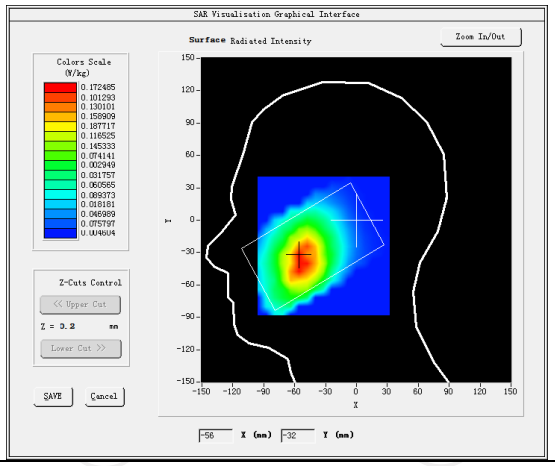
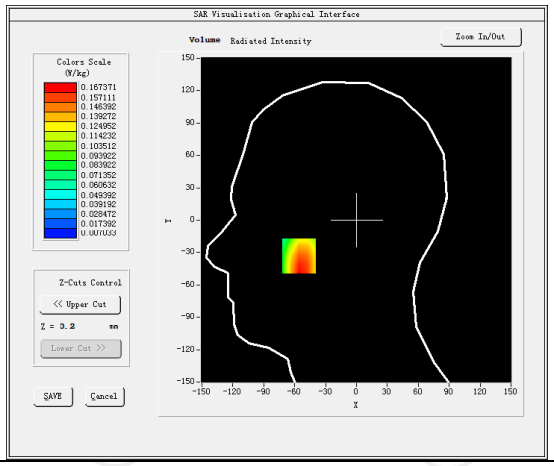
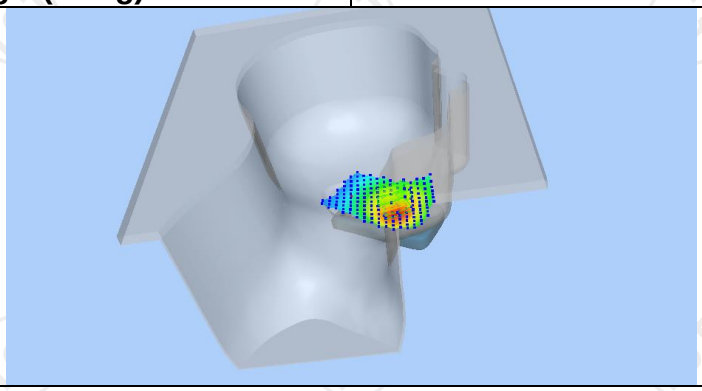
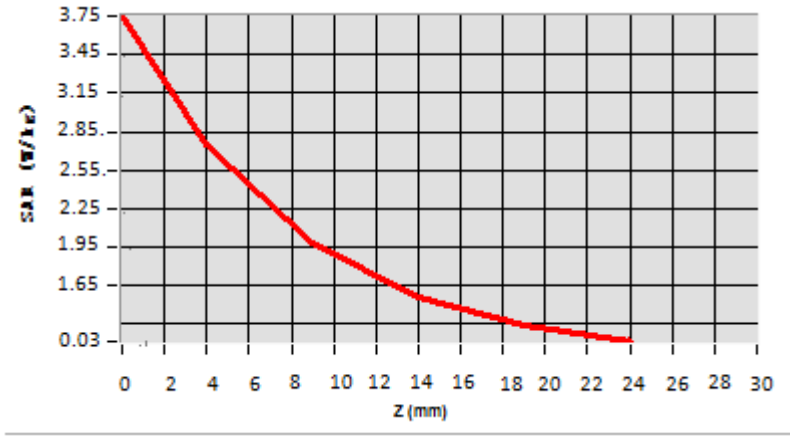
12. SAR Test Data

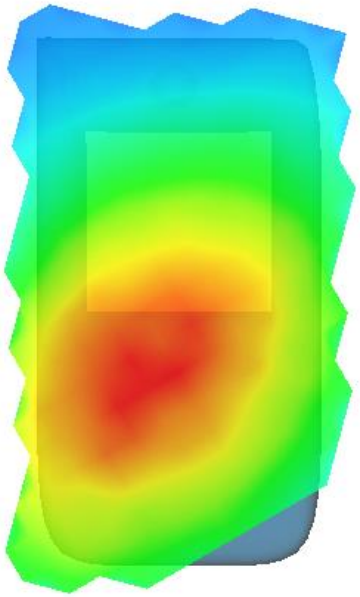
GSM850

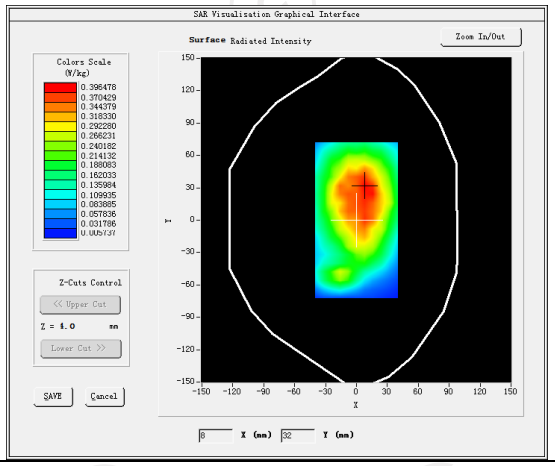
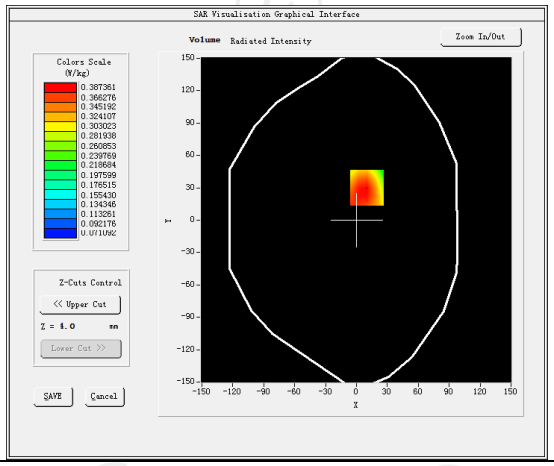
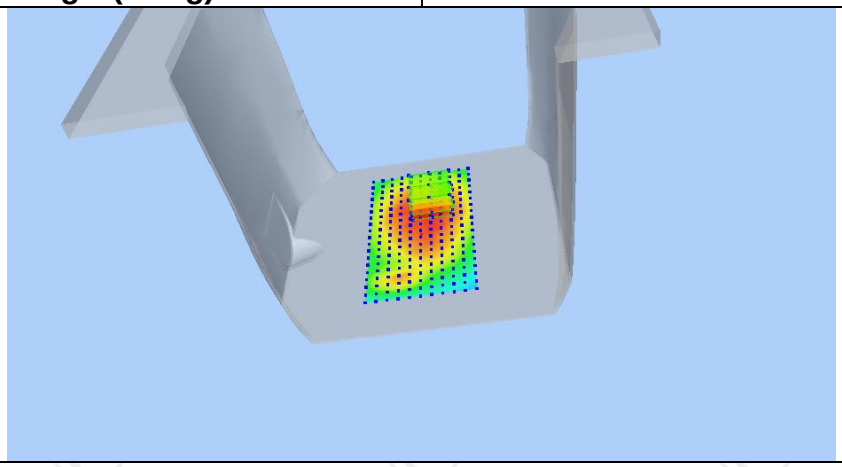
MEASUREMENT 1	
Higher Band SAR (Channel 251):	Date: 12/06/2017
Frequency (MHz)	848.799988
Relative permittivity (real part)	40.392457
Relative permittivity (imaginary part)	18.129852
Conductivity (S/m)	0.876812
Variation (%)	-1.710000
Crest Factor:	8.3
Probe Conversion factor	5.50
E-Field Probe:	SSE5 (SN 07/15 EP248)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	GSM850(voice)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-56.00, Y=-33.00 SAR Peak: 0.37 W/kg	
SAR 10g (W/Kg)	0.097639
SAR 1g (W/Kg)	0.125983
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3746	0.2735	0.1954	0.0891	0.0574

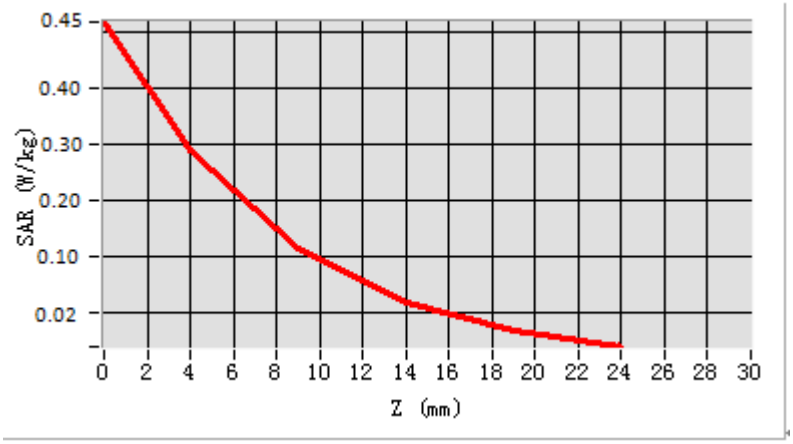


Hot spot position

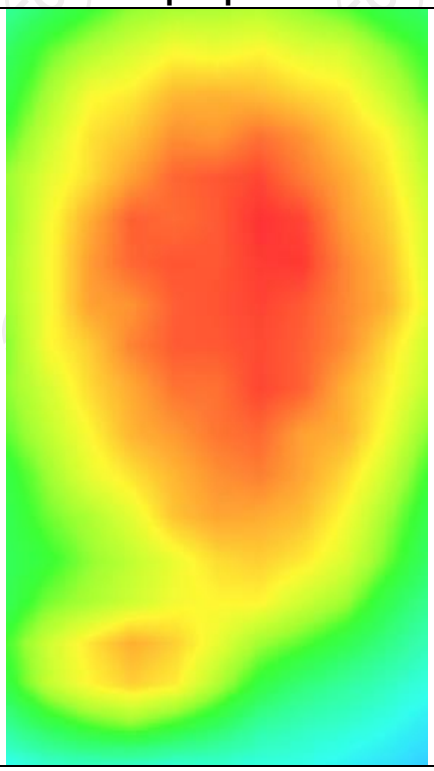


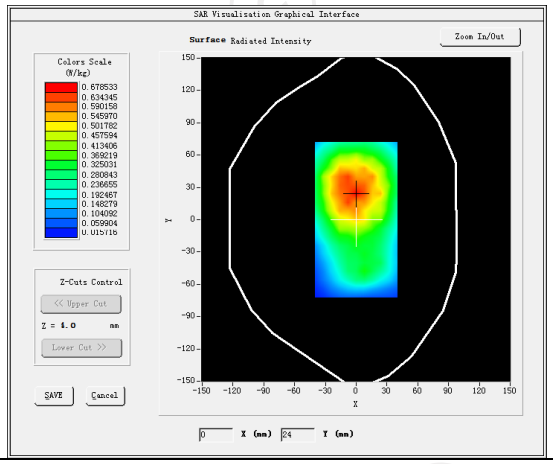
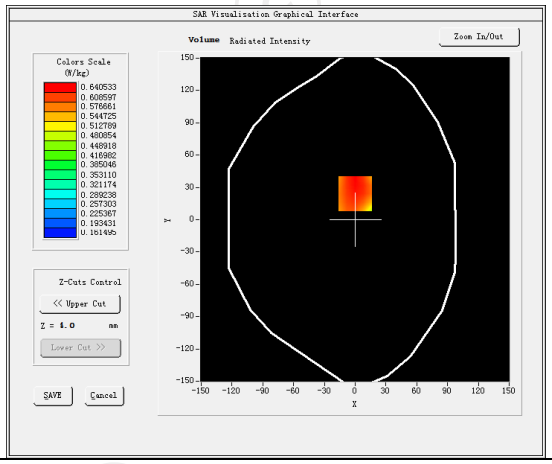
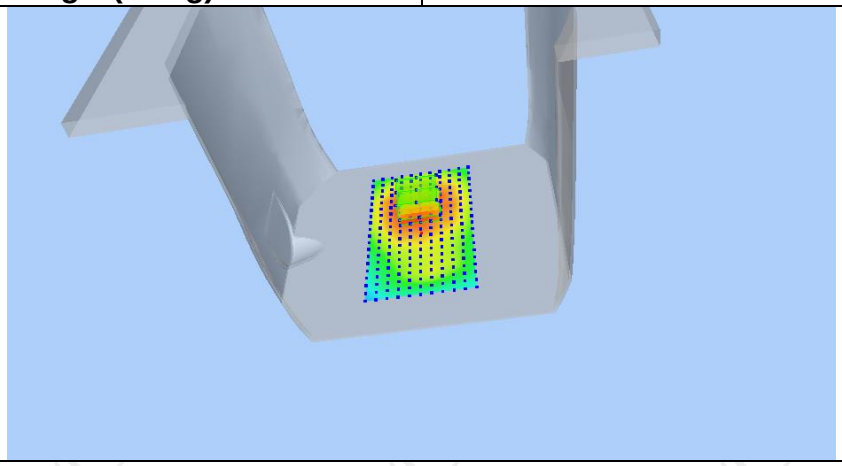
MEASUREMENT 2	
Higher Band SAR (Channel 251):	Date: 12/06/2017
Frequency (MHz)	848.799988
Relative permittivity (real part)	40.392457
Relative permittivity (imaginary part)	18.129852
Conductivity (S/m)	0.876812
Variation (%)	0.270000
Crest Factor:	8.3
Probe Conversion factor	5.65
E-Field Probe:	SSE5 (SN 07/15 EP248)
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(10mm)
Band	GSM850(Voice)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=10.00, Y=30.00 SAR Peak: 0.42 W/kg	
SAR 10g (W/Kg)	0.173946
SAR 1g (W/Kg)	0.246741
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4486	0.2965	0.1019	0.0294	0.0132

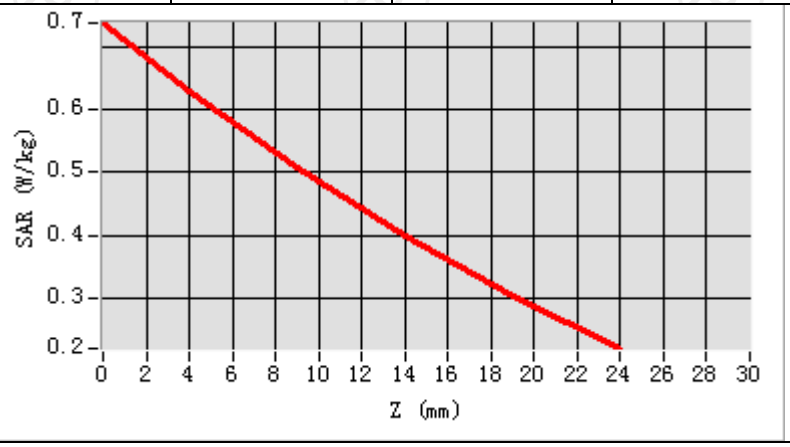


Hot spot position

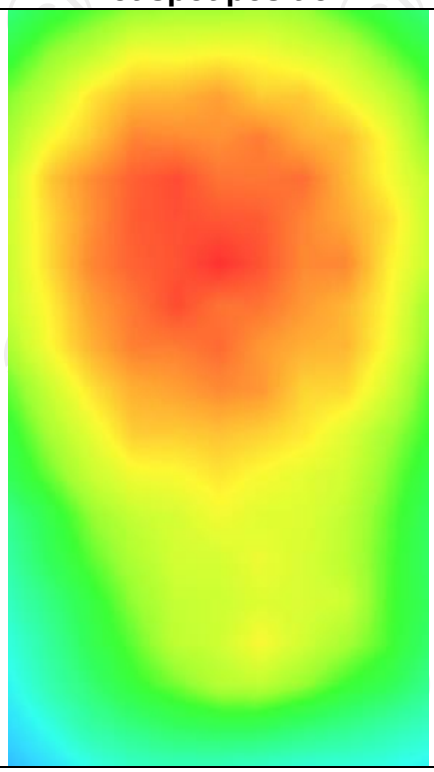


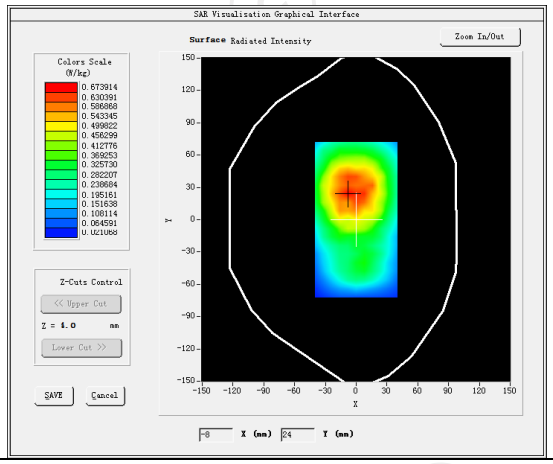
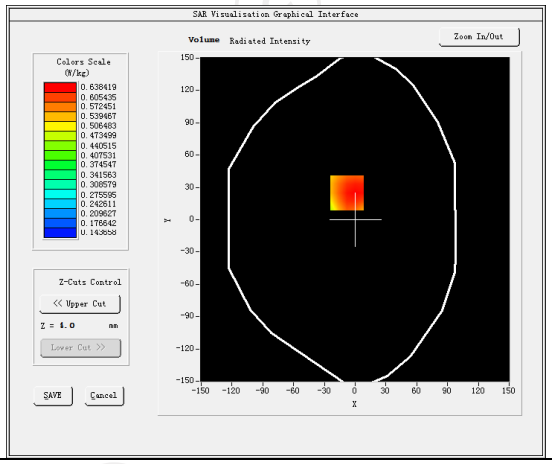
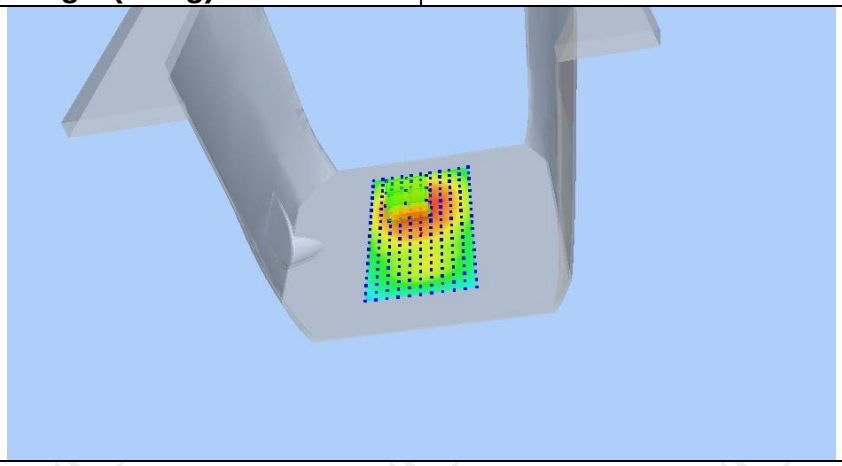
MEASUREMENT 3	
Higher Band SAR (Channel 251):	Date: 12/06/2017
Frequency (MHz)	848.799988
Relative permittivity (real part)	55.213702
Relative permittivity (imaginary part)	21.378187
Conductivity (S/m)	0.970360
Variation (%)	-3.710000
Crest Factor:	2.0
Probe Conversion factor	5.65
E-Field Probe:	SSE5 (SN 07/15 EP248)
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(10mm)
Band	GSM850(GPRS 2slot)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=0.00, Y=24.00 SAR Peak: 0.67 W/kg	
SAR 10g (W/Kg)	0.184762
SAR 1g (W/Kg)	0.270699
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7389	0.6304	0.5072	0.3977	0.3018

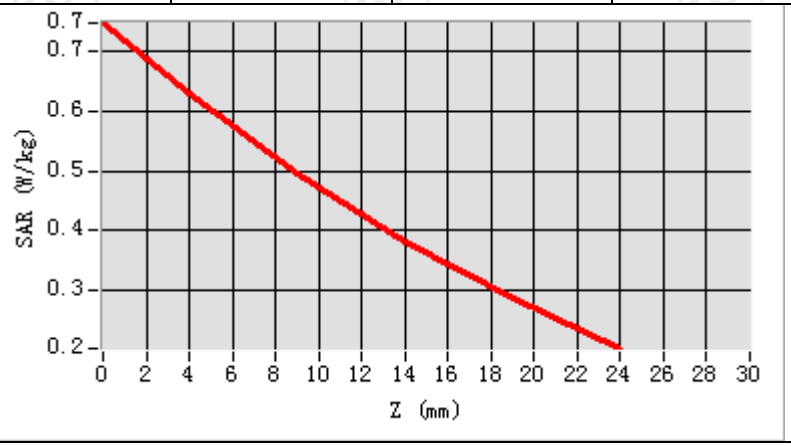


Hot spot position

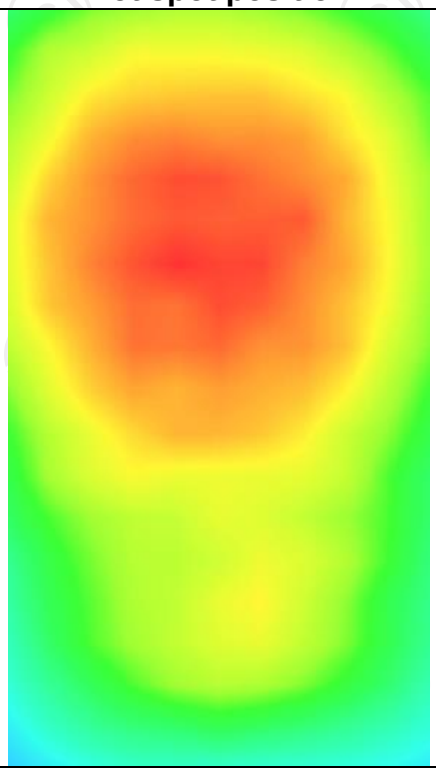


MEASUREMENT 4	
Higher Band SAR (Channel 251):	Date: 12/06/2017
Frequency (MHz)	848.799988
Relative permittivity (real part)	55.213702
Relative permittivity (imaginary part)	21.378187
Conductivity (S/m)	0.970360
Variation (%)	4.170000
Crest Factor:	2.0
Probe Conversion factor	5.65
E-Field Probe:	SSE5 (SN 07/15 EP248)
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(10mm)
Band	GSM850(GPRS 2slot hotspot)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-8.00, Y=25.00 SAR Peak: 0.86 W/kg	
SAR 10g (W/Kg)	0.285702
SAR 1g (W/Kg)	0.362971
	

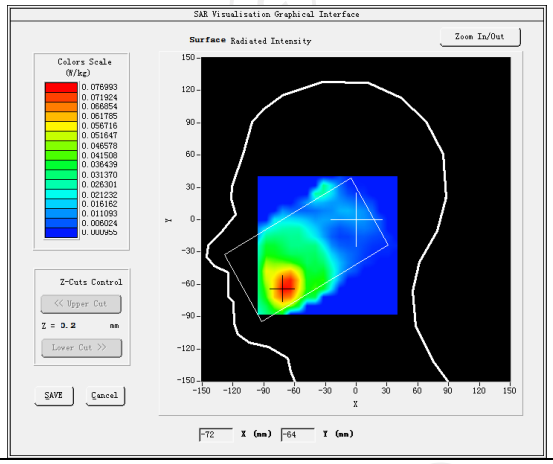
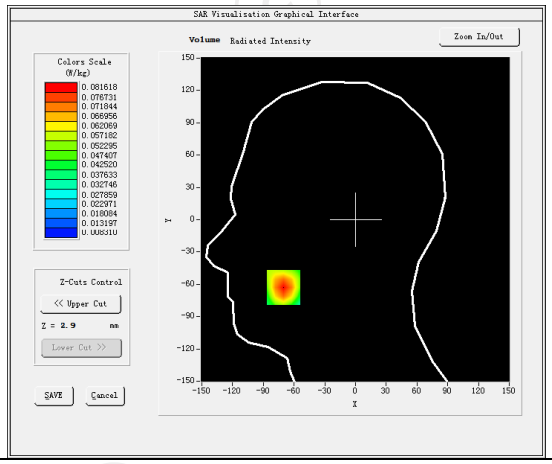
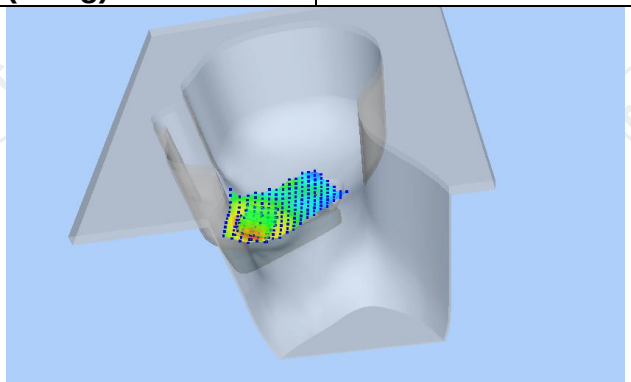
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.7472	0.6282	0.4963	0.3823	0.2849



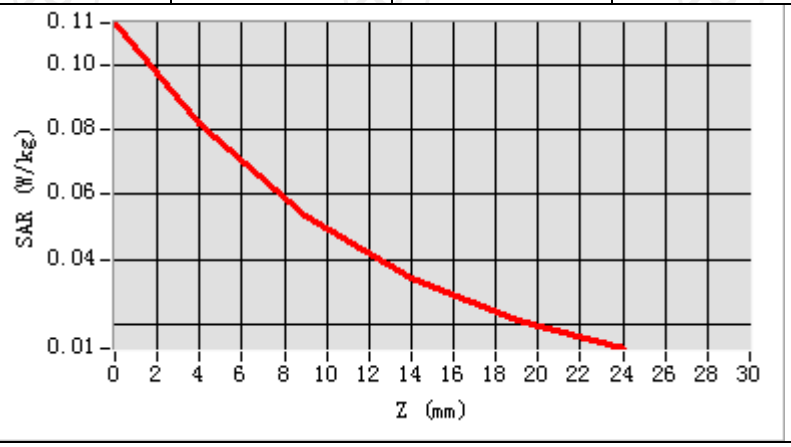
Hot spot position



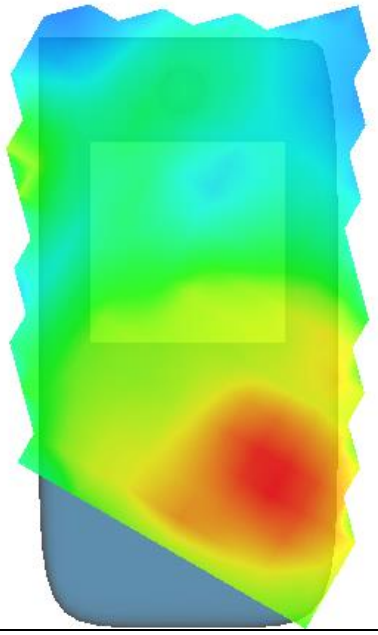
GSM1900

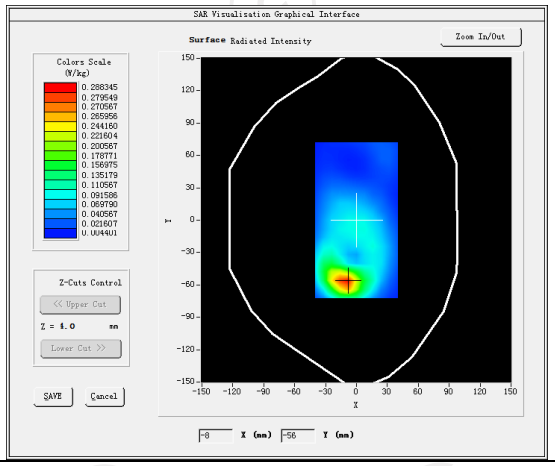
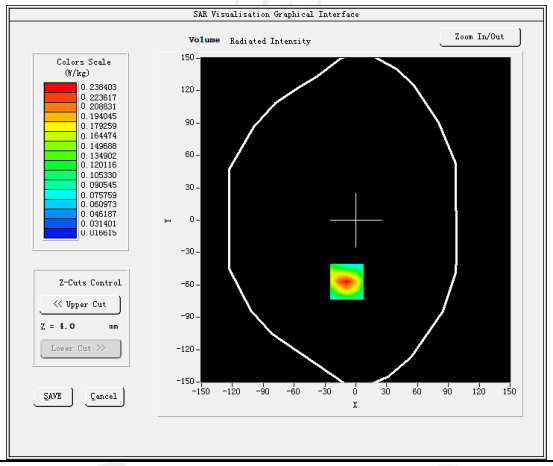
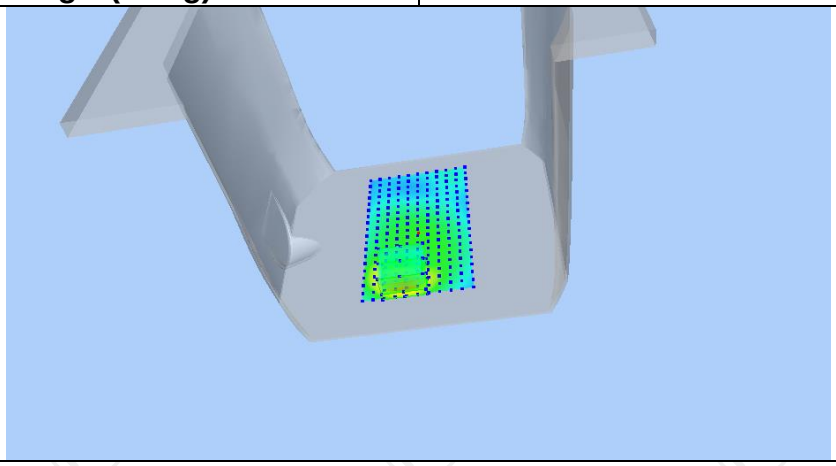
MEASUREMENT 1	
Higher Band SAR (Channel 810):	Date: 12/15/2017
Frequency (MHz)	1909.80000
Relative permittivity (real part)	39.076721
Relative permittivity (imaginary part)	12.607061
Conductivity (S/m)	1.367609
Variation (%)	3.330000
Crest Factor	8.3
Probe Conversion factor	4.85
E-Field Probe:	SSE5 (SN 07/15 EP248)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Right head
Device Position	Cheek
Band	GSM1900(voice)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-73.00, Y=-62.00 SAR Peak: 0.23 W/kg	
SAR 10g (W/Kg)	0.076278
SAR 1g (W/Kg)	0.098380
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1153	0.0837	0.0301	0.0327	0.0238

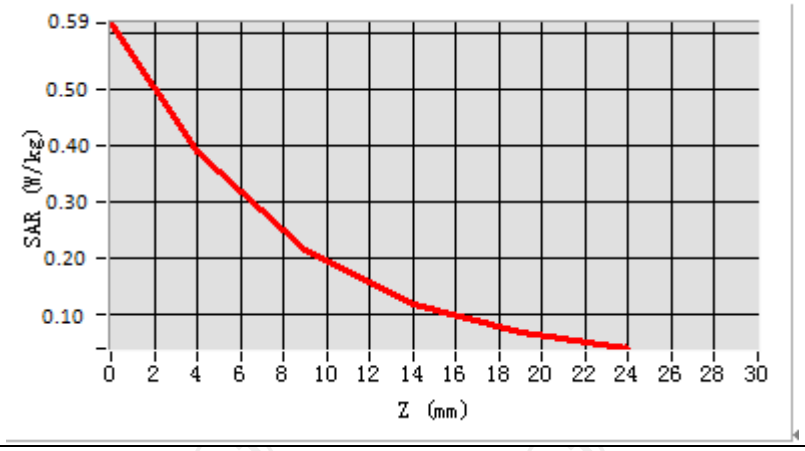


Hot spot position

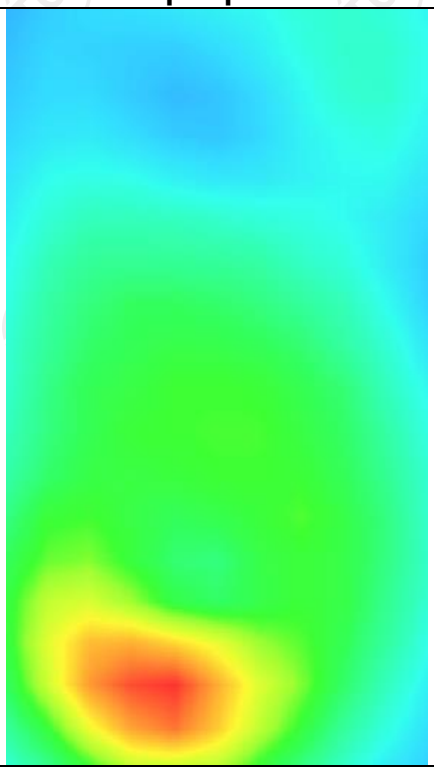


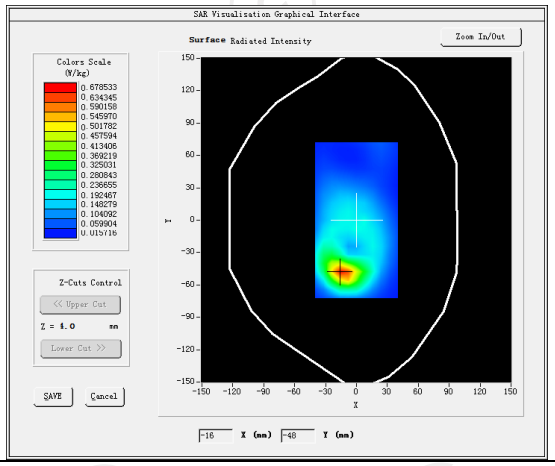
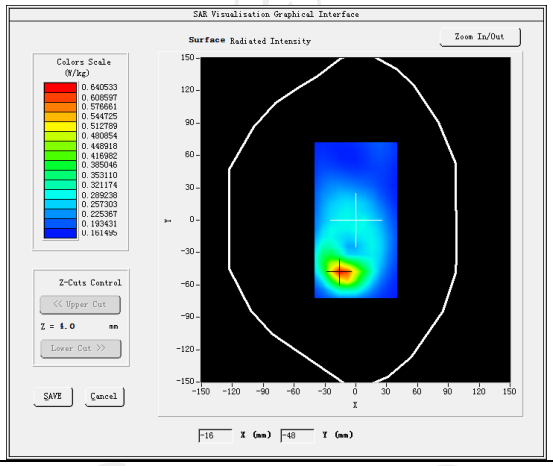
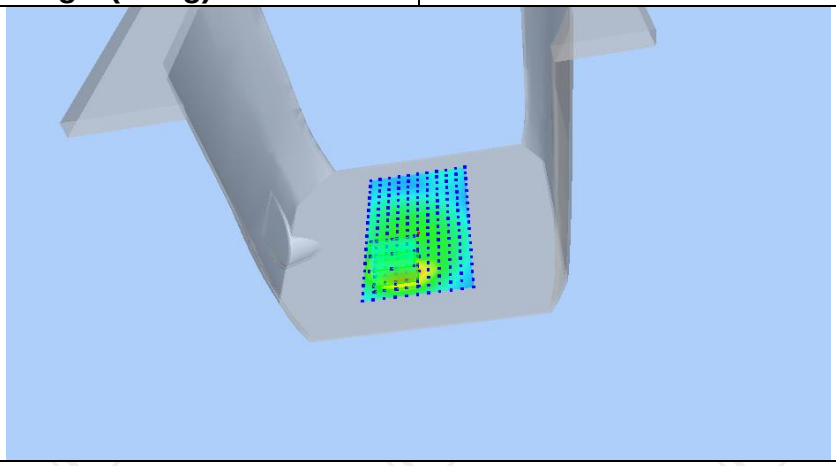
MEASUREMENT 2	
Lower Band SAR (Channel 512):	Date: 12/15/2017
Frequency (MHz)	1850.199951
Relative permittivity (real part)	53.341337
Relative permittivity (imaginary part)	14.232400
Conductivity (S/m)	1.491736
Variation (%)	-0.360000
Crest Factor	8.3
Probe Conversion factor	5.01
E-Field Probe:	SSE5 (SN 07/15 EP248)
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(10mm)
Band	GSM1900(voice)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-9.00, Y=-57.00 SAR Peak: 0.57 W/kg	
SAR 10g (W/Kg)	0.237189
SAR 1g (W/Kg)	0.305154
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.5875	0.3956	0.2319	0.1203	0.0891

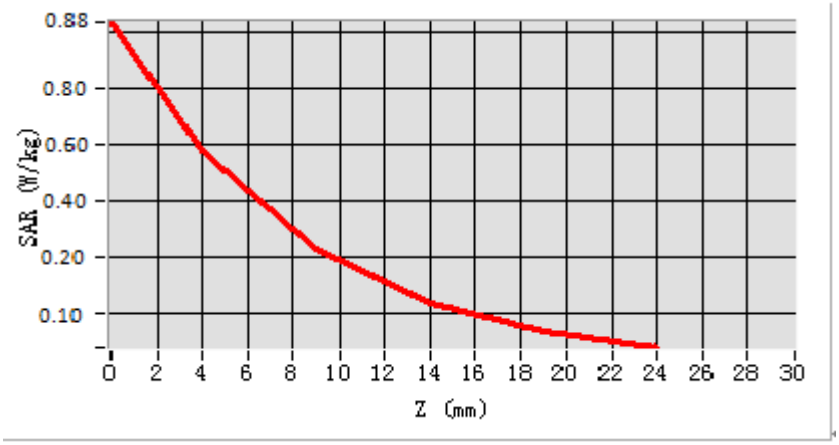


Hot spot position

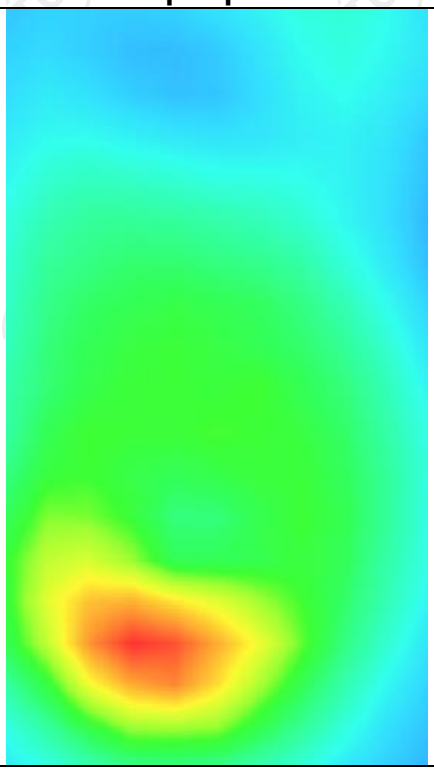


MEASUREMENT 3	
Lower Band SAR (Channel 512):	Date: 12/15/2017
Frequency (MHz)	1850.199951
Relative permittivity (real part)	53.341337
Relative permittivity (imaginary part)	14.232400
Conductivity (S/m)	1.491736
Variation (%)	-3.150000
Crest Factor	2.0
Probe Conversion factor	5.01
E-Field Probe:	SSE5 (SN 07/15 EP248)
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(10mm)
Band	GSM1900(GPRS 2slot)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-15.00, Y=-48.00 SAR Peak: 0.84 W/kg	
SAR 10g (W/Kg)	0.414649
SAR 1g (W/Kg)	0.483823
	

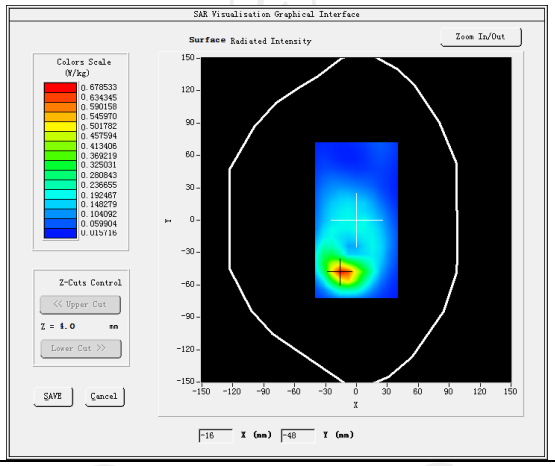
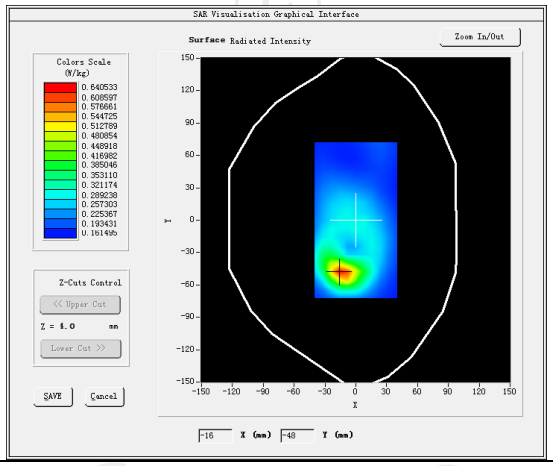
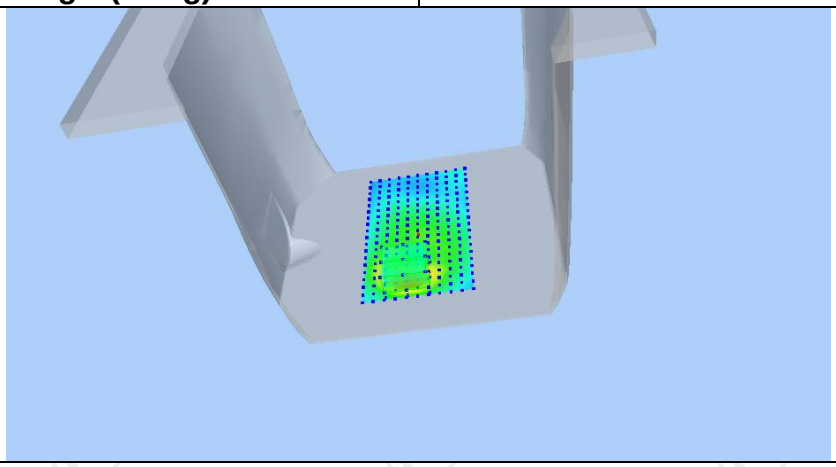
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8773	0.5861	0.2296	0.1237	0.0791



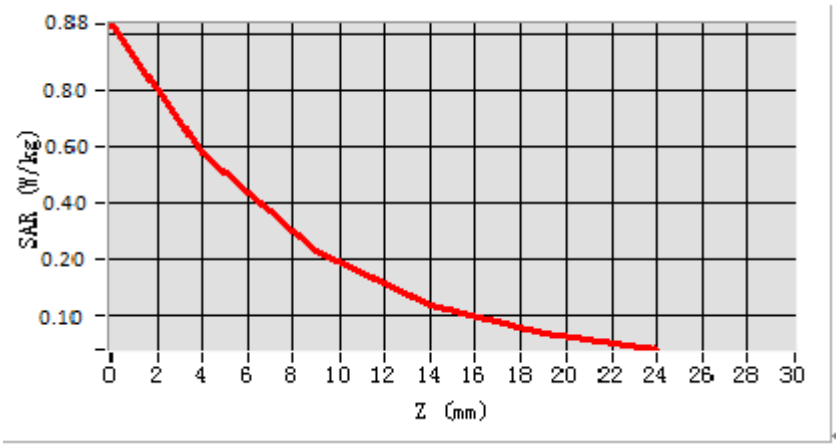
Hot spot position



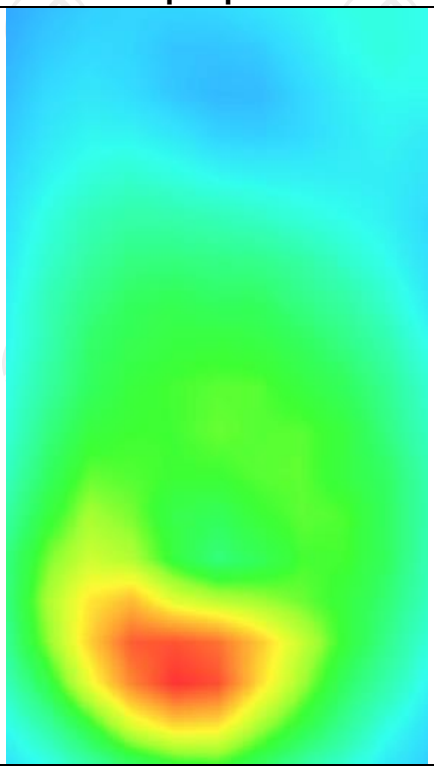
Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

MEASUREMENT 4	
Lower Band SAR (Channel 512):	Date: 12/15/2017
Frequency (MHz)	1850.199951
Relative permittivity (real part)	53.341337
Relative permittivity (imaginary part)	14.232400
Conductivity (S/m)	1.491736
Variation (%)	-0.890000
Crest Factor	2.0
Probe Conversion factor	5.01
E-Field Probe:	SSE5 (SN 07/15 EP248)
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 bottom(10mm)
Band	GSM1900(GPRS 2slot hotspot)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-17.00, Y=-49.00 SAR Peak: 0.85 W/kg	
SAR 10g (W/Kg)	0.628237
SAR 1g (W/Kg)	0.448735
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8798	0.5912	0.2351	0.1375	0.0882



Hot spot position



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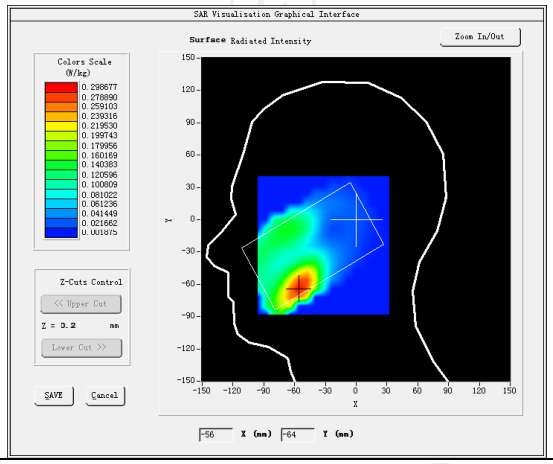
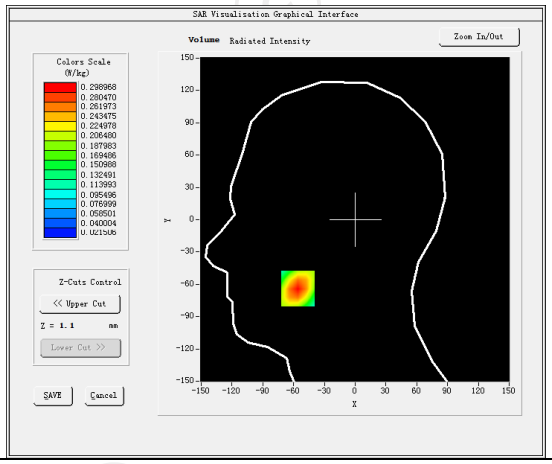
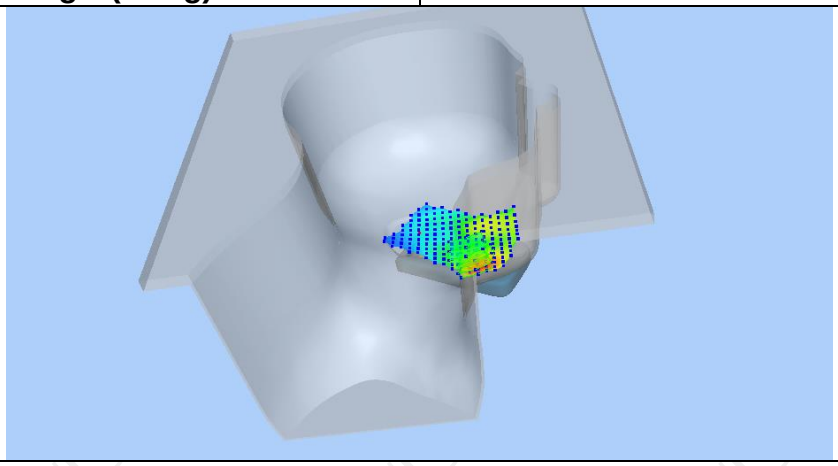
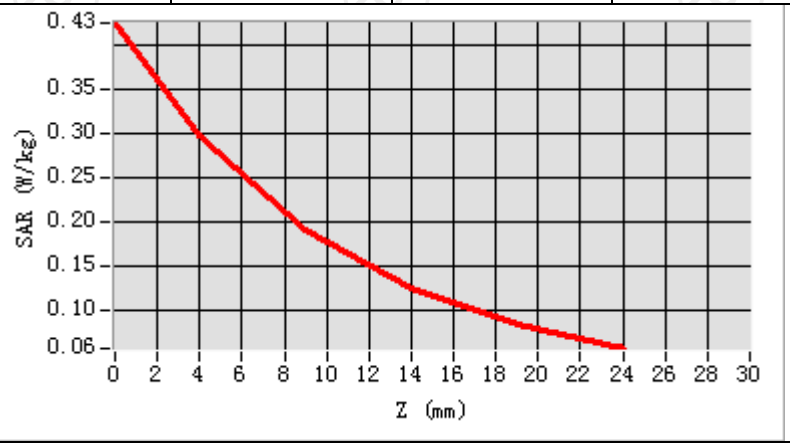
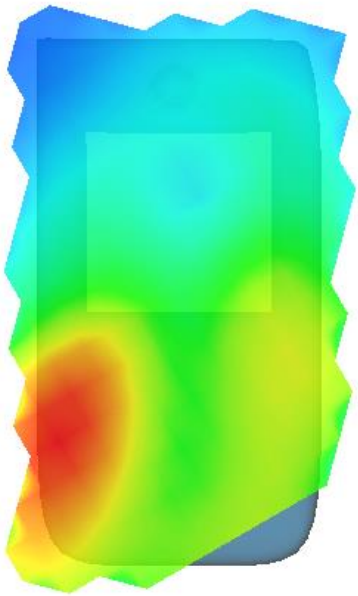
WCDMA Band II

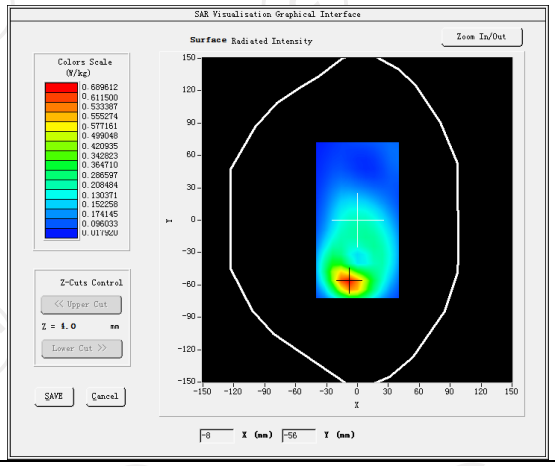
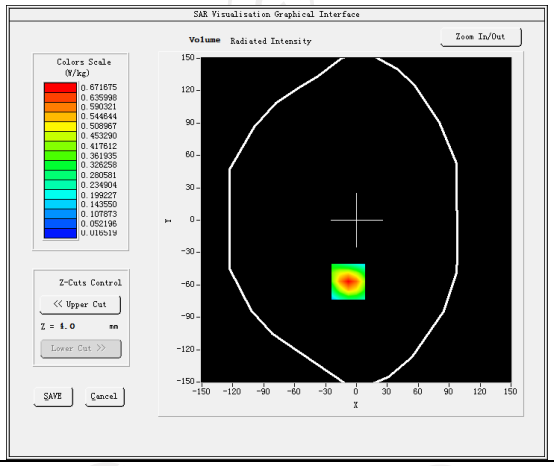
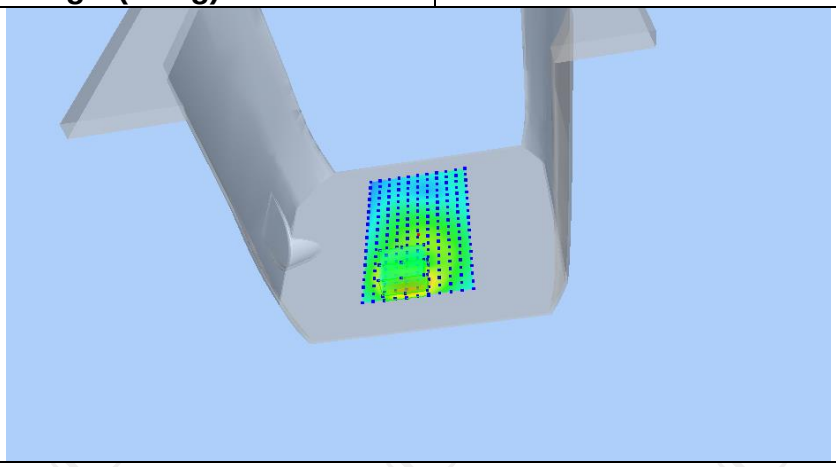
MEASUREMENT 1	
Middle Band SAR (Channel 9400):	Date: 12/15/2017
Frequency (MHz)	1880.000000
Relative permittivity (real part)	39.103841
Relative permittivity (imaginary part)	12.607061
Conductivity (S/m)	1.350609
Variation (%)	-1.250000
Crest Factor	1.0
Probe Conversion factor	4.85
E-Field Probe:	SSE5 (SN 07/15 EP248)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	BAND1 WCDMA2100
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-56.00, Y=-64.00 SAR Peak: 0.43 W/kg	
SAR 10g (W/Kg)	0.170441
SAR 1g (W/Kg)	0.281414
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4258	0.2990	0.1912	0.1246	0.0844

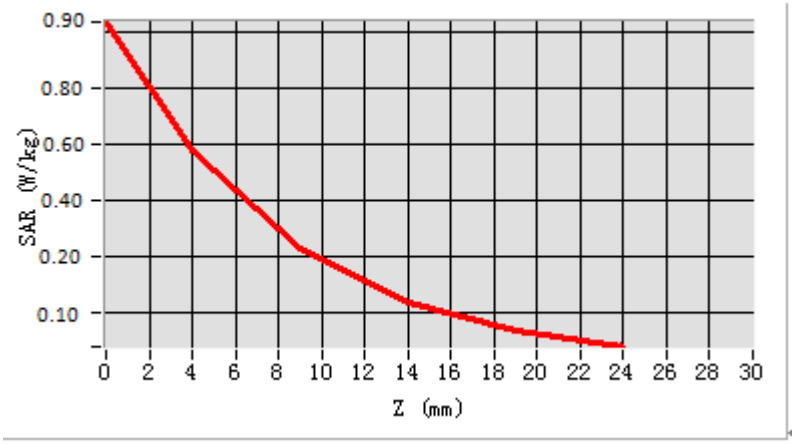


Hot spot position

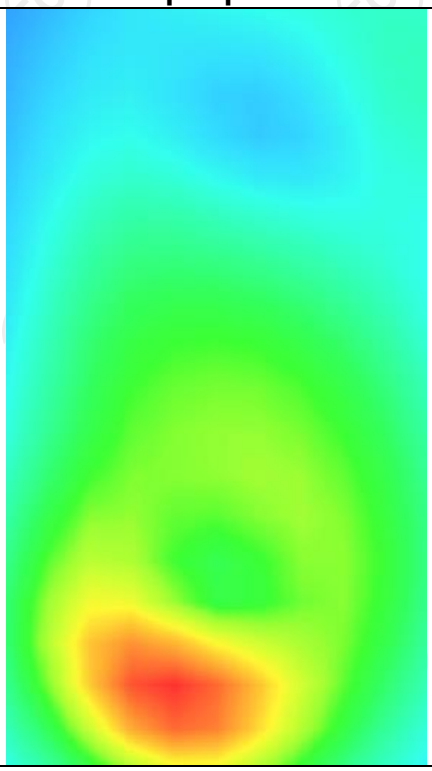


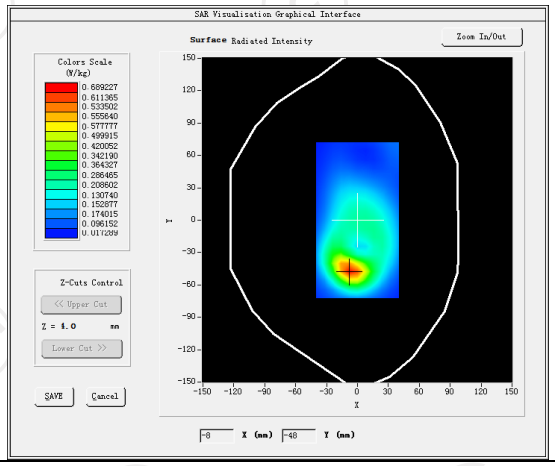
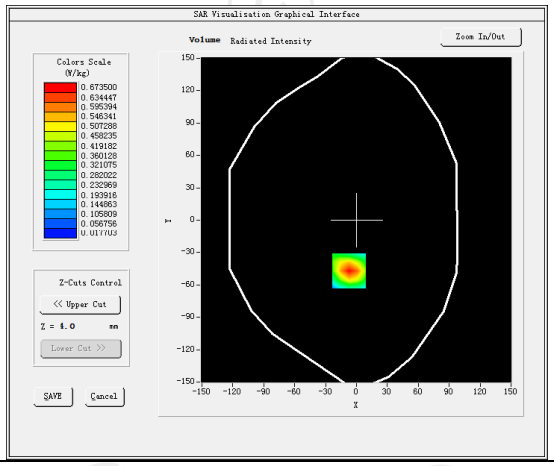
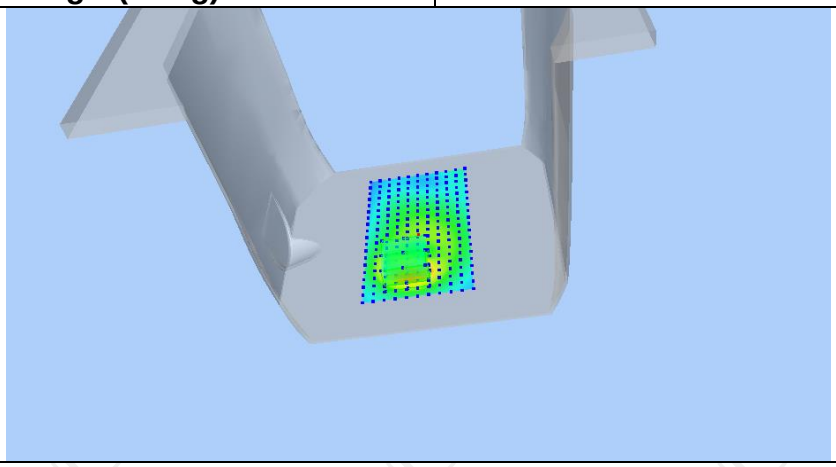
MEASUREMENT 2	
Middle Band SAR (Channel 9400):	\ Date: 12/15/2017
Frequency (MHz)	1880.000000
Relative permittivity (real part)	53.320121
Relative permittivity (imaginary part)	14.225400
Conductivity (S/m)	1.500251
Variation (%)	-0.660000
Crest Factor	1.0
Probe Conversion factor	5.01
E-Field Probe:	SSE5 (SN 07/15 EP248)
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(10mm)
Band	BAND1 WCDMA2100
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-8.00, Y=-57.00 SAR Peak: 0.90 W/kg	
SAR 10g (W/Kg)	0.439551
SAR 1g (W/Kg)	0.501528
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8930	0.5943	0.2317	0.1545	0.0821

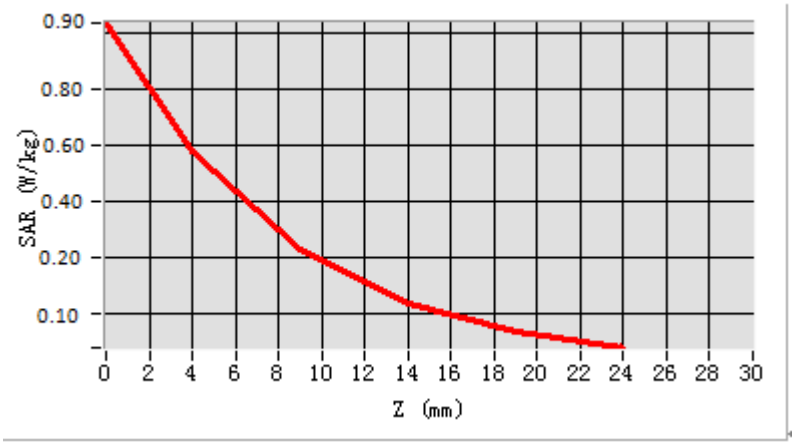


Hot spot position

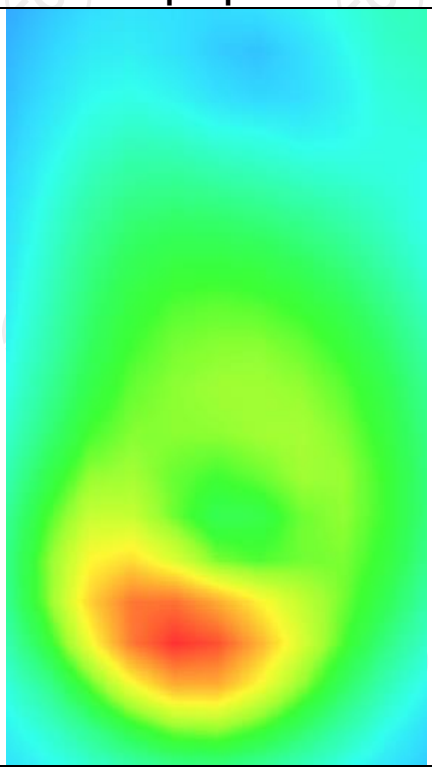


MEASUREMENT 3	
Middle Band SAR (Channel 9400):	Date: 12/15/2017
Frequency (MHz)	1880.000000
Relative permittivity (real part)	53.320121
Relative permittivity (imaginary part)	14.225400
Conductivity (S/m)	1.500251
Variation (%)	-0.780000
Crest Factor	1.0
Probe Conversion factor	5.01
E-Field Probe:	SSE5 (SN 07/15 EP248)
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 bottom(10mm)
Band	BAND1 WCDMA2100(hotspot)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-7.00, Y=-47.00 SAR Peak: 0.91 W/kg	
SAR 10g (W/Kg)	0.431466
SAR 1g (W/Kg)	0.514753
	

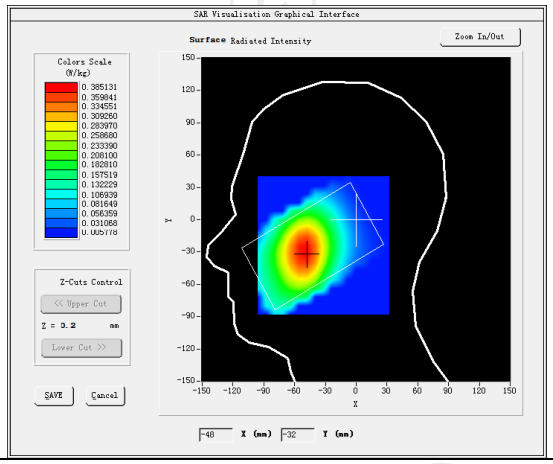
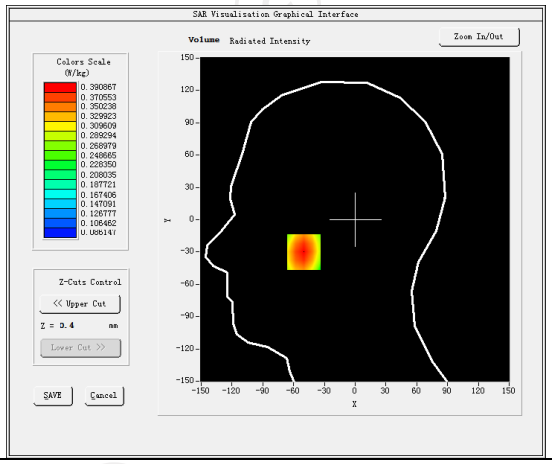
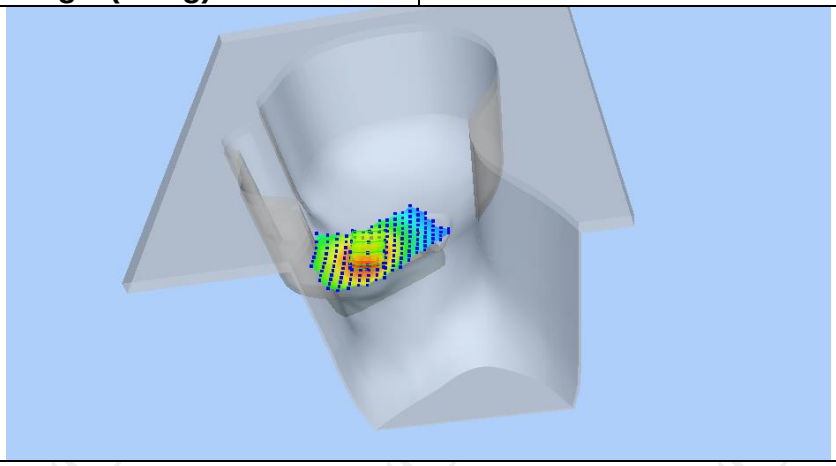
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8995	0.5967	0.2373	0.1637	0.0856



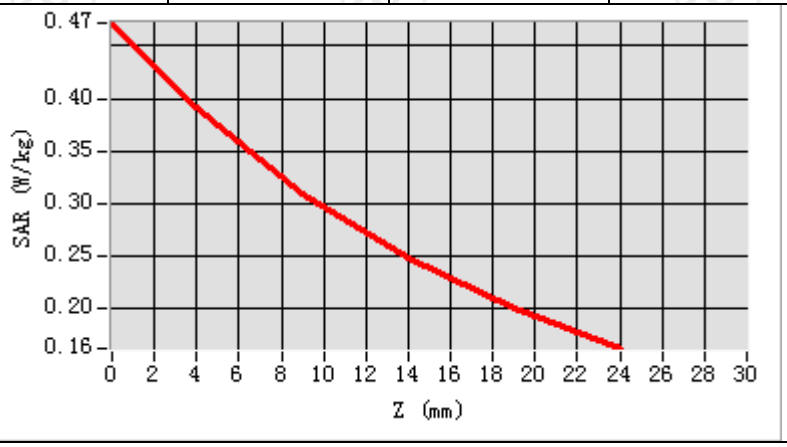
Hot spot position



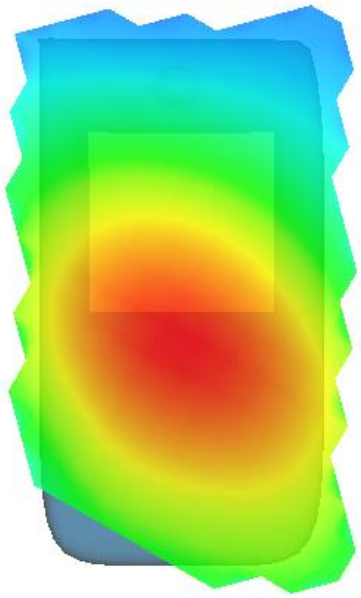
WCDMA Band V

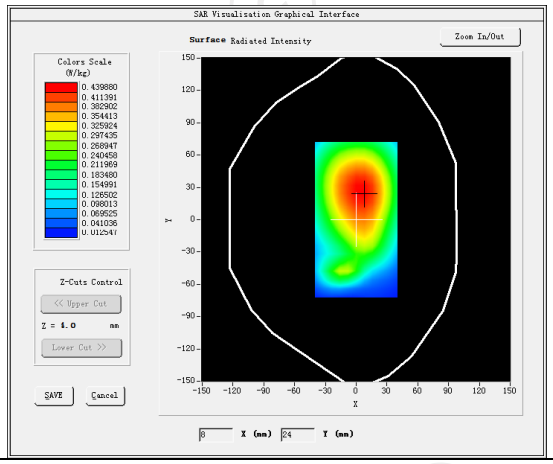
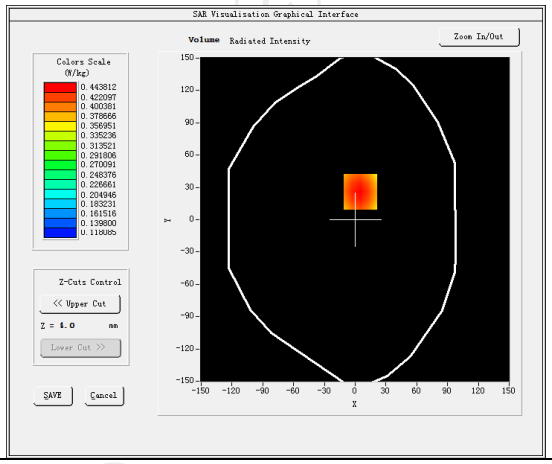
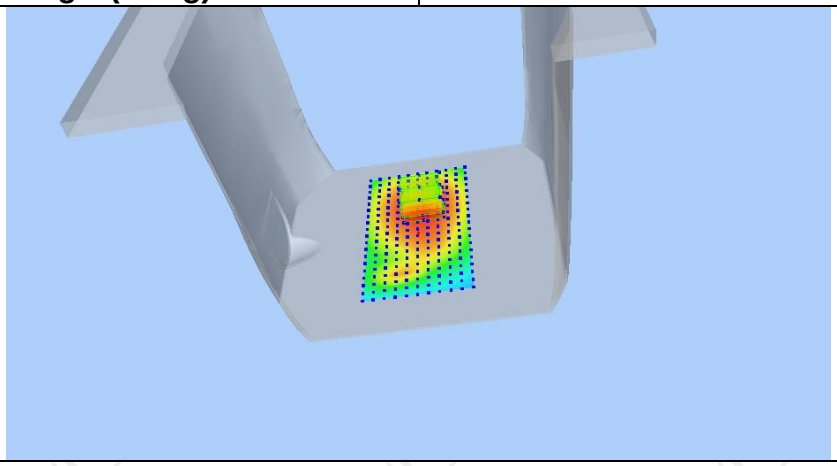
MEASUREMENT 1	
Higher Band SAR (Channel 4233):	Date: 12/06/2017
Frequency (MHz)	846.599976
Relative permittivity (real part)	40.392457
Relative permittivity (imaginary part)	18.129852
Conductivity (S/m)	0.876812
Variation (%)	-0.610000
Crest Factor:	1.0
Probe Conversion factor	5.50
E-Field Probe:	SSE5 (SN 07/15 EP248)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Right head
Device Position	Cheek
Band	BAND5_WCDMA850
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-50.00, Y=-30.00 SAR Peak: 0.47 W/kg	
SAR 10g (W/Kg)	0.281003
SAR 1g (W/Kg)	0.376607
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4716	0.3909	0.3101	0.2485	0.2012

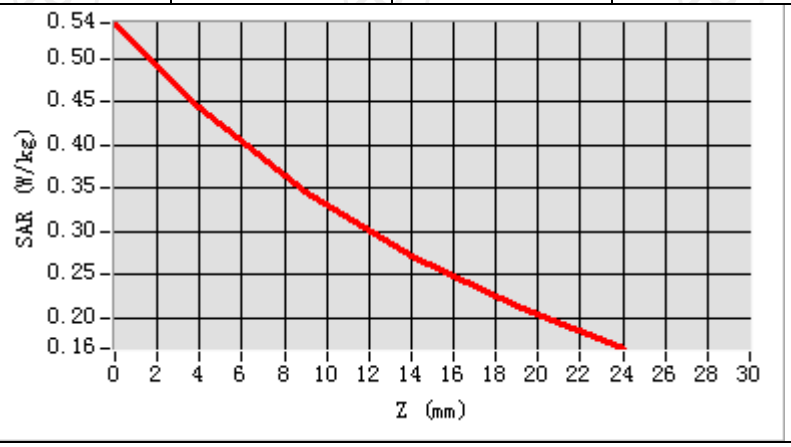


Hot spot position

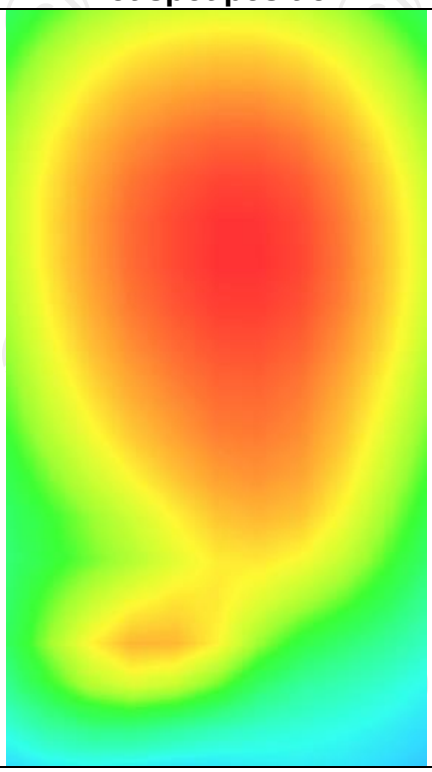


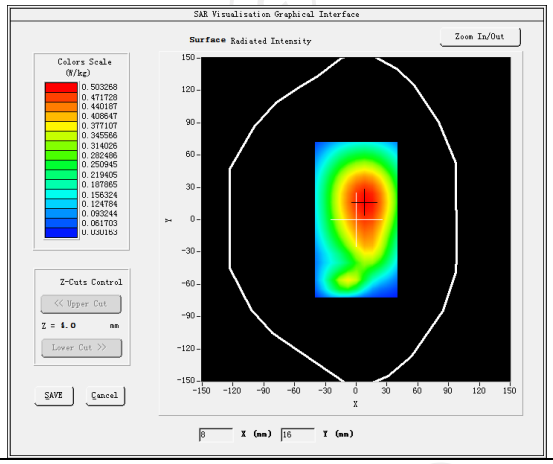
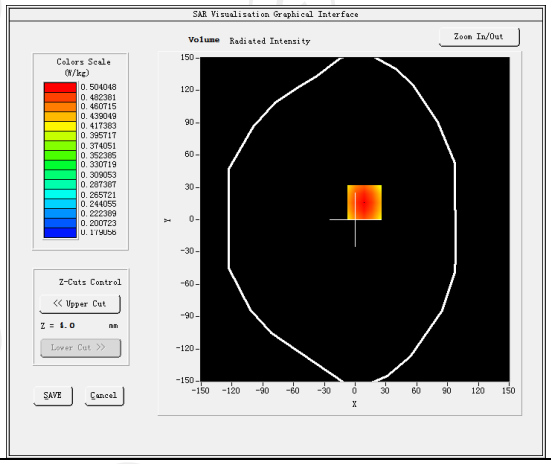
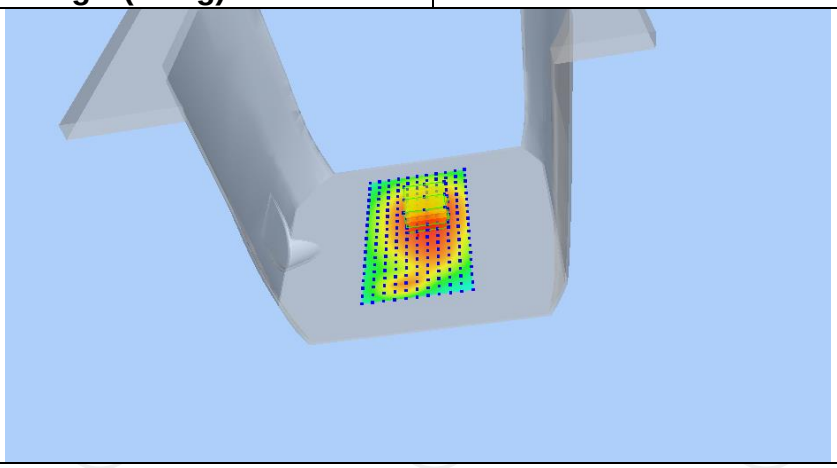
MEASUREMENT 2	
Higher Band SAR (Channel 4233):	Date: 12/06/2017
Frequency (MHz)	846.599976
Relative permittivity (real part)	55.213702
Relative permittivity (imaginary part)	21.378187
Conductivity (S/m)	0.970360
Variation (%)	0.050000
Crest Factor:	1.0
Probe Conversion factor	5.65
E-Field Probe:	SSE5 (SN 07/15 EP248)
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(5mm)
Band	BAND5_WCDMA850
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=5.00, Y=26.00 SAR Peak: 0.54 W/kg	
SAR 10g (W/Kg)	0.327466
SAR 1g (W/Kg)	0.437938
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.5408	0.4438	0.3462	0.2708	0.2124

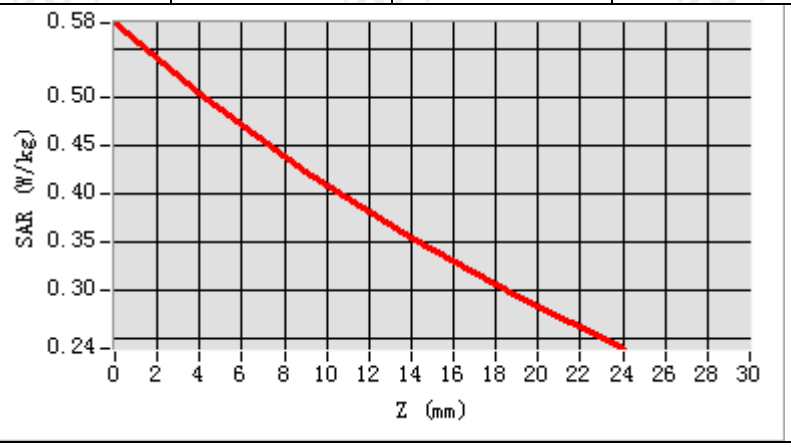


Hot spot position

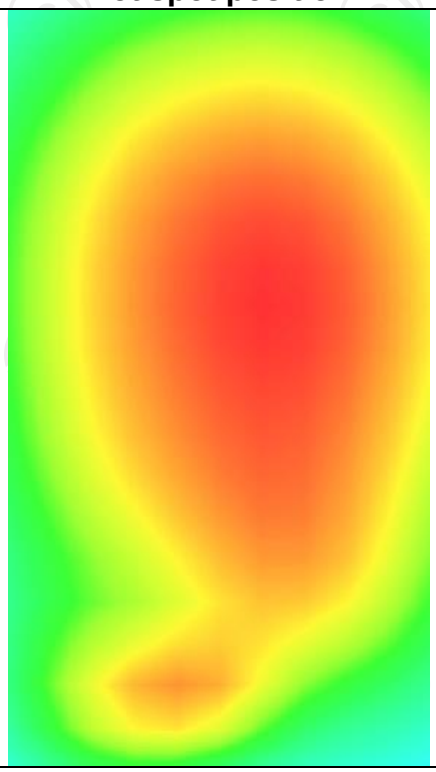


MEASUREMENT 3	
Higher Band SAR (Channel 4233):	Date: 12/06/2017
Frequency (MHz)	846.599976
Relative permittivity (real part)	55.213702
Relative permittivity (imaginary part)	21.378187
Conductivity (S/m)	0.970360
Variation (%)	-0.490000
Crest Factor:	1.0
Probe Conversion factor	5.65
E-Field Probe:	SSE5 (SN 07/15 EP248)
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(10mm)
Band	BAND5 WCDMA850(hotspot)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=9.00, Y=16.00 SAR Peak: 0.58 W/kg	
SAR 10g (W/Kg)	0.398226
SAR 1g (W/Kg)	0.499887
	

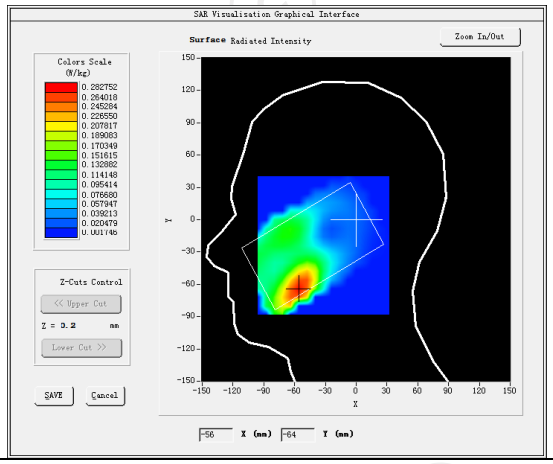
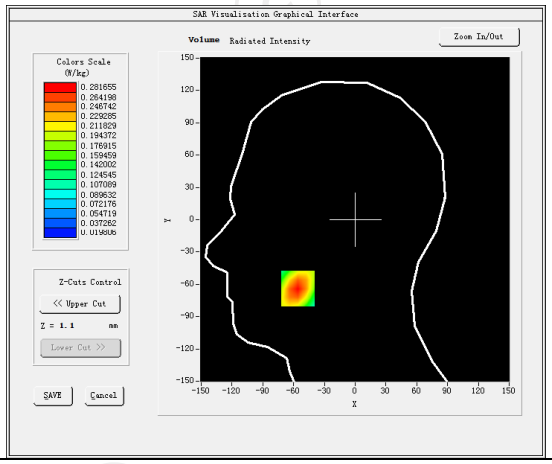
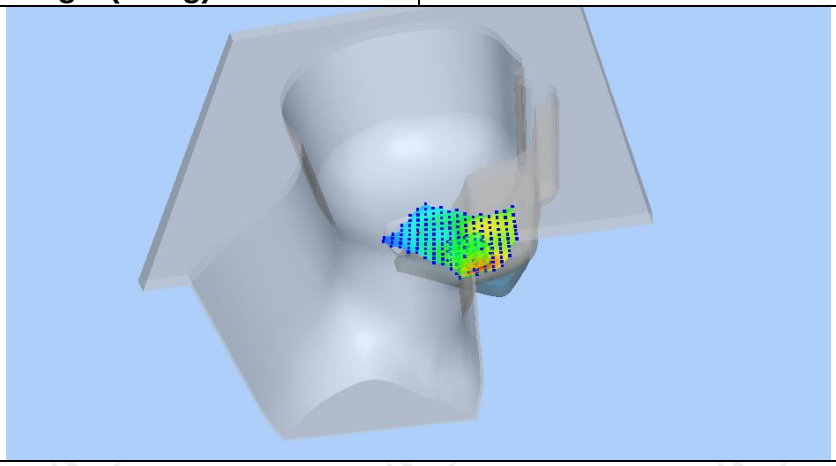
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.5765	0.5040	0.4239	0.3543	0.2939



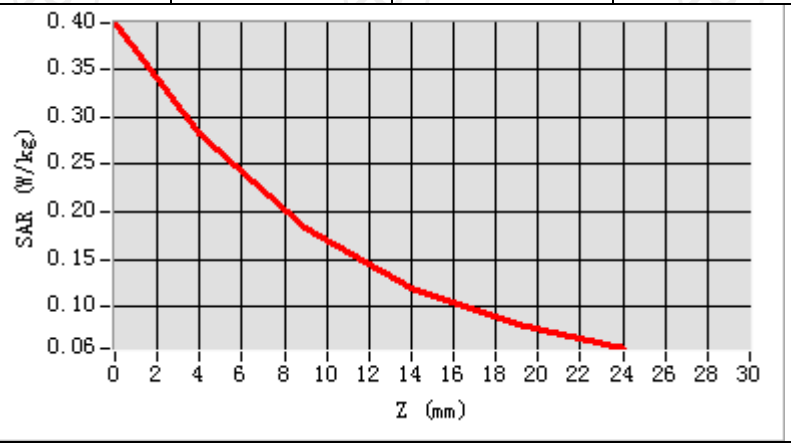
Hot spot position



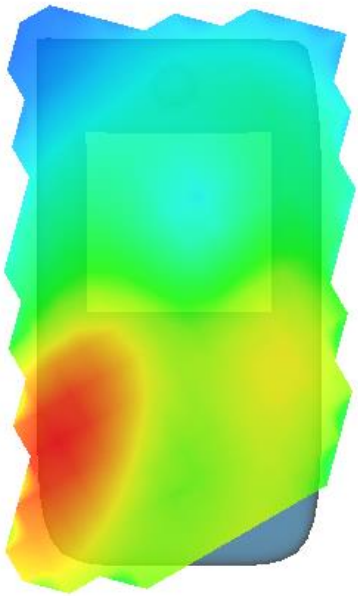
LTE Band 2

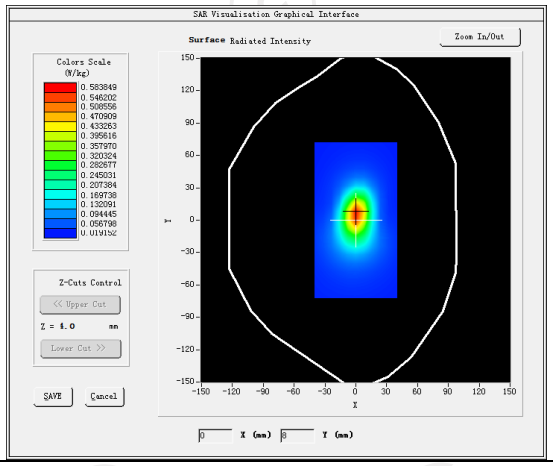
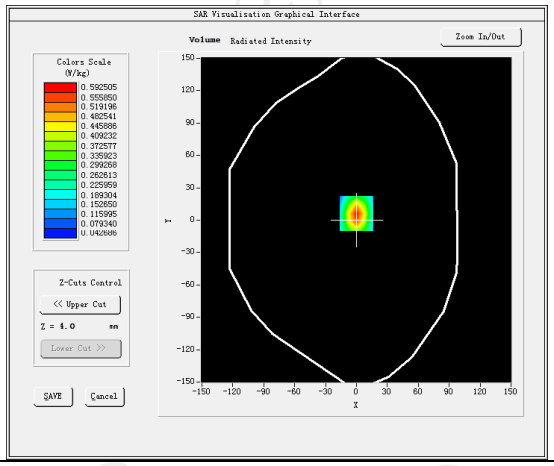
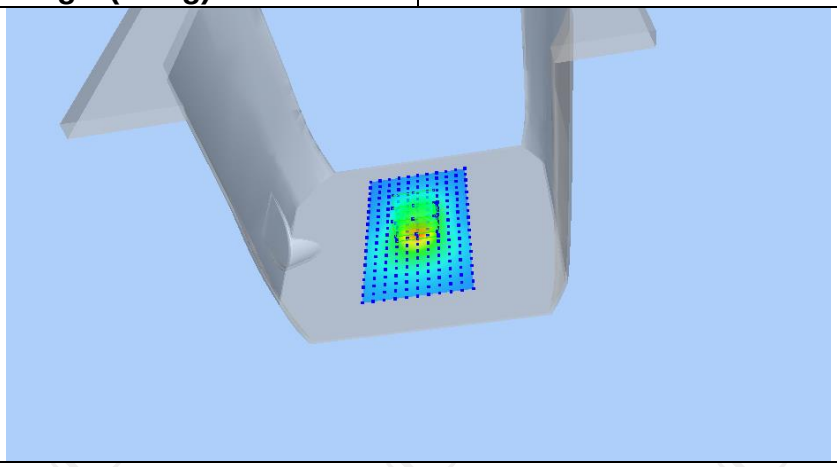
MEASUREMENT 1	
Lower Band SAR (Channel 18700):	Date: 12/15/2017
Frequency (MHz)	1860.000000
Relative permittivity (real part)	39.113793
Relative permittivity (imaginary part)	12.607061
Conductivity (S/m)	1.337526
Variation (%)	0.430000
Crest Factor	1.0
Probe Conversion factor	4.85
E-Field Probe:	SSE5 (SN 07/15 EP248)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 2 (1 RB#50)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-56.00, Y=-64.00 SAR Peak: 0.40 W/kg	
SAR 10g (W/Kg)	0.163862
SAR 1g (W/Kg)	0.266062
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3982	0.2817	0.1820	0.1199	0.0820

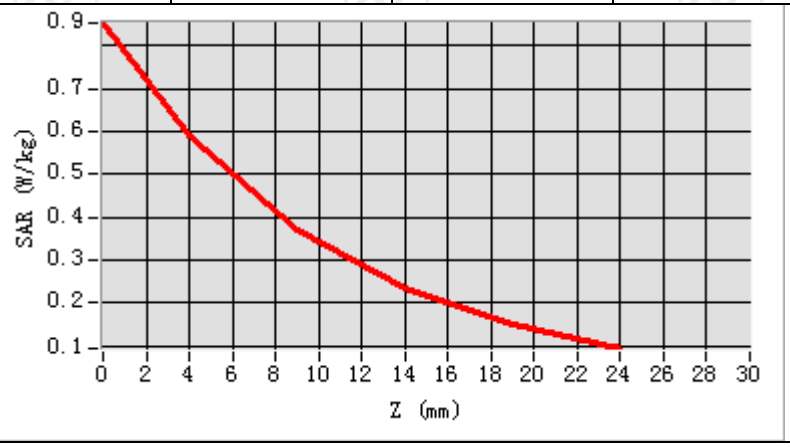


Hot spot position

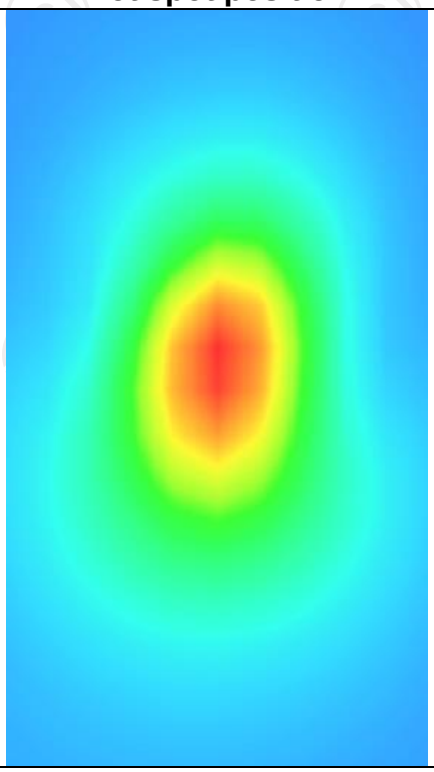


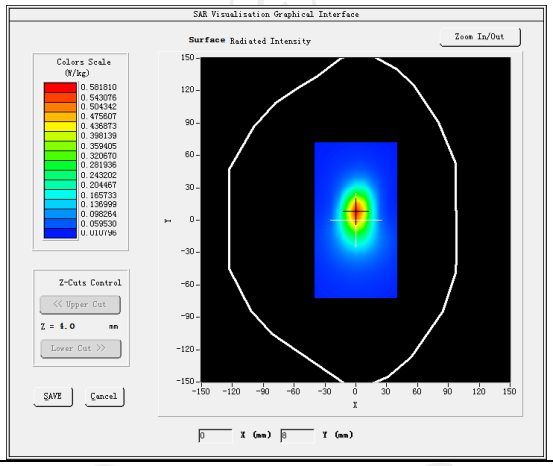
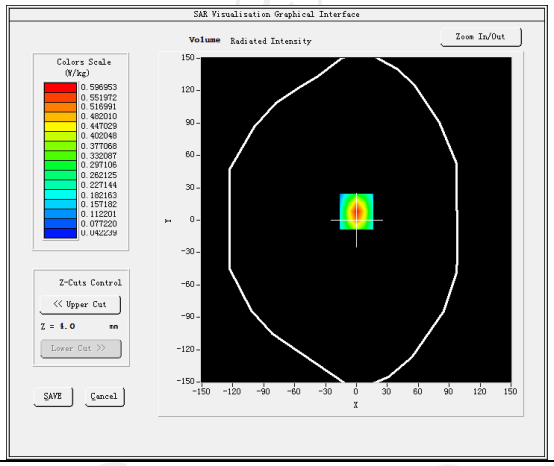
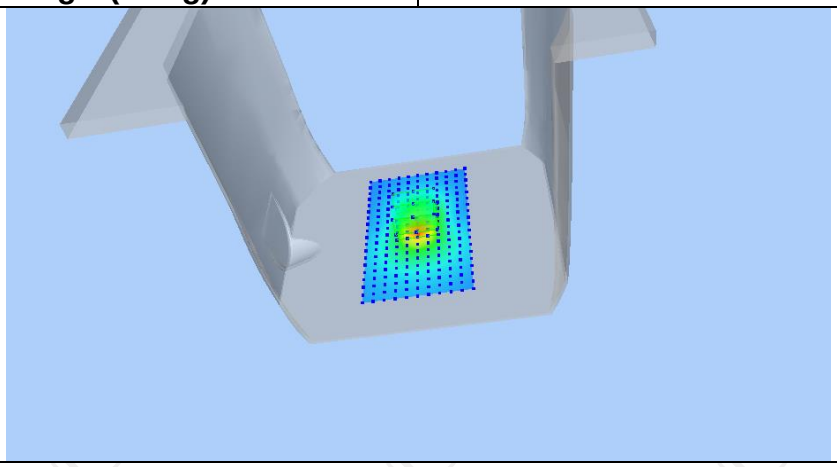
MEASUREMENT 2	
Lower Band SAR (Channel 18700):	Date: 12/15/2017
Frequency (MHz)	1860.000000
Relative permittivity (real part)	53.342133
Relative permittivity (imaginary part)	14.329440
Conductivity (S/m)	1.491983
Variation (%)	-0.830000
Crest Factor	1.0
Probe Conversion factor	5.01
E-Field Probe:	SSE5 (SN 07/15 EP248)
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(10mm)
Band	LTE band 2 (1 RB#50)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=0.00, Y=6.00 SAR Peak: 0.86 W/kg	
SAR 10g (W/Kg)	0.253427
SAR 1g (W/Kg)	0.450789
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8537	0.5925	0.3705	0.2330	0.1495

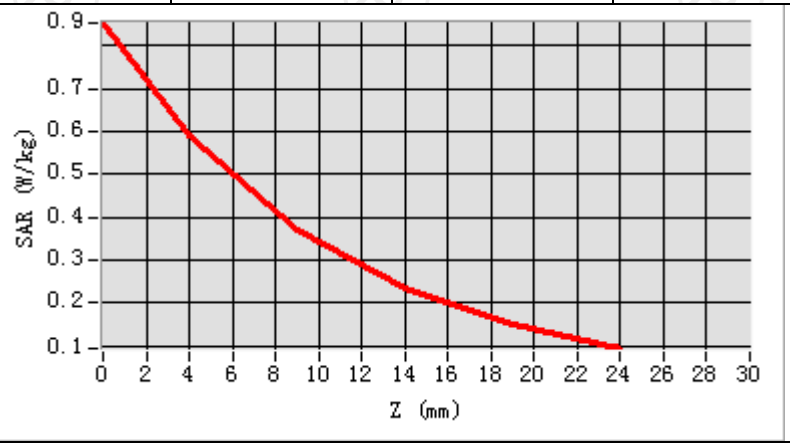


Hot spot position

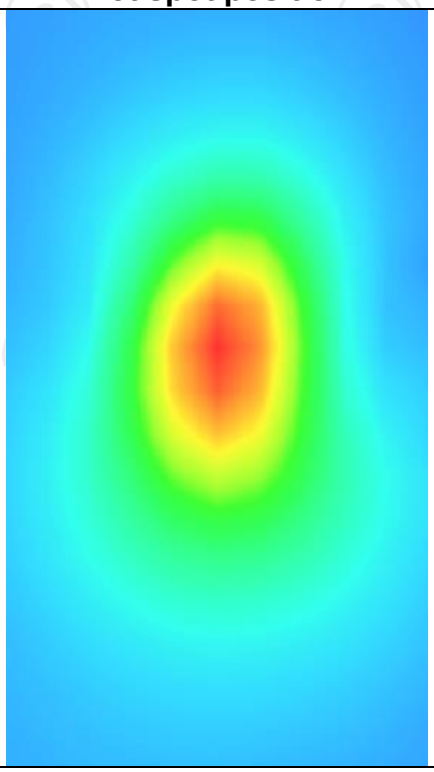


MEASUREMENT 3	
Lower Band SAR (Channel 18700):	Date: 12/15/2017
Frequency (MHz)	1860.000000
Relative permittivity (real part)	53.342133
Relative permittivity (imaginary part)	14.329440
Conductivity (S/m)	1.491983
Variation (%)	-1.560000
Crest Factor	1.0
Probe Conversion factor	5.01
E-Field Probe:	SSE5 (SN 07/15 EP248)
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 bottom (hotspot 10mm)
Band	LTE band 2 (1 RB#50)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=0.00, Y=8.00 SAR Peak: 0.89 W/kg	
SAR 10g (W/Kg)	0.270179
SAR 1g (W/Kg)	0.401843
	

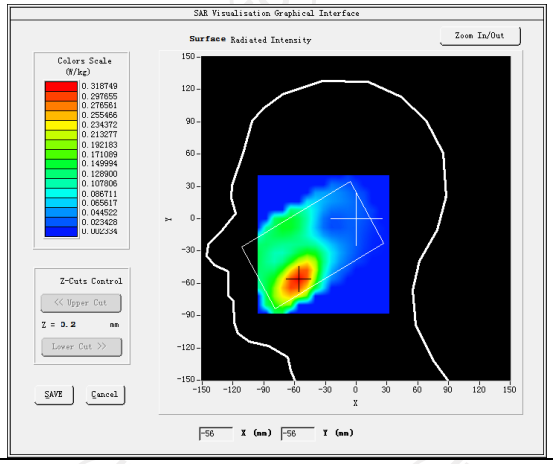
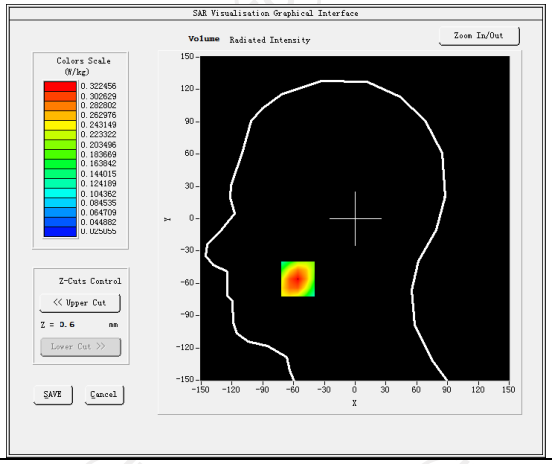
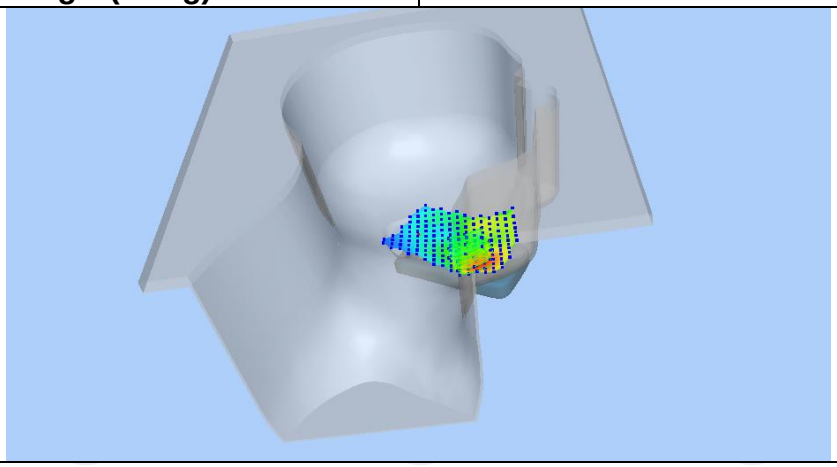
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8864	0.5973	0.3832	0.2399	0.1530



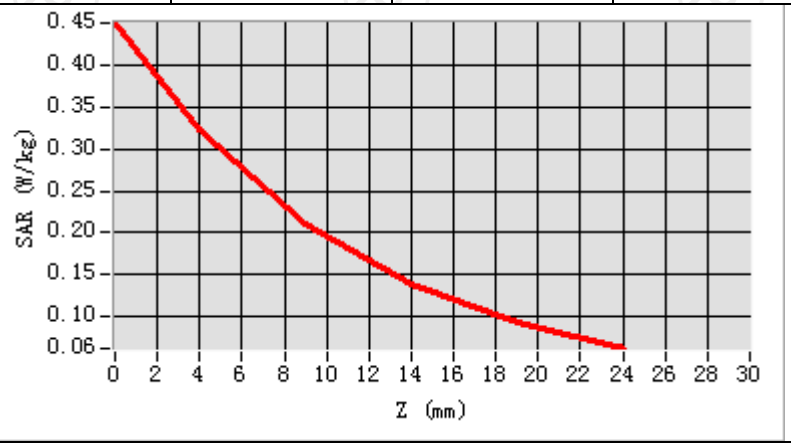
Hot spot position



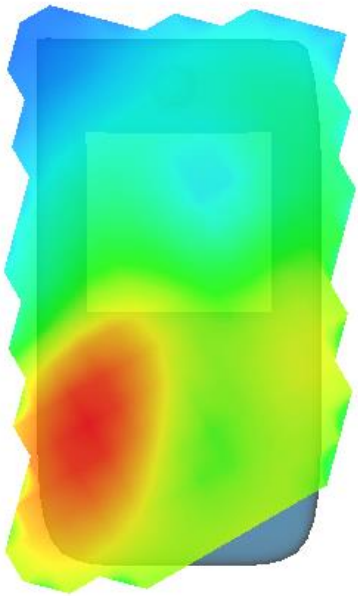
LTE Band 4

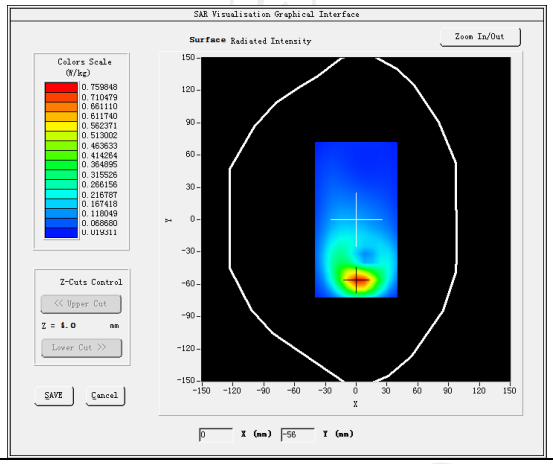
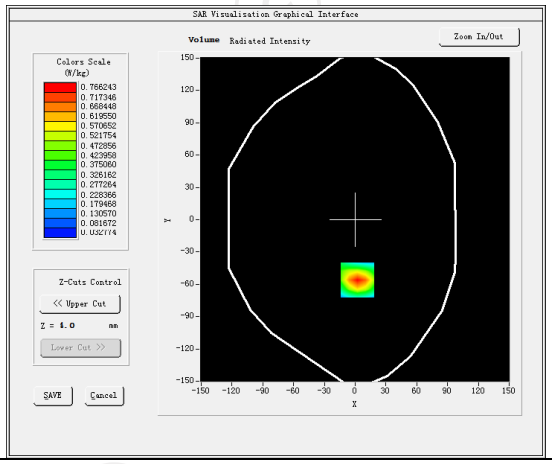
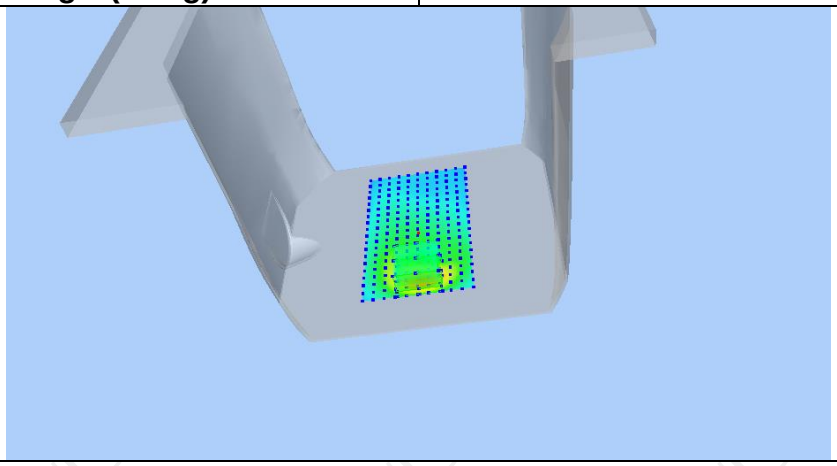
MEASUREMENT 1	
Lower Band SAR (Channel 20025):	Date: 12/12/2017
Frequency (MHz)	1717.500000
Relative permittivity (real part)	39.101249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.350792
Variation (%)	-0.620000
Crest Factor	1.0
Probe Conversion factor	4.38
E-Field Probe:	SSE5 (SN 07/15 EP248)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 4(1 RB#74)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-56.00, Y=-56.00 SAR Peak: 0.45 W/kg	
SAR 10g (W/Kg)	0.130468
SAR 1g (W/Kg)	0.195027
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.4497	0.3225	0.2112	0.1397	0.0943

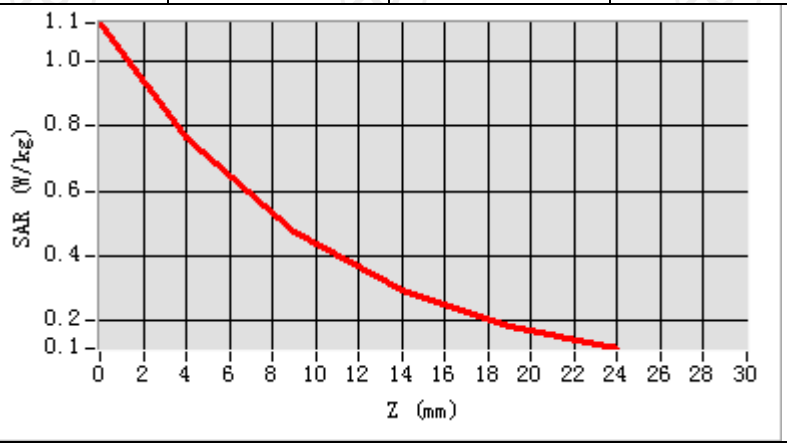


Hot spot position

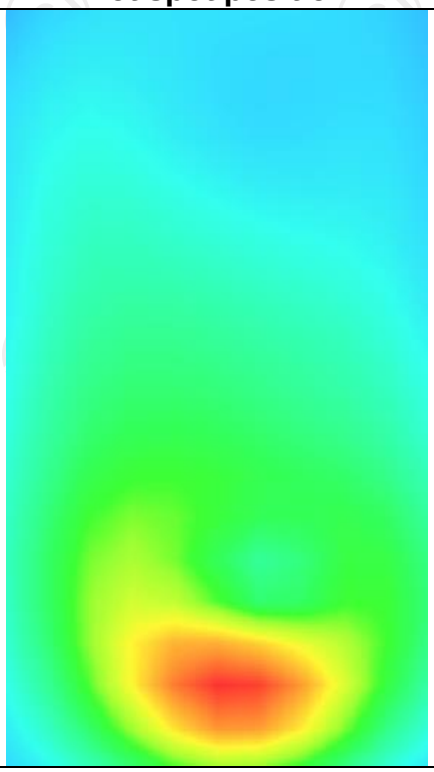


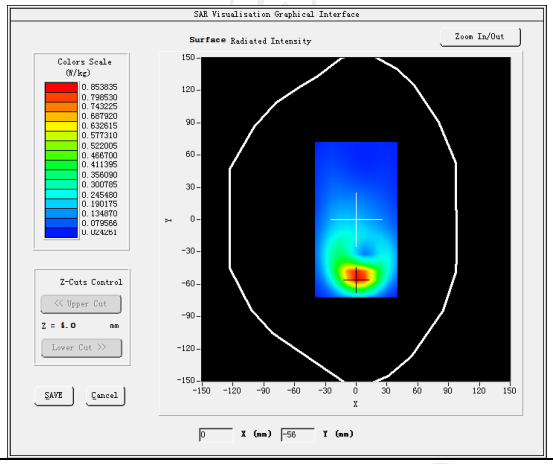
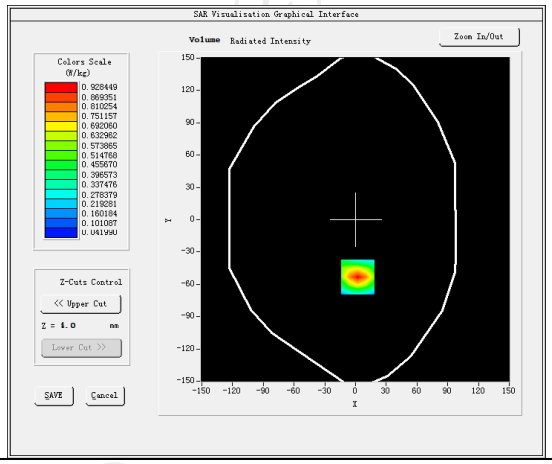
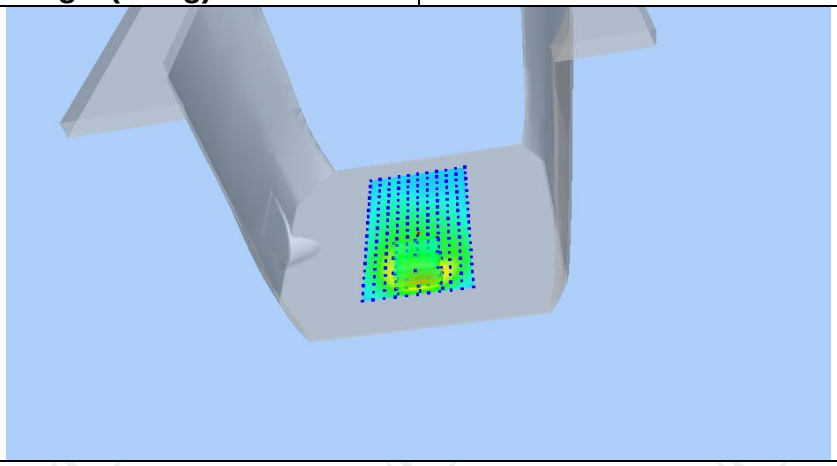
MEASUREMENT 2	
Lower Band SAR (Channel 20025):	Date: 12/12/2017
Frequency (MHz)	1717.500000
Relative permittivity (real part)	53.321249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.502592
Variation (%)	-0.540000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE5 (SN 07/15 EP248)
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 front(10mm)
Band	LTE band 4(1 RB#74)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=2.00, Y=-56.00 SAR Peak: 0.98 W/kg	
SAR 10g (W/Kg)	0.237813
SAR 1g (W/Kg)	0.403582
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.1181	0.7662	0.4711	0.2917	0.1852

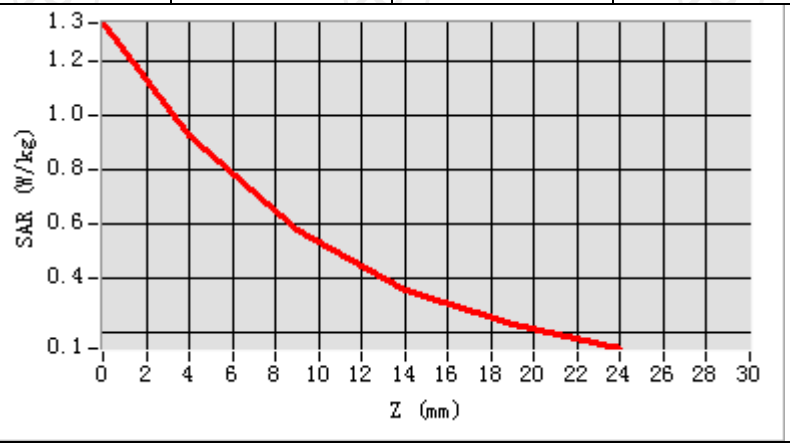


Hot spot position

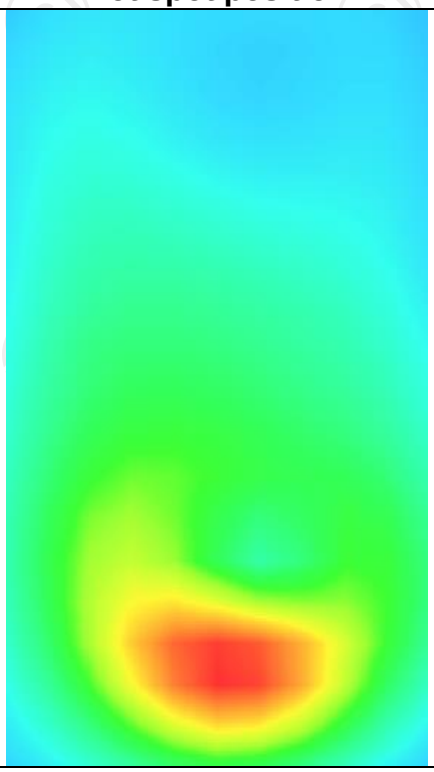


MEASUREMENT 3	
Lower Band SAR (Channel 20025):	Date: 12/12/2017
Frequency (MHz)	1717.500000
Relative permittivity (real part)	53.321249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.502592
Variation (%)	-0.480000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE5 (SN 07/15 EP248)
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 front(hotspot 10mm)
Band	LTE band 4(1 RB#74)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=2.00, Y=-53.00 SAR Peak: 1.04 W/kg	
SAR 10g (W/Kg)	0.238923
SAR 1g (W/Kg)	0.431500
	

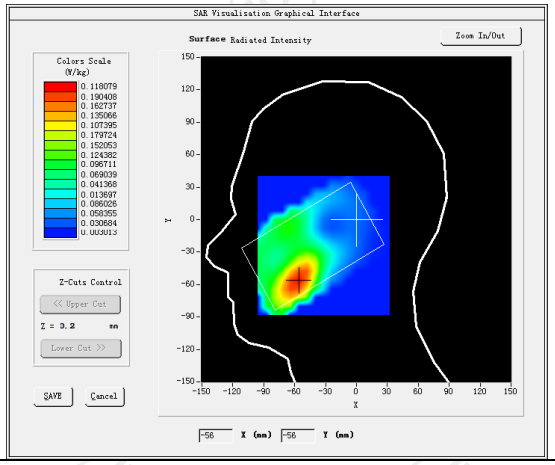
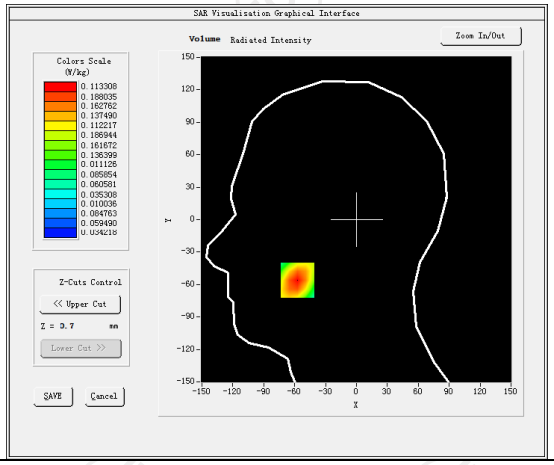
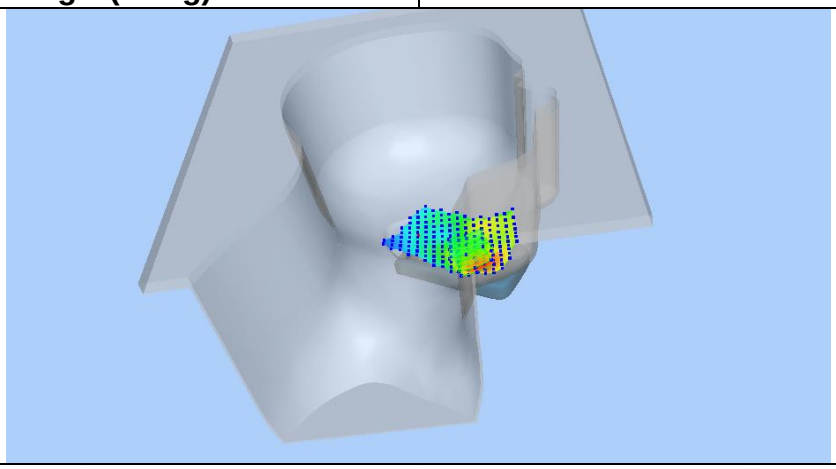
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.3445	0.9284	0.5763	0.3593	0.2285



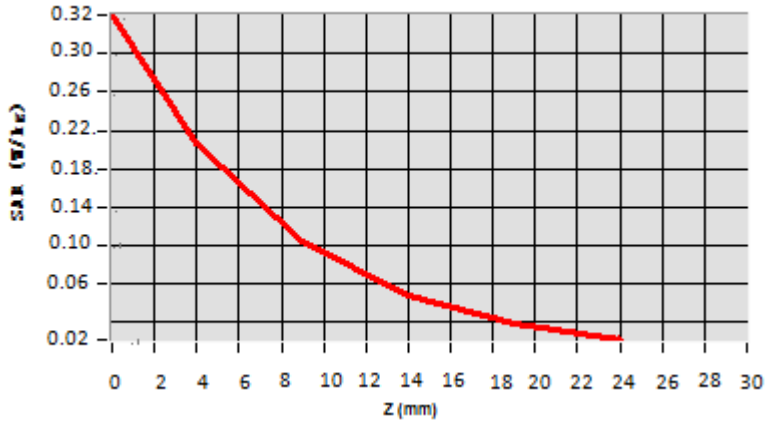
Hot spot position



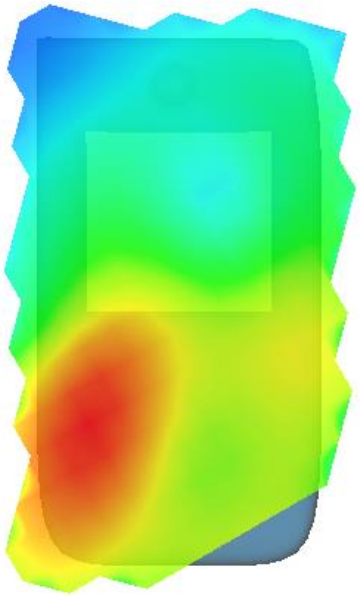
LTE Band 7

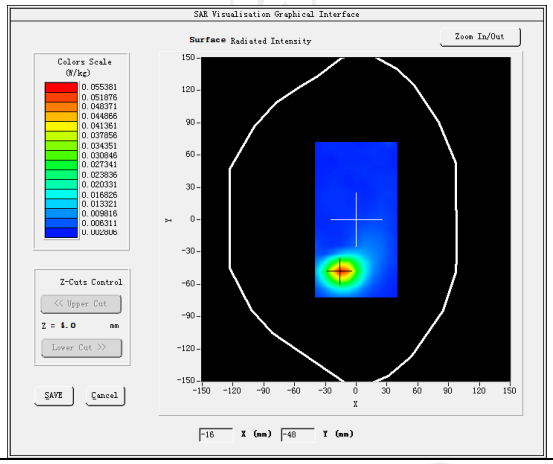
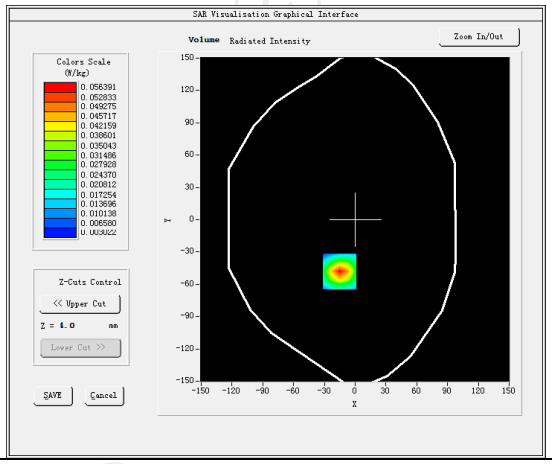
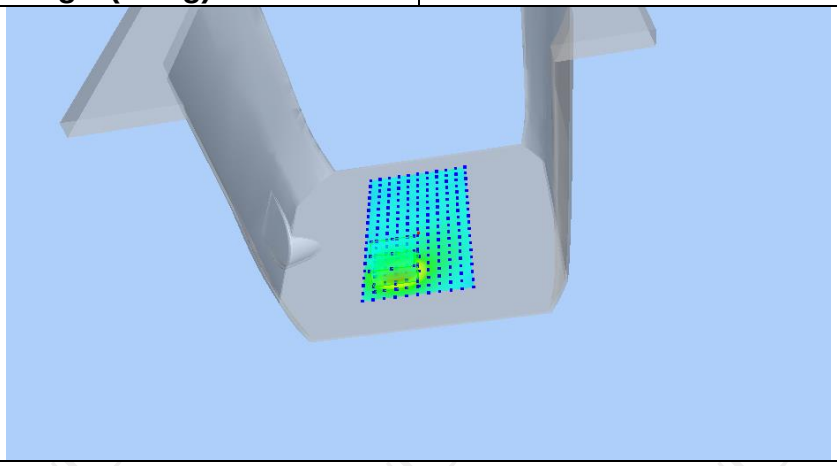
MEASUREMENT 1	
Higher Band SAR (Channel 21350):	Date: 12/22/2017
Frequency (MHz)	2560.000000
Relative permittivity (real part)	38.892754
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.902731
Variation (%)	-0.670000
Crest Factor	1.0
Probe Conversion factor	4.38
E-Field Probe:	SSE5 (SN 07/15 EP248)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Left head
Device Position	Cheek
Band	LTE band 4(1 RB#0)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-57.00, Y=-56.00 SAR Peak: 0.23 W/kg	
SAR 10g (W/Kg)	0.059746
SAR 1g (W/Kg)	0.091289
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.3193	0.2073	0.1027	0.0463	0.0198

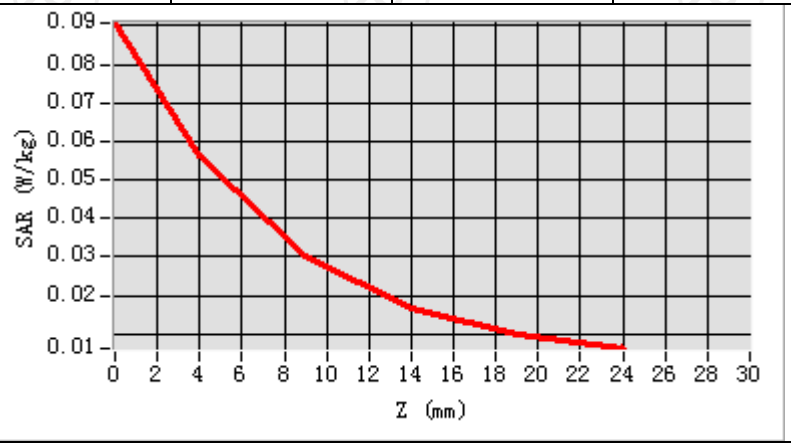


Hot spot position

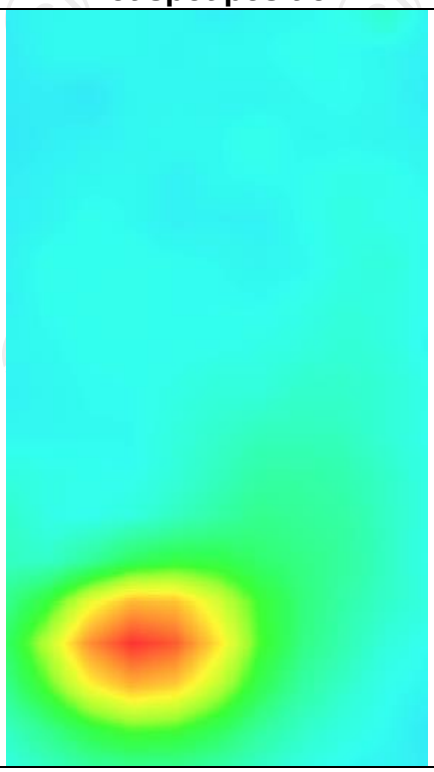


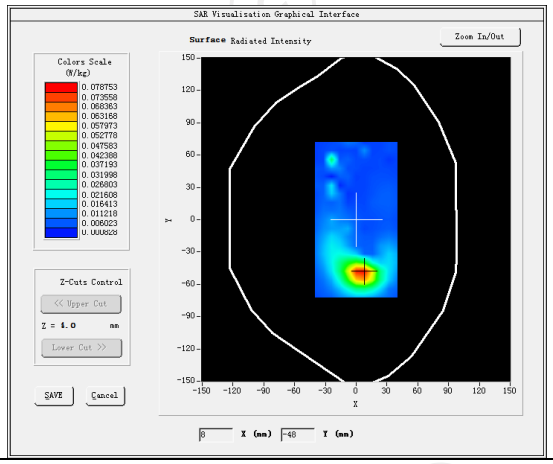
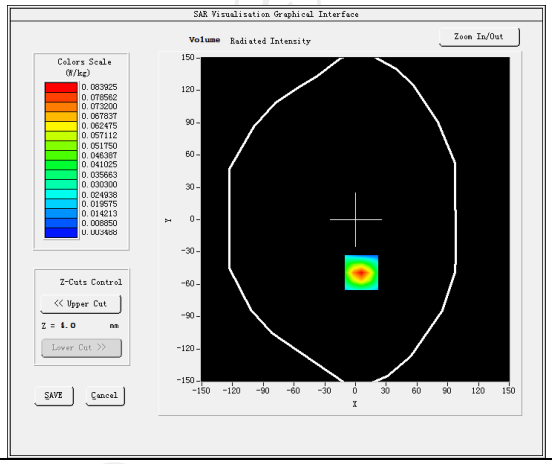
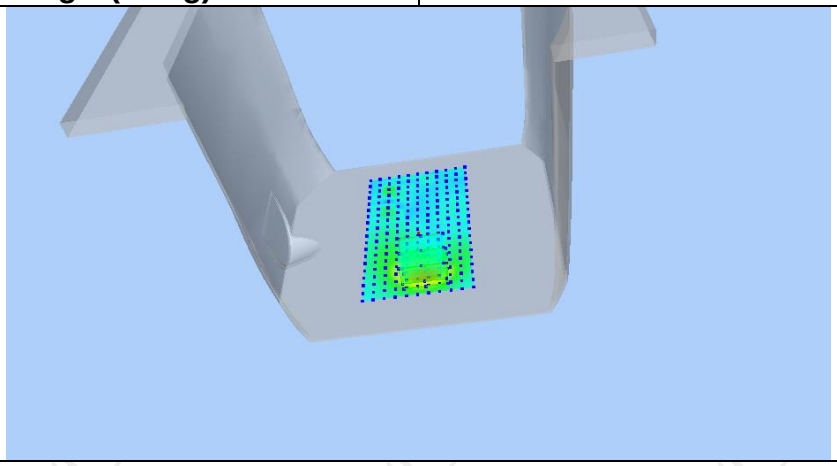
MEASUREMENT 2	
Higher Band SAR (Channel 21350):	Date: 12/22/2017
Frequency (MHz)	2560.000000
Relative permittivity (real part)	52.131509
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	2.128245
Variation (%)	-3.950000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE5 (SN 07/15 EP248)
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 front(5mm
Band	LTE band 4(1 RB#0)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-15.00, Y=-48.00 SAR Peak: 0.09 W/kg	
SAR 10g (W/Kg)	0.025539
SAR 1g (W/Kg)	0.051497
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0908	0.0564	0.0303	0.0167	0.0100

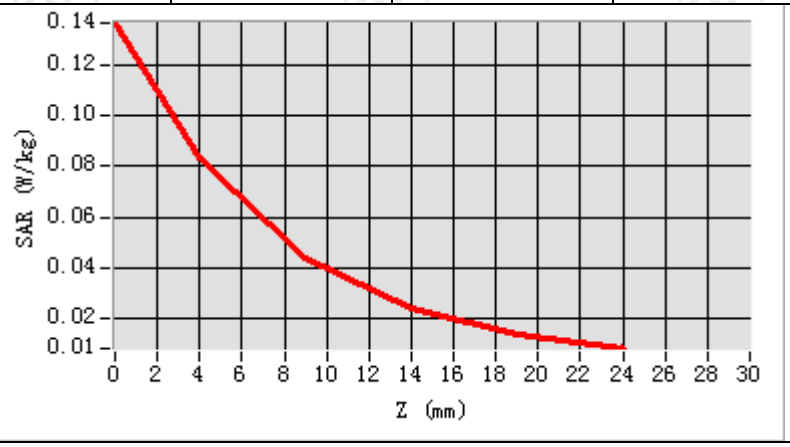


Hot spot position

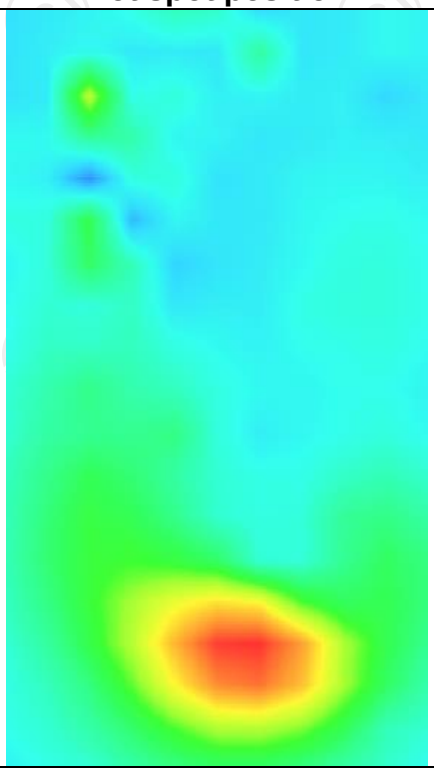


MEASUREMENT 3	
Higher Band SAR (Channel 21350):	Date: 12/22/2017
Frequency (MHz)	2560.000000
Relative permittivity (real part)	52.131509
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	2.128245
Variation (%)	-3.740000
Crest Factor	1.0
Probe Conversion factor	4.52
E-Field Probe:	SSE5 (SN 07/15 EP248)
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 front (hotspot 10mm)
Band	LTE band 4(1 RB#0)
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=6.00, Y=-49.00 SAR Peak: 0.14 W/kg	
SAR 10g (W/Kg)	0.037420
SAR 1g (W/Kg)	0.076884
	

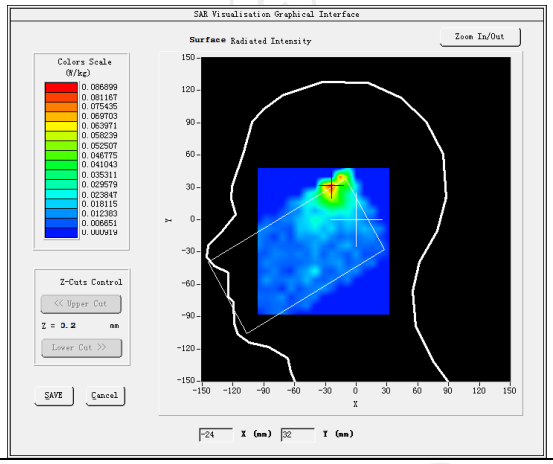
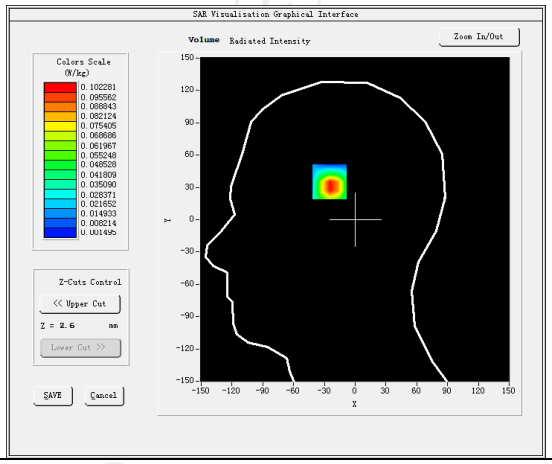
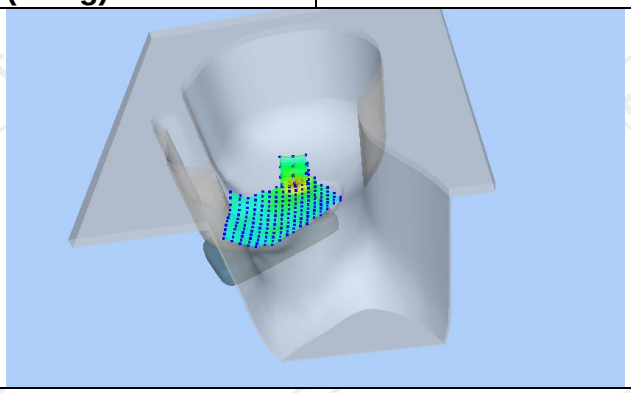
Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1369	0.0839	0.0441	0.0235	0.0135



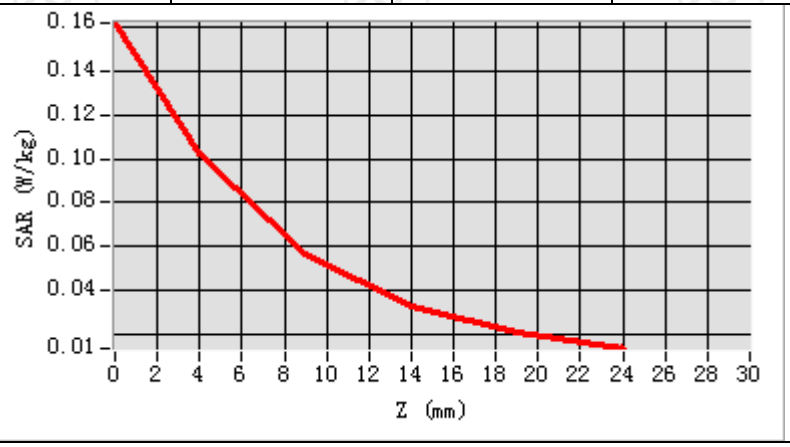
Hot spot position



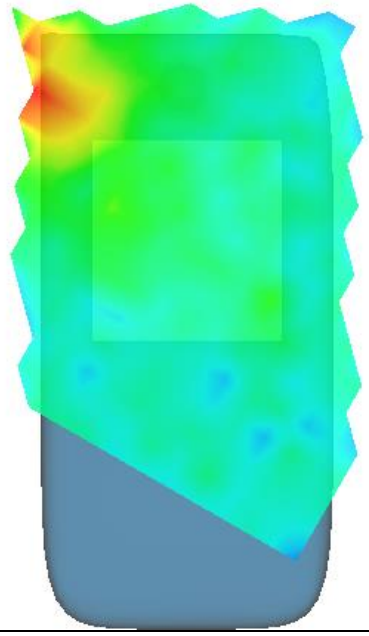
WLAN 2.4

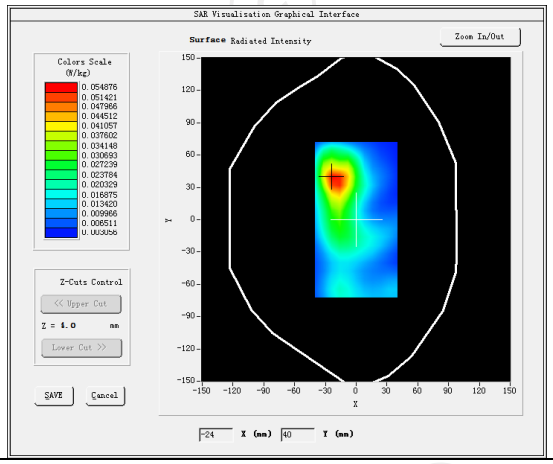
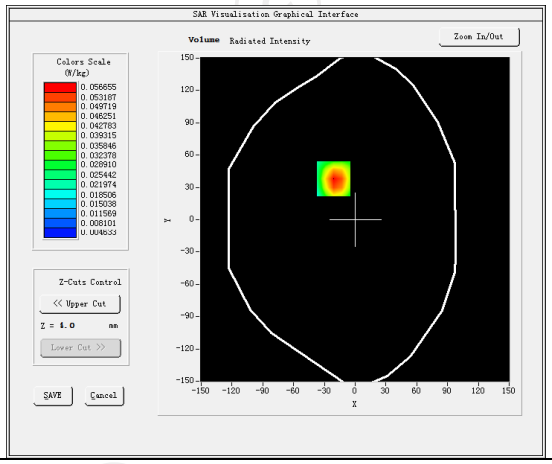
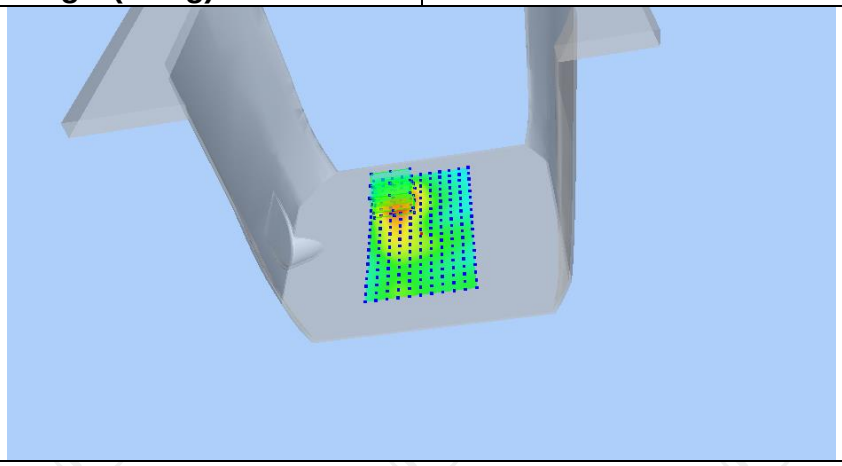
MEASUREMENT 1	
Lower Band SAR (Channel 1):	Date: 12/19/2017
Frequency (MHz)	2412.000000
Relative permittivity (real part)	37.843841
Relative permittivity (imaginary part)	13.546980
Conductivity (S/m)	1.793582
Variation (%)	4.520000
Crest Factor	1.0
Probe Conversion factor	4.58
E-Field Probe:	SSE5 (SN 07/15 EP248)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Right head
Device Position	Cheek
Band	IEEE 802.11b ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-25.00, Y=40.00 SAR Peak: 0.18 W/kg	
SAR 10g (W/Kg)	0.051603
SAR 1g (W/Kg)	0.104020
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.1619	0.1023	0.0567	0.0325	0.0205

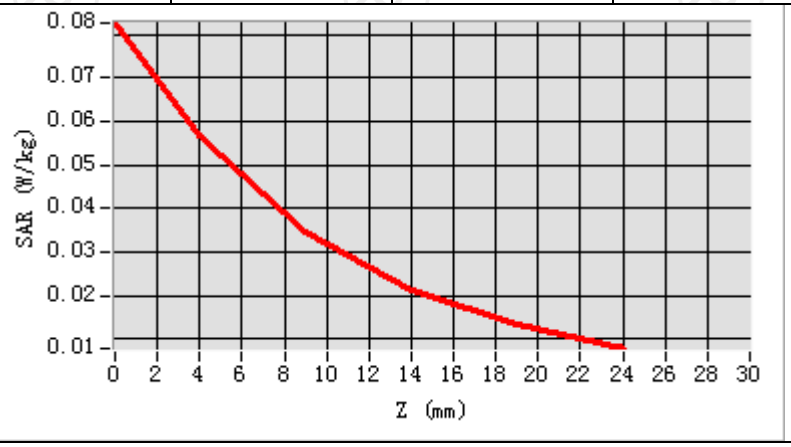


Hot spot position

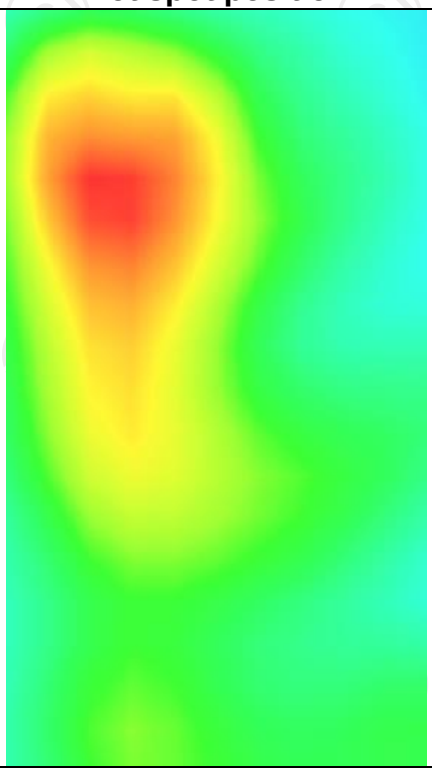


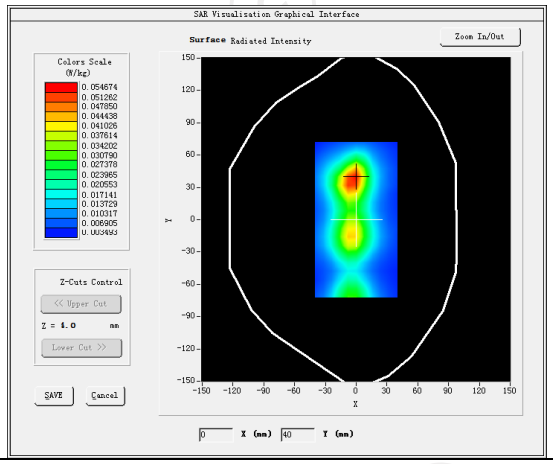
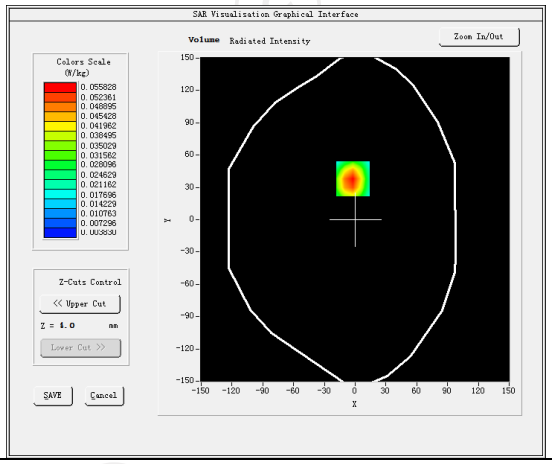
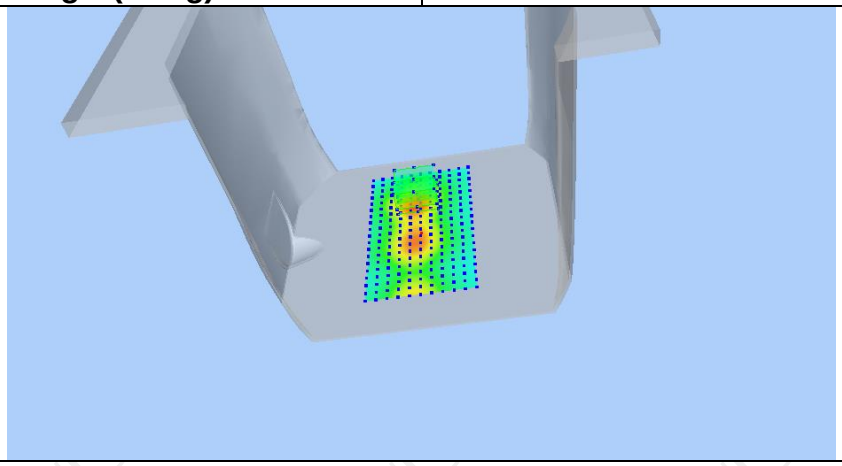
MEASUREMENT 2	
Lower Band SAR (Channel 1):	Date: 12/19/2017
Frequency (MHz)	2412.000000
Relative permittivity (real part)	54.648325
Relative permittivity (imaginary part)	14.318444
Conductivity (S/m)	1.972650
Variation (%)	-0.900000
Crest Factor	1.0
Probe Conversion factor	4.70
E-Field Probe:	SSE5 (SN 07/15 EP248)
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 front(10mm)
Band	IEEE 802.11b ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-21.00, Y=38.00 SAR Peak: 0.08 W/kg	
SAR 10g (W/Kg)	0.031626
SAR 1g (W/Kg)	0.055632
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0826	0.0567	0.0348	0.0213	0.0132

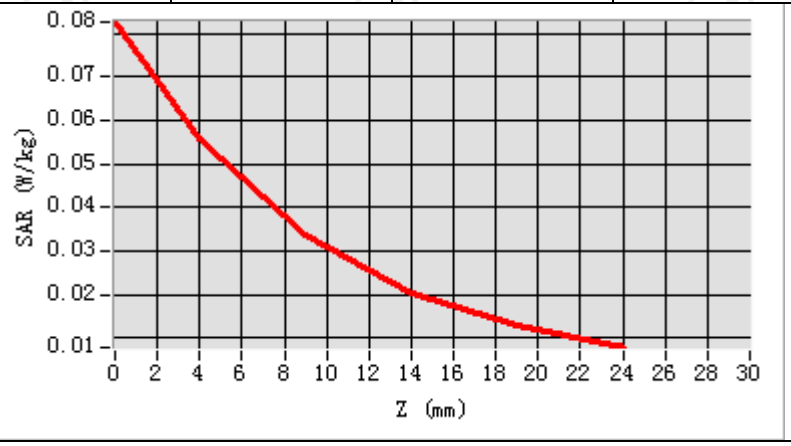


Hot spot position

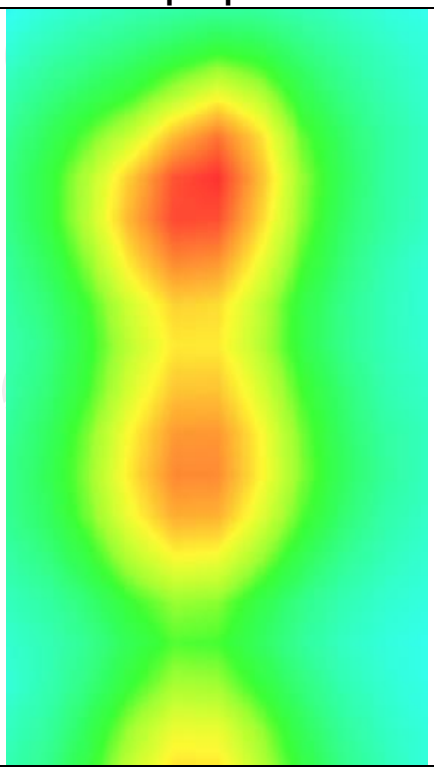


MEASUREMENT 3	
Lower Band SAR (Channel 1):	Date: 12/19/2017
Frequency (MHz)	2412.000000
Relative permittivity (real part)	54.648325
Relative permittivity (imaginary part)	14.318444
Conductivity (S/m)	1.972650
Variation (%)	0.980000
Crest Factor	1.0
Probe Conversion factor	4.70
E-Field Probe:	SSE5 (SN 07/15 EP248)
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 left(10mm)
Band	IEEE 802.11b ISM
SURFACE SAR	**VOLUME SAR**
	
Maximum location: X=-2.00, Y=38.00 SAR Peak: 0.08 W/kg	
SAR 10g (W/Kg)	0.030245
SAR 1g (W/Kg)	0.054448
	

Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.0825	0.0558	0.0337	0.0205	0.0129

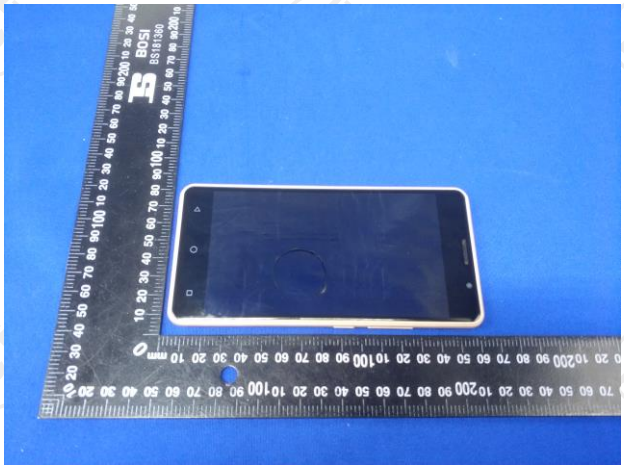


Hot spot position



Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

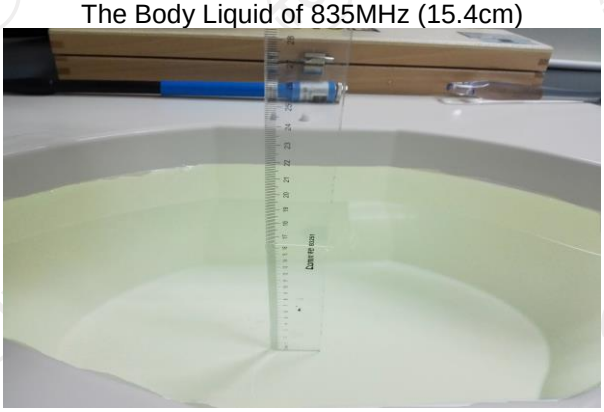
Appendix A: EUT Photos



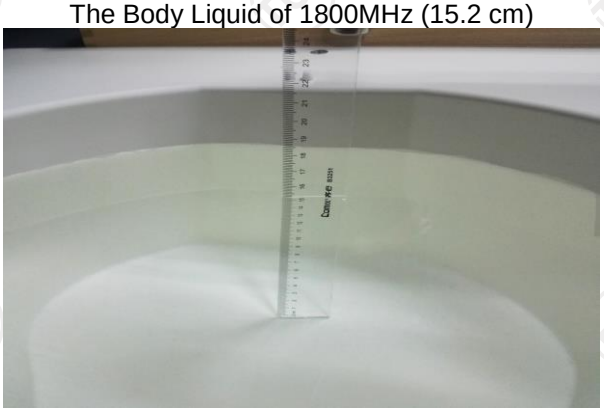
Liquid depth

The Body Liquid of 835MHz (15.4cm)

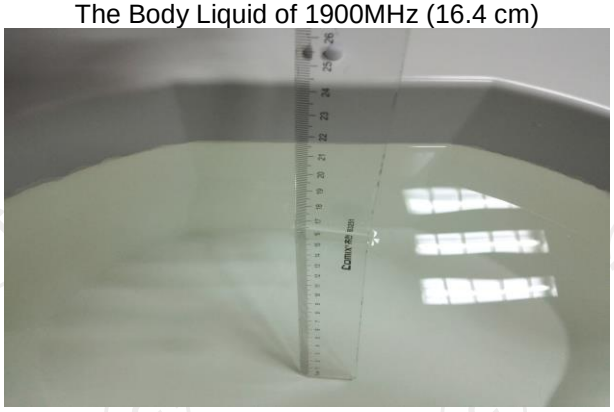
The Body Liquid of 1800MHz (15.2 cm)



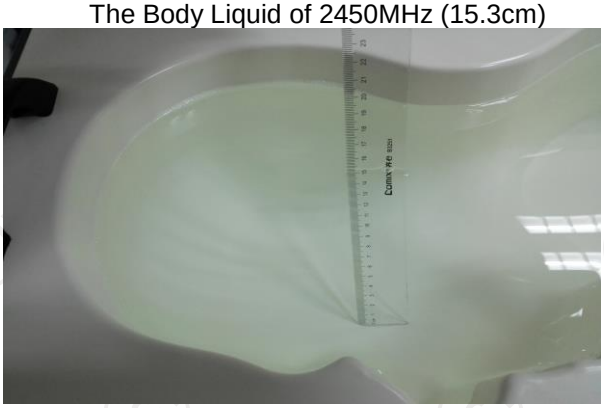
The Body Liquid of 1900MHz (16.4 cm)



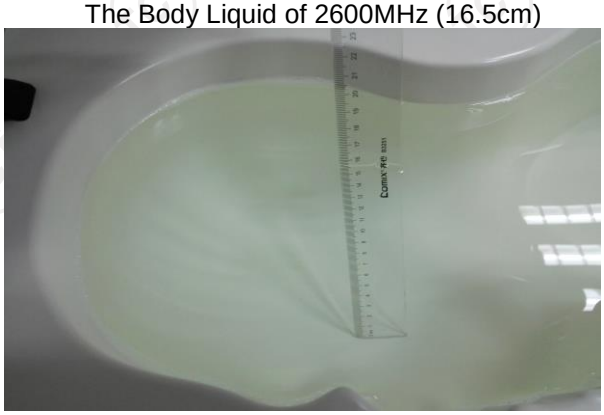
The Body Liquid of 2450MHz (15.3cm)



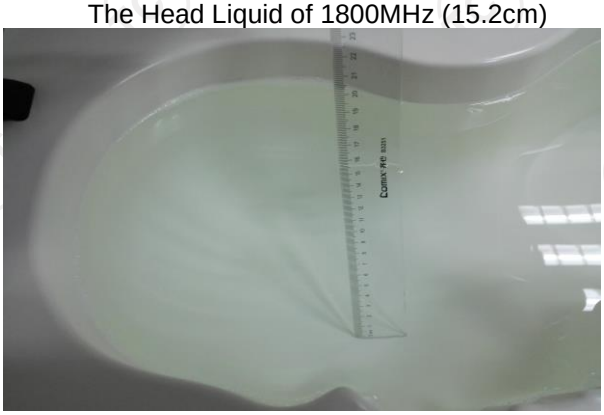
The Body Liquid of 2600MHz (16.5cm)



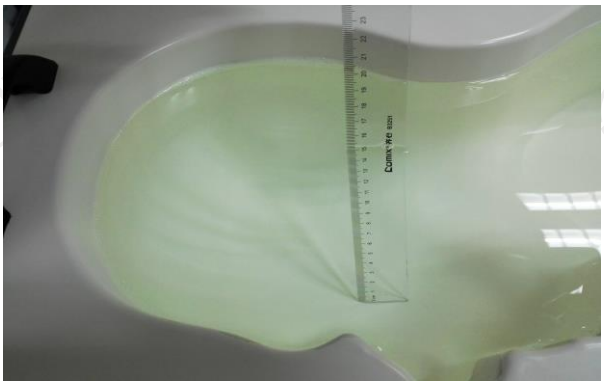
The Head Liquid of 1800MHz (15.2cm)



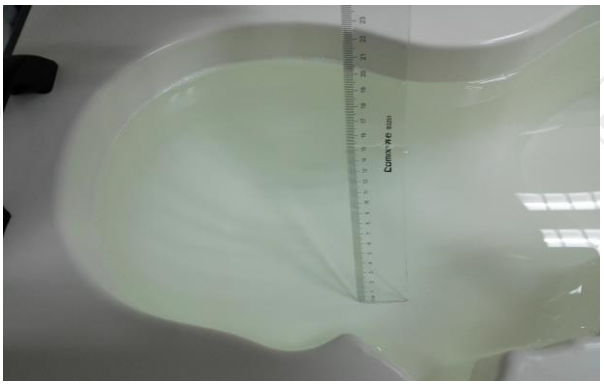
The Head Liquid of 1900MHz (15.5cm)



The Head Liquid of 2450MHz (15.6cm)

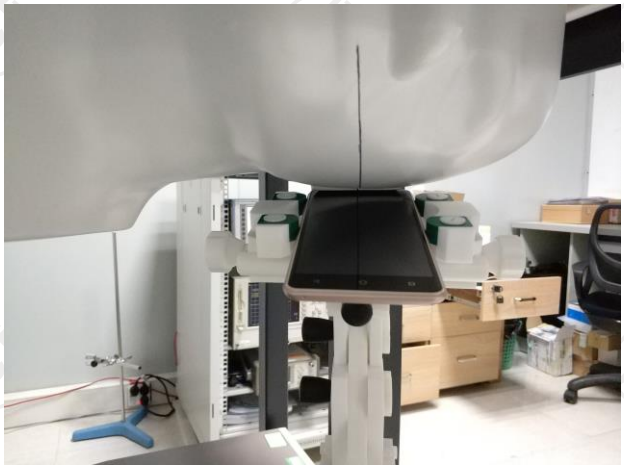


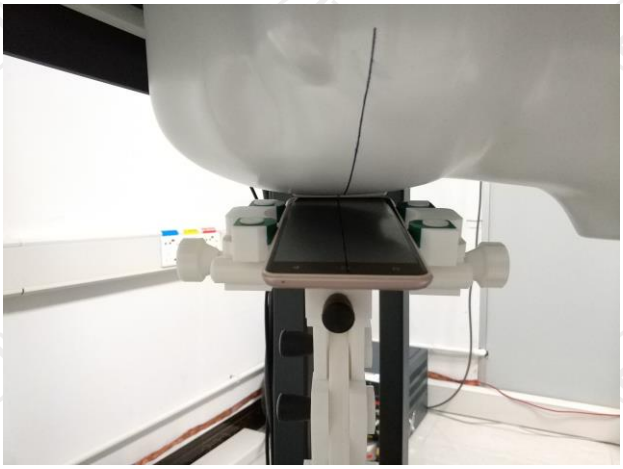
The Head Liquid of 835MHz (15.3cm)

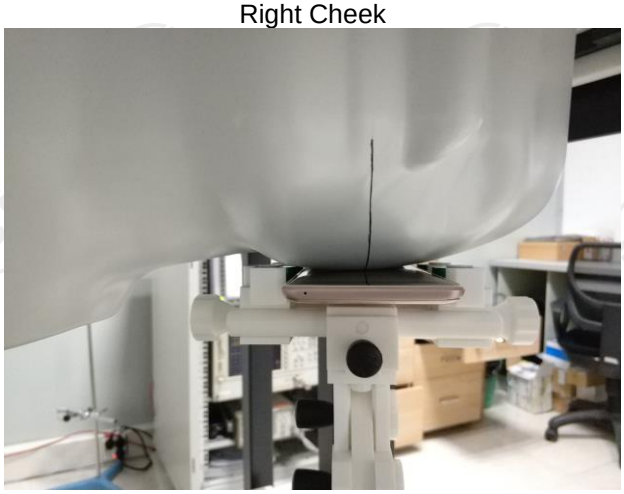


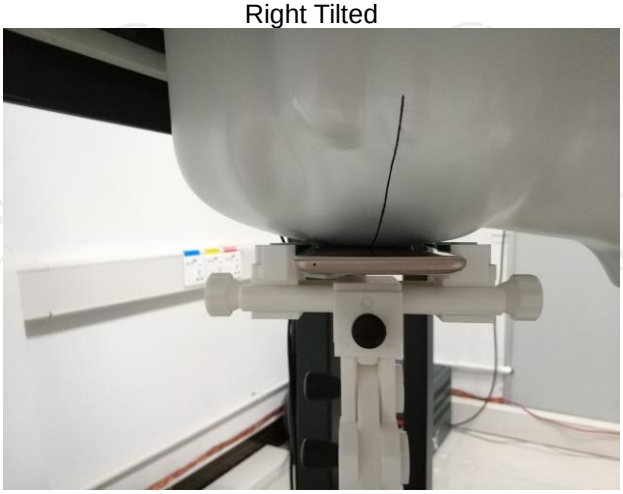
The Head Liquid of 2600MHz (15.1cm)

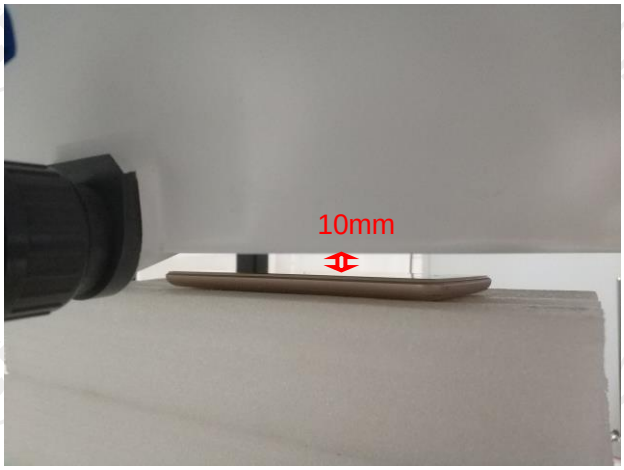
Appendix B: Test Setup Photos


Right Cheek


Right Tilted

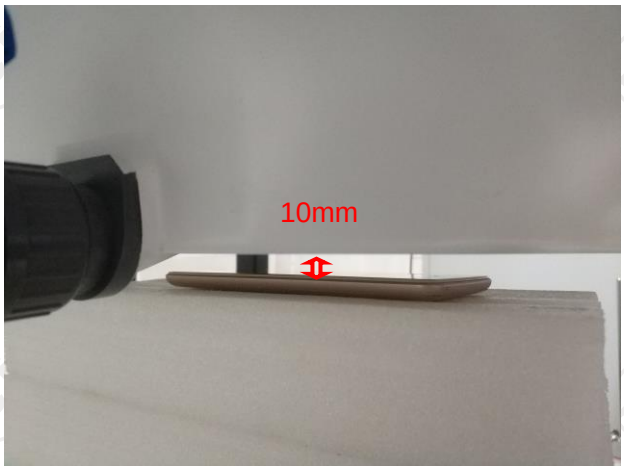

Left Cheek


Left Tilted

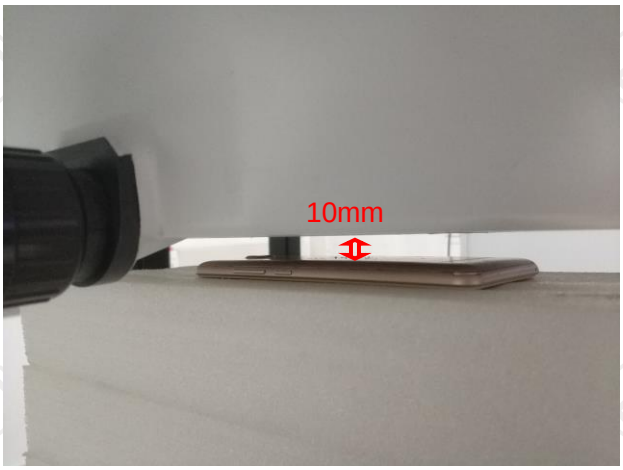


Body worn – Front (10mm)

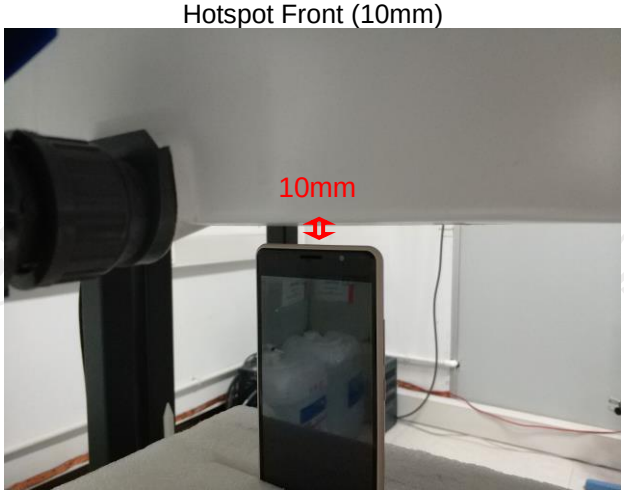
Body worn – Back (10mm)



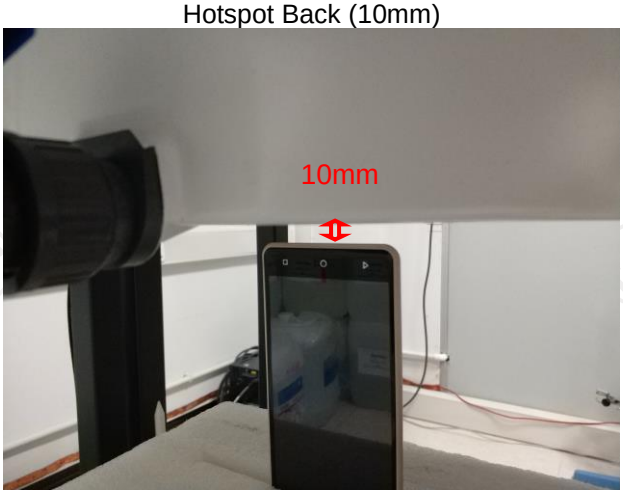
Hotspot Front (10mm)



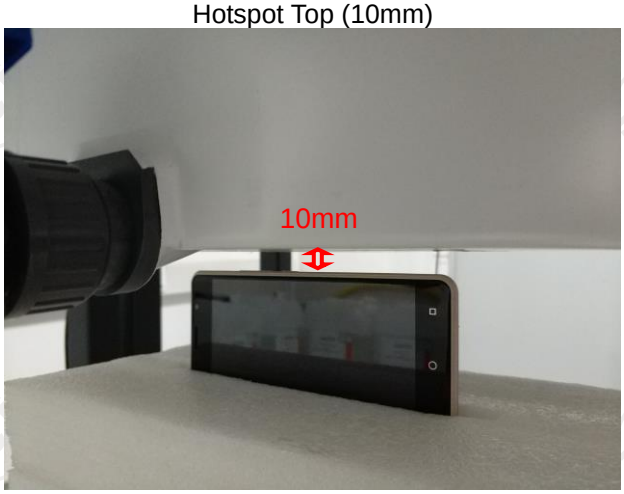
Hotspot Back (10mm)



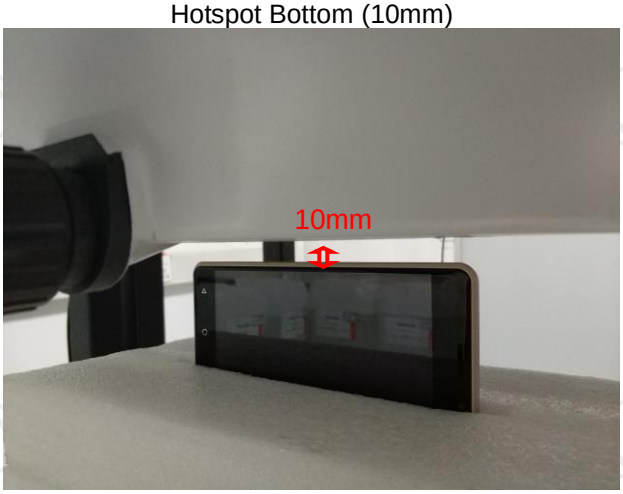
Hotspot Top (10mm)



Hotspot Bottom (10mm)



Hotspot Right (10mm)



Hotspot Left (10mm)

Appendix C: Probe Calibration Certificate

COMOSAR E-FIELD Probe

COMOSAR E-Field Probe Calibration Report

Ref : ACR.128.4.17.SATU.A

SHENZHEN TONGCE TESTING Lab.

IF, LEINUO WATCH.1 BUILDING, FUYONG TOWN,

BAOAN DIST, SHENZHENG,CHINA

MVG COMOSAR DOSIMETRIC E-FIELD PROBE

SERIAL NO.: SN 07/15 EP248

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144

Calibration Date: 01/10/2017

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.128.4.17.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	1/10/2017	
Checked by :	Jérôme LUC	Product Manager	1/10/2017	
Approved by :	Kim RUTKOWSKI	Quality Manager	1/10/2017	

	Customer Name
Distribution :	Shenzhen Tongce Testing Lab

Issue	Date	Modifications
A	1/10/2017	Initial release

TABLE OF CONTENTS

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE5
Serial Number	SN 07/15 EP248
Product Condition (new / used)	New
Frequency Range of Probe	0.45 GHz - 3GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.218 MΩ Dipole 2: R2=0.217 MΩ Dipole 3: R3=0.215 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	4.5 mm
Maximum external diameter	8 mm
Probe Tip External Diameter	5 mm
Distance between dipoles / probe extremity	2.7 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.

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%

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 %

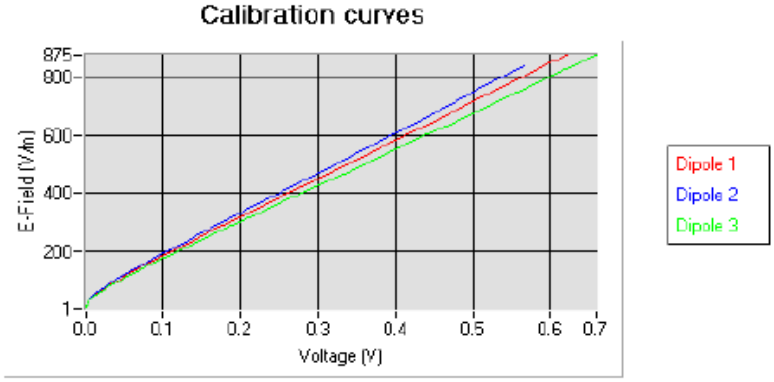
5.1 SENSITIVITY IN AIR

Normx dipole 1 (μV/(V/m)^2)	Normy dipole 2 (μV/(V/m)^2)	Normz dipole 3 (μV/(V/m)^2)
6.90	7.45	6.47

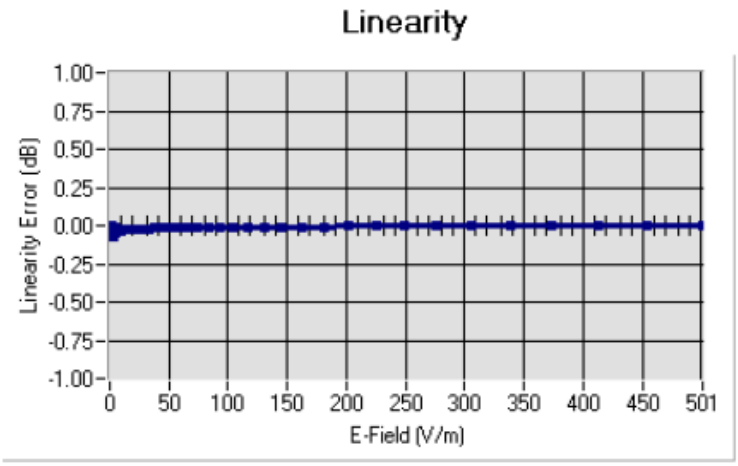
DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
98	94	95

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

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



5.2 LINEARITY



Linearity: +/-1.58% (+/-0.07dB)

5.3 SENSITIVITY IN LIQUID

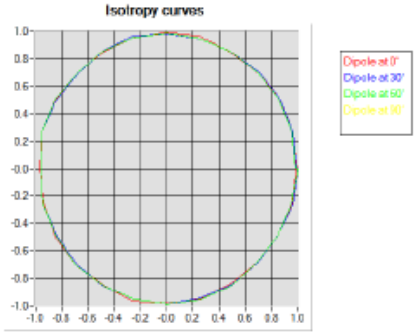
Liquid	Frequency (MHz +/- 100MHz)	Permittivity	Epsilon (S/m)	ConvF
HL450	450	42.17	0.87	5.33
BL450	450	57.65	0.94	5.51
HL750	750	40.03	0.93	4.74
BL750	750	56.83	1.00	4.93
HL850	835	42.19	0.90	5.50
BL850	835	54.67	1.01	5.65
HL900	900	42.08	1.01	4.93
BL900	900	55.25	1.08	5.04
HL1800	1800	41.68	1.46	4.38
BL1800	1800	53.86	1.46	4.52
HL1900	1900	38.45	1.45	4.85
BL1900	1900	53.32	1.56	5.01
HL2000	2000	38.26	1.38	4.68
BL2000	2000	52.70	1.51	4.80
HL2450	2450	37.50	1.80	4.58
BL2450	2450	53.22	1.89	4.70
HL2600	2600	39.80	1.99	4.36
BL2600	2600	52.52	2.23	4.50

LOWER DETECTION LIMIT: 8mW/kg

5.4 ISOTROPY

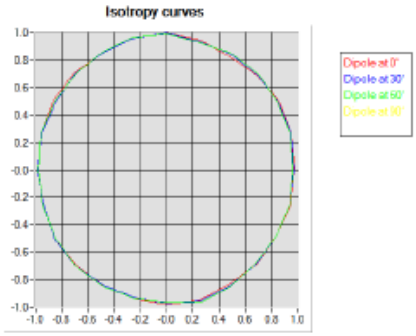
HL850 MHz

- Axial isotropy: 0.06 dB
- Hemispherical isotropy: 0.07 dB



HL2450 MHz

- Axial isotropy: 0.07 dB
- Hemispherical isotropy: 0.06 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	02/2015	02/2018
Reference Probe	MVG	EP 94 SN 37/08	02/2015	02/2018
Multimeter	Keithley 2000	1188656	02/2015	02/2018
Signal Generator	Agilent E4438C	MY49070581	02/2015	02/2018
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	02/2015	02/2018
Power Sensor	HP ECP-E26A	US37181460	02/2016	02/2018
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	10/2016	10/2018

Dielectric Probe Calibration Report

Ref : ACR.156.11.15.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 SHENZHEN, CHINA

MVG LIMESAR DIELECTRIC PROBE

FREQUENCY: 0.3-6 GHZ

SERIAL NO.: SN 19/15 OCPG 71

Calibrated at MVG US

2105 Barrett Park Dr. - Kennesaw, GA 30144

ACCREDITED Calibration CERT #2246-02

Calibration Date: 05/06/2016

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.

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

SAR DIELECTRIC PROBE CALIBRATION REPORT

Ref: ACR.156.11.15.SATU.A

	Name	Function	Date	Signature
Prepared by :	Jérôme LUC	Product Manager	6/5/2016	
Checked by :	Jérôme LUC	Product Manager	6/5/2016	
Approved by :	Kim RUTKOWSKI	Quality Manager	6/5/2016	

	Customer Name
Distribution :	Shenzhen TCT Testing Technology Co.,Ltd

Issue	Date	Modifications
A	6/5/2016	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)	New

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 1528-2003, 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%

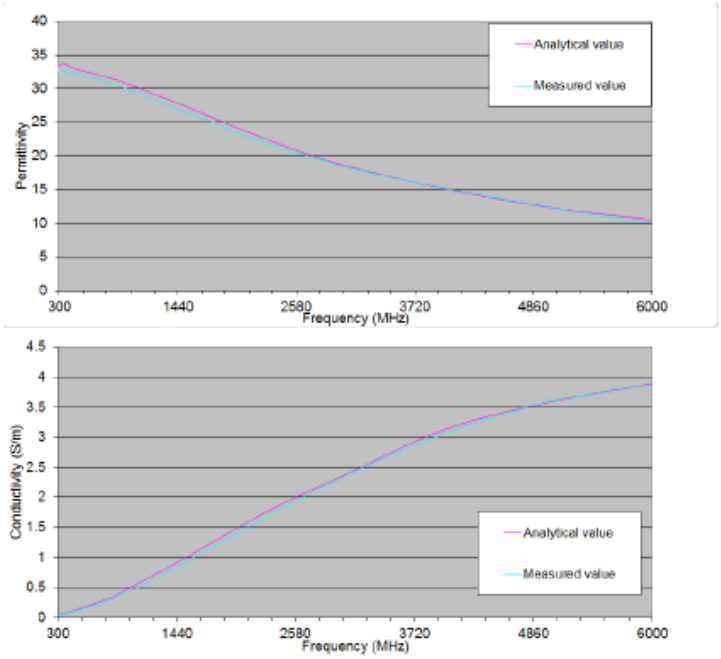
6 CALIBRATION MEASUREMENT RESULTS

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 ε'+jε") are compared with the well-known theoretical values for this liquid.



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	02/2015	02/2018
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	8/2015	8/2018