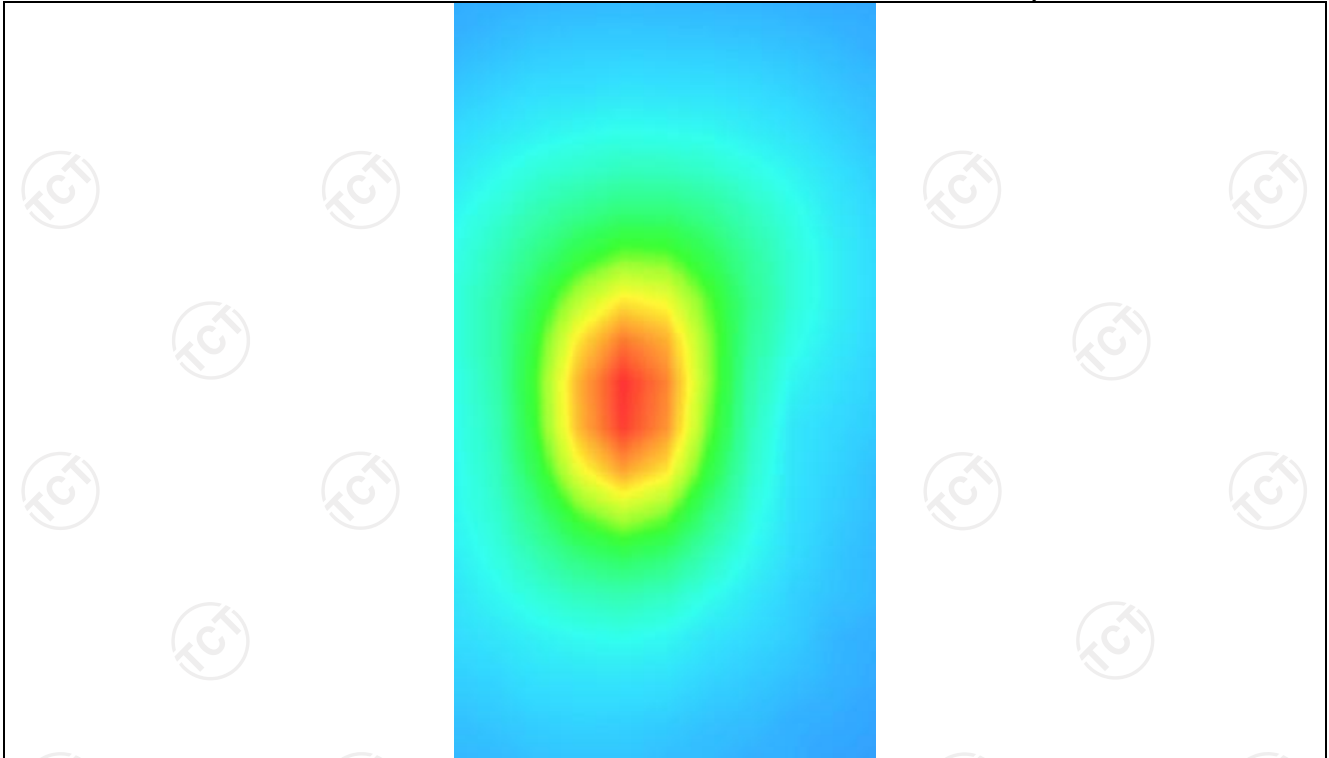
SAR 10g (W/Kg)	0.128262
SAR 1g (W/Kg)	0.486647



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.2663	0.8557	0.5155	0.3120	0.1937



Hot spot position



LTE Band 5

MEASUREMENT 1

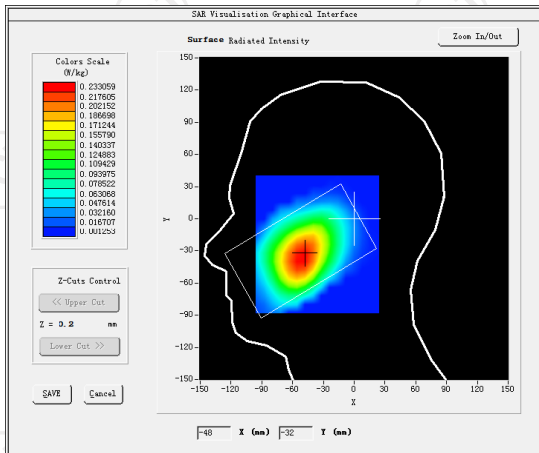
High Band SAR (Channel 20600):

Date: 08/31/2020

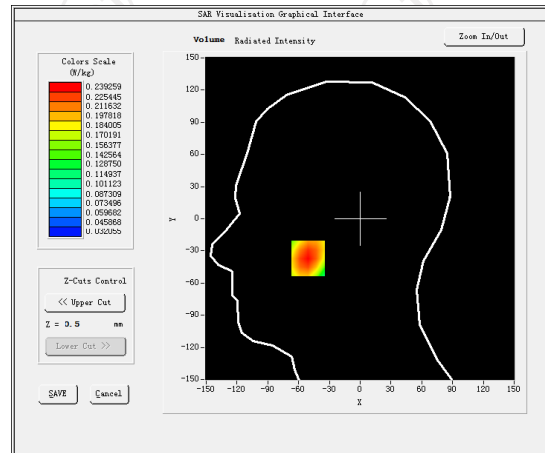
Frequency (MHz)	844.000000
Relative permittivity (real part)	40.392976
Relative permittivity (imaginary part)	12.468860
Conductivity (S/m)	0.882835
Variation (%)	1.690000
Crest Factor	1.0
Probe Conversion factor	4.38
E-Field Probe:	SSE2 (SN 41/18 EPGO331)

Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Right head</u>
Device Position	<u>Cheek</u>
Band	<u>LTE band 5(1 RB#0)</u>

SURFACE SAR

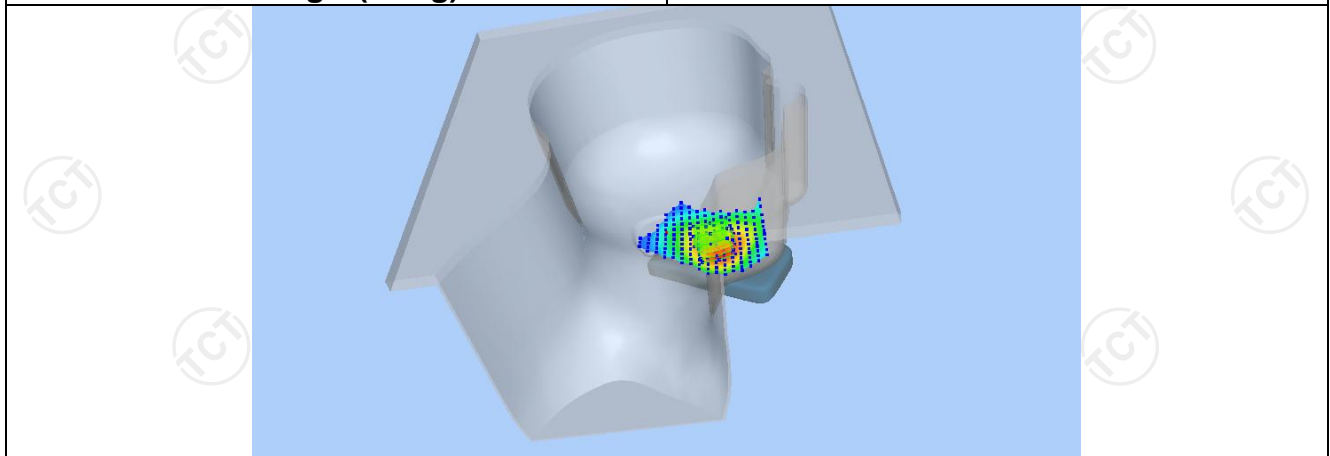


VOLUME SAR

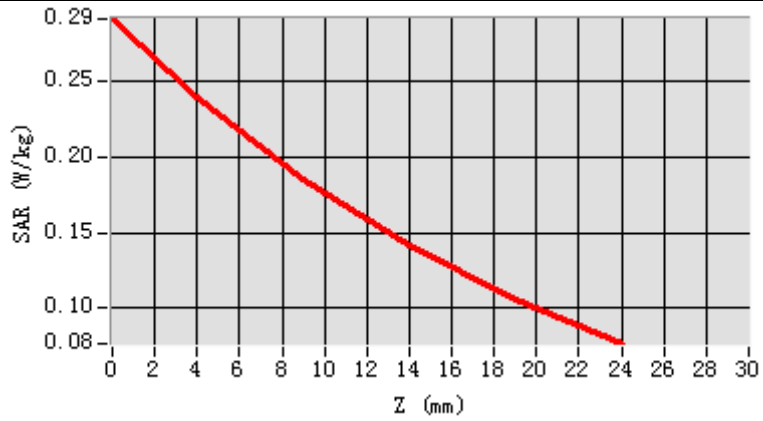


Maximum location: X=-51.00, Y=-37.00 SAR Peak: 0.29 W/kg

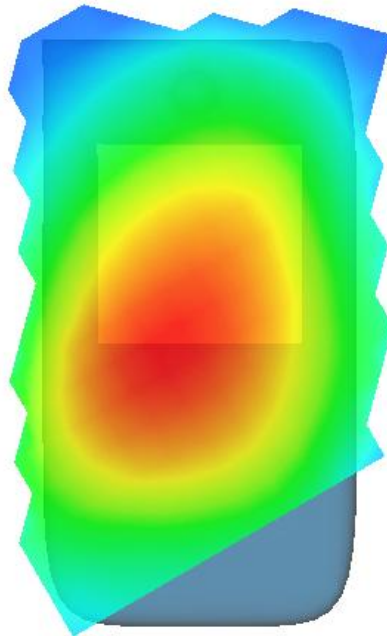
SAR 10g (W/Kg)	0.163789
SAR 1g (W/Kg)	0.219156



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



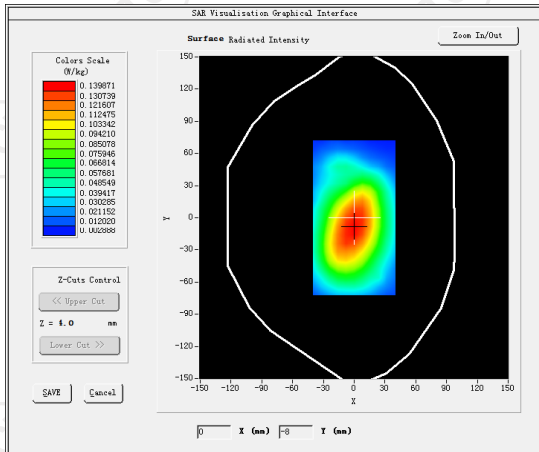
MEASUREMENT 2

High Band SAR (Channel 20600)

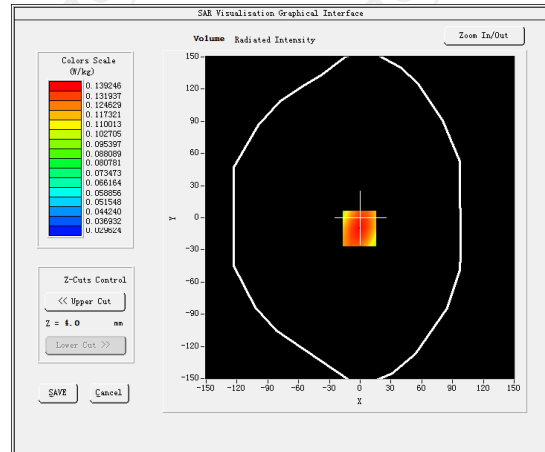
Date: 08/31/2020

Frequency (MHz)	844.000000
Relative permittivity (real part)	55.210832
Relative permittivity (imaginary part)	12.468860
Conductivity (S/m)	0.974272
Variation (%)	-1.510000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE2 (SN 41/18 EPG0331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(10mm)</u>
Band	<u>LTE band 5(1 RB#0)</u>

SURFACE SAR



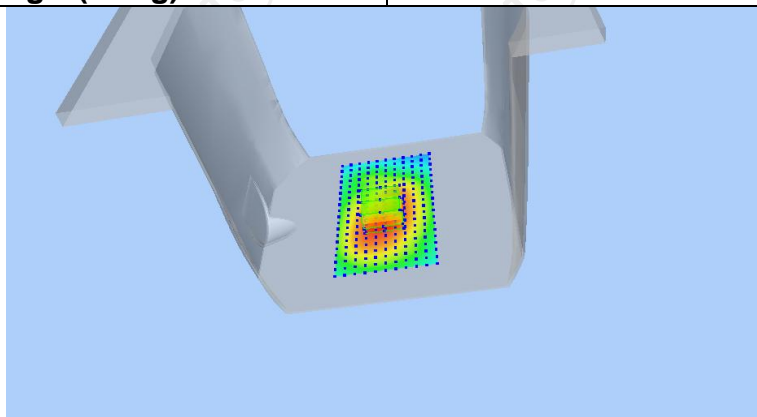
VOLUME SAR



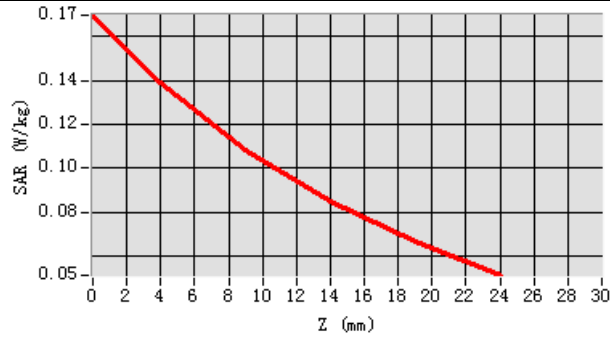
Maximum location: X=-1.00, Y=-10.00
SAR Peak: 0.17 W/kg

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

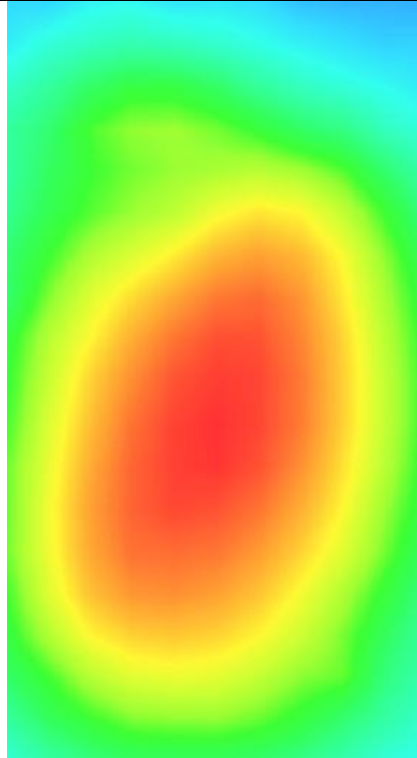
0.100074
0.135032



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1698	0.1392	0.1085	0.0847	0.0663



Hot spot position

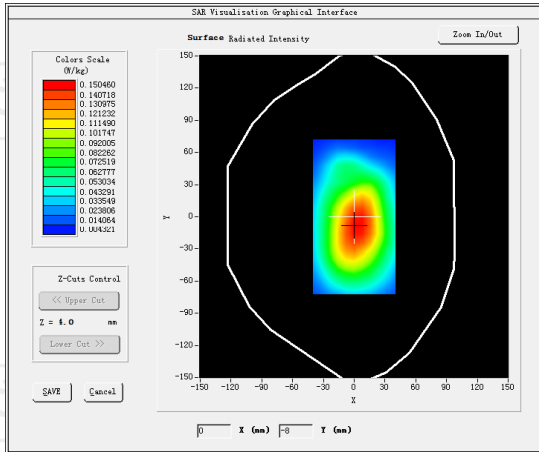


MEASUREMENT 3

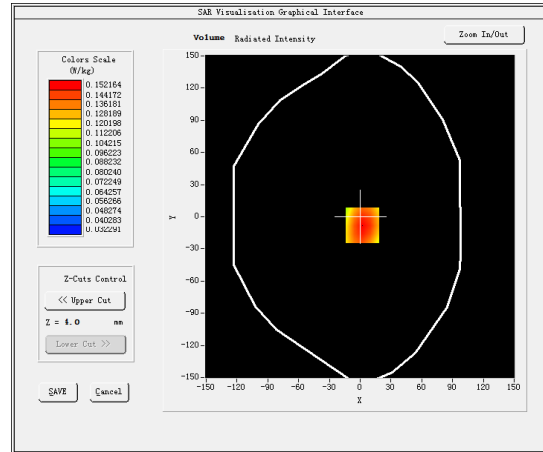
Frequency (MHz)	844.000000
Relative permittivity (real part)	55.210832
Relative permittivity (imaginary part)	12.468860
Conductivity (S/m)	0.974272
Variation (%)	-0.670000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE2 (SN 41/18 EPG0331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>

Phantom	<u>Validation plane</u>
Device Position	<u>Body back(10mm)</u>
Band	<u>LTE band 5(1 RB#0)</u>

SURFACE SAR



VOLUME SAR



Maximum location: X=2.00, Y=-8.00

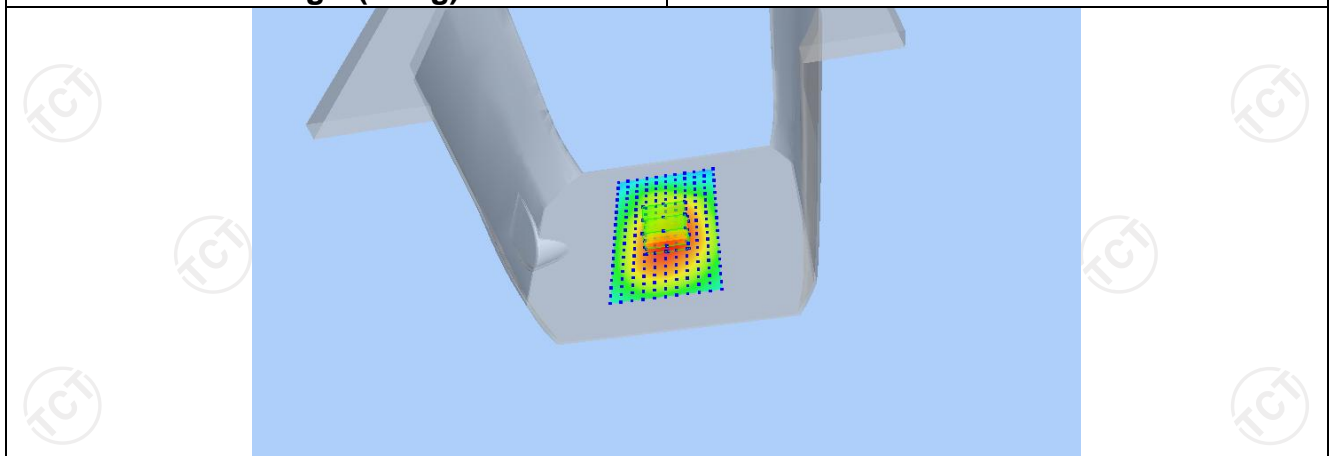
SAR Peak: 0.18 W/kg

SAR 10g (W/Kg)

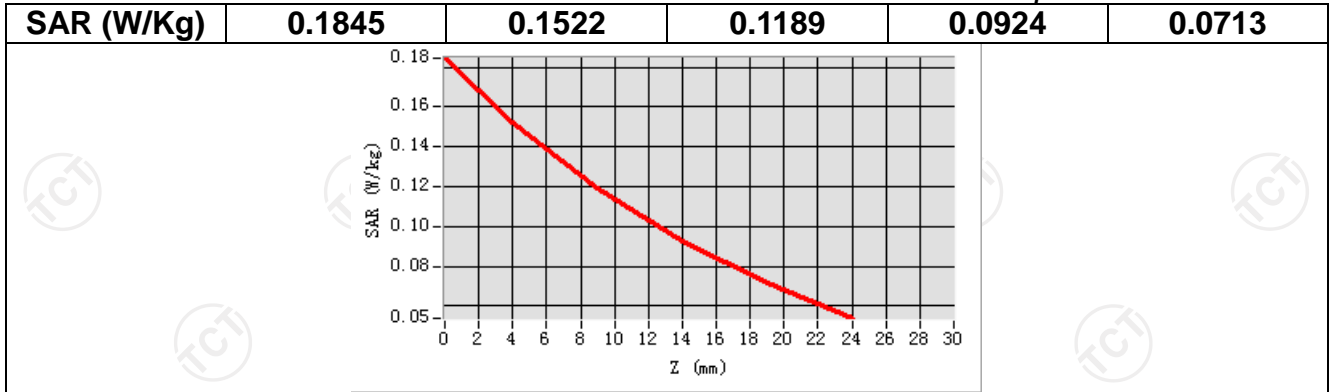
0.108848

SAR 1g (W/Kg)

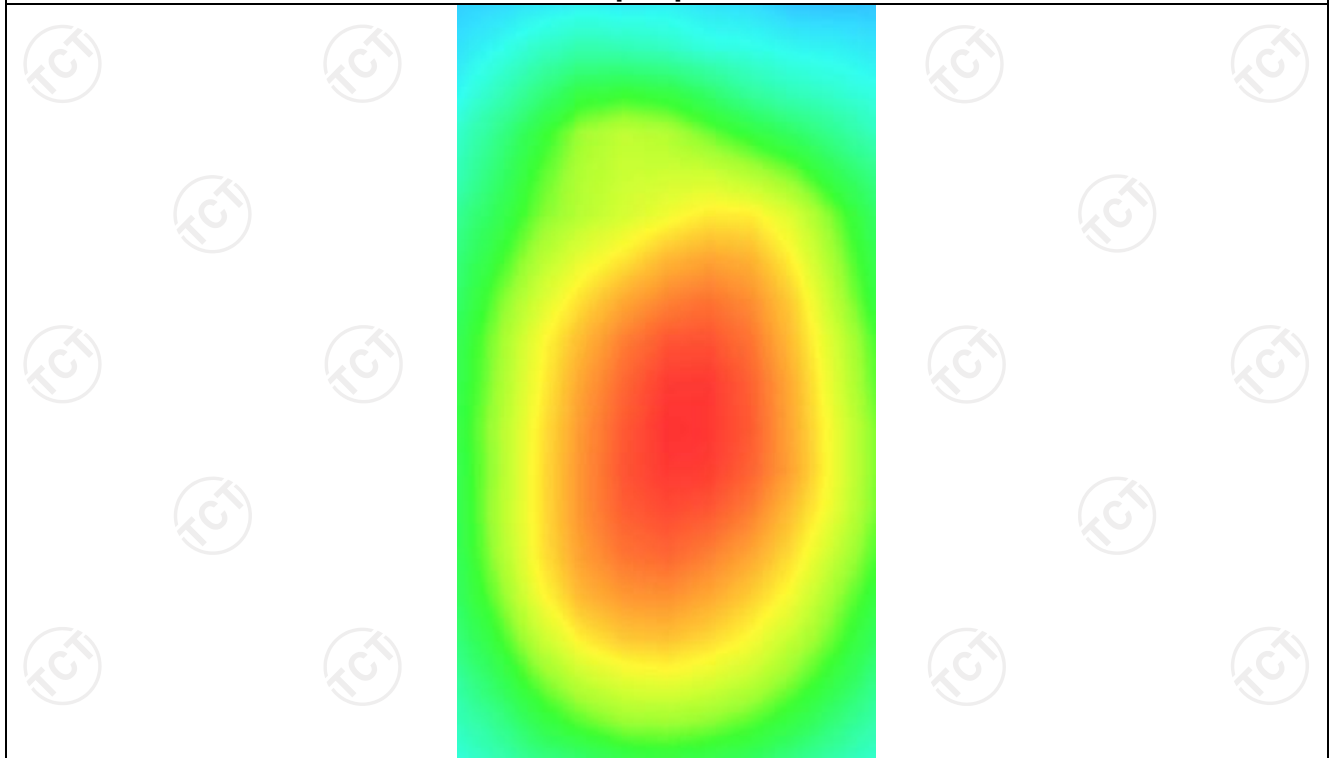
0.147582



Z (mm)	0.00	4.00	9.00	14.00	19.00
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Hot spot position



LTE Band 12

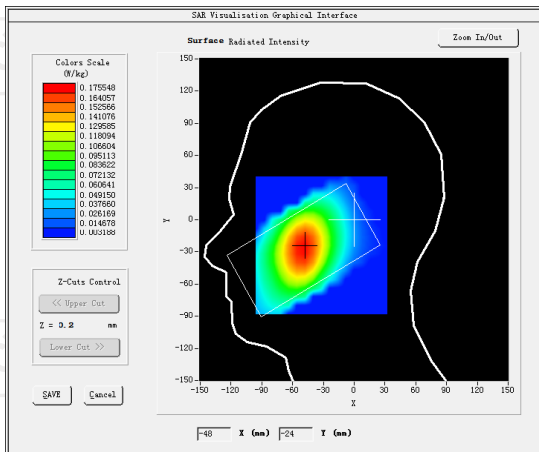
MEASUREMENT 1

High Band SAR (Channel 23130):

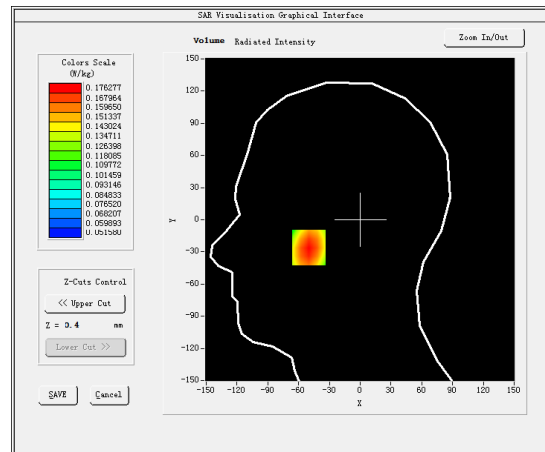
Date: 08/31/2020

Frequency (MHz)	711.000000
Relative permittivity (real part)	41.432976
Relative permittivity (imaginary part)	12.468860
Conductivity (S/m)	0.862835
Variation (%)	0.190000
Crest Factor	1.0
Probe Conversion factor	4.38
E-Field Probe:	SSE2 (SN 41/18 EPGO331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Right head</u>
Device Position	<u>Cheek</u>
Band	<u>LTE band 12(1 RB#24)</u>

SURFACE SAR



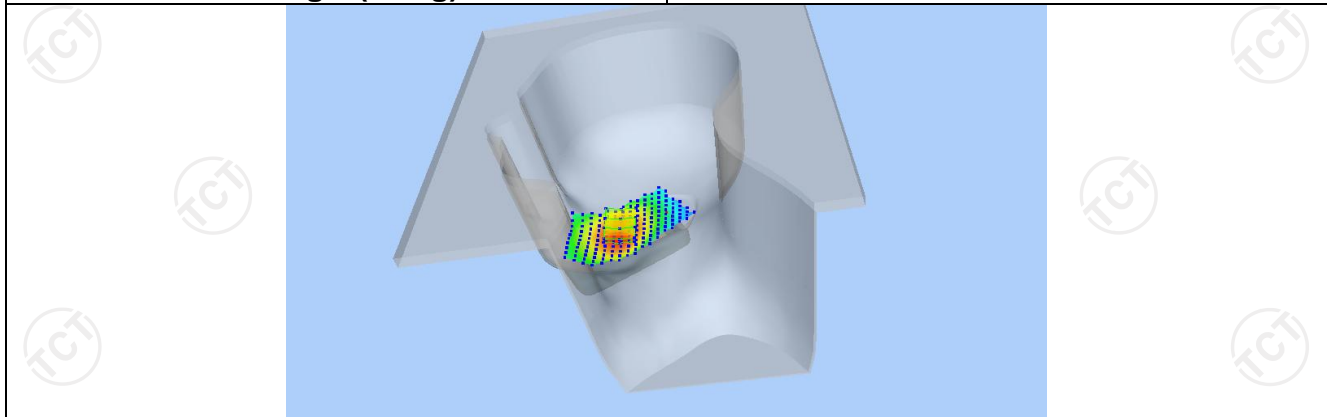
VOLUME SAR



Maximum location: X=-50.00, Y=-26.00

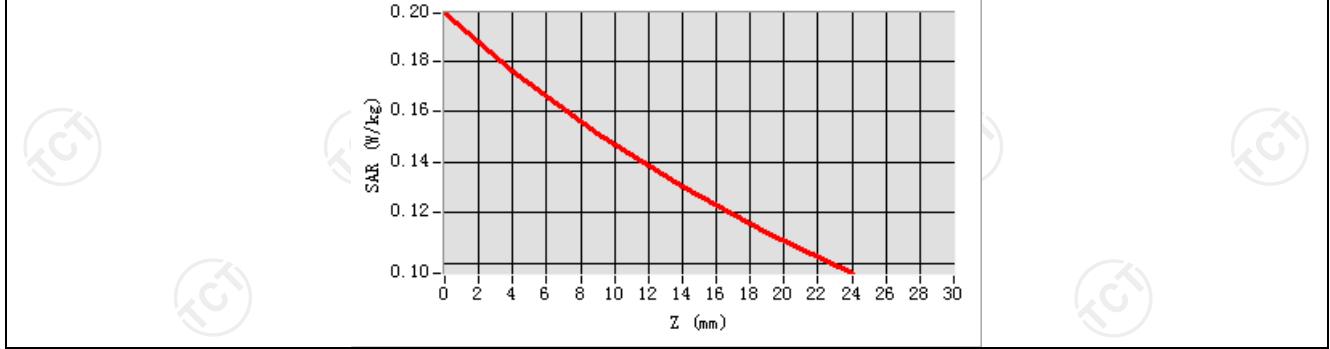
SAR Peak: 0.20 W/Kg

SAR 10g (W/Kg)	0.139978
SAR 1g (W/Kg)	0.174748

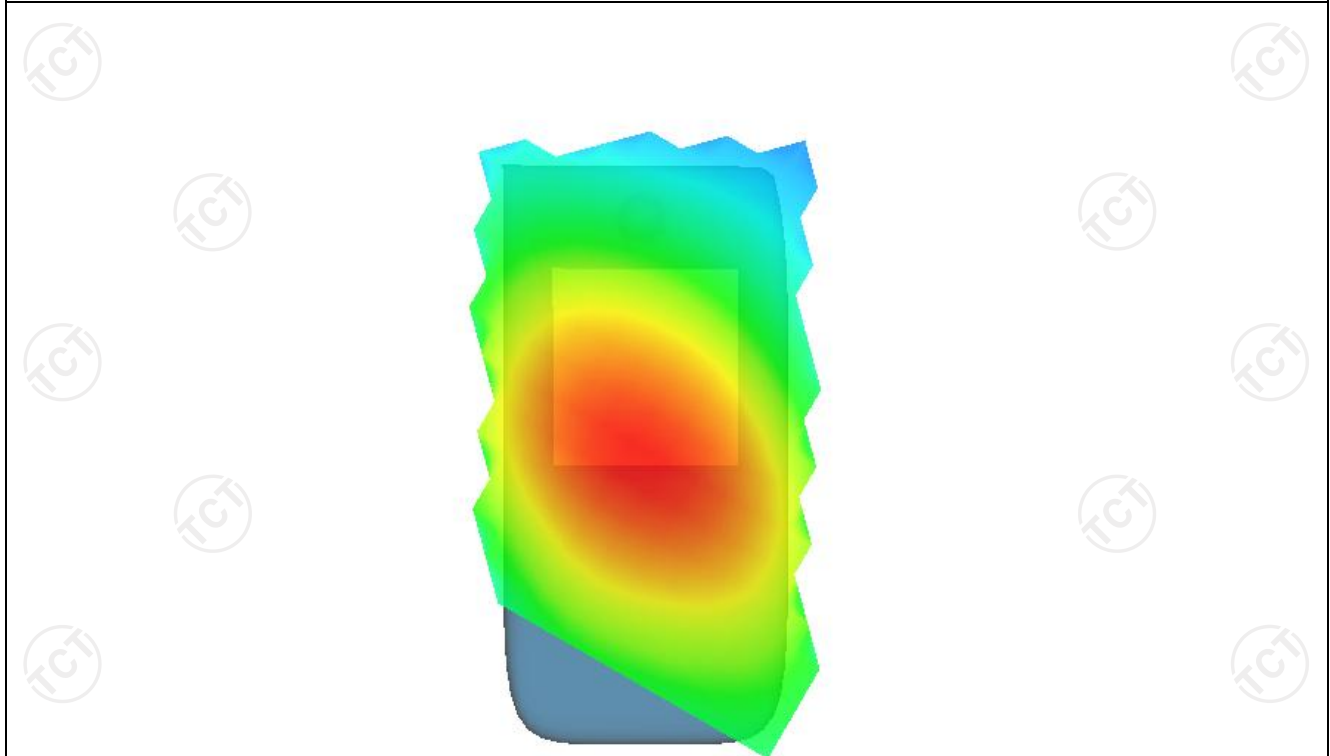


Z (mm)	0.00	4.00	9.00	14.00	19.00
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SAR (W/Kg)	0.1989	0.1763	0.1516	0.1305	0.1123
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Hot spot position

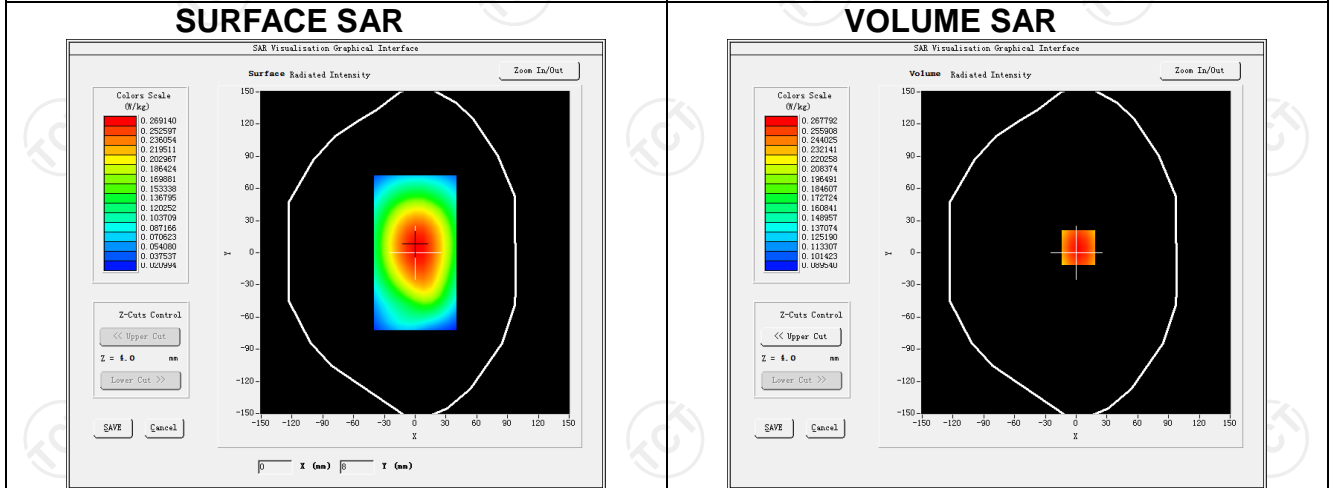


MEASUREMENT 2

Frequency (MHz)	711.000000
Relative permittivity (real part)	55.260832
Relative permittivity (imaginary part)	12.468860
Conductivity (S/m)	0.934272
Variation (%)	-1.810000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE2 (SN 41/18 EPG0331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>

Phantom	<u>Validation plane</u>
Device Position	<u>Body back(10mm)</u>

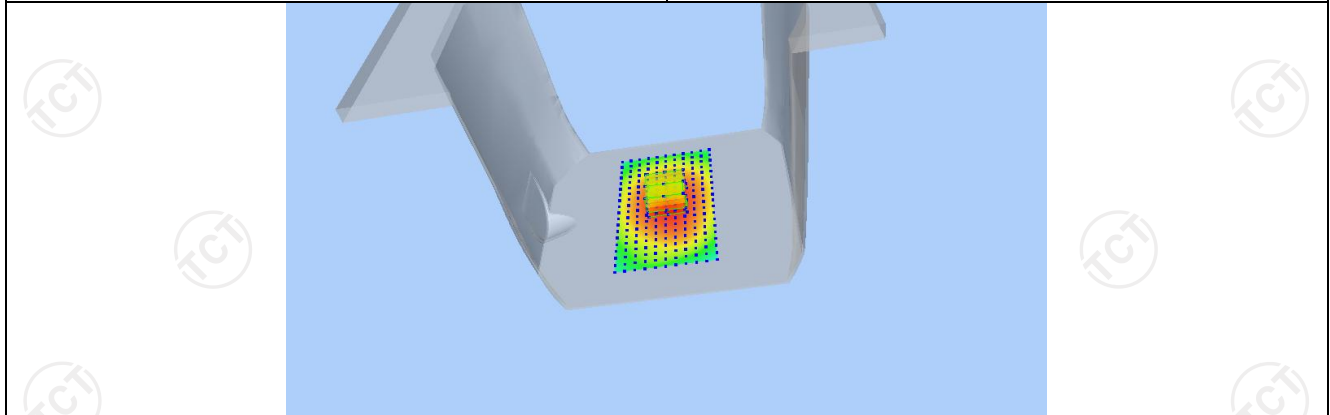
Band	<u>LTE band 12(1 RB#24)</u>
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Maximum location: X=2.00, Y=5.00

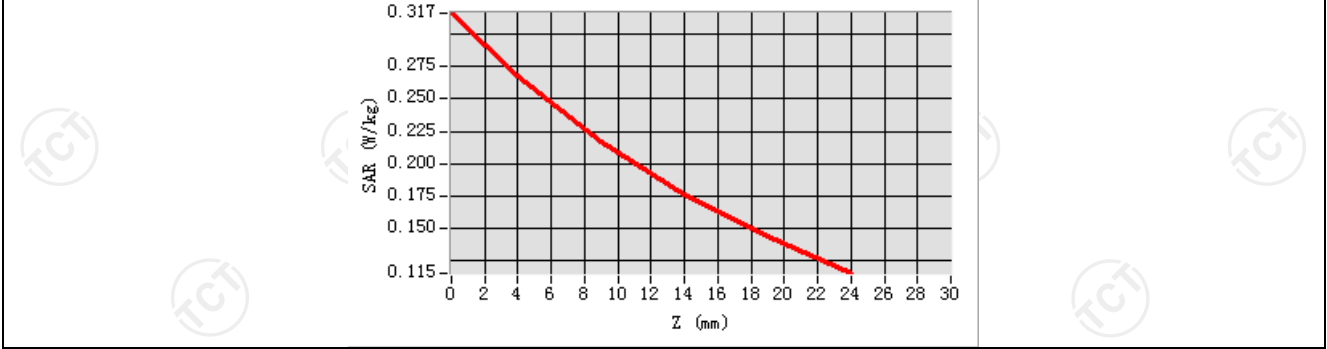
SAR Peak: 0.32 W/kg

SAR 10g (W/Kg)	0.203032
SAR 1g (W/Kg)	0.259988

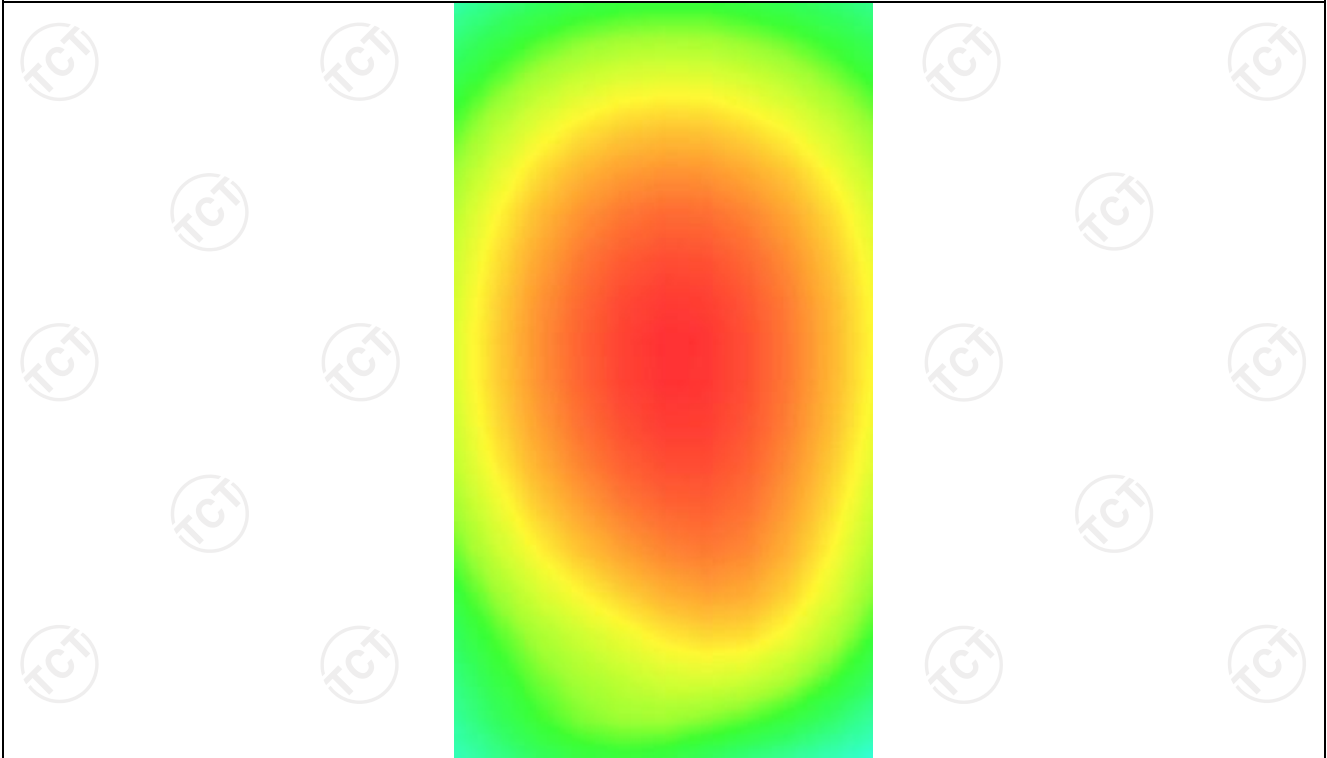


Z (mm)	0.00	4.00	9.00	14.00	19.00
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SAR (W/Kg)	0.3165	0.2678	0.2170	0.1761	0.1430
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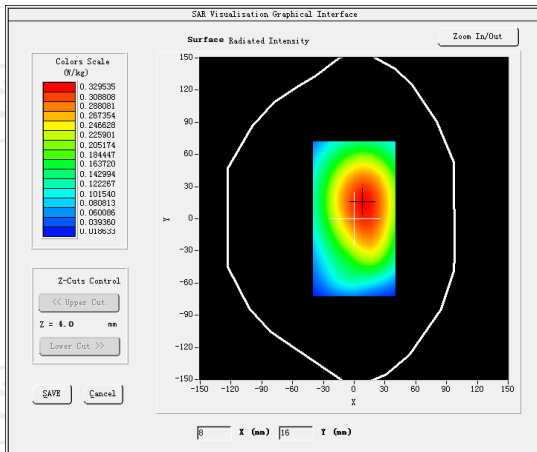
Hot spot position



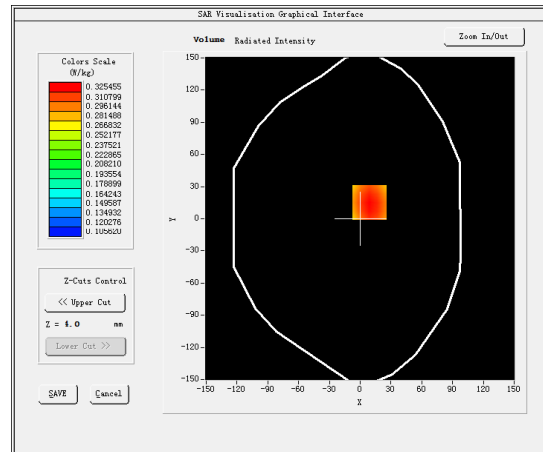
MEASUREMENT 3

Frequency (MHz)	711.000000
Relative permittivity (real part)	55.260832
Relative permittivity (imaginary part)	12.468860
Conductivity (S/m)	0.934272
Variation (%)	-2.020000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE2 (SN 41/18 EPG0331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(hotspot 10mm)</u>
Band	<u>LTE band 12(1 RB#24)</u>

SURFACE SAR



VOLUME SAR



Maximum location: X=9.00, Y=15.00

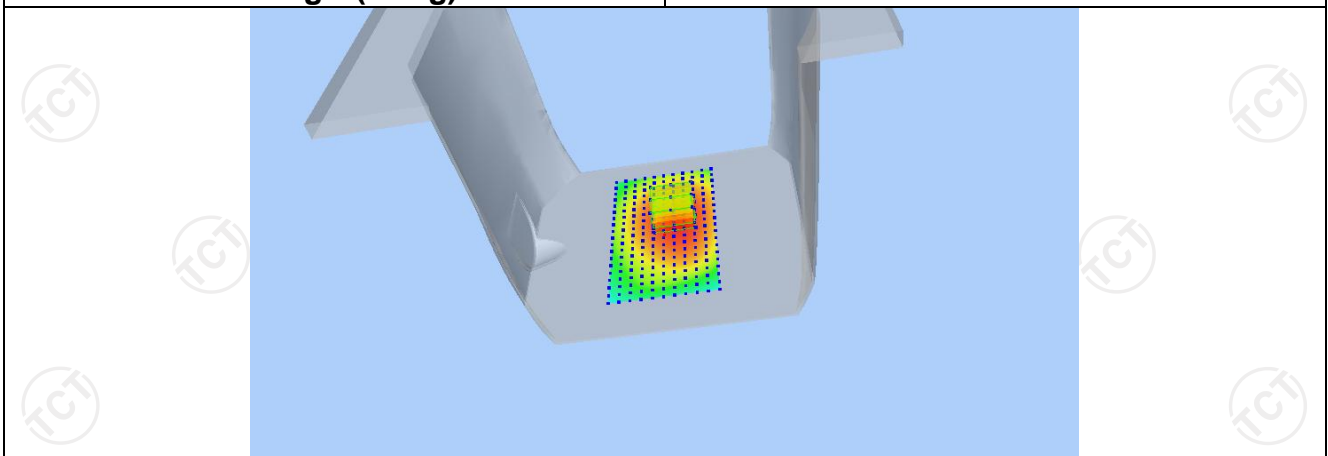
SAR Peak: 0.39 W/kg

SAR 10g (W/Kg)

0.245348

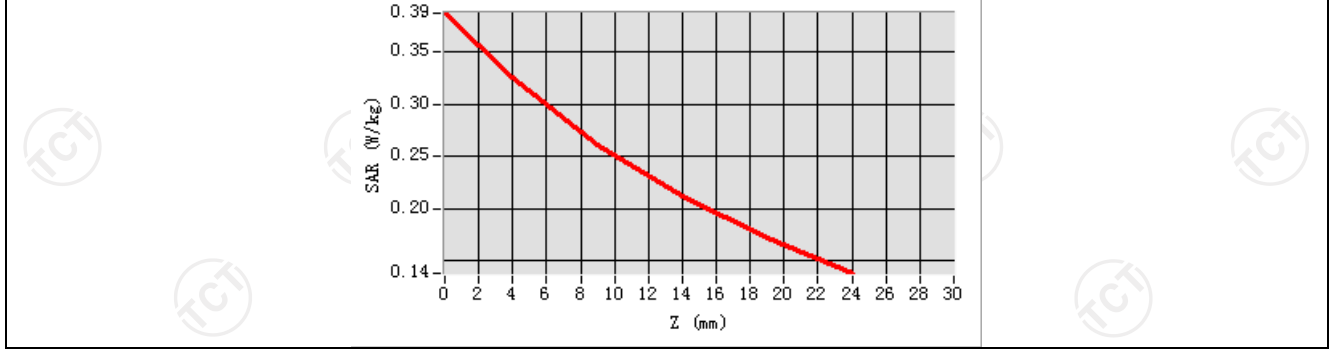
SAR 1g (W/Kg)

0.315940

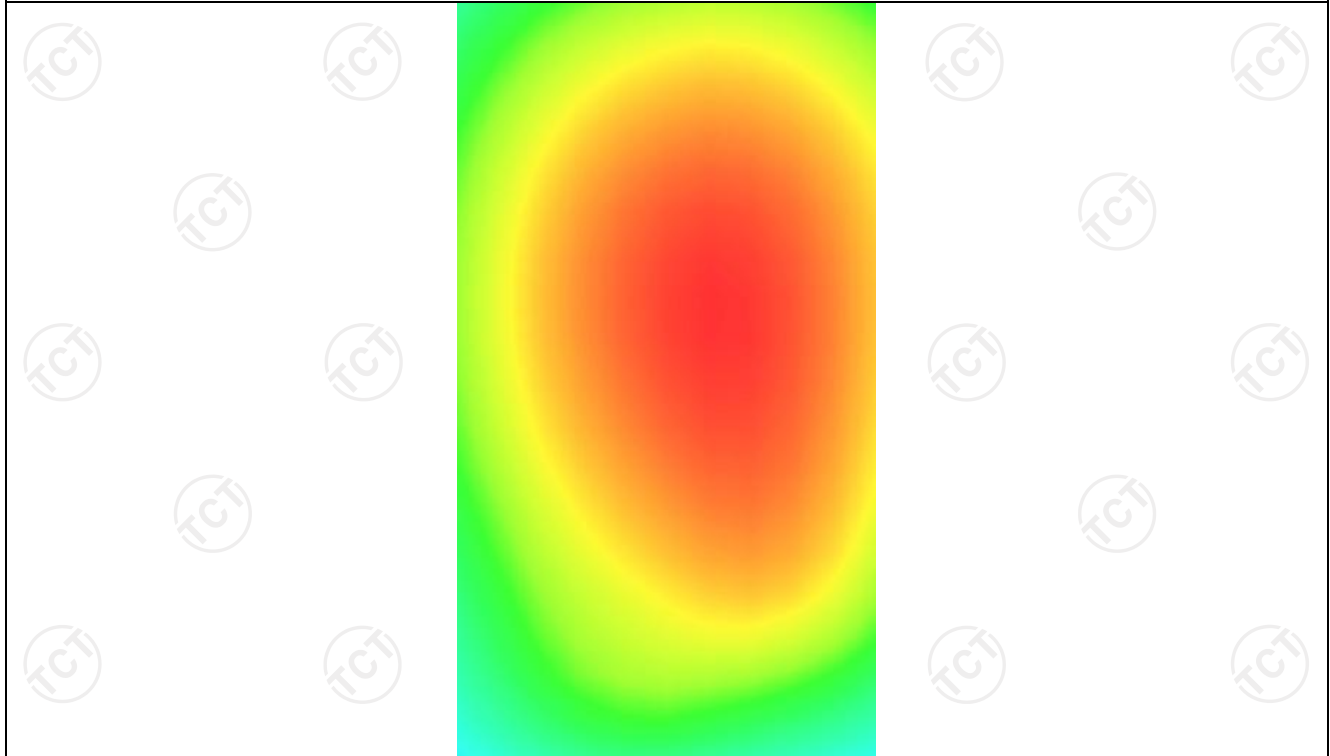


Z (mm)	0.00	4.00	9.00	14.00	19.00
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SAR (W/Kg)	0.3878	0.3255	0.2615	0.2111	0.1711
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Hot spot position



LTE Band 17

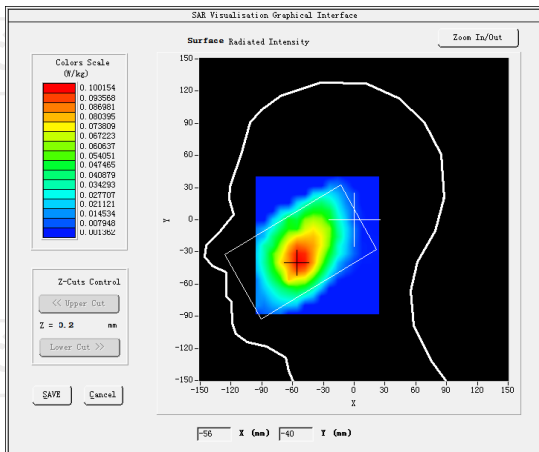
MEASUREMENT 1

Middle Band SAR (Channel 23790):

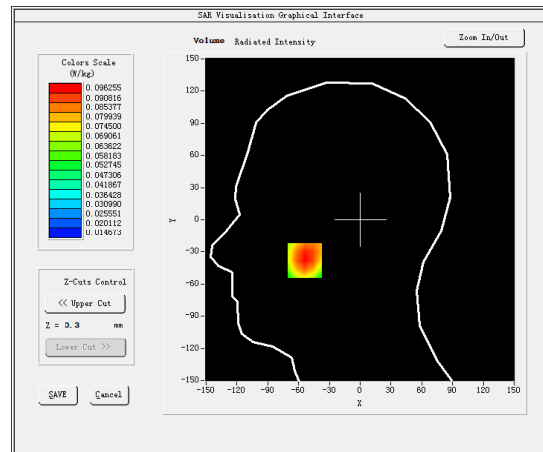
Date: 08/31/2020

Frequency (MHz)	710.000000
Relative permittivity (real part)	41.430182
Relative permittivity (imaginary part)	12.468765
Conductivity (S/m)	0.859210
Variation (%)	-1.040000
Crest Factor	1.0
Probe Conversion factor	4.38
E-Field Probe:	SSE2 (SN 41/18 EPG0331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Right head</u>
Device Position	<u>Cheek</u>
Band	<u>LTE band 17(1 RB#0)</u>

SURFACE SAR



VOLUME SAR



Maximum location: X=-54.00, Y=-38.00

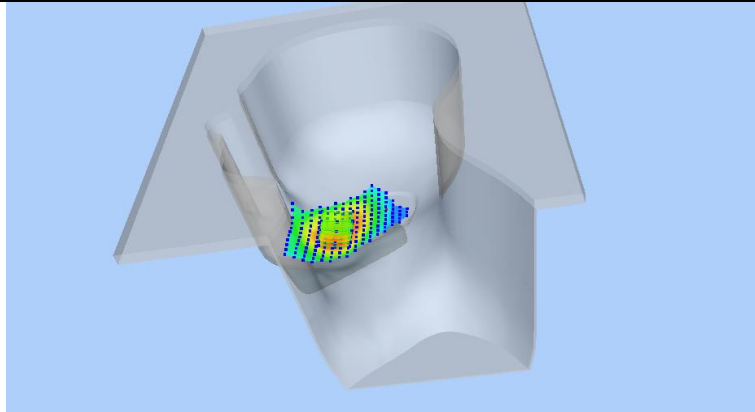
SAR Peak: 0.11 W/kg

SAR 10g (W/Kg)

0.070160

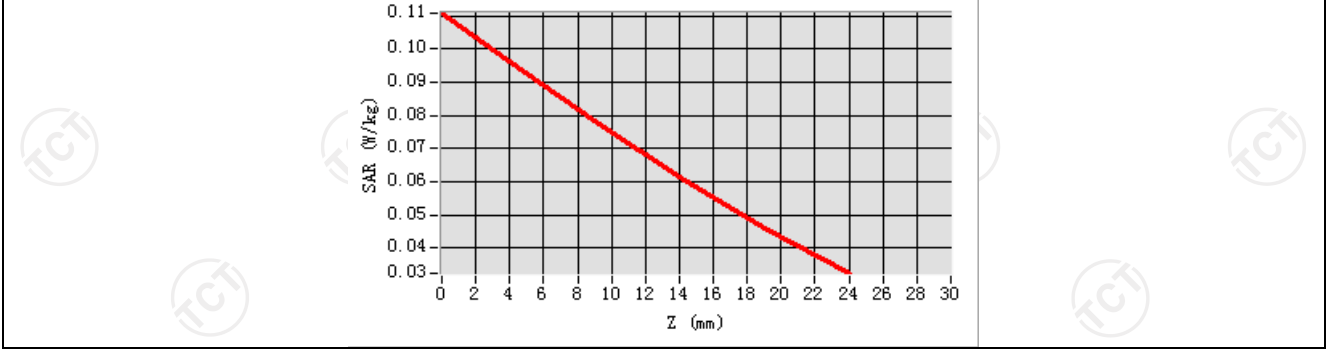
SAR 1g (W/Kg)

0.094565

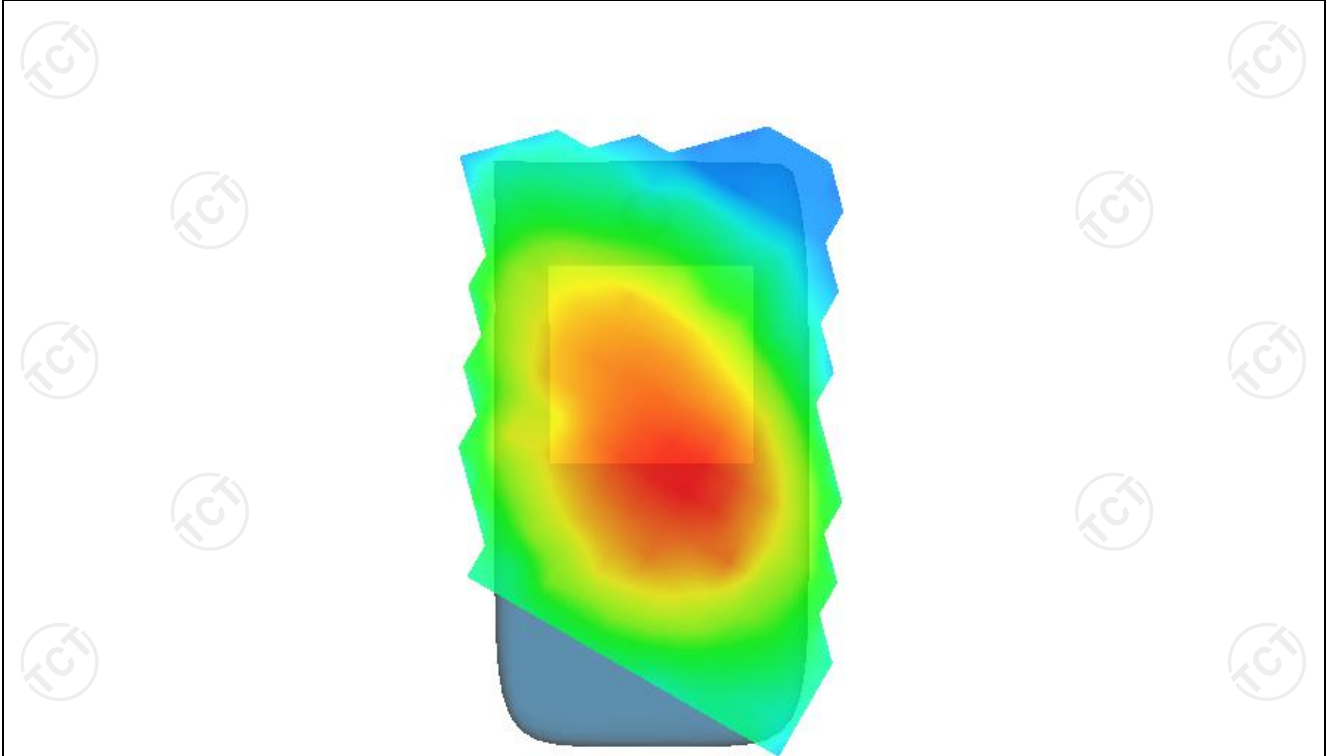


Z (mm)	0.00	4.00	9.00	14.00	19.00
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SAR (W/Kg)	0.1109	0.0963	0.0785	0.0616	0.0460
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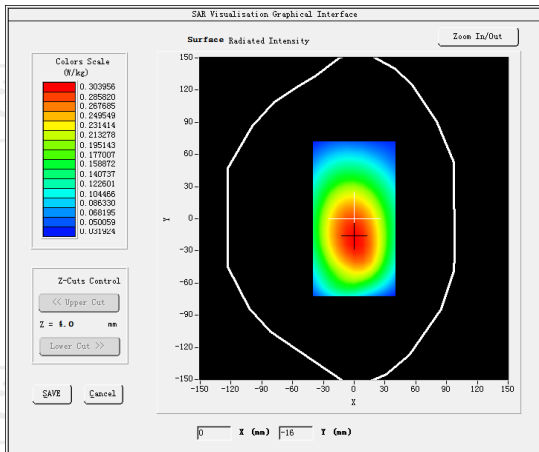
Hot spot position



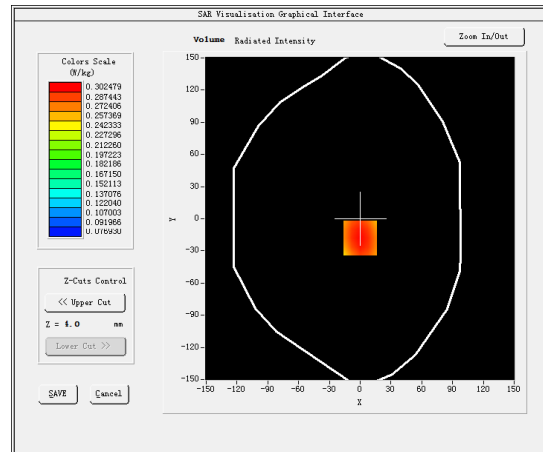
MEASUREMENT 2

Frequency (MHz)	710.000000
Relative permittivity (real part)	55.263812
Relative permittivity (imaginary part)	12.468867
Conductivity (S/m)	0.930822
Variation (%)	-0.560000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE2 (SN 41/18 EPGO331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(10mm)</u>
Band	<u>LTE band 17(1 RB#0)</u>

SURFACE SAR



VOLUME SAR



Maximum location: X=0.00, Y=-18.00

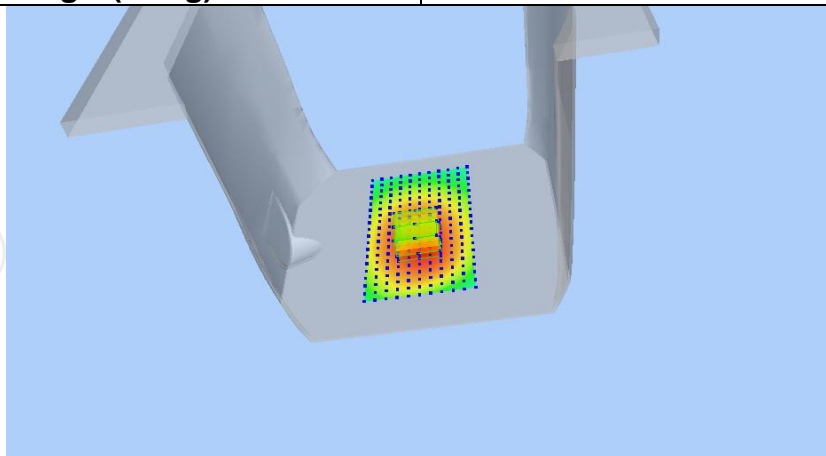
SAR Peak: 0.36 W/kg

SAR 10g (W/Kg)

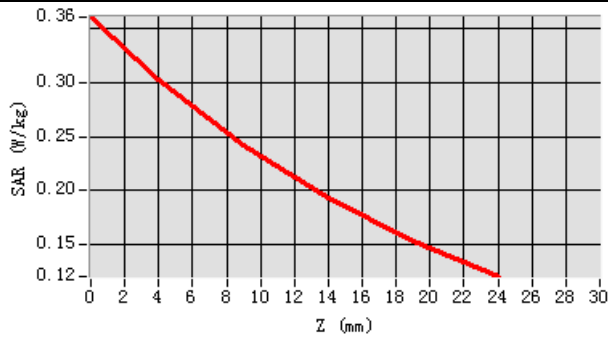
0.229755

SAR 1g (W/Kg)

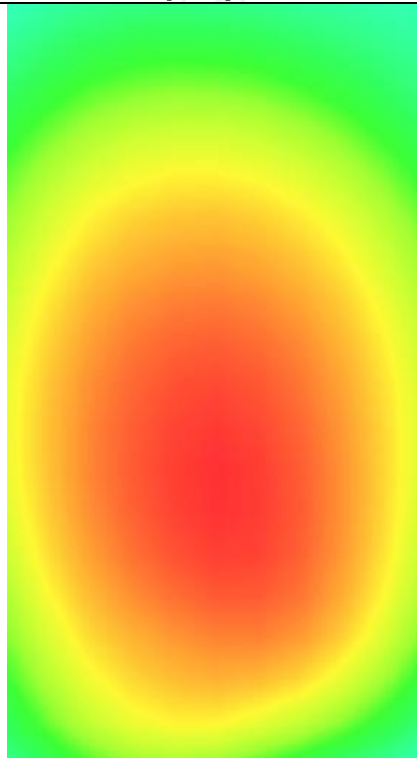
0.298575



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3609	0.3025	0.2418	0.1930	0.1537



Hot spot position

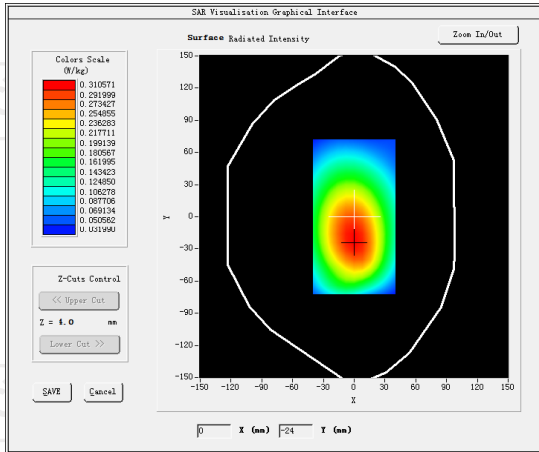


MEASUREMENT 3

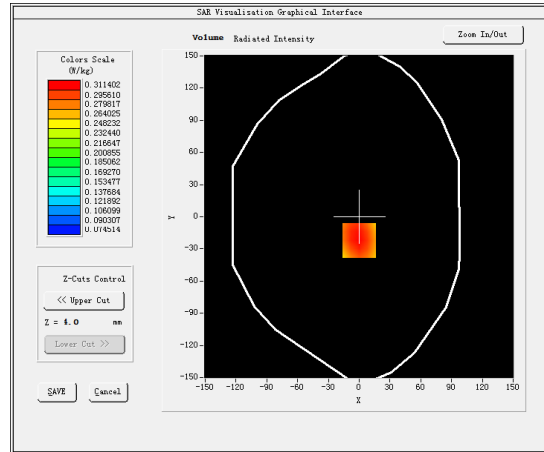
Frequency (MHz)	710.000000
Relative permittivity (real part)	55.263812
Relative permittivity (imaginary part)	12.468867
Conductivity (S/m)	0.931392
Variation (%)	0.460000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE2 (SN 41/18 EPGO331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>

Phantom	<u>Validation plane</u>
Device Position	<u>Body back(hotspot 10mm)</u>
Band	<u>LTE band 17(1 RB#0)</u>

SURFACE SAR



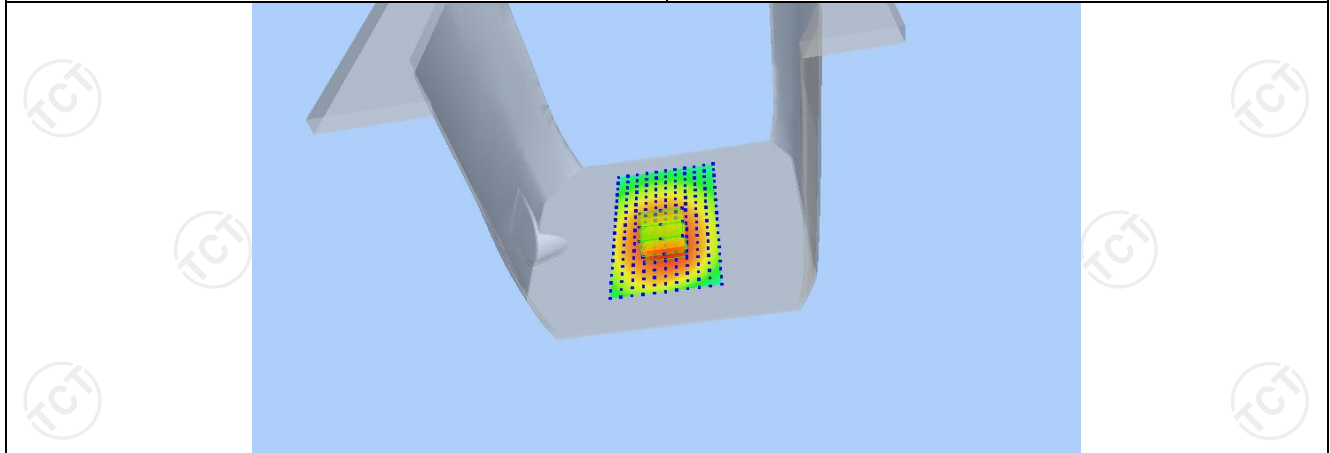
VOLUME SAR



Maximum location: X=0.00, Y=-22.00

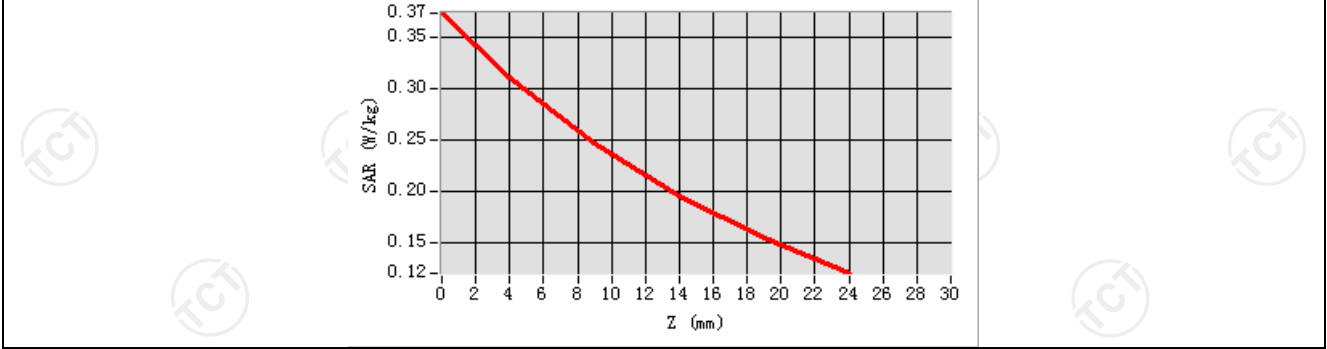
SAR Peak: 0.38 W/kg

SAR 10g (W/Kg)	0.234887
SAR 1g (W/Kg)	0.307506

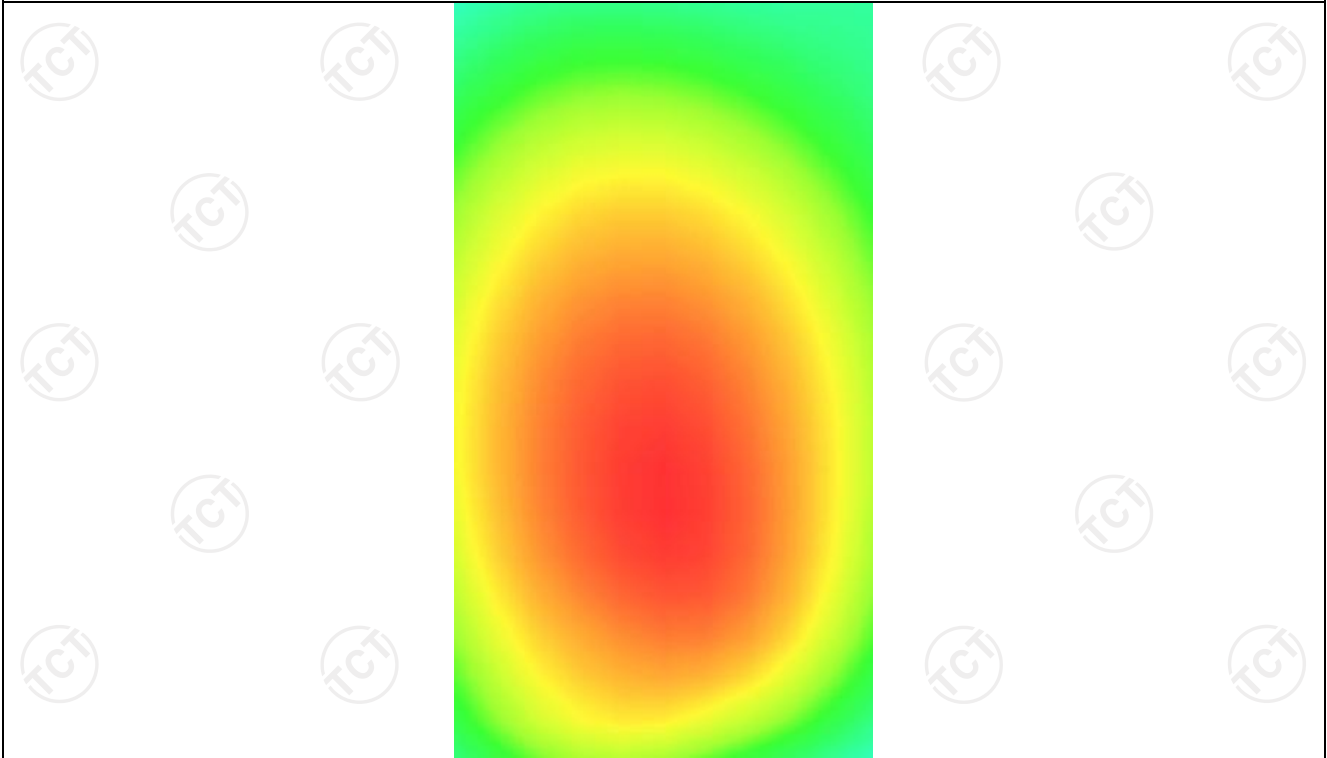


Z (mm)	0.00	4.00	9.00	14.00	19.00
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SAR (W/Kg)	0.3743	0.3114	0.2466	0.1951	0.1539
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Hot spot position



LTE Band 66

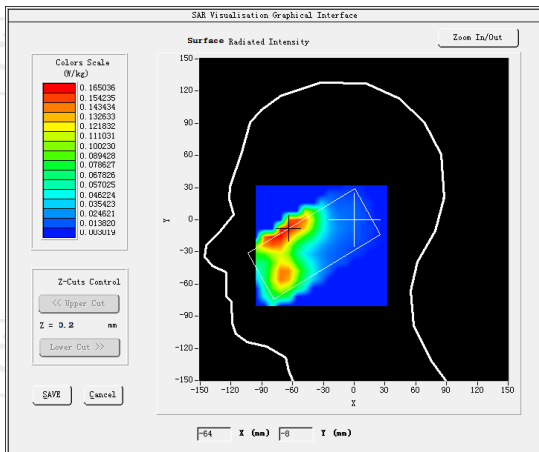
MEASUREMENT 1

High Band SAR (Channel 132422):

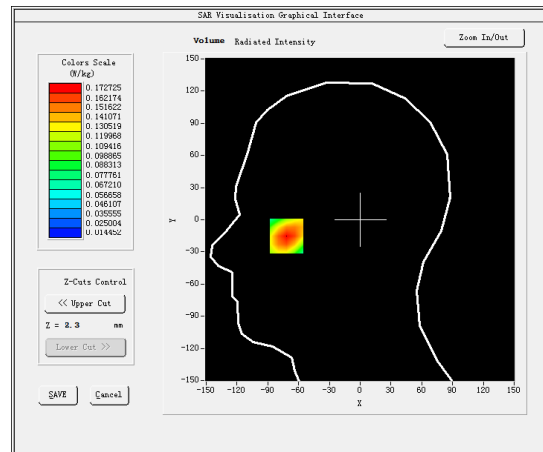
Date: 09/03/2020

Frequency (MHz)	1755.000000
Relative permittivity (real part)	39.111249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.340792
Variation (%)	-1.310000
Crest Factor	1.0
Probe Conversion factor	4.38
E-Field Probe:	SSE2 (SN 41/18 EPGO331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Right head</u>
Device Position	<u>Cheek</u>
Band	<u>LTE band 66(1 RB#0)</u>

SURFACE SAR



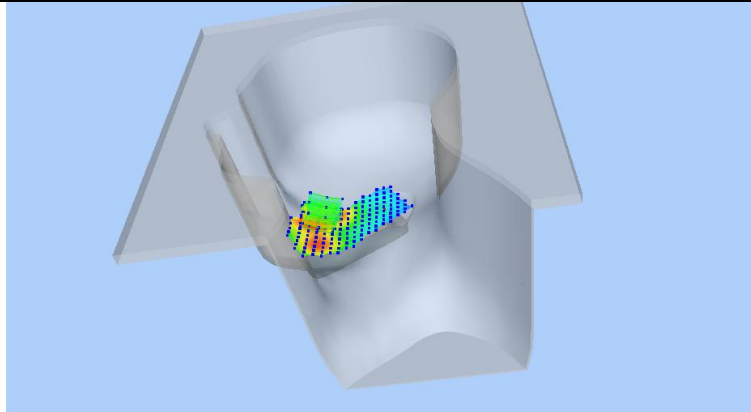
VOLUME SAR



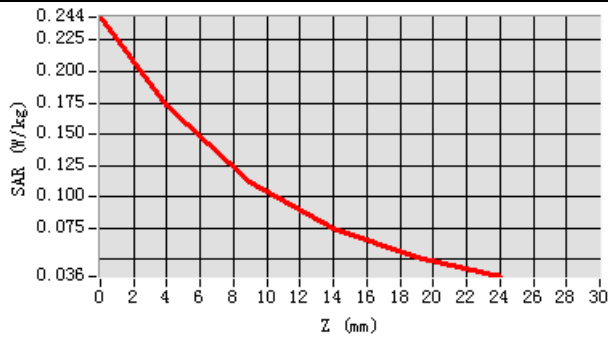
Maximum location: X=-72.00, Y=-13.00

SAR Peak: 0.24 W/Kg

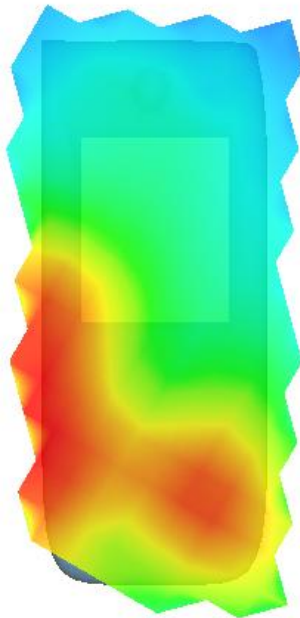
SAR 10g (W/Kg)	0.102503
SAR 1g (W/Kg)	0.163999



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2435	0.1727	0.1122	0.0747	0.0518



Hot spot position

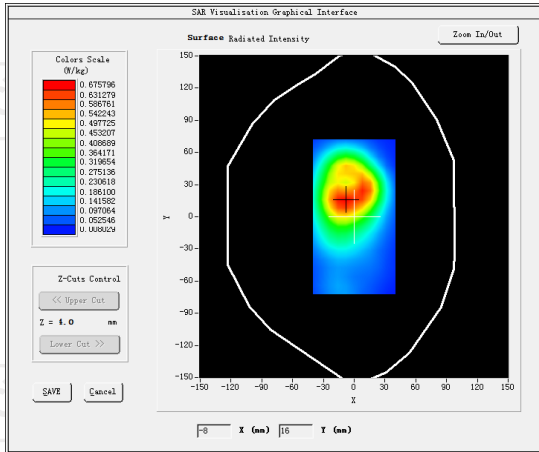


MEASUREMENT 2

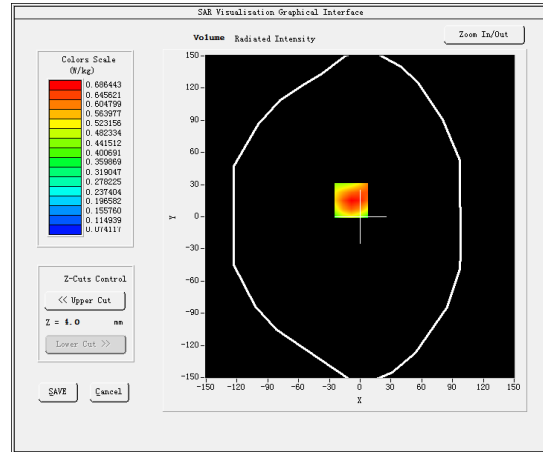
Frequency (MHz)	1755.000000
Relative permittivity (real part)	53.341249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.492592
Variation (%)	1.440000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE2 (SN 41/18 EPG0331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>

Phantom	<u>Validation plane</u>
Device Position	<u>Body back(10mm)</u>
Band	<u>LTE band 66(1 RB#0)</u>

SURFACE SAR



VOLUME SAR



Maximum location: X=-9.00, Y=15.00

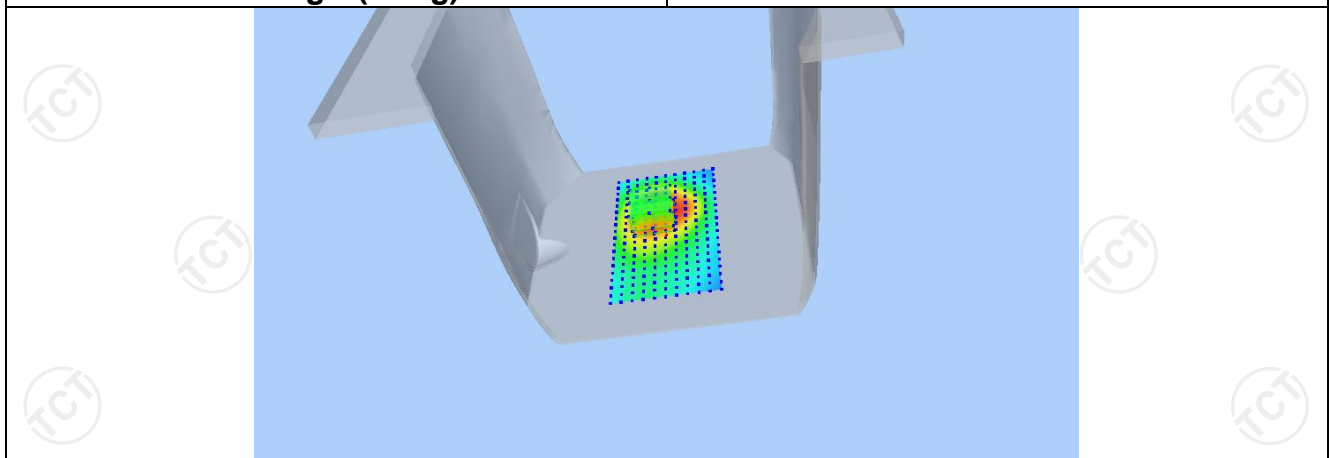
SAR Peak: 1.01 W/kg

SAR 10g (W/Kg)

0.300456

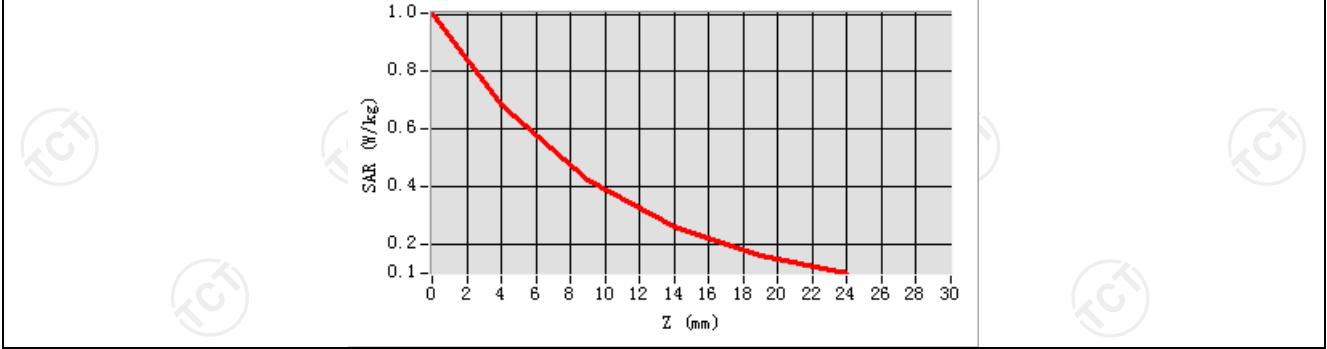
SAR 1g (W/Kg)

0.553799



Z (mm)	0.00	4.00	9.00	14.00	19.00
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SAR (W/Kg)	1.0035	0.6864	0.4201	0.2578	0.1612
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Hot spot position



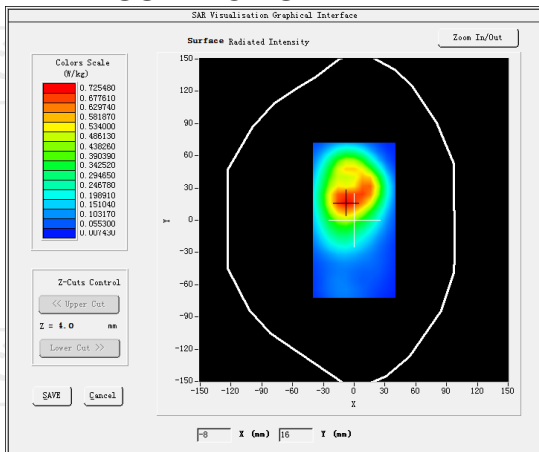
MEASUREMENT 3

High Band SAR (Channel 132422):

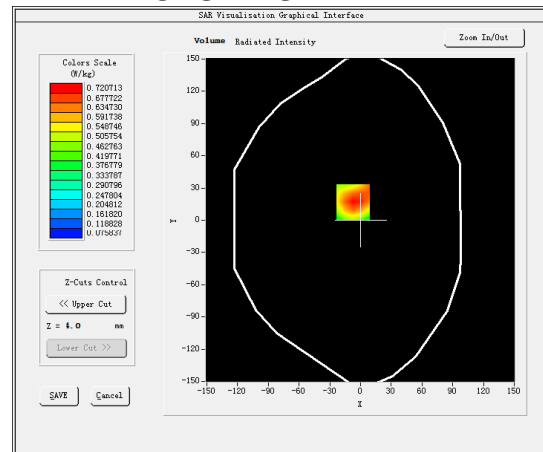
Date: 09/03/2020

Frequency (MHz)	1755.000000
Relative permittivity (real part)	53.341249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.492592
Variation (%)	-1.100000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE2 (SN 41/18 EPGO331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm, Complete/ndx=8mm dy=8mm, h= 5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(hotspot 10mm)</u>
Band	<u>LTE band 66(1 RB#0)</u>

SURFACE SAR

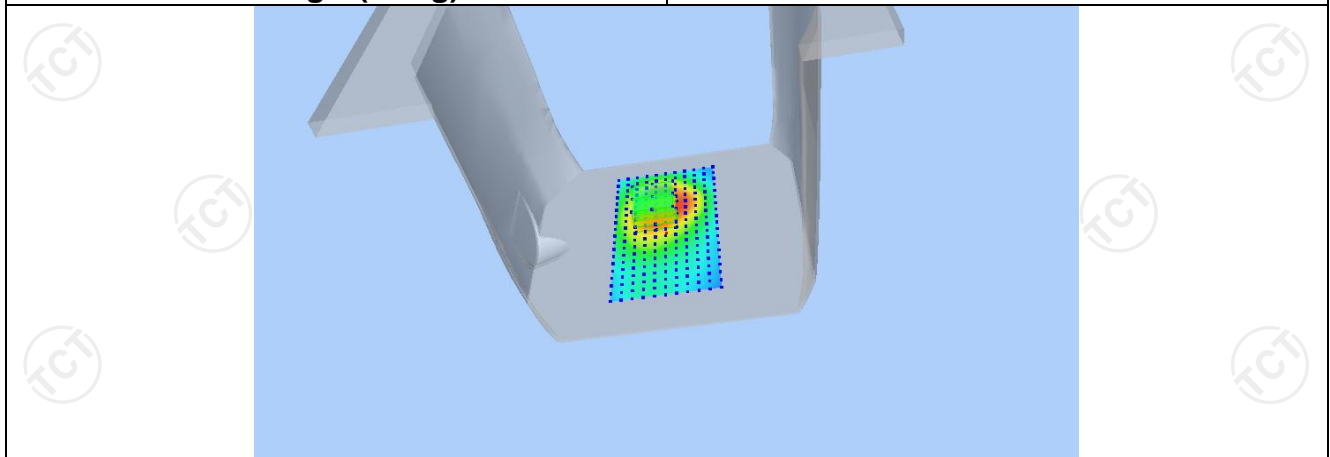


VOLUME SAR

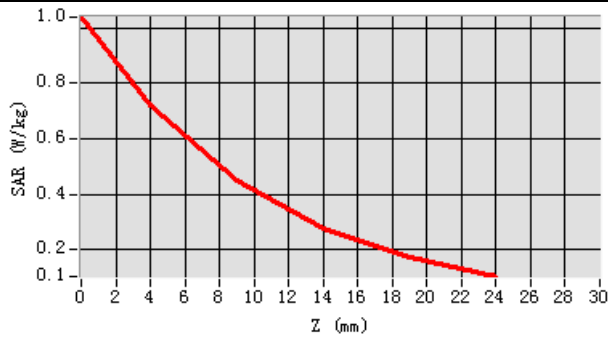


**Maximum location: X=-7.00, Y=17.00
SAR Peak: 1.04 W/kg**

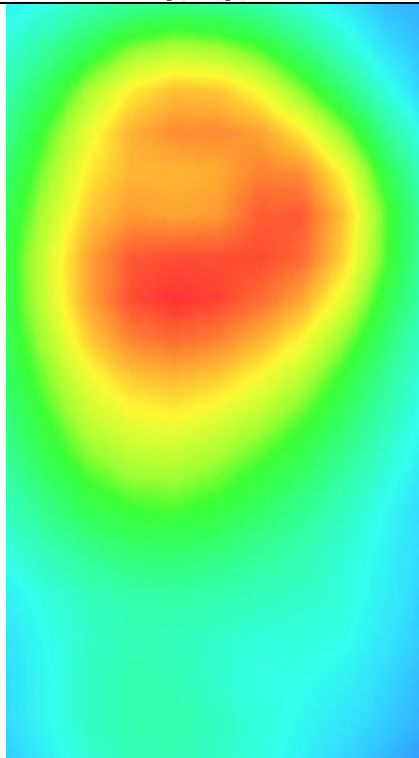
SAR 10g (W/Kg)	0.319148
SAR 1g (W/Kg)	0.584869



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.0387	0.7207	0.4487	0.2785	0.1741



Hot spot position



WIFI 2.4G

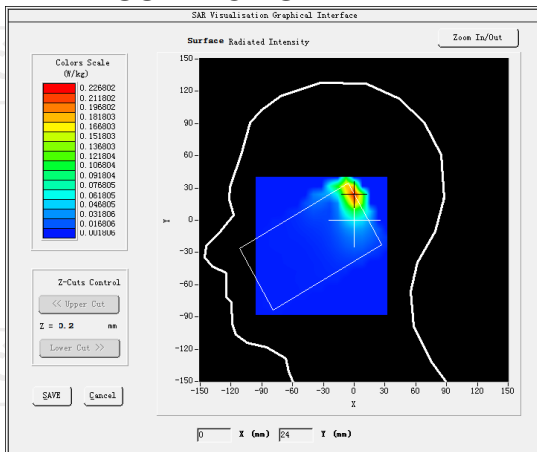
MEASUREMENT 1

Lower Band SAR (Channel 1):

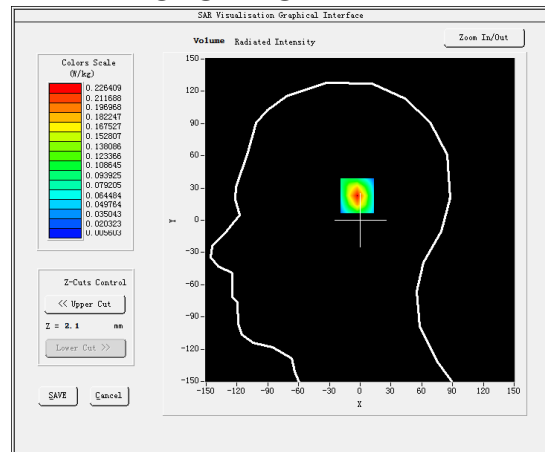
Date: 09/10/2020

Frequency (MHz)	2412.000000
Relative permittivity (real part)	37.842831
Relative permittivity (imaginary part)	13.546209
Conductivity (S/m)	1.792611
Variation (%)	-0.470000
Crest Factor	1.0
Probe Conversion factor	4.58
E-Field Probe:	SSE2 (SN 41/18 EPGO331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Right head</u>
Device Position	<u>Cheek</u>
Band	<u>IEEE 802.11b ISM</u>

SURFACE SAR

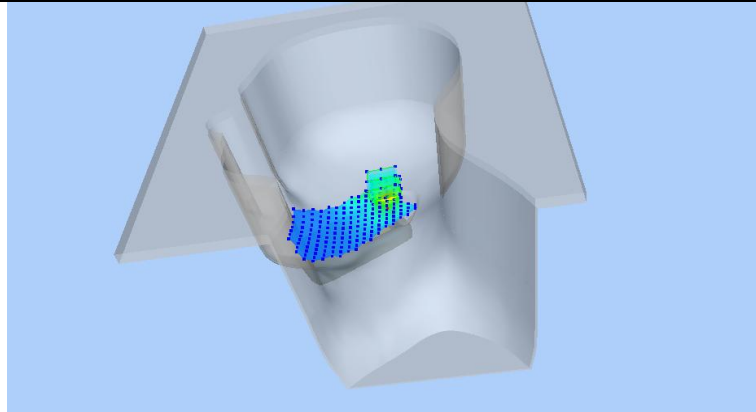


VOLUME SAR

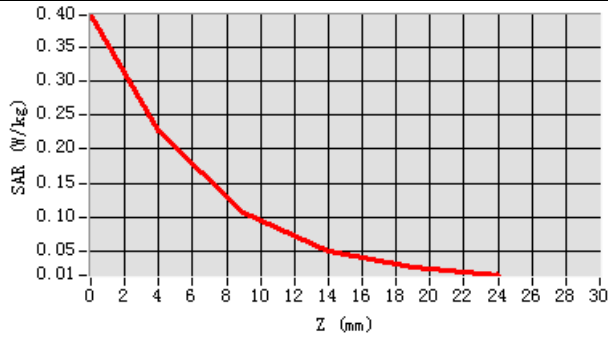


Maximum location: X=0.00, Y=24.00
SAR Peak: 0.40 W/kg

SAR 10g (W/Kg)	0.097184
SAR 1g (W/Kg)	0.210966



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3970	0.2264	0.1062	0.0500	0.0263



Hot spot position



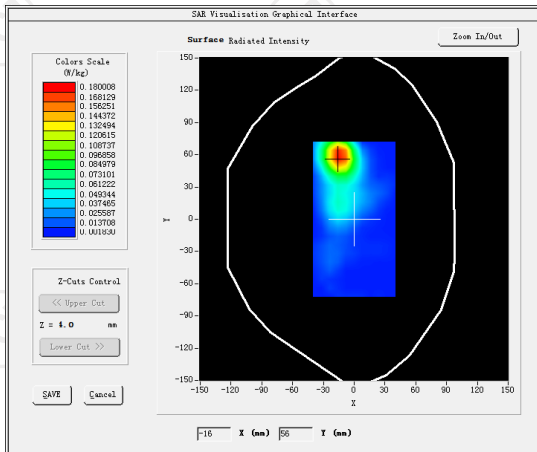
MEASUREMENT 2

Lower Band SAR (Channel 1):

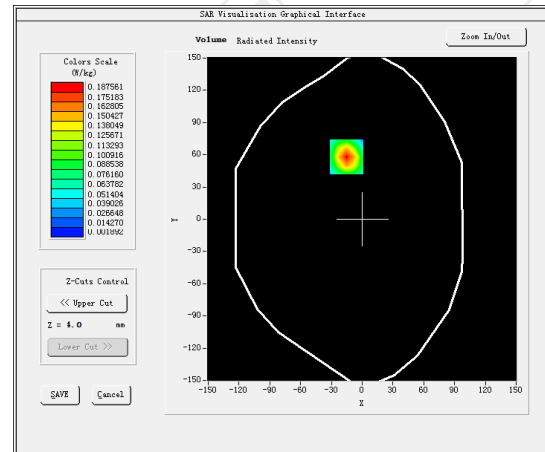
Date: 09/10/2020

Frequency (MHz)	2412.000000
Relative permittivity (real part)	54.660667
Relative permittivity (imaginary part)	14.318428
Conductivity (S/m)	1.972536
Variation (%)	1.010000
Crest Factor	1.0
Probe Conversion factor	4.70
E-Field Probe:	SSE2 (SN 41/18 EPG0331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	Validation plane
Device Position	Body back(10mm)
Band	<u>IEEE 802.11b ISM</u>

SURFACE SAR

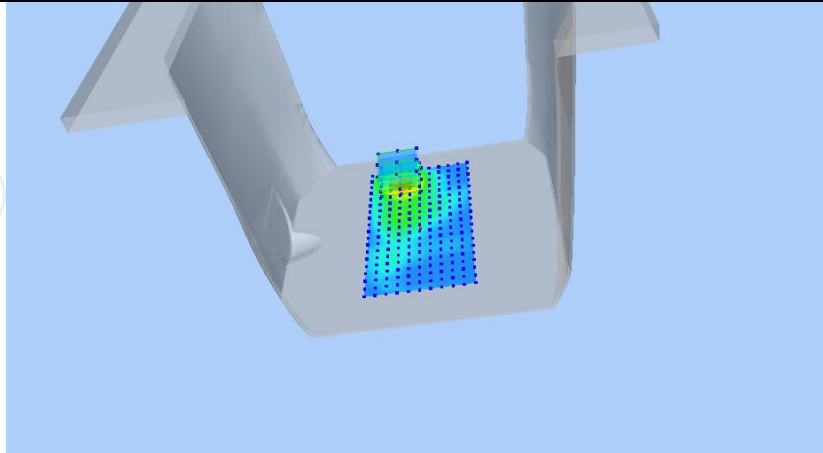


VOLUME SAR

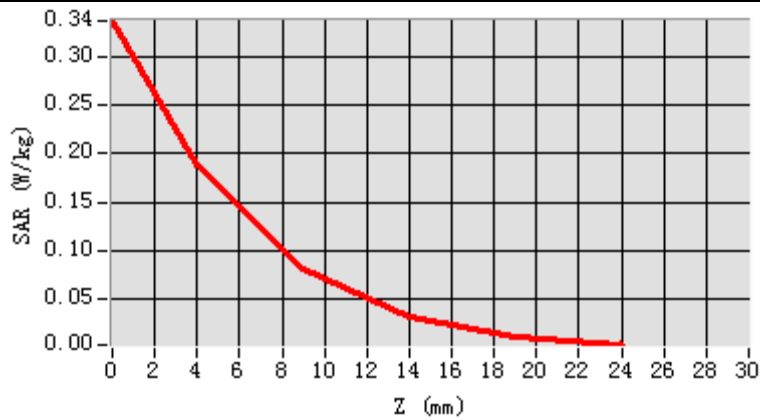


Maximum location: X=-15.00, Y=58.00 SAR Peak: 0.34 W/kg

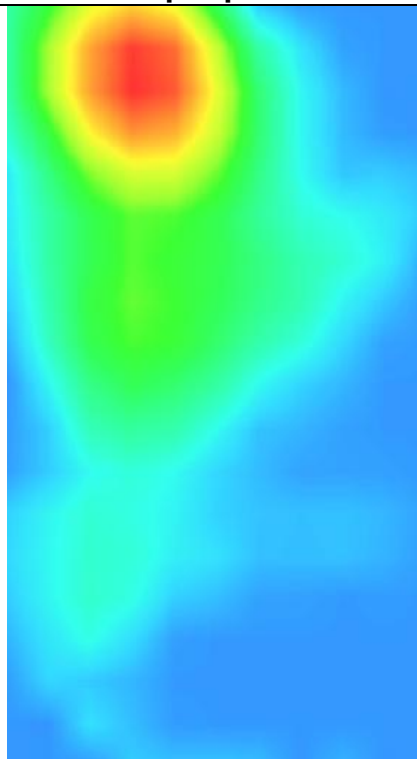
SAR 10g (W/Kg)	0.077530
SAR 1g (W/Kg)	0.153292



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



Hot spot position



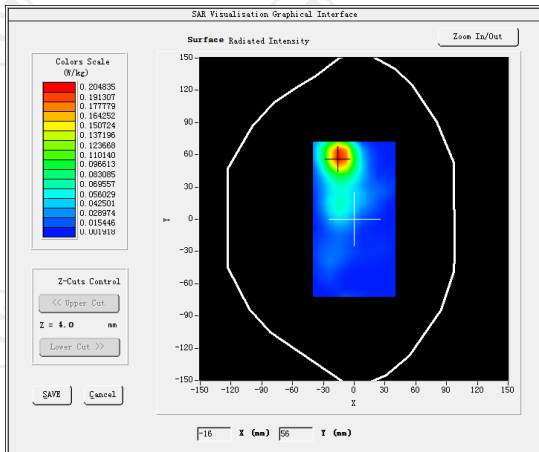
MEASUREMENT 3

Lower Band SAR (Channel 1):

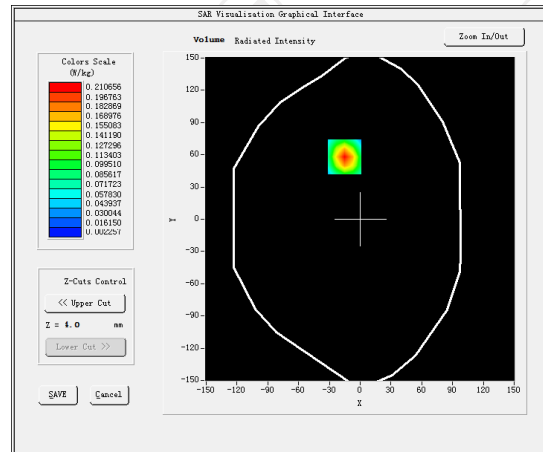
Date: 09/10/2020

Frequency (MHz)	2412.000000
Relative permittivity (real part)	54.660667
Relative permittivity (imaginary part)	14.318428
Conductivity (S/m)	1.972536
Variation (%)	-2.110000
Crest Factor	1.0
Probe Conversion factor	4.70
E-Field Probe:	SSE2 (SN 41/18 EPG0331)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7,dx=8mm dy=8mm</u> <u>dz=5mm,Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	Validation plane
Device Position	Body back(10mm)
Band	<u>IEEE 802.11b ISM(hotspot)</u>

SURFACE SAR



VOLUME SAR



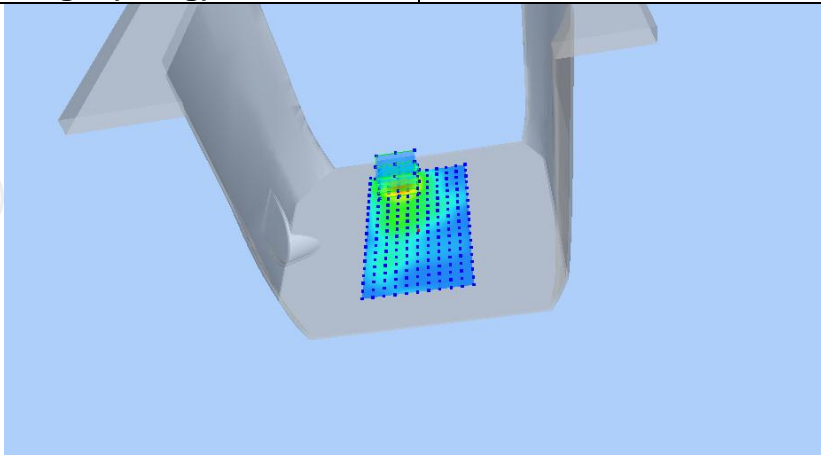
Maximum location: X=-15.00, Y=58.00 SAR Peak: 0.37 W/kg

SAR 10g (W/Kg)

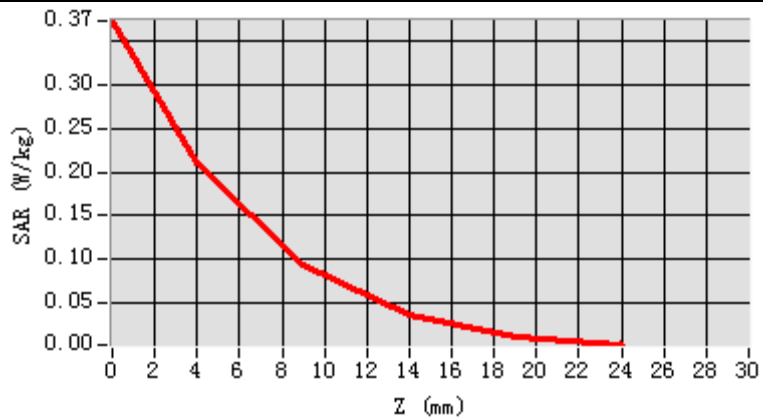
0.087182

SAR 1g (W/Kg)

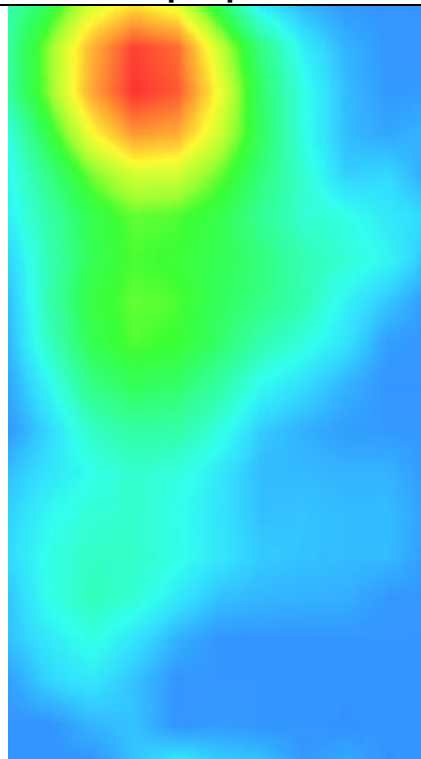
0.163788



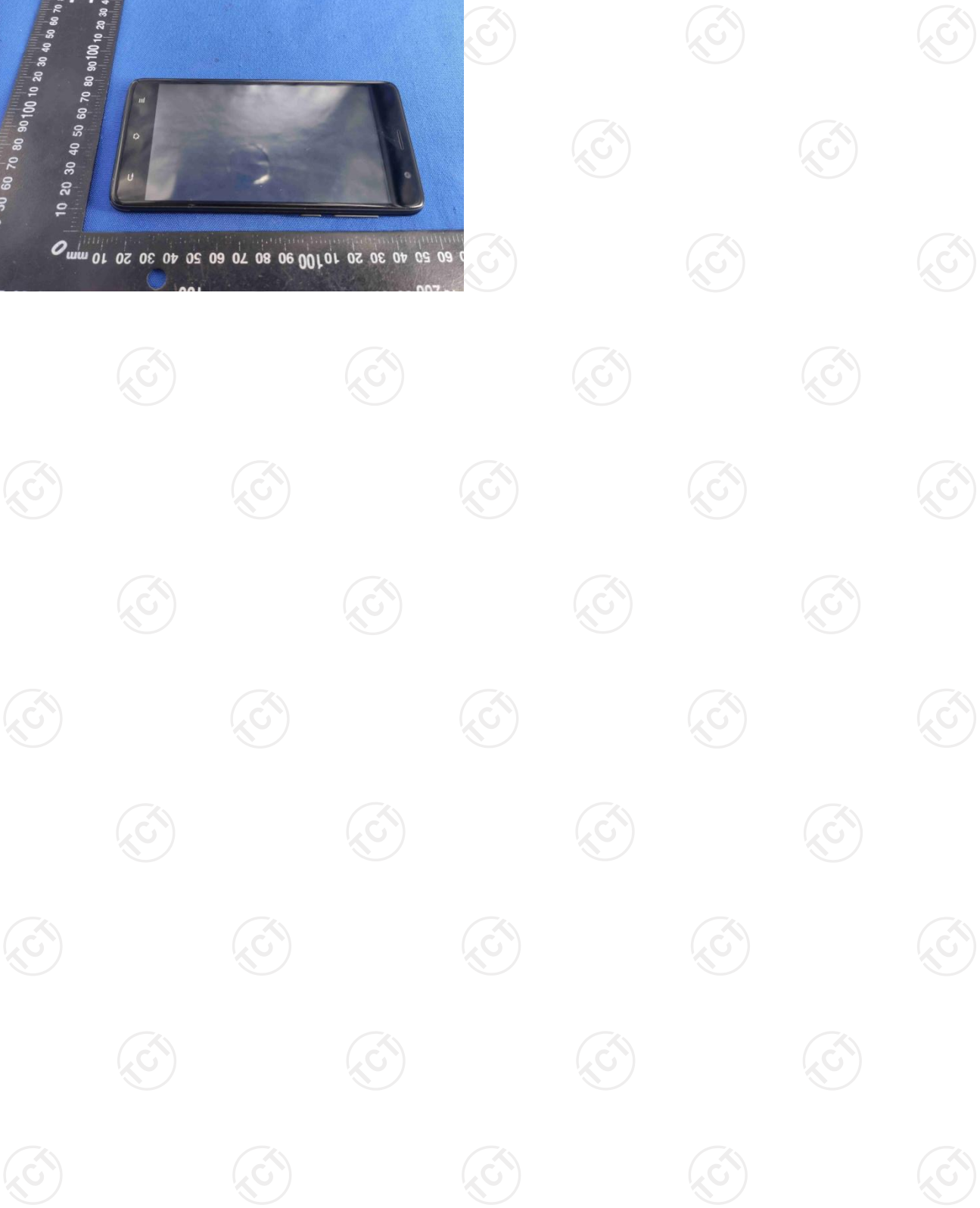
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3732	0.2107	0.0935	0.0368	0.0124



Hot spot position



13. Appendix A: EUT Photos



Liquid depth



The Body Liquid of 835MHz (15.4cm)



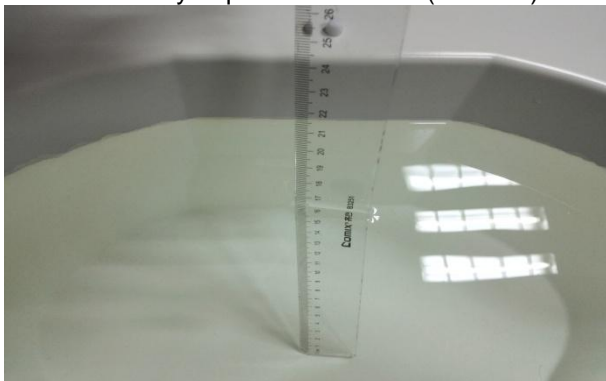
The Body Liquid of 1800MHz (15.2 cm)



The Body Liquid of 1900MHz (16.4 cm)



The Body Liquid of 2450MHz (15.3cm)



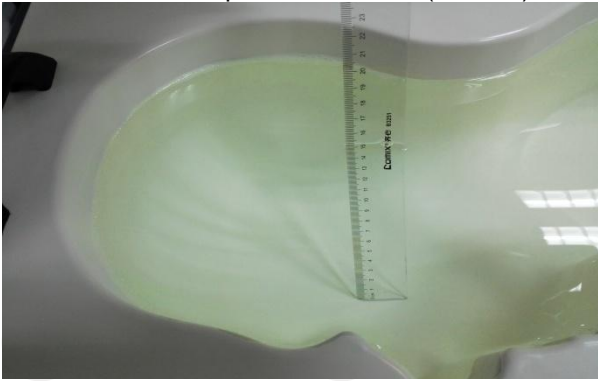
The Body Liquid of 2600MHz (16.5cm)



The Head Liquid of 1900MHz (15.5cm)



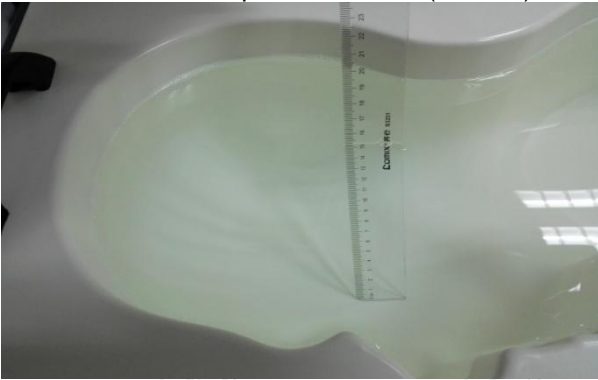
The Head Liquid of 2450MHz (15.6cm)



The Head Liquid of 835MHz (15.3cm)

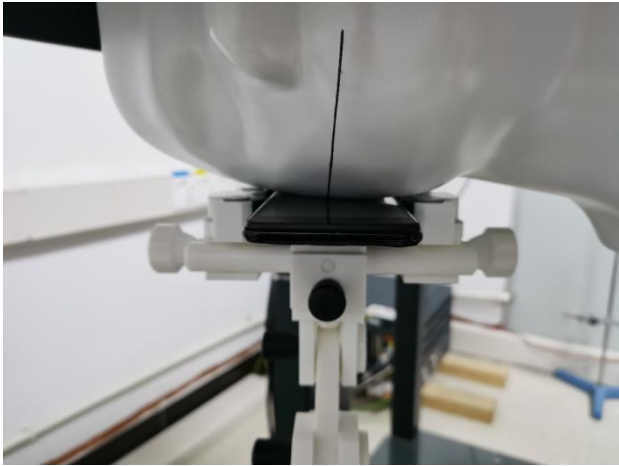


The Head Liquid of 2600MHz (15.1cm)

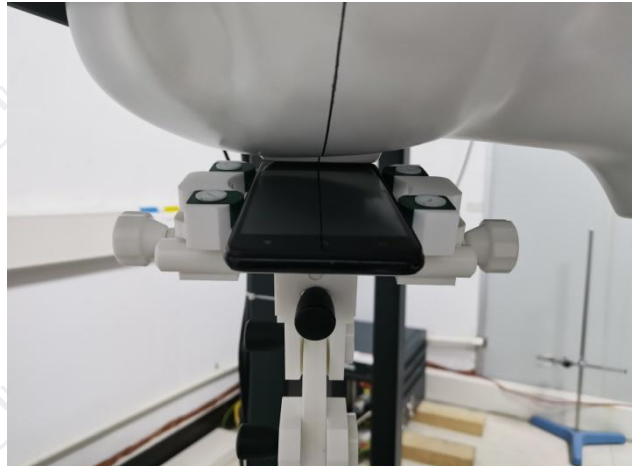


The Head Liquid of 1800MHz (15.2cm)

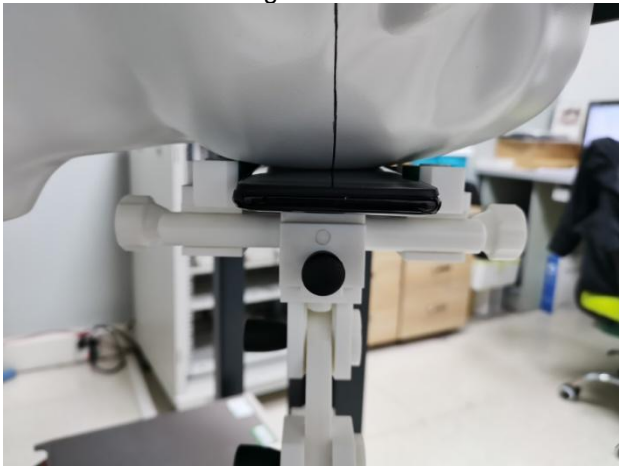
14. Appendix B: Test Setup Photos



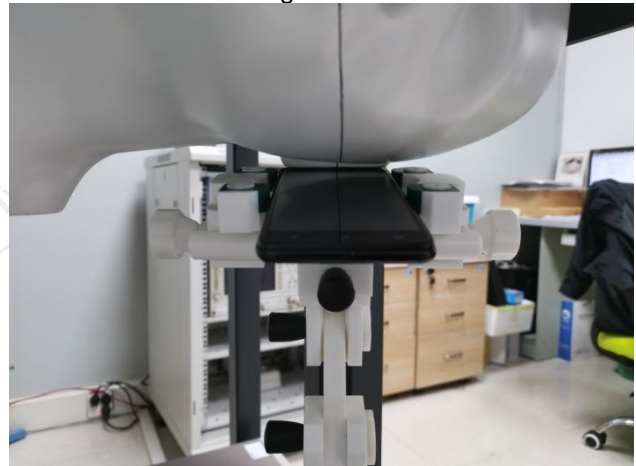
Right Cheek



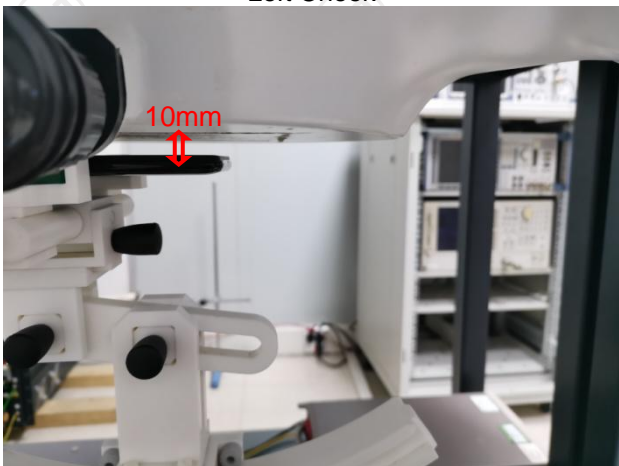
Right Tilted



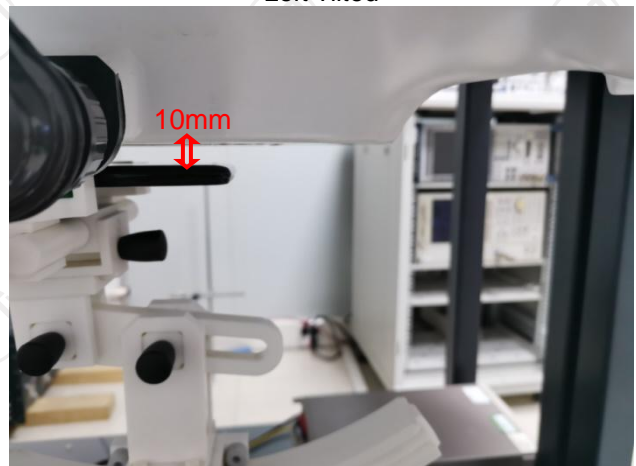
Left Cheek



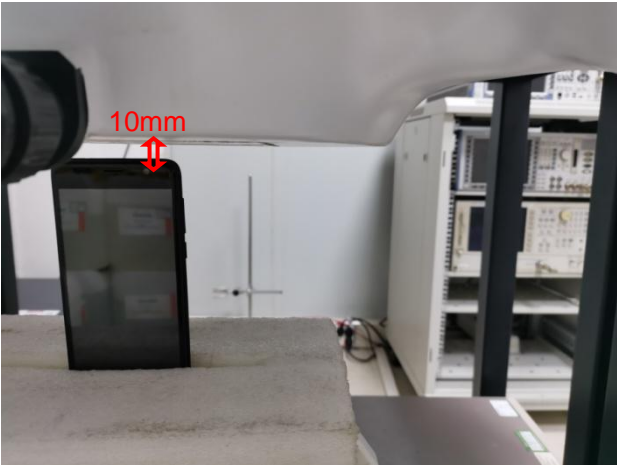
Left Tilted



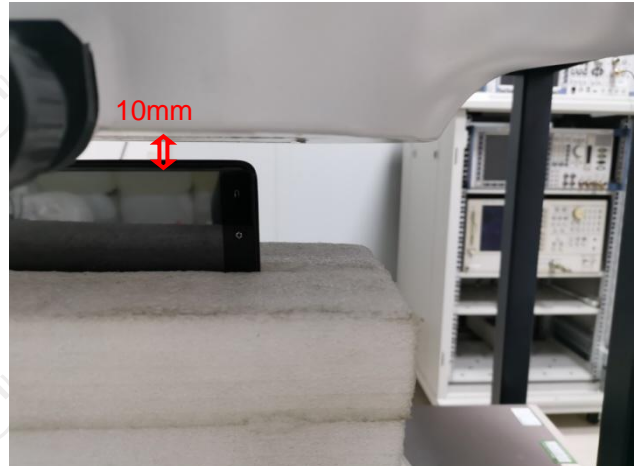
Body worn – Front (10mm)



Body worn – Back (10mm)



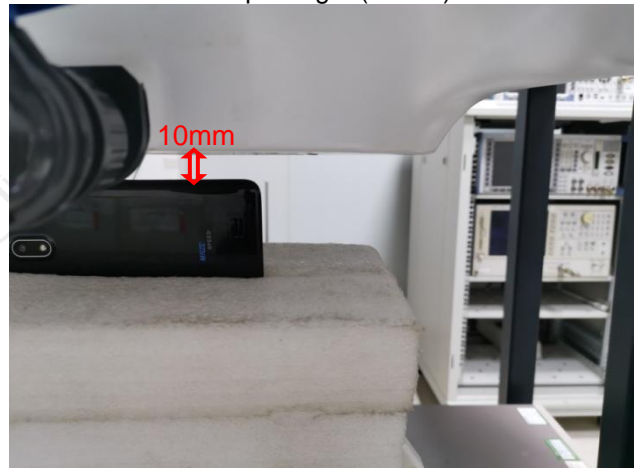
Hotspot Top (10mm)



Hotspot Right (10mm)



Hotspot Bottom (10mm)



Hotspot Left (10mm)



15. Appendix C: Probe Calibration Certificate

COMOSAR E-FIELD Probe



COMOSAR E-Field Probe Calibration Report

Ref : ACR.241.1.19.SATU.A

**SHENZHEN TCT TESTING TECHNOLOGY
CO.,LTD**

**1F, NO.1 BUILDING, YIBAOLAI INDUSTRIAL PARK,NO.1
CHONGQING ROAD,QIAOTOU VILLAGE,**

FUYONG TOWN, BAOAN DISTRICT

MVG COMOSAR DOSIMETRIC E-FIELD PROBE

SERIAL NO.: SN 41/18 EPG0331

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144



Calibration Date: 08/29/2019

Summary:

This document presents the method and results from an accredited COMOSAR Dosimetric E-Field Probe calibration performed in MVG USA using the CALISAR / CALIBAIR test bench, for use with a COMOSAR system only. All calibration results are traceable to national metrology institutions.



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.241.1.19.SATU.A

	<i>Name</i>	<i>Function</i>	<i>Date</i>	<i>Signature</i>
<i>Prepared by :</i>	Jérôme LUC	Product Manager	8/29/2019	<i>JS</i>
<i>Checked by :</i>	Jérôme LUC	Product Manager	8/29/2019	<i>JS</i>
<i>Approved by :</i>	Kim RUTKOWSKI	Quality Manager	8/29/2019	<i>Kim Rutkowski</i>

	<i>Customer Name</i>
<i>Distribution :</i>	Shenzhen TCT Testing Technology Co.,Ltd

<i>Issue</i>	<i>Date</i>	<i>Modifications</i>
A	8/29/2019	Initial release

Page: 2/10

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1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	SN 41/18 EPGO331
Product Condition (new / used)	New
Frequency Range of Probe	0.4 GHz-6GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.184 MΩ Dipole 2: R2=0.191 MΩ Dipole 3: R3=0.192 MΩ

A yearly calibration interval is recommended.

2 PRODUCT DESCRIPTION

2.1 GENERAL INFORMATION

MVG's COMOSAR E field Probes are built in accordance to the IEEE 1528, OET 65 Bulletin C 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, OET 65 Bulletin C, CENELEC EN50361 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 - 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°).

3.5 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.

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 (%)
Incident or forward power	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Reflected power	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Liquid conductivity	5.00%	Rectangular	$\sqrt{3}$	1	2.887%
Liquid permittivity	4.00%	Rectangular	$\sqrt{3}$	1	2.309%
Field homogeneity	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Field probe positioning	5.00%	Rectangular	$\sqrt{3}$	1	2.887%



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.241.1.19.SATU.A

Field probe linearity	3.00%	Rectangular	$\sqrt{3}$	1	1.732%
Combined standard uncertainty					5.831%
Expanded uncertainty 95 % confidence level k = 2					12.0%

5 CALIBRATION MEASUREMENT RESULTS

Calibration Parameters	
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

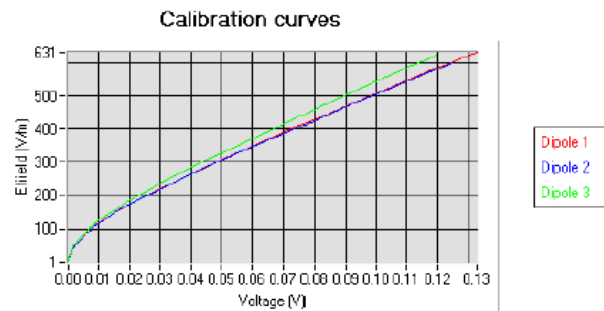
5.1 SENSITIVITY IN AIR

Normx dipole 1 ($\mu\text{V}/(\text{V}/\text{m}^2)$)	Normy dipole 2 ($\mu\text{V}/(\text{V}/\text{m}^2)$)	Normz dipole 3 ($\mu\text{V}/(\text{V}/\text{m}^2)$)
0.86	0.78	0.74

DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
95	93	91

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

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

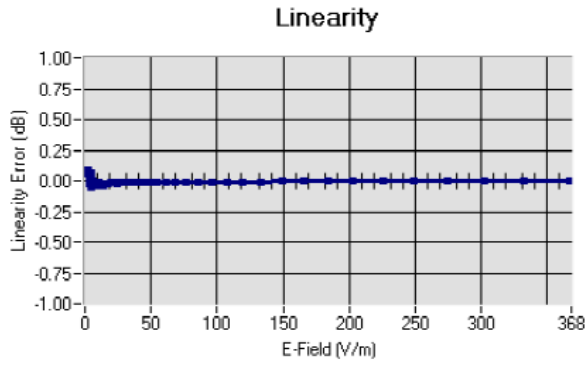




COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.241.1.19.SATU.A

5.2 LINEARITY



Linearity: $\pm 1.92\%$ ($\pm 0.08\text{dB}$)

5.3 SENSITIVITY IN LIQUID

Liquid	Frequency (MHz +/- 100MHz)	Permittivity	Epsilon (S/m)	ConvF
HL450	450	45.43	0.86	1.85
BL450	450	58.80	0.90	1.92
HL750	750	40.76	0.93	1.71
BL750	750	56.70	0.98	1.78
HL850	835	40.86	0.92	1.80
BL850	835	56.35	0.99	1.86
HL900	900	41.94	0.93	1.91
BL900	900	54.62	0.98	1.96
HL1800	1800	40.86	1.29	2.08
BL1800	1800	52.27	1.47	2.16
HL1900	1900	39.67	1.38	2.23
BL1900	1900	52.84	1.59	2.32
HL2000	2000	38.71	1.42	2.03
BL2000	2000	52.03	1.52	2.10
HL2450	2450	38.72	1.80	2.31
BL2450	2450	54.91	1.97	2.37
HL2600	2600	39.98	1.89	2.16
BL2600	2600	54.42	2.18	2.23
HL3500	3500	37.96	2.87	2.21
BL3500	3500	53.40	3.28	2.28
HL5200	5200	36.68	4.45	2.01
BL5200	5200	49.02	5.46	2.08
HL5400	5400	36.08	4.69	1.94
BL5400	5400	49.55	5.53	1.99
HL5600	5600	35.34	4.95	2.07
BL5600	5600	47.60	5.77	2.12
HL5800	5800	34.81	5.08	2.06
BL5800	5800	47.81	6.12	2.13

LOWER DETECTION LIMIT: 9mW/kg

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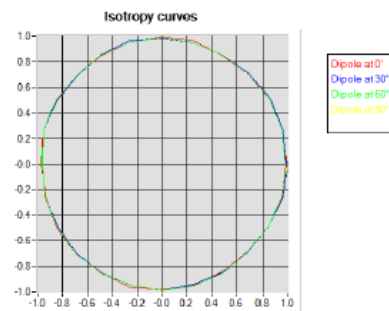
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5.4 ISOTROPY

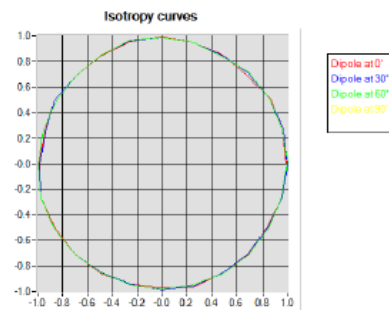
HL850 MHz

- Axial isotropy: 0.04 dB
- Hemispherical isotropy: 0.07 dB



HL1900 MHz

- Axial isotropy: 0.04 dB
- Hemispherical isotropy: 0.08 dB



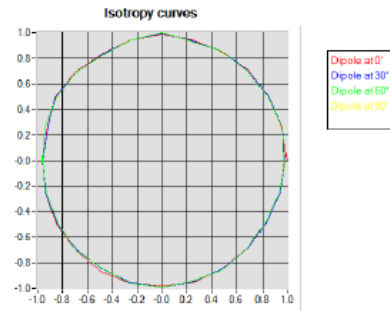


COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.241.1.19.SATU.A

HL5600 MHz

- Axial isotropy: 0.06 dB
- Hemispherical isotropy: 0.10 dB





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	Rhode & Schwarz ZVA	SN100132	02/2019	02/2022
Reference Probe	MVG	EP 94 SN 37/08	10/2017	10/2019
Multimeter	Keithley 2000	1188656	01/2017	01/2020
Signal Generator	Agilent E4438C	MY49070581	01/2017	01/2020
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	01/2017	01/2020
Power Sensor	HP ECP-E26A	US37181460	01/2017	01/2020
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	Control Company	150798832	11/2017	11/2020



Dielectric Probe Calibration Report

Ref : ACR.138.4.33.SATU.A

Shenzhen Tongce Testing Lab.
1B/F., Building 1, Yibaolai Industrial Park,
Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, 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: 06/05/2018

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..SATU.A

	<i>Name</i>	<i>Function</i>	<i>Date</i>	<i>Signature</i>
<i>Prepared by :</i>	Jérôme LUC	Product Manager	06/05/2018	<i>JS</i>
<i>Checked by :</i>	Jérôme LUC	Product Manager	06/05/2018	<i>JS</i>
<i>Approved by :</i>	Kim RUTKOWSKI	Quality Manager	06/05/2018	<i>Kim Rutkowski</i>

	<i>Customer Name</i>
<i>Distribution :</i>	Shenzhen Tongce Testing Lab

<i>Issue</i>	<i>Date</i>	<i>Modifications</i>
A	06/05/2018	Initial release

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1 INTRODUCTION

This document contains a summary of the suggested methods and requirements set forth by the IEEE 1528 and CEI/IEC 62209 standards for liquid permittivity measurements and the measurements that were performed to verify that the product complies with the fore mentioned standards.

2 DEVICE UNDER TEST

Device Under Test	
Device Type	LIMESAR DIELECTRIC PROBE
Manufacturer	MVG
Model	SCLMP
Serial Number	SN 19/15 OCPG 71
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

MVG's Dielectric Probes are built in accordance to the IEEE 1528 and CEI/IEC 62209 standards. The product is designed for use with the LIMESAR test bench only.



Figure 1 – MVG LIMESAR Dielectric Probe



4 MEASUREMENT METHOD

The IEEE 1528, OET 65 Bulletin C and CEI/IEC 62209-1 & 2 standards outline techniques for dielectric property measurements. The LIMESAR test bench employs one of the methods outlined in the standards, using a contact probe or open-ended coaxial transmission-line probe and vector network analyzer. The standards recommend the measurement of two reference materials that have well established and stable dielectric properties to validate the system, one for the calibration and one for checking the calibration. The LIMESAR test bench uses De-ionized water as the reference for the calibration and either DMS or Methanol as the reference for checking the calibration. The following measurements were performed to verify that the product complies with the fore mentioned standards.

4.1 LIQUID PERMITTIVITY MEASUREMENTS

The permittivity of a liquid with well established dielectric properties was measured and the measurement results compared to the values provided in the fore mentioned standards.

5 MEASUREMENT UNCERTAINTY

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.

5.1 DIELECTRIC PERMITTIVITY MEASUREMENT

The following uncertainties apply to the Dielectric Permittivity measurement:

Uncertainty analysis of Permittivity Measurement					
ERROR SOURCES	Uncertainty value (+/-%)	Probability Distribution	Divisor	ci	Standard Uncertainty (+/-%)
Repeatability (n repeats, mid-band)	4.00%	N	1	1	4.000%
Deviation from reference liquid	5.00%	R	√3	1	2.887%
Network analyser-drift, linearity	2.00%	R	√3	1	1.155%
Test-port cable variations	0.00%	U	√2	1	0.000%
Combined standard uncertainty					5.066%
Expanded uncertainty (confidence level of 95%, k = 2)					10.0%

Uncertainty analysis of Conductivity Measurement					
ERROR SOURCES	Uncertainty value (+/-%)	Probability Distribution	Divisor	ci	Standard Uncertainty (+/-%)
Repeatability (n repeats, mid-band)	3.50%	N	1	1	3.500%
Deviation from reference liquid	3.00%	R	√3	1	1.732%
Network analyser-drift, linearity	2.00%	R	√3	1	1.155%
Test-port cable variations	0.00%	U	√2	1	0.000%
Combined standard uncertainty					4.072%
Expanded uncertainty (confidence level of 95%, k = 2)					8.1%



SAR DIELECTRIC PROBE CALIBRATION REPORT

Ref. ACR.138.4.33..SATU.A

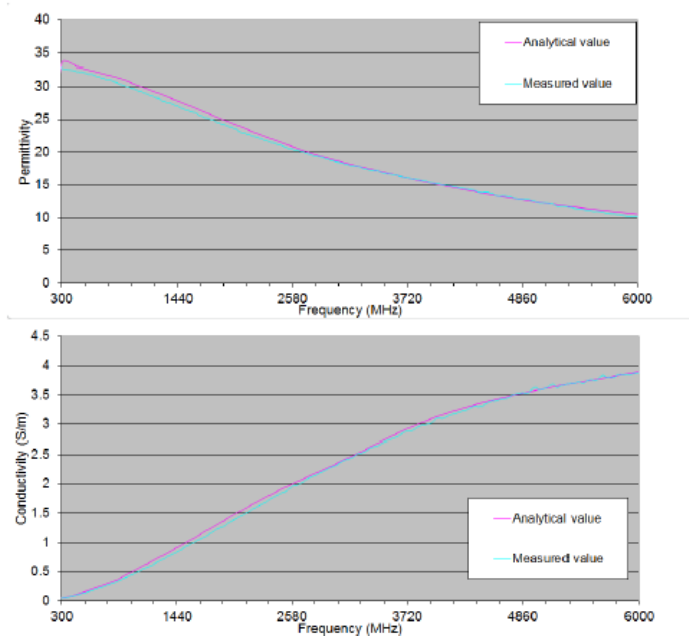
6 CALIBRATION MEASUREMENT RESULTS

Measurement Condition

Software	LIMESAR
Liquid Temperature	21°C
Lab Temperature	21°C
Lab Humidity	44%

6.1 LIQUID PERMITTIVITY MEASUREMENT

A liquid of known characteristics (methanol at 20°C) is measured with the probe and the results (complex permittivity $\epsilon' + j\epsilon''$) are compared with the well-known theoretical values for this liquid.





SAR DIELECTRIC PROBE CALIBRATION REPORT

Ref. ACR.138.4.33..SATU.A

7 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	Manufacturer / Model	Identification No.	Current Calibration Date	Next Calibration Date
LIMESAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rhode & Schwarz ZVA	SN100132	02/2018	02/2021
Methanol CAS 67-56-1	Alpha Aesar	Lot D13W011	Validated. No cal required.	Validated. No cal required.
Temperature and Humidity Sensor	Control Company	11-661-9	09/2018	09/2019

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16. Appendix D: Dipole Calibration Report

SID 835



SAR Reference Dipole Calibration Report

Ref : ACR.156.4.15.SATU.A

SHENZHEN TONGCE TESTING Lab.

1B/F., Building 1, Yibaolai Industrial Park,
Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

MVG COMOSAR REFERENCE DIPOLE

FREQUENCY: 835 MHZ

SERIAL NO.: SN 16/15 DIP 0G835-369

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144



Calibration Date: 06/05/2018

Summary:

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



SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.156.4.15.SATU.A

	<i>Name</i>	<i>Function</i>	<i>Date</i>	<i>Signature</i>
<i>Prepared by :</i>	Jérôme LUC	Product Manager	06/05/2018	<i>JS</i>
<i>Checked by :</i>	Jérôme LUC	Product Manager	06/05/2018	<i>JS</i>
<i>Approved by :</i>	Kim RUTKOWSKI	Quality Manager	06/05/2018	<i>Kim Rutkowski</i>

	<i>Customer Name</i>
<i>Distribution :</i>	Shenzhen Tongce Testing Lab

<i>Issue</i>	<i>Date</i>	<i>Modifications</i>
A	06/05/2018	Initial release

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1 INTRODUCTION

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

2 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR 835 MHz REFERENCE DIPOLE
Manufacturer	MVG
Model	SID835
Serial Number	SN 16/15 DIP 0G835-369
Product Condition (new / used)	Used

A yearly calibration interval is recommended.

3 PRODUCT DESCRIPTION

3.1 GENERAL INFORMATION

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



Figure 1 – MVG COMOSAR Validation Dipole

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4 MEASUREMENT METHOD

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

4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards.

4.2 MECHANICAL REQUIREMENTS

The IEEE Std. 1528 and CEI/IEC 62209 standards specify the mechanical components and dimensions of the validation dipoles, with the dimensions frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness.

5 MEASUREMENT UNCERTAINTY

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.

5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

Frequency band	Expanded Uncertainty on Return Loss
400-6000MHz	0.1 dB

5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

Length (mm)	Expanded Uncertainty on Length
3 - 300	0.05 mm

5.3 VALIDATION MEASUREMENT

The guidelines outlined in the IEEE 1528, FCC KDBs, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty for validation measurements.

Scan Volume	Expanded Uncertainty
1 g	20.3 %

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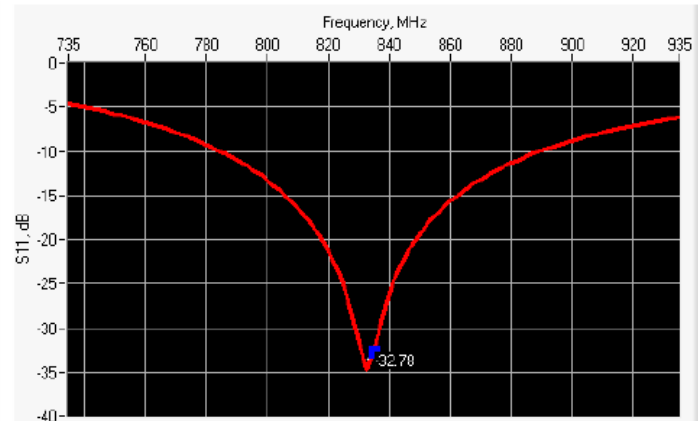
SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref. ACR.156.4.15.SATU.A

10 g	20.1 %
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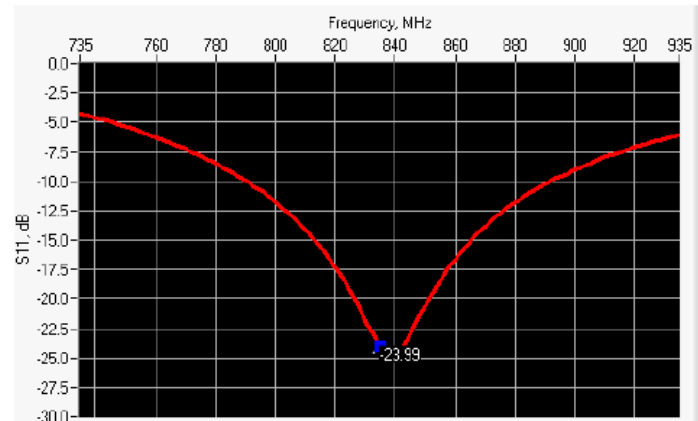
6 CALIBRATION MEASUREMENT RESULTS

6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
835	-32.78	-20	51.5 Ω + 1.7 jΩ

6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



Frequency (MHz)	Return Loss (dB)	Requirement (dB)	Impedance
835	-23.99	-20	47.3 Ω + 5.6 jΩ

6.3 MECHANICAL DIMENSIONS

Frequency MHz	L mm		h mm		d mm	
	required	measured	required	measured	required	measured
300	420.0 ±1 %		250.0 ±1 %		6.35 ±1 %	

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