

Body-Worn with 10mm	/Freq.		1g	10g	(±5%)	(dBm)	(dBm)	1g (W/Kg)	
ANT1									
Front Side	56/5280	802.11a	0.079	0.043	3.85	17.49	18.00	0.089	2022/2/15
Back Side	56/5280	802.11a	0.102	0.058	-1.76	17.49	18.00	0.115	2022/2/15
ANT2									
Front Side	56/5280	802.11a	0.040	0.023	3.96	17.42	17.50	0.041	2022/2/15
Back Side	56/5280	802.11a	0.060	0.036	-1.65	17.42	17.50	0.061	2022/2/15
MIMO									
Front Side	56/5280	802.11n HT20	0.106	0.062	-0.16	19.30	20.00	0.125	2022/2/15
Back Side	56/5280	802.11n HT20	0.125	0.075	1.08	19.30	20.00	0.147	2022/2/15

NOTE: Body-Worn SAR test results of WLAN 5.3G

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					
ANT1									
Front Side	56/5280	802.11a	0.079	0.043	3.85	17.49	18.00	0.089	2022/2/15
Back Side	56/5280	802.11a	0.102	0.058	-1.76	17.49	18.00	0.115	2022/2/15
Left Side	56/5280	802.11a	0.056	0.032	-2.95	17.49	18.00	0.063	2022/2/15
Bottom Side	56/5280	802.11a	0.033	0.018	-0.91	17.49	18.00	0.037	2022/2/15
ANT2									
Front Side	56/5280	802.11a	0.040	0.023	3.96	17.42	17.50	0.041	2022/2/15
Back Side	56/5280	802.11a	0.060	0.036	-1.65	17.42	17.50	0.061	2022/2/15
Right Side	56/5280	802.11a	0.024	0.014	-3.39	17.42	17.50	0.024	2022/2/15
MIMO									
Front Side	56/5280	802.11n HT20	0.106	0.062	-0.16	19.30	20.00	0.125	2022/2/15
Back Side	56/5280	802.11n HT20	0.125	0.075	1.08	19.30	20.00	0.147	2022/2/15
Left Side	56/5280	802.11n HT20	0.060	0.036	1.14	19.30	20.00	0.070	2022/2/15
Right Side	56/5280	802.11n HT20	0.039	0.022	1.17	19.30	20.00	0.046	2022/2/15
Bottom Side	56/5280	802.11n HT20	0.030	0.016	2.15	19.30	20.00	0.035	2022/2/15

NOTE: Hotspot SAR test results of WLAN 5.3G

10.1.26. SAR measurement Result of WLAN 5.6G

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					
ANT1									
Front Side	116/5580	802.11a	0.079	0.043	1.82	16.81	18.00	0.104	2022/2/17
Back Side	116/5580	802.11a	0.114	0.064	2.31	16.81	18.00	0.150	2022/2/17
ANT2									
Front Side	116/5580	802.11a	0.066	0.036	2.91	16.73	17.00	0.070	2022/2/17
Back Side	116/5580	802.11a	0.076	0.042	-3.90	16.73	17.00	0.081	2022/2/17
MIMO									
Front Side	116/5580	802.11n HT20	0.125	0.070	-0.17	18.00	19.00	0.157	2022/2/17
Back Side	116/5580	802.11n HT20	0.141	0.079	-3.51	18.00	19.00	0.178	2022/2/17

NOTE: Body-Worn SAR test results of WLAN 5.6G

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					
ANT1									
Front Side	116/5580	802.11a	0.079	0.043	1.82	16.81	18.00	0.104	2022/2/17
Back Side	116/5580	802.11a	0.114	0.064	2.31	16.81	18.00	0.150	2022/2/17
Left Side	116/5580	802.11a	0.056	0.031	-0.35	16.81	18.00	0.074	2022/2/17
Bottom Side	116/5580	802.11a	0.039	0.021	-2.07	16.81	18.00	0.051	2022/2/17
ANT2									
Front Side	116/5580	802.11a	0.066	0.036	2.91	16.73	17.00	0.070	2022/2/17
Back Side	116/5580	802.11a	0.076	0.042	-3.90	16.73	17.00	0.081	2022/2/17
Right Side	116/5580	802.11a	0.032	0.018	2.16	16.73	17.00	0.034	2022/2/17
MIMO									
Front Side	116/5580	802.11n HT20	0.125	0.070	-0.17	18.00	19.00	0.157	2022/2/17
Back Side	116/5580	802.11n HT20	0.141	0.079	-3.51	18.00	19.00	0.178	2022/2/17
Left Side	116/5580	802.11n HT20	0.072	0.040	-3.13	18.00	19.00	0.091	2022/2/17

Right Side	116/5580	802.11n HT20	0.048	0.026	1.05	18.00	19.00	0.060	2022/2/17
Bottom Side	116/5580	802.11n HT20	0.036	0.023	0.77	18.00	19.00	0.045	2022/2/17

NOTE: Hotspot SAR test results of WLAN 5.6G

10.1.27. SAR measurement Result of WLAN 5.8G

Test Position of Body-Worn with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					
ANT1									
Front Side	157/5785	802.11a	0.087	0.053	-0.23	13.53	14.50	0.109	2022/2/16
Back Side	157/5785	802.11a	0.117	0.069	0.53	13.53	14.50	0.146	2022/2/16
ANT2									
Front Side	157/5785	802.11a	0.060	0.038	-1.32	10.98	11.50	0.068	2022/2/16
Back Side	157/5785	802.11a	0.068	0.045	1.35	10.98	11.50	0.077	2022/2/16
MIMO									
Front Side	157/5785	802.11n HT20	0.114	0.067	-1.27	13.70	14.50	0.137	2022/2/16
Back Side	157/5785	802.11n HT20	0.144	0.086	-1.32	13.70	14.50	0.173	2022/2/16

NOTE: Body-Worn SAR test results of WLAN 5.8G

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)	Date
			1g	10g					
ANT1									
Front Side	157/5785	802.11a	0.087	0.053	-0.23	13.53	14.50	0.109	2022/2/16
Back Side	157/5785	802.11a	0.117	0.069	0.53	13.53	14.50	0.146	2022/2/16
Left Side	157/5785	802.11a	0.056	0.032	1.59	13.53	14.50	0.070	2022/2/16
Bottom Side	157/5785	802.11a	0.039	0.022	-0.09	13.53	14.50	0.049	2022/2/16
ANT2									
Front Side	157/5785	802.11a	0.060	0.038	-1.32	10.98	11.50	0.068	2022/2/16
Back Side	157/5785	802.11a	0.068	0.045	1.35	10.98	11.50	0.077	2022/2/16
Right Side	157/5785	802.11a	0.036	0.023	-3.69	10.98	11.50	0.041	2022/2/16
MIMO									

Front Side	157/5785	802.11n HT20	0.114	0.067	-1.27	13.70	14.50	0.137	2022/2/16
Back Side	157/5785	802.11n HT20	0.144	0.086	-1.32	13.70	14.50	0.173	2022/2/16
Left Side	157/5785	802.11n HT20	0.068	0.041	-3.88	13.70	14.50	0.082	2022/2/16
Right Side	157/5785	802.11n HT20	0.045	0.027	1.25	13.70	14.50	0.054	2022/2/16
Bottom Side	157/5785	802.11n HT20	0.040	0.023	3.38	13.70	14.50	0.048	2022/2/16

NOTE: Hotspot SAR test results of WLAN 5.8G

10.2. Simultaneous Transmission Analysis

Per KDB 447498 D01, simultaneous transmission SAR is compliant if,

- 1) Scalar SAR summation < 1.6W/kg.
- 2) $SPLSR = (SAR_1 + SAR_2)^{1.5} / (\text{min. separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan. If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.

Test Position		Scaled SAR _{MAX}		Σ 1-g SAR (W/Kg)	SPLSR	Remark
		WWAN	DTS			
Body-Worn	Front Side	0.699	0.173	0.872	N/A	N/A
	Back Side	1.193	0.269	1.462	N/A	N/A
Hotspot	Front Side	0.699	0.173	0.872	N/A	N/A
	Back Side	1.193	0.269	1.462	N/A	N/A
	Left Side	0.484	0.097	0.581	N/A	N/A
	Right Side	0.504	0.058	0.562	N/A	N/A
	Top Side	0.796	N/A	0.796	N/A	N/A
	Bottom Side	0.224	0.120	0.344	N/A	N/A

Test Position		Scaled SAR _{MAX}		Σ 1-g SAR (W/Kg)	SPLSR	Remark
		WWAN	NII			
Body-Worn	Front Side	0.699	0.157	0.856	N/A	N/A
	Back Side	1.193	0.260	1.453	N/A	N/A
Hotspot	Front Side	0.699	0.157	0.856	N/A	N/A
	Back Side	1.193	0.260	1.453	N/A	N/A
	Left Side	0.484	0.110	0.594	N/A	N/A
	Right Side	0.504	0.079	0.583	N/A	N/A

	Top Side	0.796	N/A	0.796	N/A	N/A
	Bottom Side	0.224	0.073	0.297	N/A	N/A

Test Position		Scaled SAR _{MAX}		Σ 1-g SAR (W/Kg)	SPLSR	Remark
		WWAN	DSS			
Body-Worn	Front Side	0.699	0.094	0.793	N/A	N/A
	Back Side	1.193	0.094	1.287	N/A	N/A
Hotspot	Front Side	0.699	0.094	0.793	N/A	N/A
	Back Side	1.193	0.094	1.287	N/A	N/A
	Left Side	0.484	0.094	0.578	N/A	N/A
	Right Side	0.504	N/A	0.504	N/A	N/A
	Top Side	0.796	N/A	0.796	N/A	N/A
	Bottom Side	0.224	0.094	0.318	N/A	N/A

Test Position		Scaled SAR _{MAX}			Σ 1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band2	NR N77	DTS			
Body-Worn	Front Side	0.033	0.560	0.173	0.766	N/A	N/A
	Back Side	0.039	0.912	0.269	1.220	N/A	N/A
Hotspot	Front Side	0.033	0.560	0.173	0.766	N/A	N/A
	Back Side	0.039	0.912	0.269	1.220	N/A	N/A
	Left Side	0.023	N/A	0.097	0.120	N/A	N/A
	Right Side	0.022	0.429	0.058	0.509	N/A	N/A
	Top Side	0.035	N/A	N/A	0.035	N/A	N/A
	Bottom Side	N/A	0.224	0.120	0.344	N/A	N/A

Test Position		Scaled SAR _{MAX}			Σ 1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band2	NR N77	NII			
Body-Worn	Front Side	0.033	0.560	0.157	0.750	N/A	N/A
	Back Side	0.039	0.912	0.260	1.211	N/A	N/A
Hotspot	Front Side	0.033	0.560	0.157	0.750	N/A	N/A
	Back Side	0.039	0.912	0.260	1.211	N/A	N/A
	Left Side	0.023	N/A	0.110	0.133	N/A	N/A
	Right Side	0.022	0.429	0.079	0.530	N/A	N/A
	Top Side	0.035	N/A	N/A	0.035	N/A	N/A

	Bottom Side	N/A	0.224	0.073	0.297	N/A	N/A
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Test Position		Scaled SAR _{MAX}			Σ 1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band2	NR N77	DSS			
Body-Worn	Front Side	0.033	0.560	0.094	0.687	N/A	N/A
	Back Side	0.039	0.912	0.094	1.045	N/A	N/A
Hotspot	Front Side	0.033	0.560	0.094	0.687	N/A	N/A
	Back Side	0.039	0.912	0.094	1.045	N/A	N/A
	Left Side	0.023	N/A	0.094	0.117	N/A	N/A
	Right Side	0.022	0.429	N/A	0.451	N/A	N/A
	Top Side	0.035	N/A	N/A	0.035	N/A	N/A
	Bottom Side	N/A	0.224	0.094	0.318	N/A	N/A

11. Appendix A. Photo documentation

Refer to appendix Test Setup photo---SAR

12. Appendix B. System Check Plots

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MEASUREMENT 1 System Performance Check - 750MHz
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MEASUREMENT 6 System Performance Check - 2600MHz
MEASUREMENT 7 System Performance Check - 3700MHz
MEASUREMENT 8 System Performance Check - 3900MHz
MEASUREMENT 9 System Performance Check - 5200MHz
MEASUREMENT 10 System Performance Check - 5600MHz
MEASUREMENT 11 System Performance Check - 5800MHz

MEASUREMENT 1

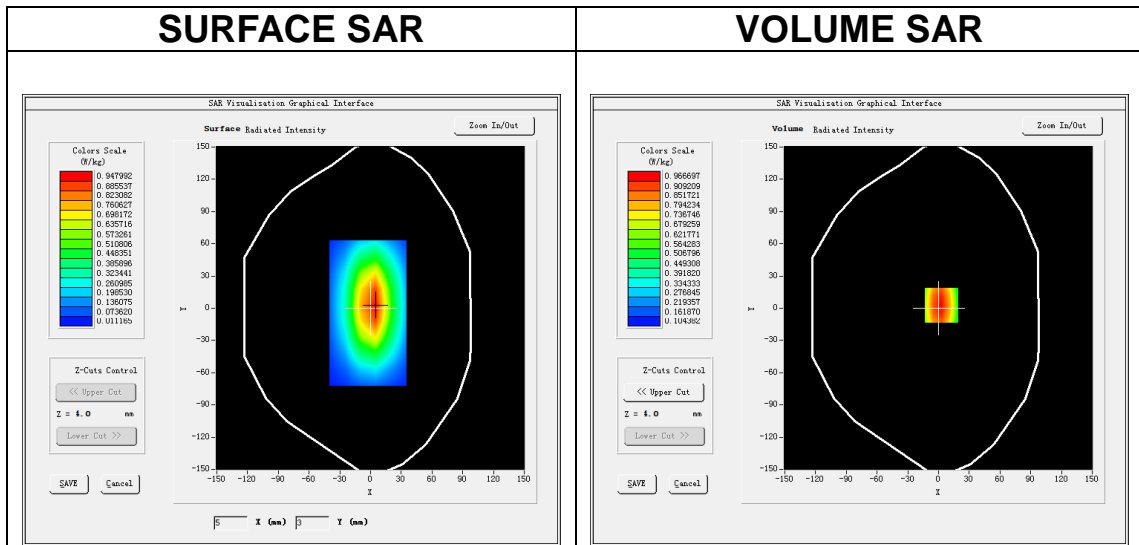
Date of measurement: 18/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Dipole</u>
Band	<u>CW750</u>
Channels	<u>Middle</u>
Signal	<u>CW (Crest factor: 1.0)</u>

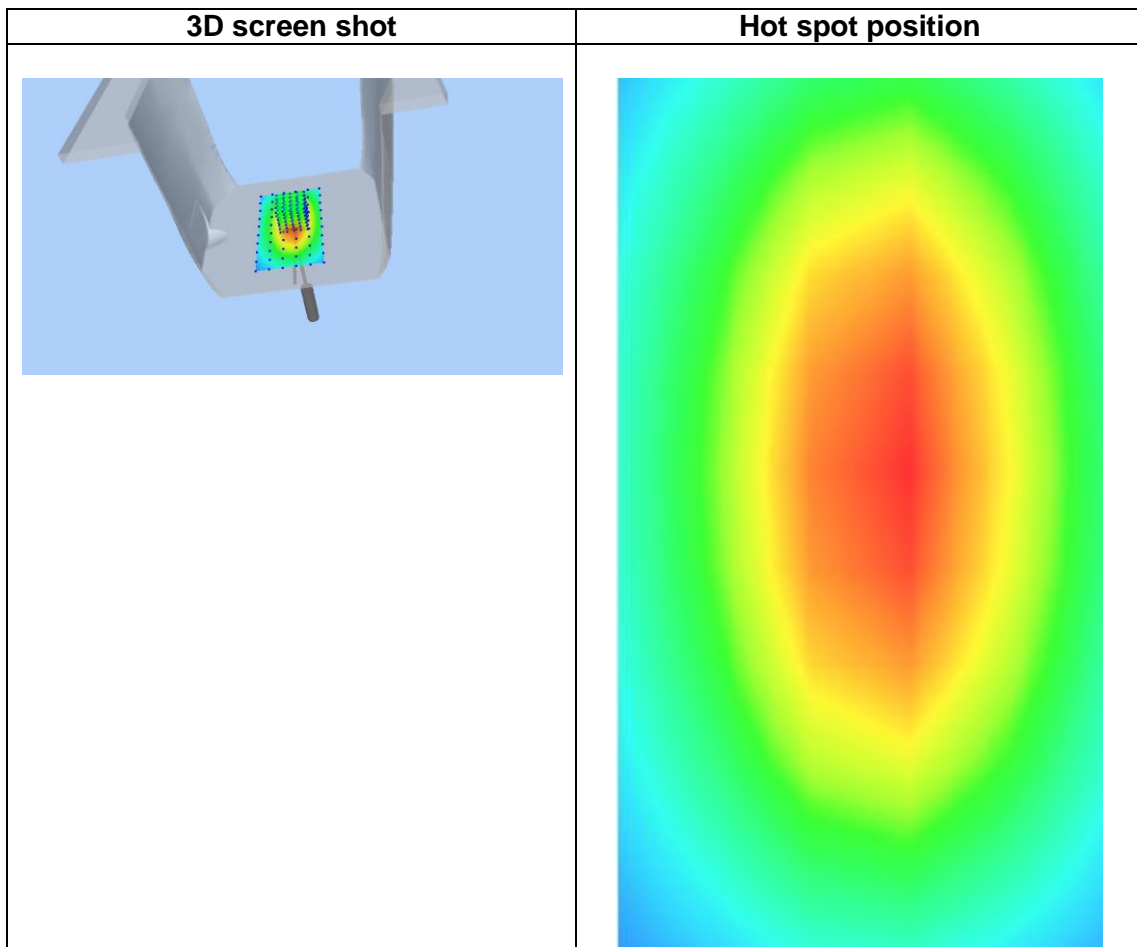
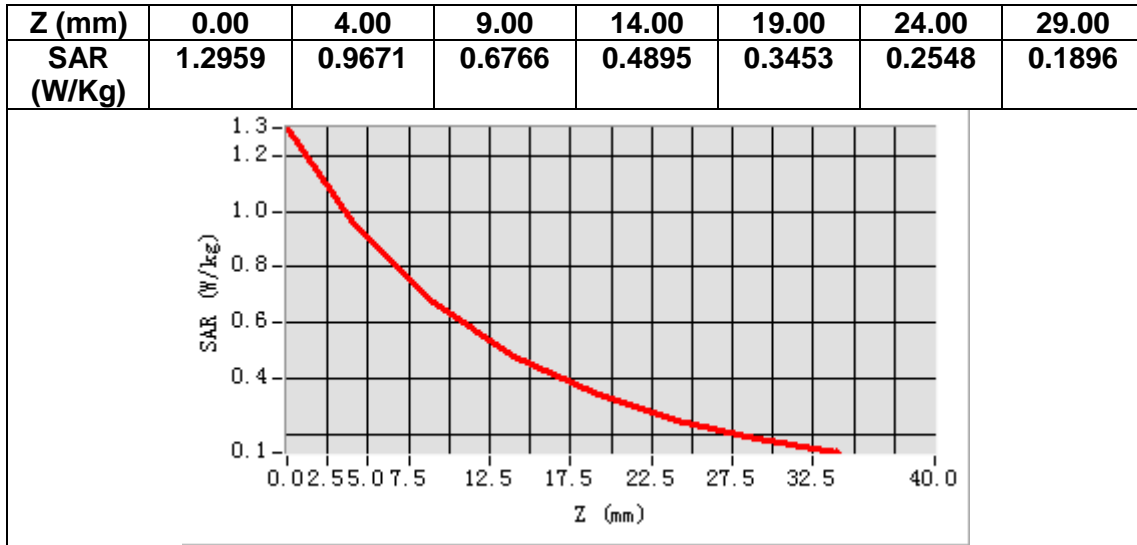
B. SAR Measurement Results

Frequency (MHz)	750.000000
Relative permittivity (real part)	41.567567
Relative permittivity (imaginary part)	21.553931
Conductivity (S/m)	0.898080
Variation (%)	-2.160000



Maximum location: X=3.00, Y=3.00
SAR Peak: 1.30 W/kg

SAR 10g (W/Kg)	0.519318
SAR 1g (W/Kg)	0.928339



MEASUREMENT 2

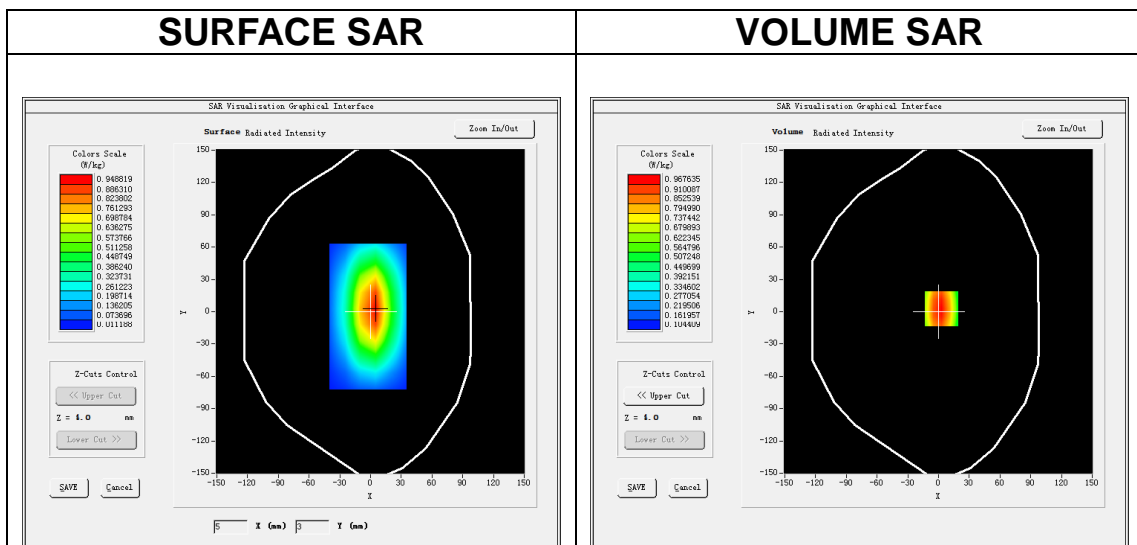
Date of measurement: 13/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Dipole</u>
Band	<u>CW835</u>
Channels	<u>Middle</u>
Signal	<u>CW (Crest factor: 1.0)</u>

B. SAR Measurement Results

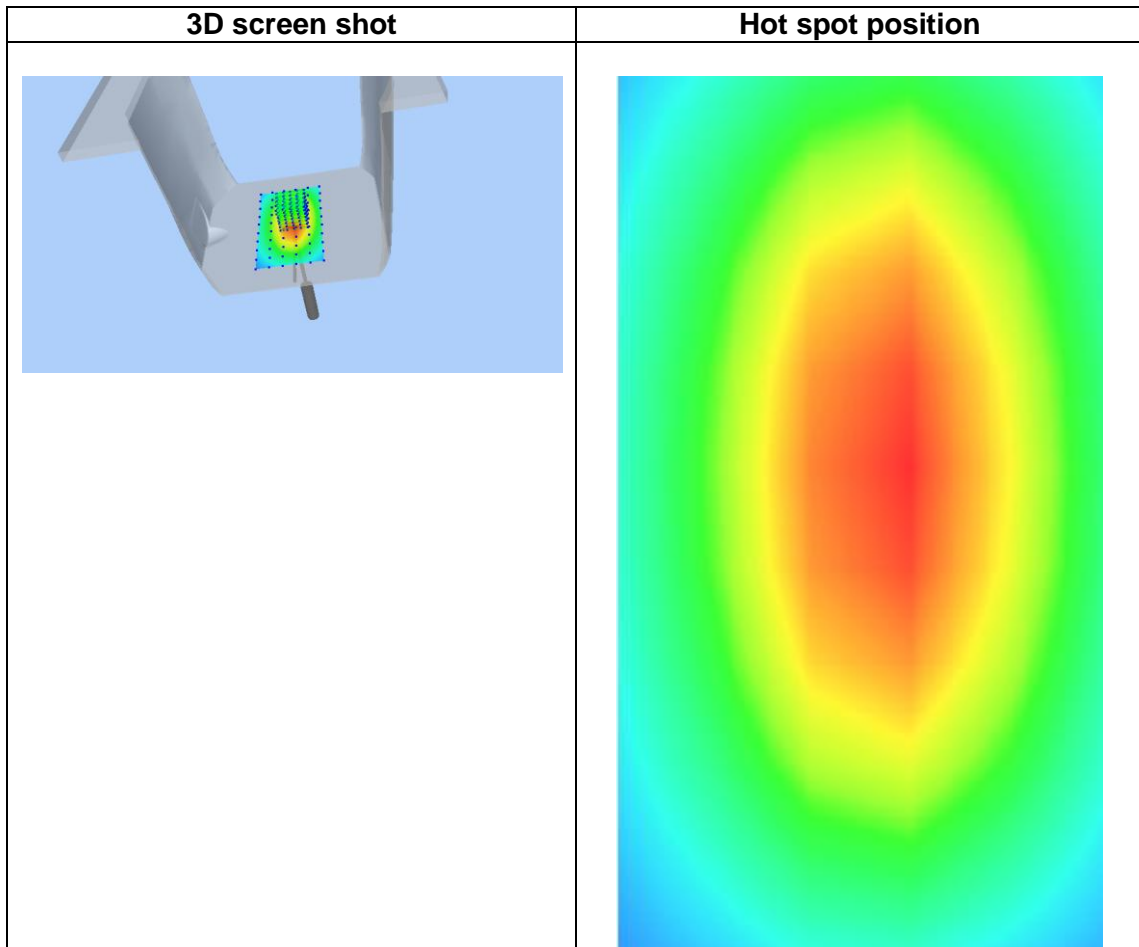
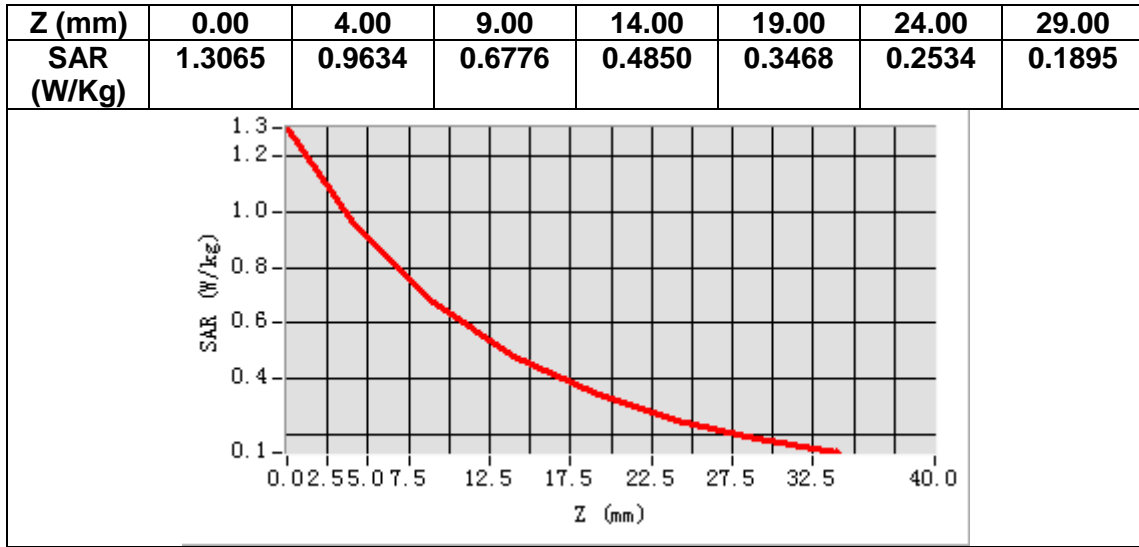
Frequency (MHz)	835.000000
Relative permittivity (real part)	42.778473
Relative permittivity (imaginary part)	19.926605
Conductivity (S/m)	0.924373
Variation (%)	-0.780000



Maximum location: X=3.00, Y=3.00

SAR Peak: 1.30 W/kg

SAR 10g (W/Kg)	0.607115
SAR 1g (W/Kg)	0.904057



MEASUREMENT 3

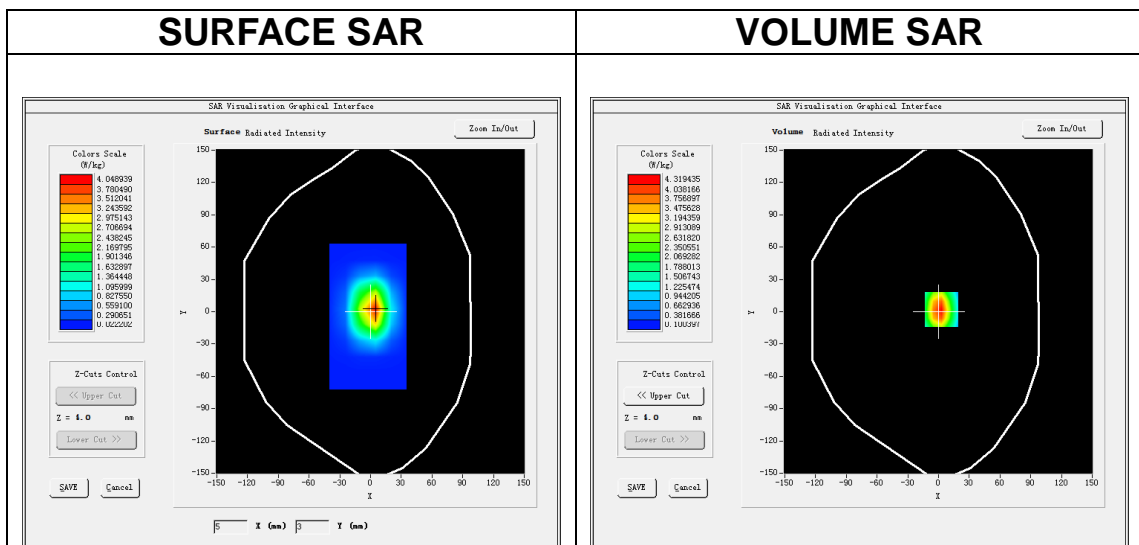
Date of measurement: 14/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Dipole</u>
Band	<u>CW1800</u>
Channels	<u>Middle</u>
Signal	<u>CW (Crest factor: 1.0)</u>

B. SAR Measurement Results

Frequency (MHz)	1800.000000
Relative permittivity (real part)	39.365248
Relative permittivity (imaginary part)	13.959278
Conductivity (S/m)	1.395928
Variation (%)	-3.570000

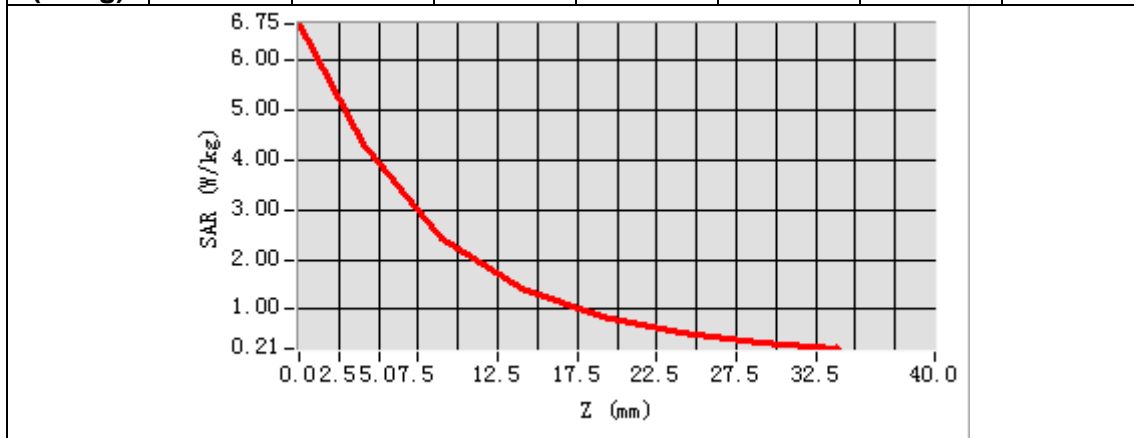


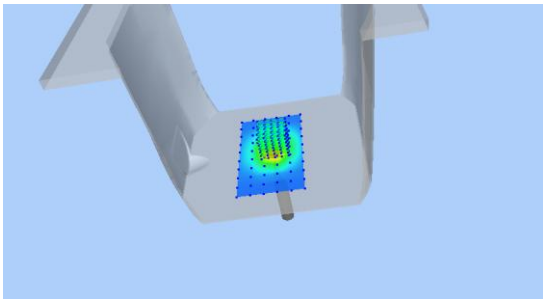
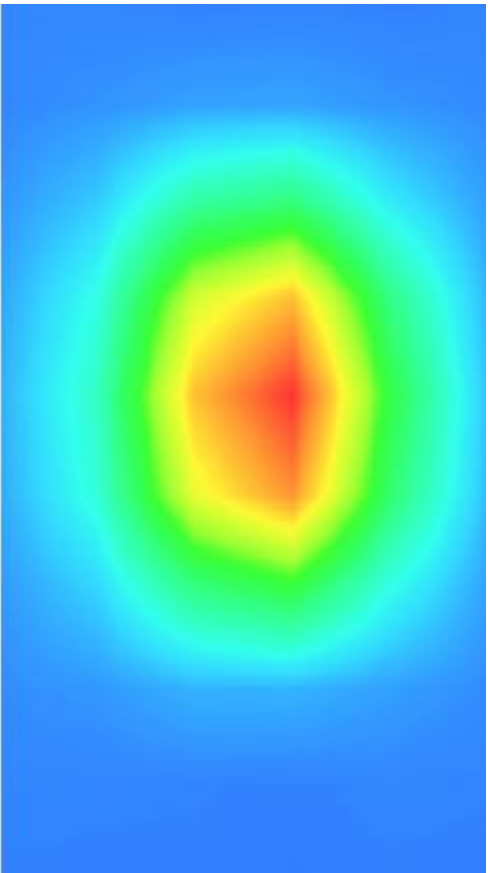
Maximum location: X=3.00, Y=2.00

SAR Peak: 6.82 W/kg

SAR 10g (W/Kg)	2.102138
SAR 1g (W/Kg)	3.895120

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.7454	4.3152	2.4363	1.4268	0.8532	0.5218	0.3235



3D screen shot	Hot spot position
	

MEASUREMENT 4

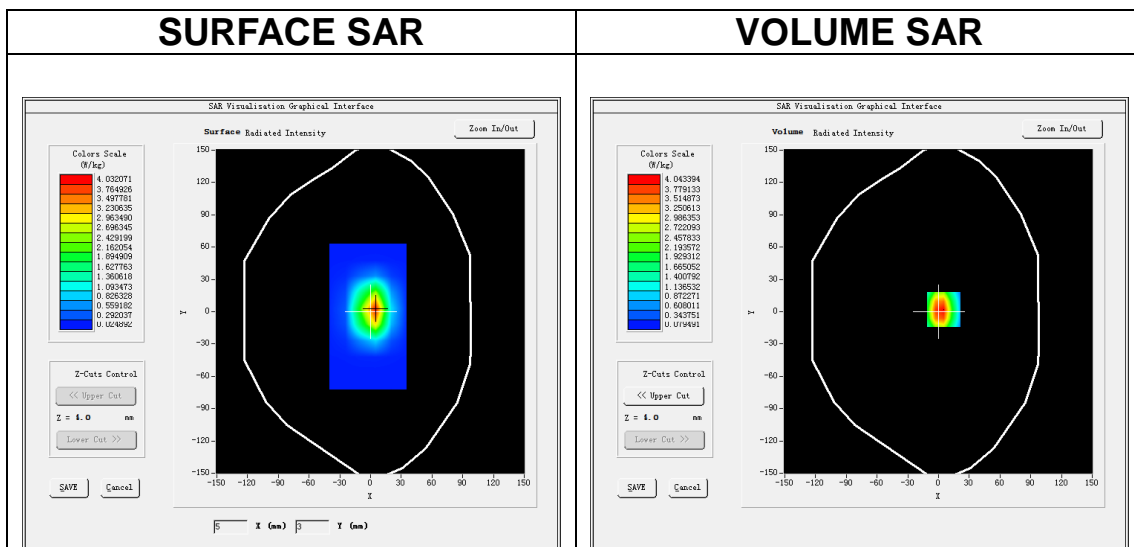
Date of measurement: 25/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Dipole</u>
Band	<u>CW1900</u>
Channels	<u>Middle</u>
Signal	<u>CW (Crest factor: 1.0)</u>

B. SAR Measurement Results

Frequency (MHz)	1900.000000
Relative permittivity (real part)	38.841472
Relative permittivity (imaginary part)	13.850548
Conductivity (S/m)	1.462002
Variation (%)	-1.560000

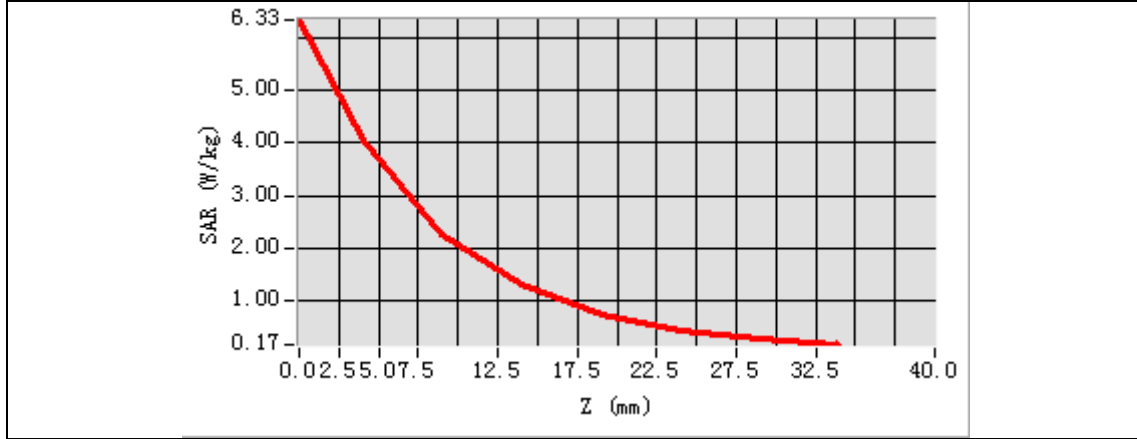


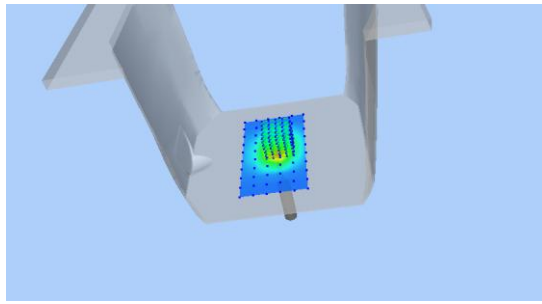
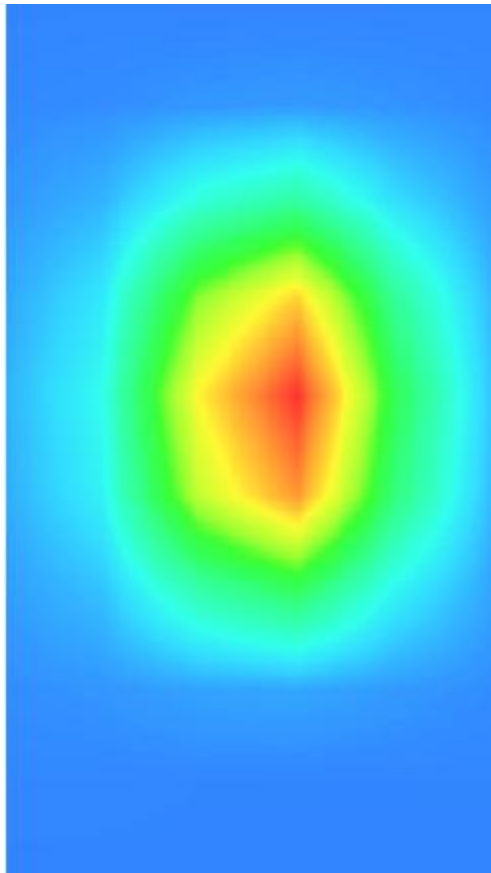
Maximum location: X=5.00, Y=2.00

SAR Peak: 6.70 W/kg

SAR 10g (W/Kg)	1.997012
SAR 1g (W/Kg)	4.300167

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.3290	4.0491	2.2626	1.3016	0.7652	0.4516	0.2711



3D screen shot	Hot spot position
	

MEASUREMENT 5

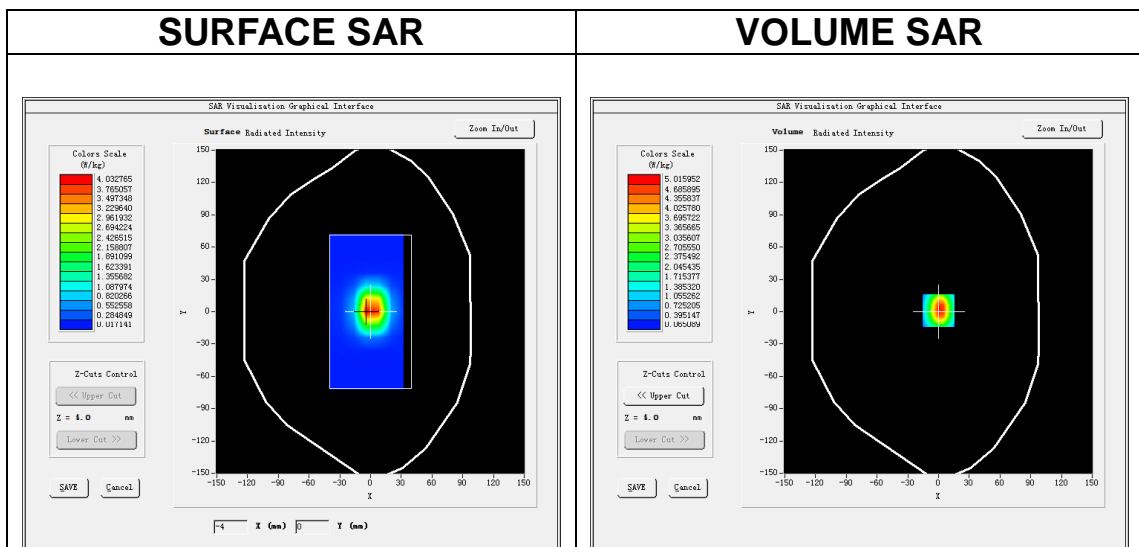
Date of measurement: 11/2/2022

A. Experimental conditions.

Area Scan	<u>dx=12mm dy=12mm, h= 5.00 mm</u>
ZoomScan	<u>7x7x7, dx=5mm dy=5mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Dipole</u>
Band	<u>CW2450</u>
Channels	<u>Middle</u>
Signal	<u>CW (Crest factor: 1.0)</u>

B. SAR Measurement Results

Frequency (MHz)	2450.000000
Relative permittivity (real part)	39.074762
Relative permittivity (imaginary part)	13.428403
Conductivity (S/m)	1.827755
Variation (%)	-0.280000

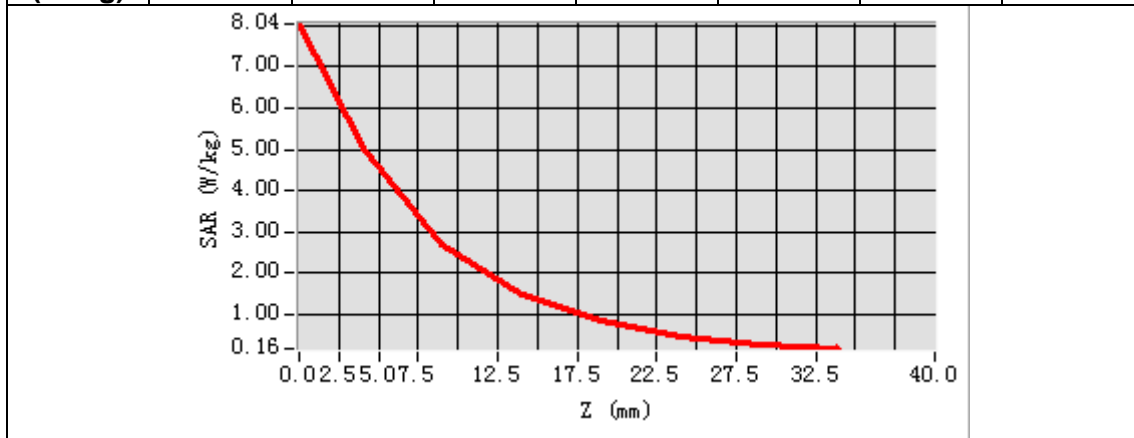


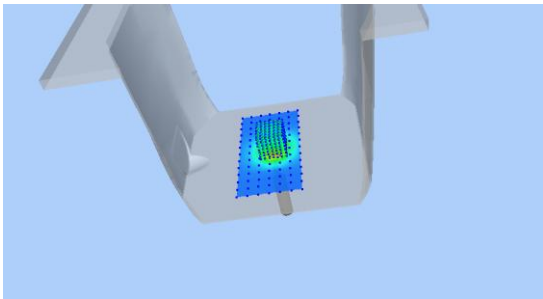
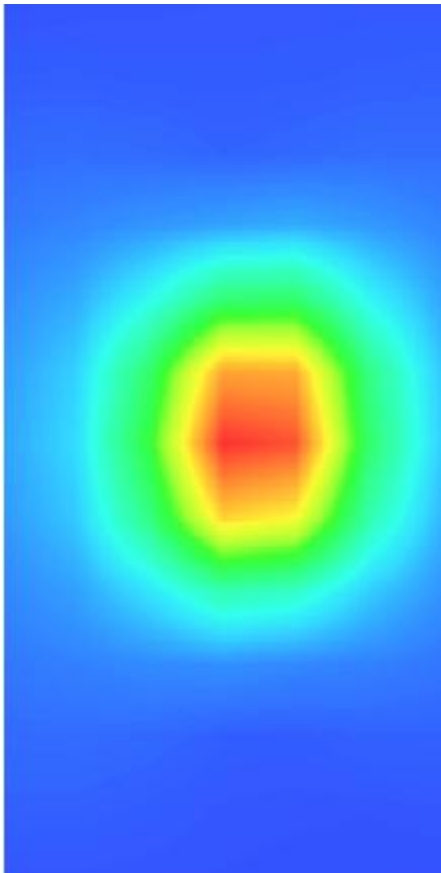
Maximum location: X=0.00, Y=1.00

SAR Peak: 8.14 W/kg

SAR 10g (W/Kg)	2.285331
SAR 1g (W/Kg)	5.438268

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	8.0337	5.0194	2.6917	1.4811	0.8362	0.4684	0.2617



3D screen shot	Hot spot position
	

MEASUREMENT 6

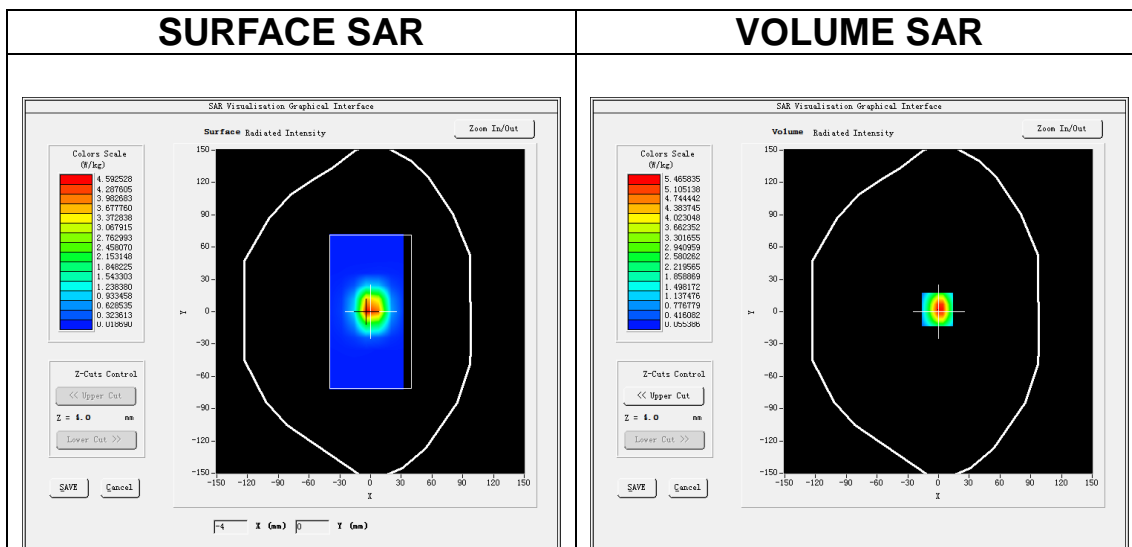
Date of measurement: 20/1/2022

A. Experimental conditions.

Area Scan	<u>dx=12mm dy=12mm, h= 5.00 mm</u>
ZoomScan	<u>7x7x7, dx=5mm dy=5mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Dipole</u>
Band	<u>CW2600</u>
Channels	<u>Middle</u>
Signal	<u>CW (Crest factor: 1.0)</u>

B. SAR Measurement Results

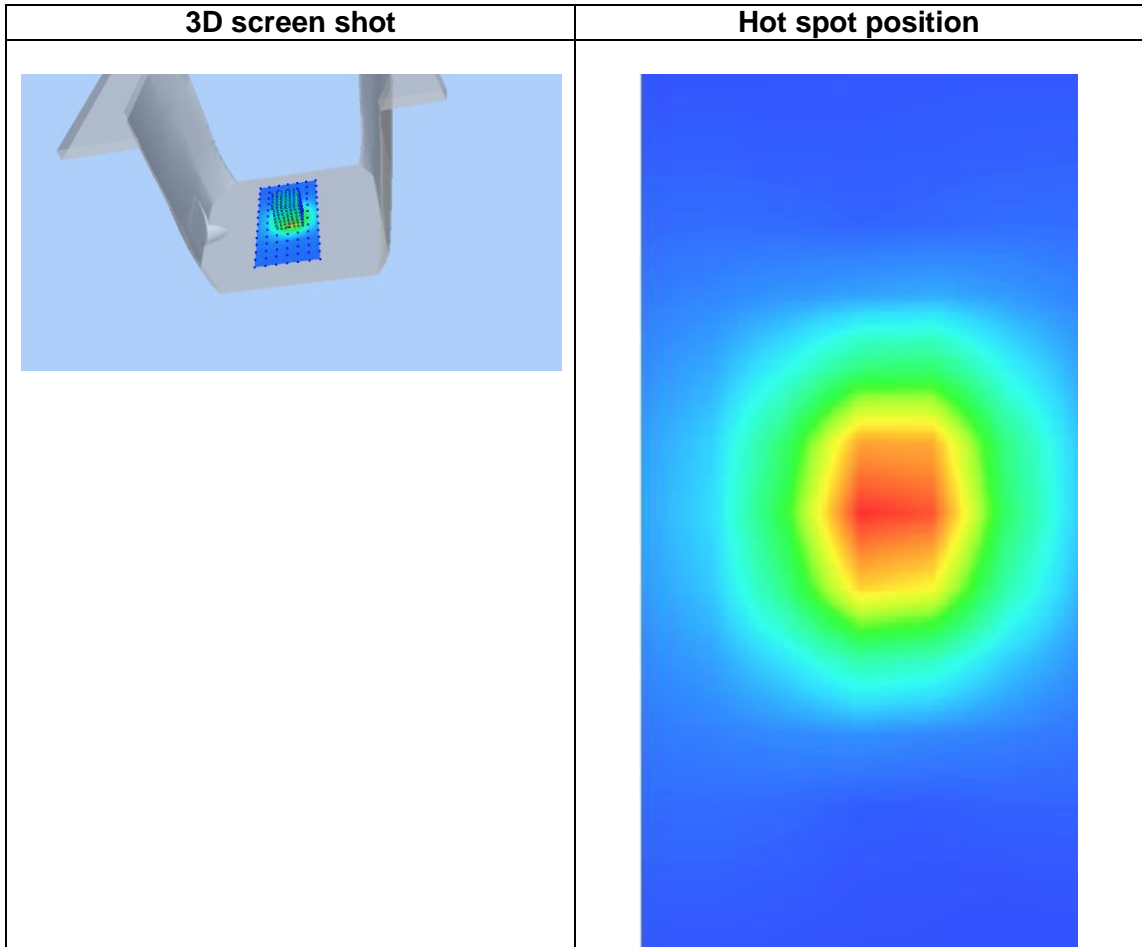
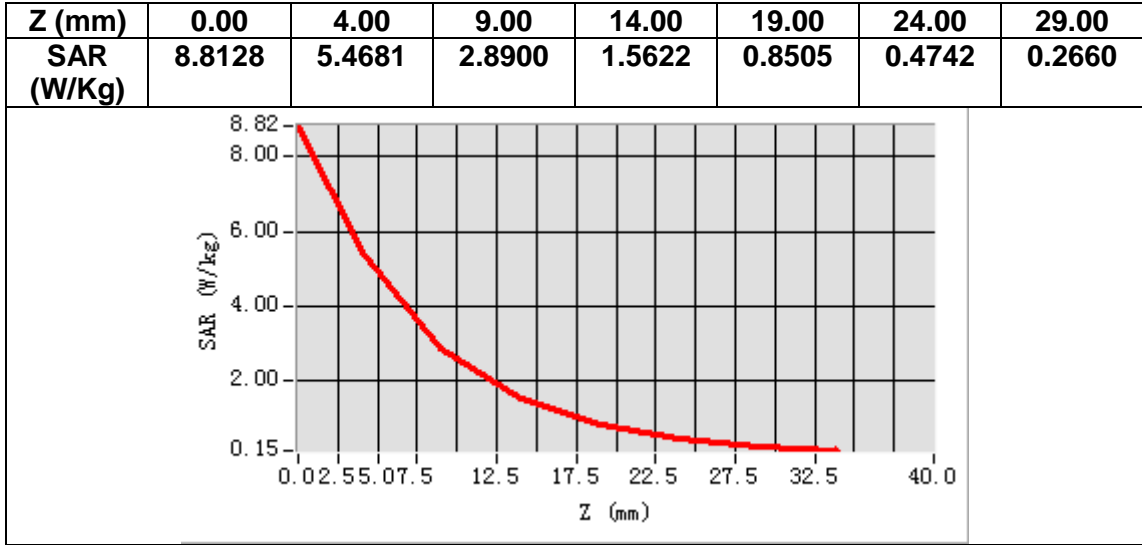
Frequency (MHz)	2600.000000
Relative permittivity (real part)	39.066289
Relative permittivity (imaginary part)	13.982615
Conductivity (S/m)	2.019711
Variation (%)	2.500000



Maximum location: X=-1.00, Y=2.00

SAR Peak: 9.07 W/kg

SAR 10g (W/Kg)	2.281105
SAR 1g (W/Kg)	5.694294



MEASUREMENT 7

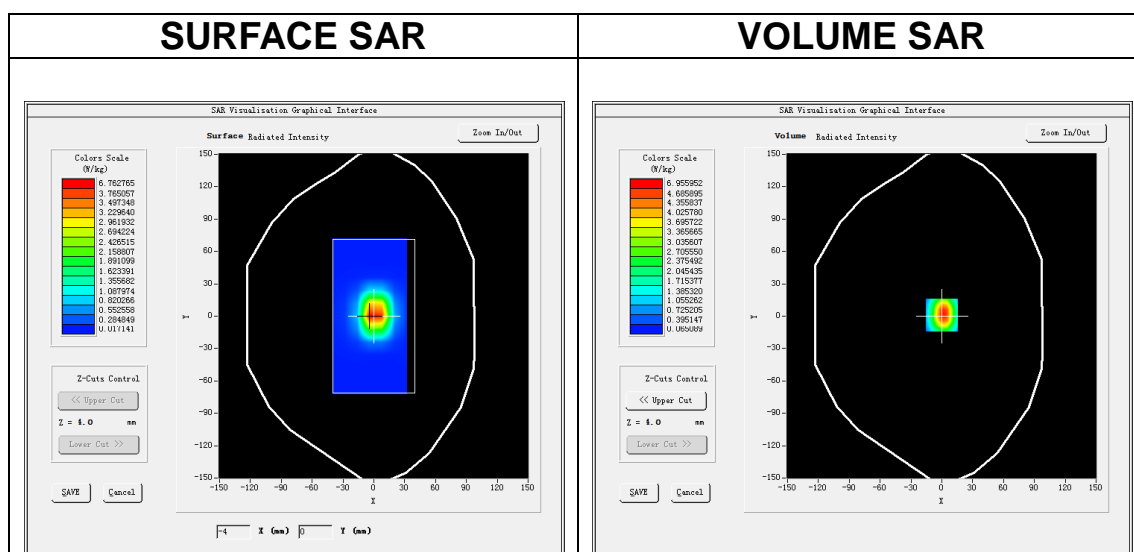
Date of measurement: 18/2/2022

A. Experimental conditions.

Area Scan	<u>dx=12mm dy=12mm, h= 5.00 mm</u>
ZoomScan	<u>7x7x7, dx=5mm dy=5mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Dipole</u>
Band	<u>CW3700</u>
Channels	<u>Middle</u>
Signal	<u>CW (Crest factor: 1.0)</u>

B. SAR Measurement Results

Frequency (MHz)	3700.000000
Relative permittivity (real part)	37.872232
Relative permittivity (imaginary part)	14.773160
Conductivity (S/m)	3.036705
Variation (%)	-3.350000

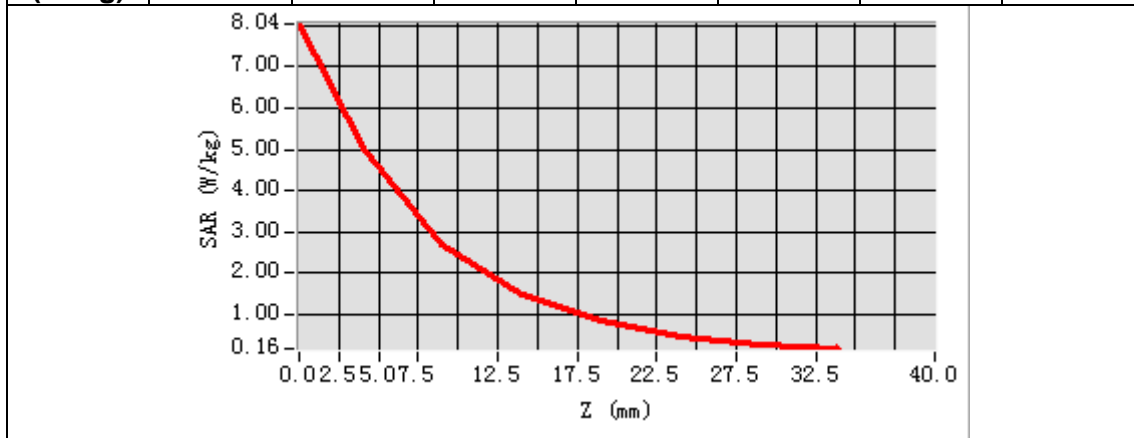


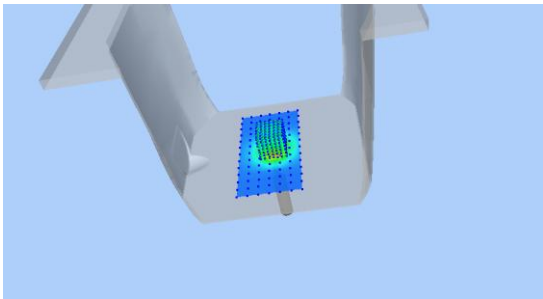
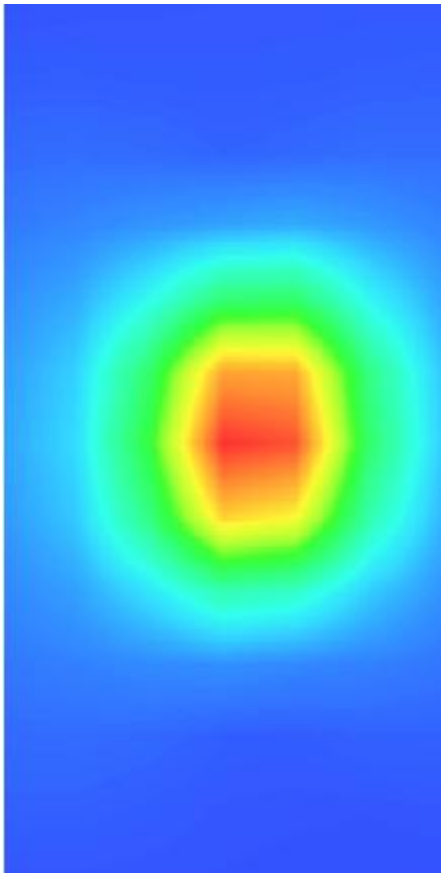
Maximum location: X=0.00, Y=1.00

SAR Peak: 8.14 W/kg

SAR 10g (W/Kg)	2.309175
SAR 1g (W/Kg)	6.620435

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	8.0302	5.0113	2.6947	1.4868	0.8390	0.4693	0.2643



3D screen shot	Hot spot position
	

MEASUREMENT 8

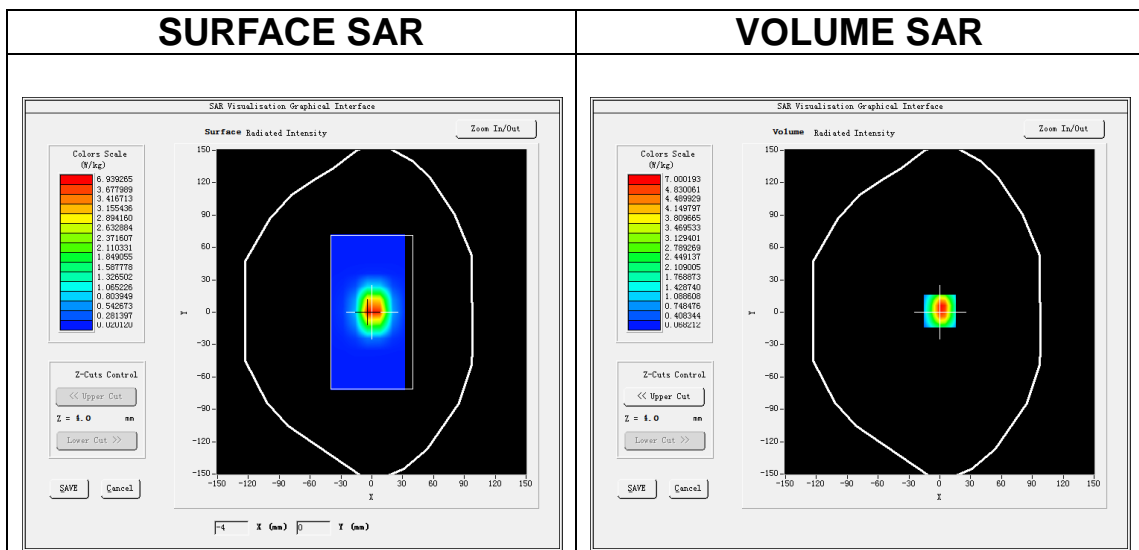
Date of measurement: 18/2/2022

A. Experimental conditions.

Area Scan	<u>dx=12mm dy=12mm, h= 5.00 mm</u>
ZoomScan	<u>7x7x7, dx=5mm dy=5mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Dipole</u>
Band	<u>CW3900</u>
Channels	<u>Middle</u>
Signal	<u>CW (Crest factor: 1.0)</u>

B. SAR Measurement Results

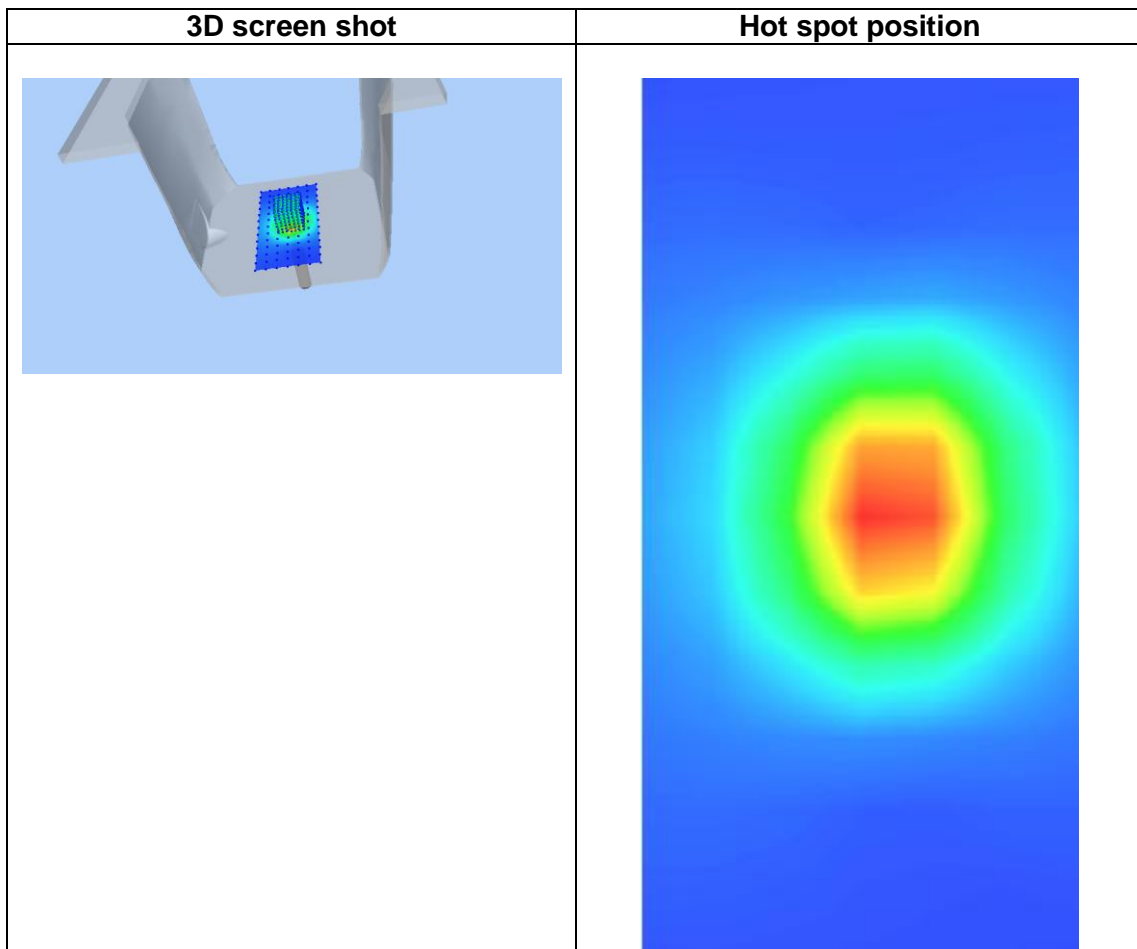
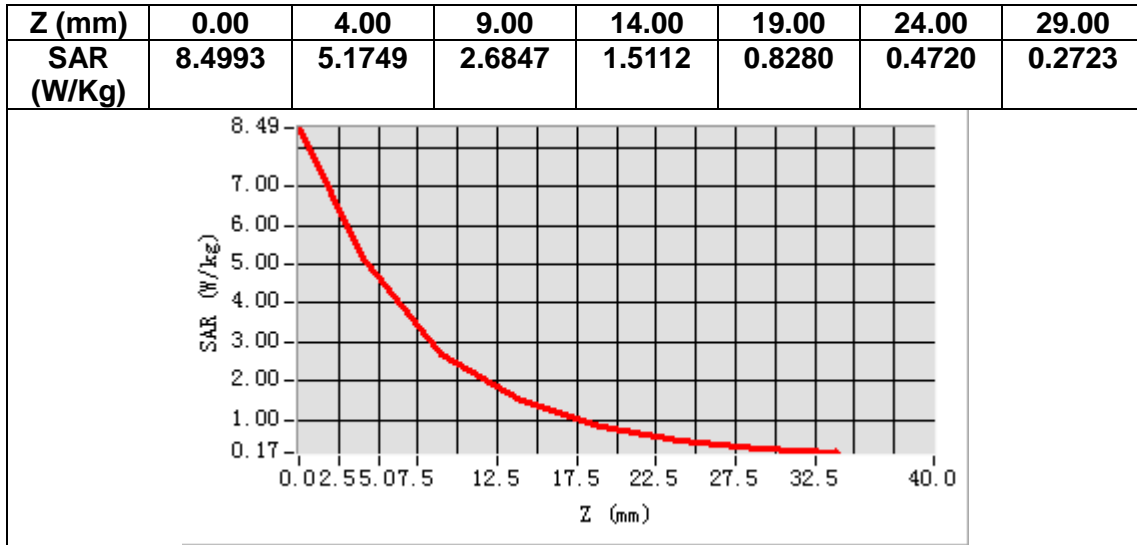
Frequency (MHz)	3900.000000
Relative permittivity (real part)	37.999417
Relative permittivity (imaginary part)	15.149160
Conductivity (S/m)	3.282318
Variation (%)	-2.070000



Maximum location: X=0.00, Y=1.00

SAR Peak: 8.42 W/kg

SAR 10g (W/Kg)	2.430258
SAR 1g (W/Kg)	6.720367



MEASUREMENT 9

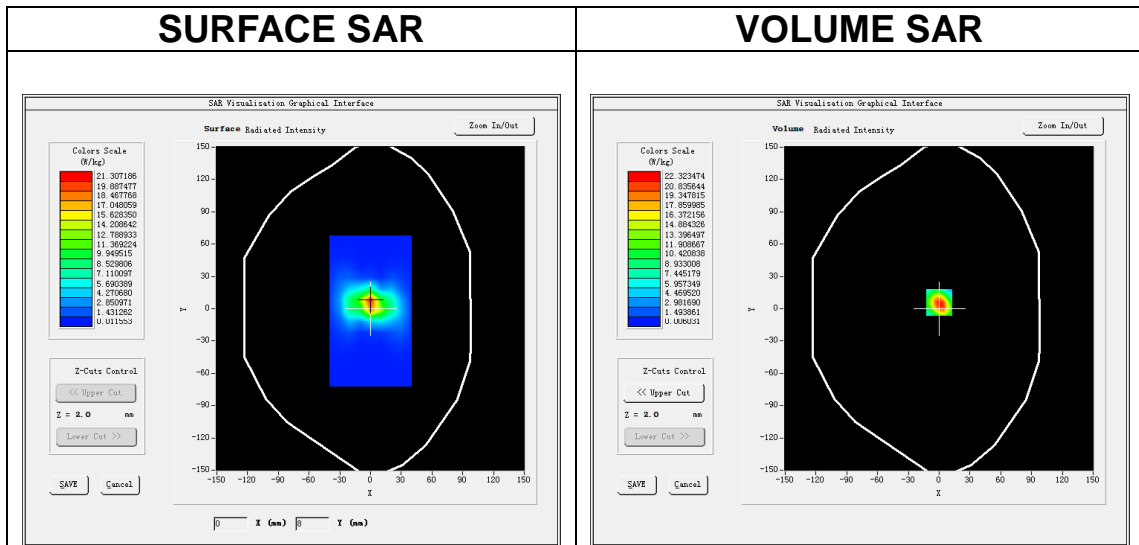
Date of measurement: 15/2/2022

A. Experimental conditions.

Area Scan	<u>dx=10mm dy=10mm, h= 2.00 mm</u>
ZoomScan	<u>7x7x12,dx=4mm dy=4mm dz=2mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Dipole</u>
Band	<u>CW5200</u>
Channels	<u>Middle</u>
Signal	<u>CW (Crest factor: 1.0)</u>

B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative permittivity (real part)	36.862278
Relative permittivity (imaginary part)	16.364639
Conductivity (S/m)	4.727562
Variation (%)	3.790000

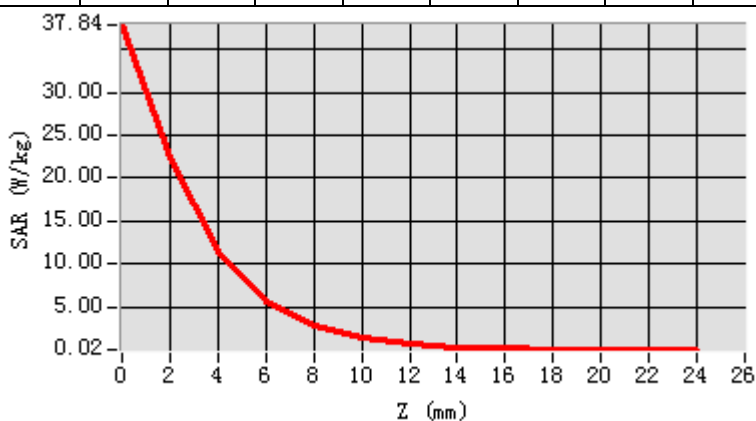


Maximum location: X=0.00, Y=6.00

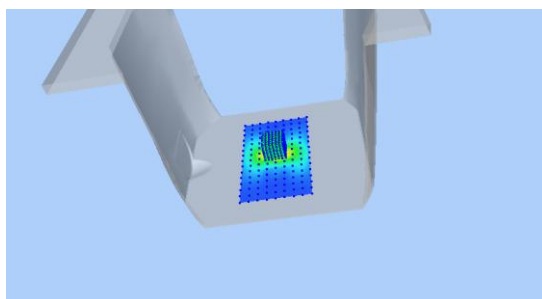
SAR Peak: 40.06 W/kg

SAR 10g (W/Kg)	5.781217
SAR 1g (W/Kg)	17.805024

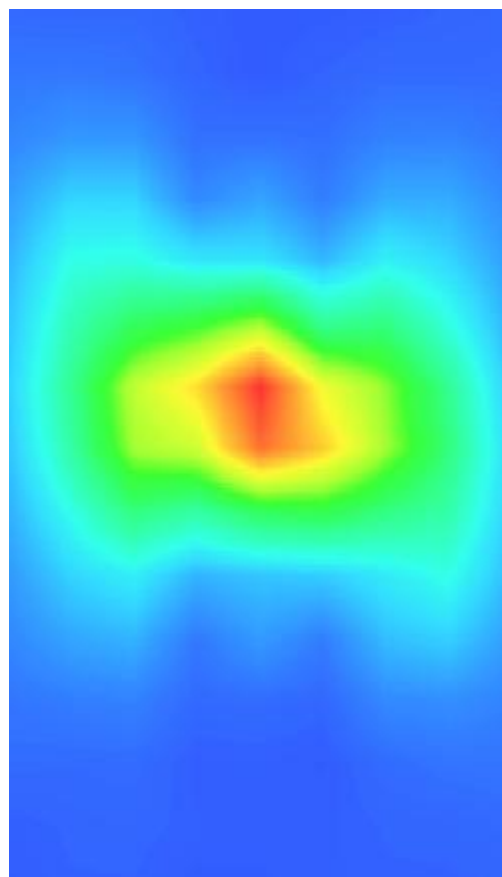
Z (m m)	0.00	2.00	4.00	6.00	8.00	10.0	12.0	14.0	16.0	18.0	20.0	22.0
SA R (W/ Kg)	37.8 23	22.3 59	11.3 97	5.66 31	2.82 50	1.40 23	0.71 98	0.36 20	0.18 37	0.10 96	0.05 42	0.03 27



3D screen shot



Hot spot position



MEASUREMENT 10

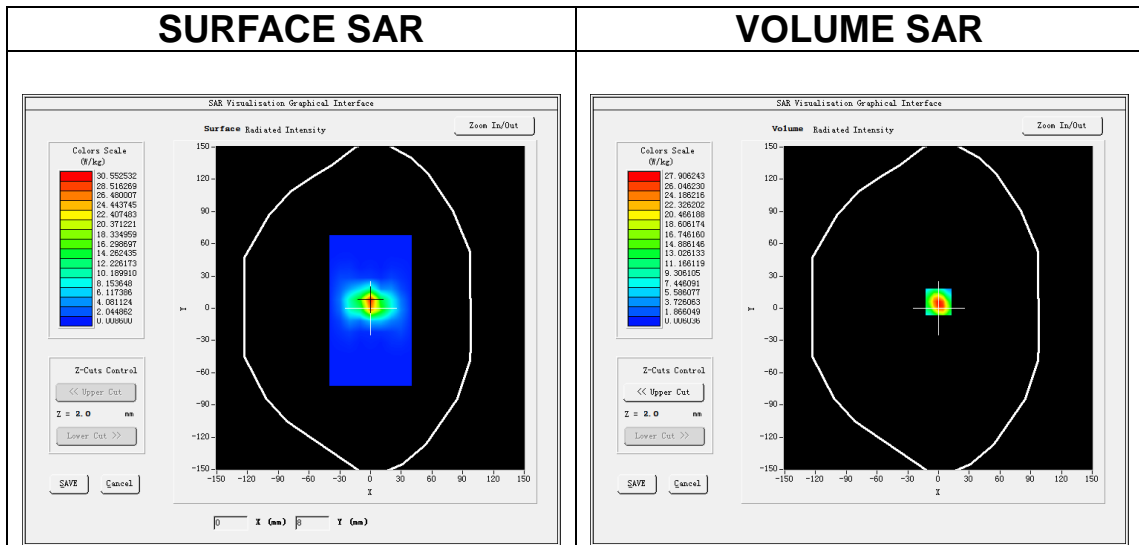
Date of measurement: 17/2/2022

A. Experimental conditions.

Area Scan	<u>dx=10mm dy=10mm, h= 2.00 mm</u>
ZoomScan	<u>7x7x12,dx=4mm dy=4mm dz=2mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Dipole</u>
Band	<u>CW5600</u>
Channels	<u>Middle</u>
Signal	<u>CW (Crest factor: 1.0)</u>

B. SAR Measurement Results

Frequency (MHz)	5600.000000
Relative permittivity (real part)	36.082672
Relative permittivity (imaginary part)	16.144519
Conductivity (S/m)	5.022739
Variation (%)	0.130000

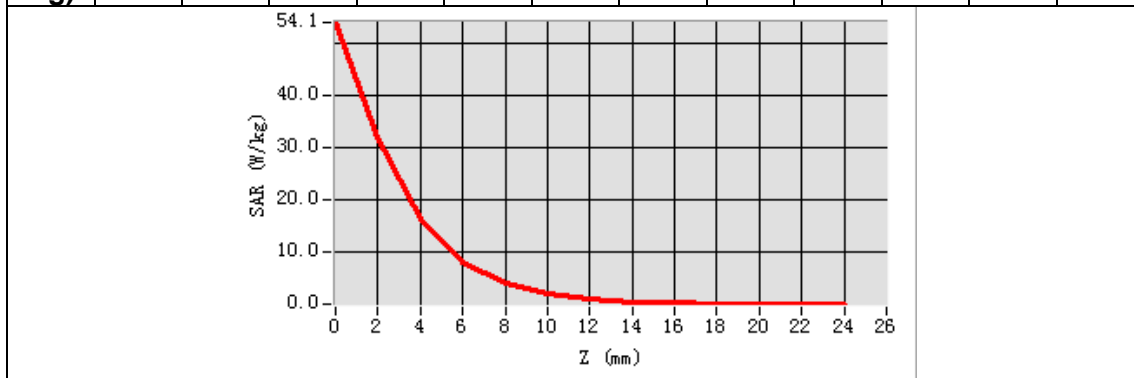


Maximum location: X=0.00, Y=6.00

SAR Peak: 51.23 W/kg

SAR 10g (W/Kg)	5.993051
SAR 1g (W/Kg)	17.869450

Z (m m)	0.00	2.00	4.00	6.00	8.00	10.0 0	12.0 0	14.0 0	16.0 0	18.0 0	20.0 0	22.0 0
SA R (W/ Kg)	54.1 388	31.9 062	16.3 510	8.17 83	4.08 24	3.81 66	1.03 45	0.46 87	0.27 29	0.13 26	0.07 55	0.05 02



3D screen shot	Hot spot position

MEASUREMENT 11

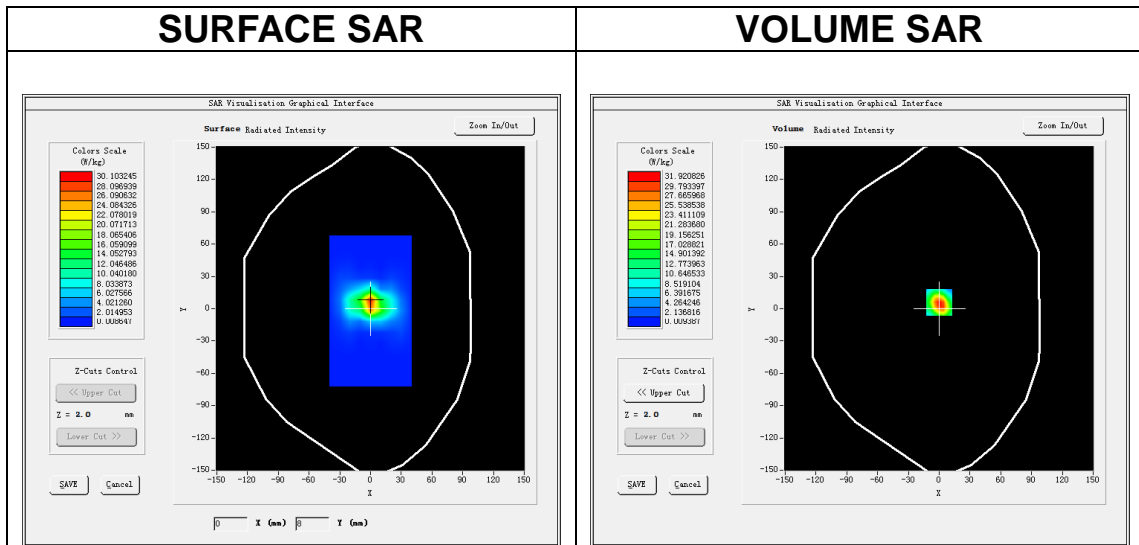
Date of measurement: 16/2/2022

A. Experimental conditions.

Area Scan	<u>dx=10mm dy=10mm, h= 2.00 mm</u>
ZoomScan	<u>7x7x12,dx=4mm dy=4mm dz=2mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Dipole</u>
Band	<u>CW5800</u>
Channels	<u>Middle</u>
Signal	<u>CW (Crest factor: 1.0)</u>

B. SAR Measurement Results

Frequency (MHz)	5800.000000
Relative permittivity (real part)	35.853698
Relative permittivity (imaginary part)	16.718866
Conductivity (S/m)	5.387190
Variation (%)	-1.540000

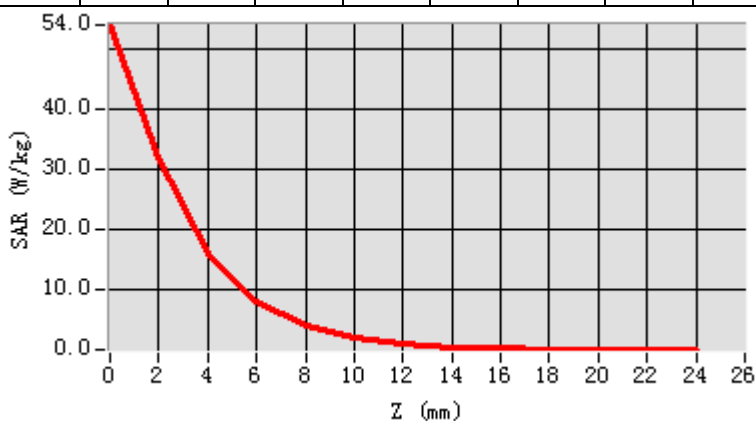


Maximum location: X=0.00, Y=6.00

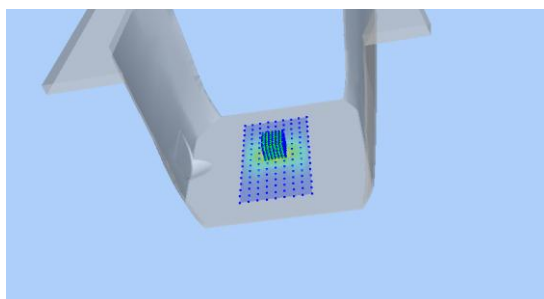
SAR Peak: 57.37 W/kg

SAR 10g (W/Kg)	5.666177
SAR 1g (W/Kg)	17.511230

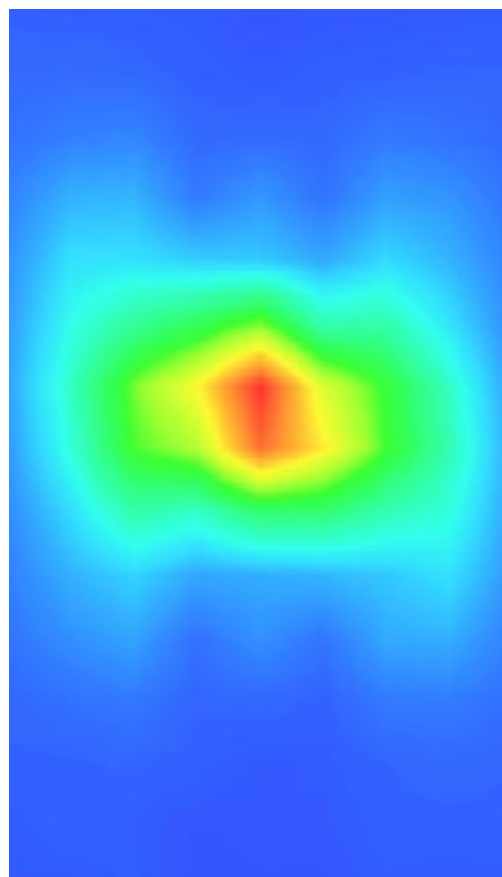
Z (m)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	54.086	31.968	16.133	8.1788	4.0888	2.0575	1.0336	0.5112	0.2770	0.1530	0.0774	0.0474



3D screen shot



Hot spot position



13. Appendix C. Plots of High SAR Measurement

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MEASUREMENT 25 NR SA N77 Body
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MEASUREMENT 1

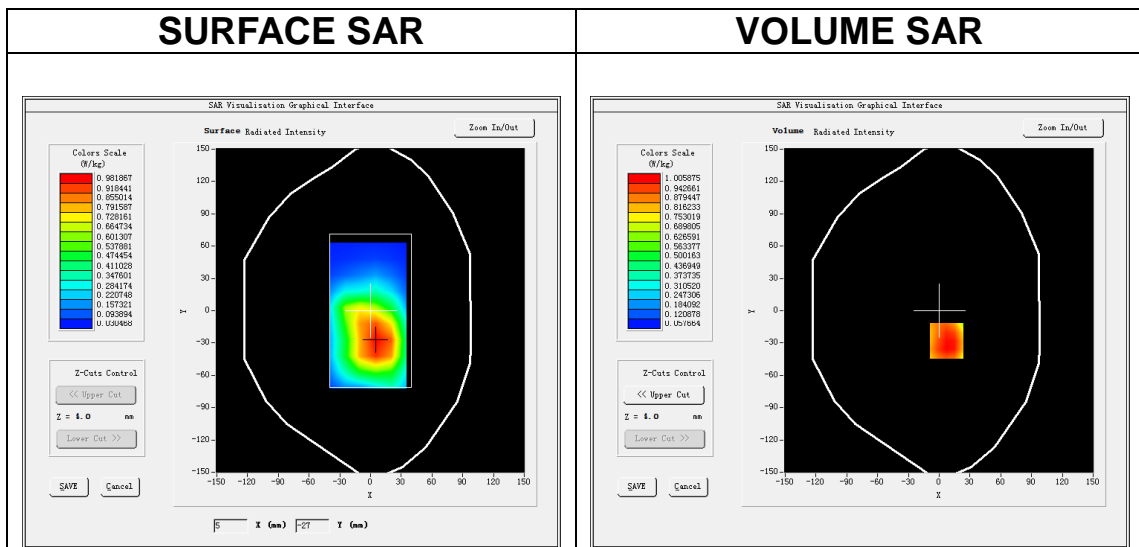
Date of measurement: 25/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>Band2 WCDMA1900</u>
Channels	<u>Middle</u>
Signal	<u>WCDMA (Crest factor: 1.0)</u>

B. SAR Measurement Results

Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.927872
Relative permittivity (imaginary part)	13.868348
Conductivity (S/m)	1.448472
Variation (%)	0.270000

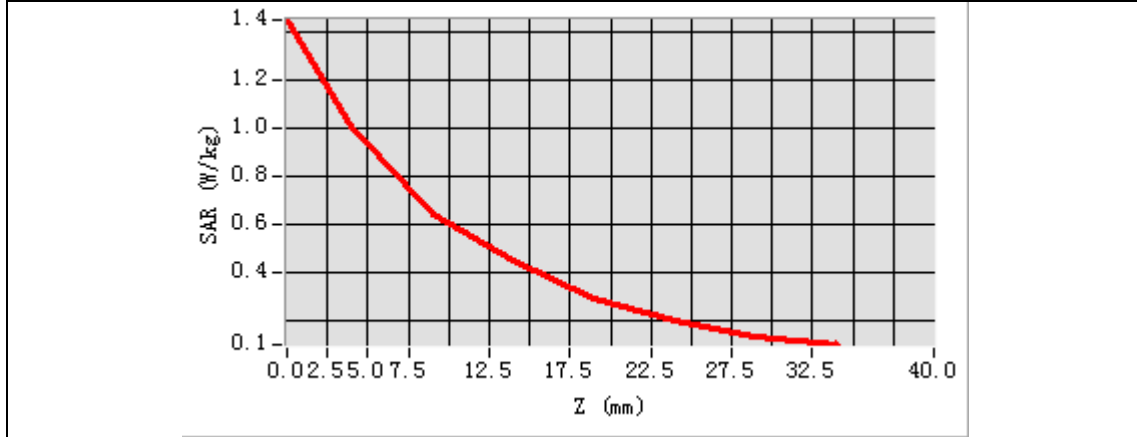


Maximum location: X=7.00, Y=-28.00

SAR Peak: 1.41 W/kg

SAR 10g (W/Kg)	0.635677
SAR 1g (W/Kg)	1.001041

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.4467	1.0059	0.6417	0.4463	0.2892	0.1981	0.1318



3D screen shot	Hot spot position
<p>A 3D perspective view of a grey handheld device. A small rectangular area on the front face is highlighted with a color-coded heatmap, showing a concentration of high SAR values (red and yellow) in the center, transitioning to lower values (green and blue) towards the edges.</p>	<p>A 2D top-down view of the device's front face. The entire surface is covered with a color gradient representing SAR distribution. The highest SAR values are concentrated in a central rectangular region, shown in red and orange, with values decreasing outwards through yellow, green, and cyan to blue at the very edges.</p>

MEASUREMENT 2

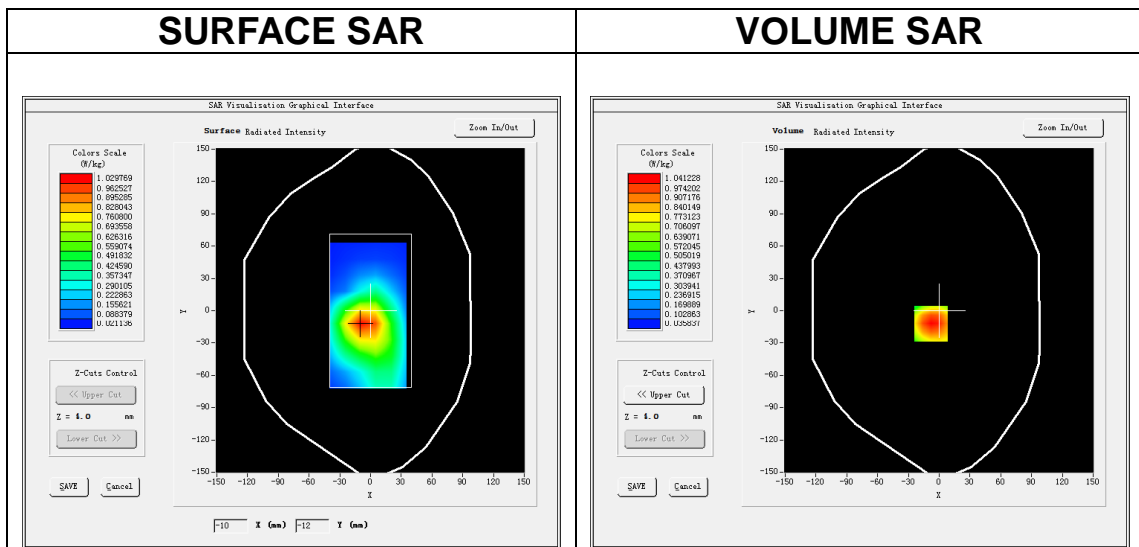
Date of measurement: 14/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>Band4 WCDMA1700</u>
Channels	<u>Middle</u>
Signal	<u>WCDMA (Crest factor: 1.0)</u>

B. SAR Measurement Results

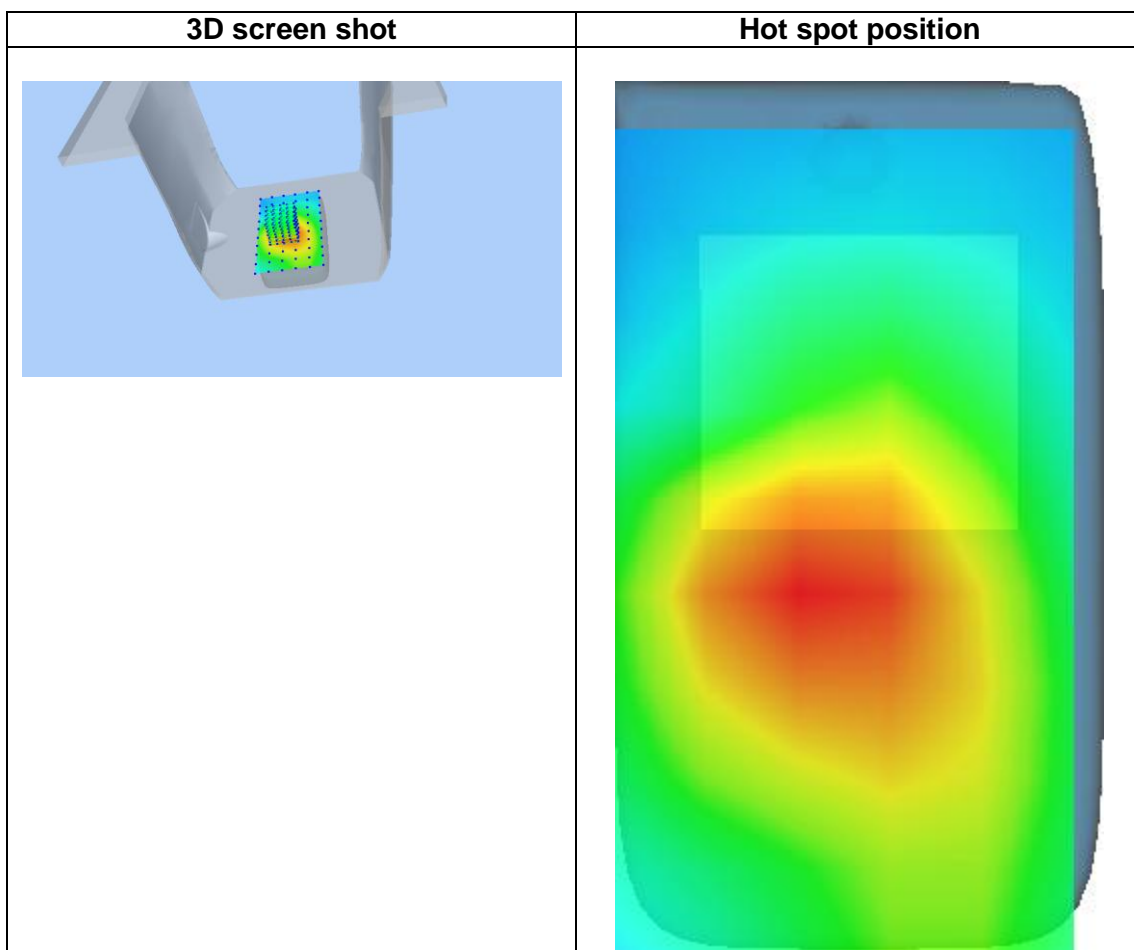
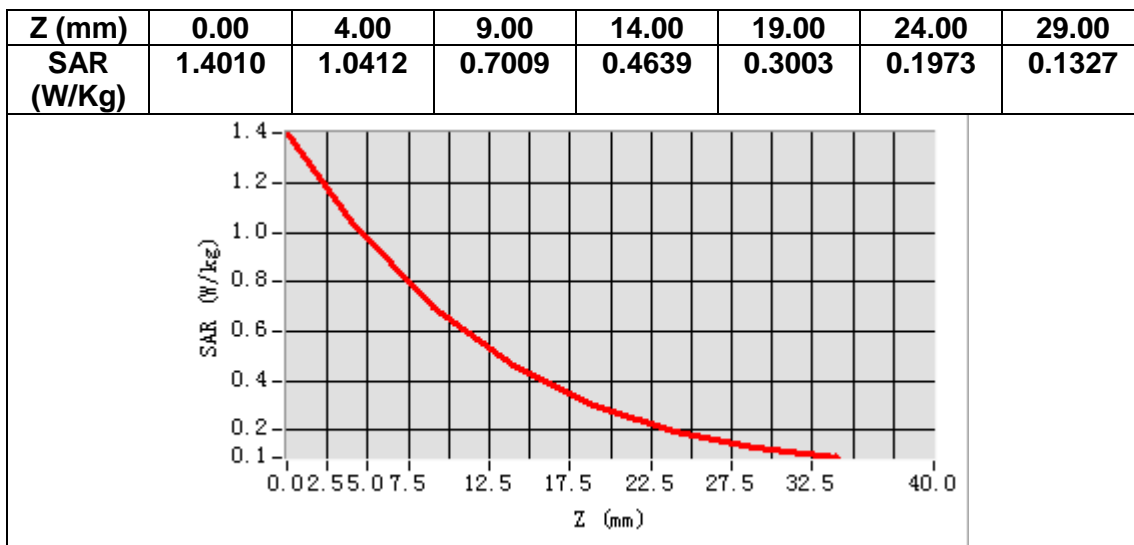
Frequency (MHz)	1732.600000
Relative permittivity (real part)	39.824947
Relative permittivity (imaginary part)	13.911578
Conductivity (S/m)	1.338603
Variation (%)	-0.350000



Maximum location: X=-8.00, Y=-12.00

SAR Peak: 1.44 W/kg

SAR 10g (W/Kg)	0.636892
SAR 1g (W/Kg)	0.996230



MEASUREMENT 3

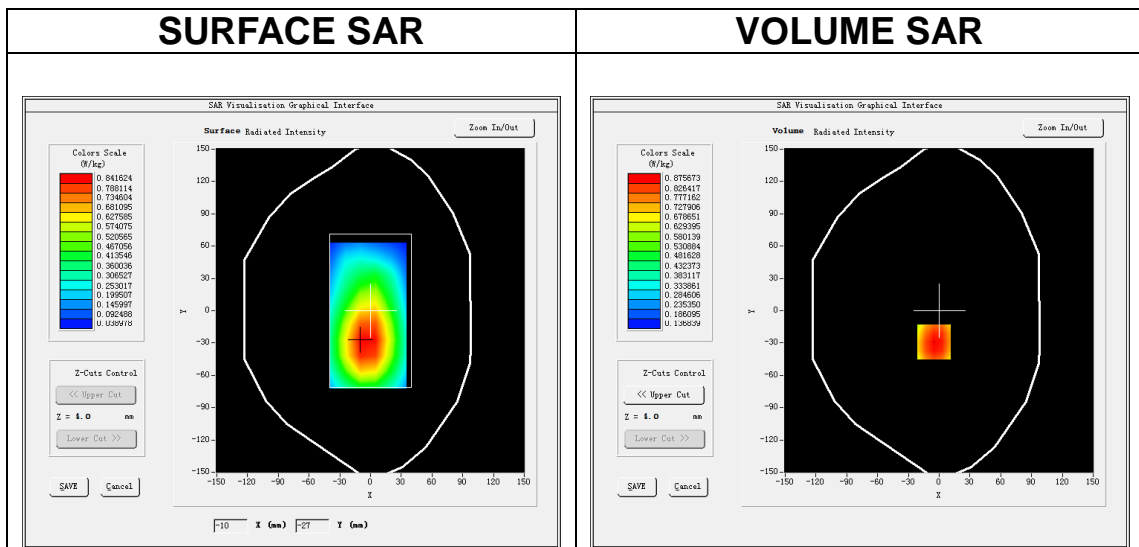
Date of measurement: 13/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>Band5 WCDMA850</u>
Channels	<u>Middle</u>
Signal	<u>WCDMA (Crest factor: 1.0)</u>

B. SAR Measurement Results

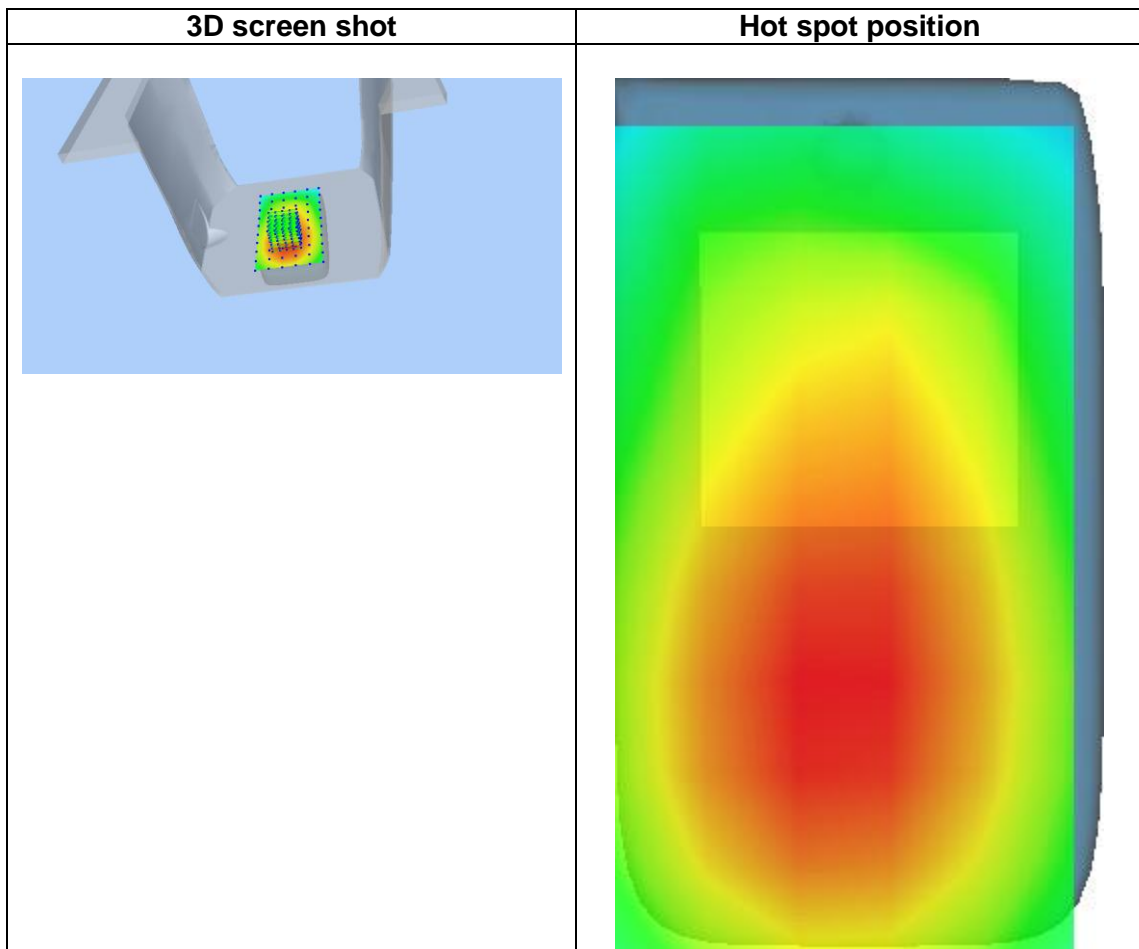
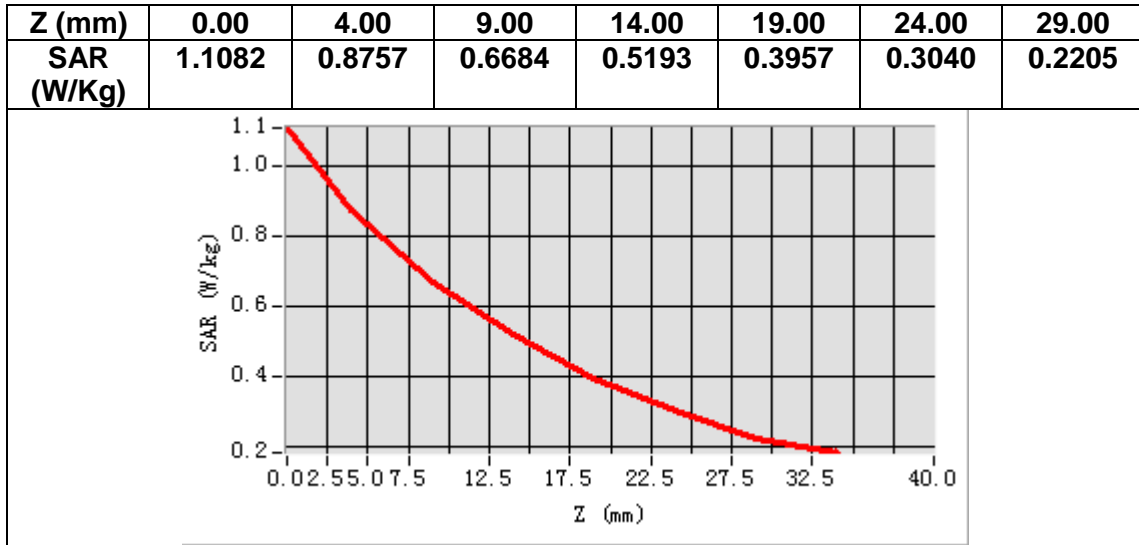
Frequency (MHz)	836.600000
Relative permittivity (real part)	42.694134
Relative permittivity (imaginary part)	19.952444
Conductivity (S/m)	0.927124
Variation (%)	0.110000



Maximum location: X=-5.00, Y=-29.00

SAR Peak: 1.10 W/kg

SAR 10g (W/Kg)	0.630427
SAR 1g (W/Kg)	0.868699



MEASUREMENT 4

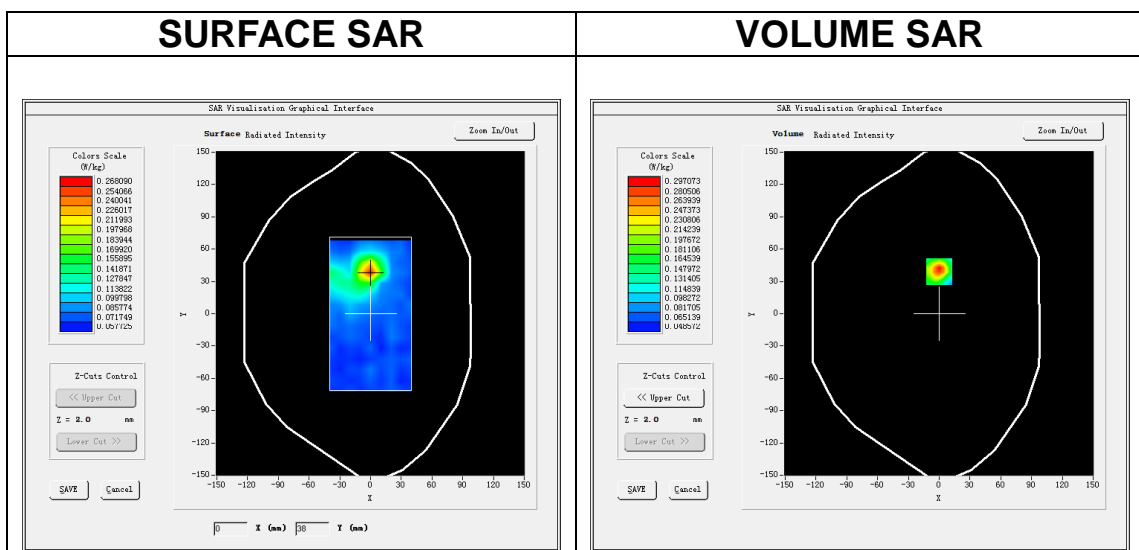
Date of measurement: 15/2/2022

A. Experimental conditions.

Area Scan	<u>dx=10mm dy=10mm, h= 2.00 mm</u>
ZoomScan	<u>7x7x12,dx=4mm dy=4mm dz=2mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>IEEE 802.11n U-NII</u>
Channels	<u>Middle</u>
Signal	<u>IEEE802.11n (Crest factor: 1.0)</u>

B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative permittivity (real part)	36.862278
Relative permittivity (imaginary part)	16.364639
Conductivity (S/m)	4.727562
Variation (%)	-0.410000

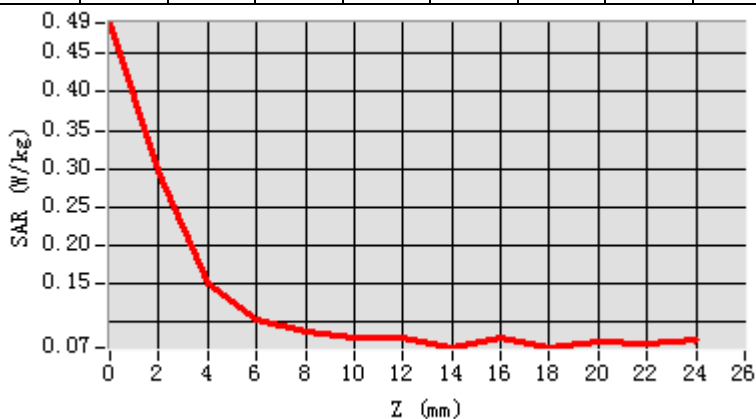


Maximum location: X=0.00, Y=39.00

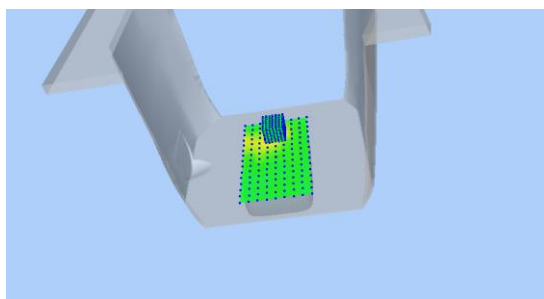
SAR Peak: 0.51 W/kg

SAR 10g (W/Kg)	0.109095
SAR 1g (W/Kg)	0.187719

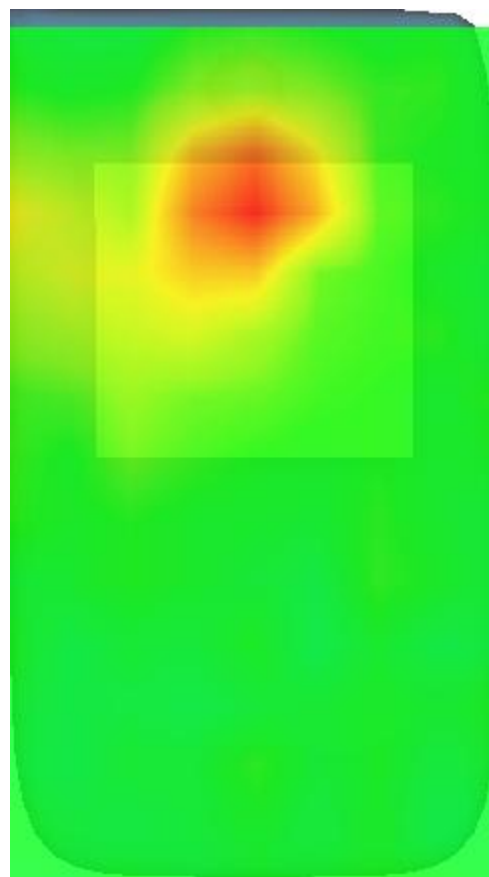
Z (m)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	0.4900	0.2971	0.1501	0.1047	0.0885	0.0808	0.0809	0.0671	0.0788	0.0678	0.0743	0.0710



3D screen shot



Hot spot position



MEASUREMENT 5

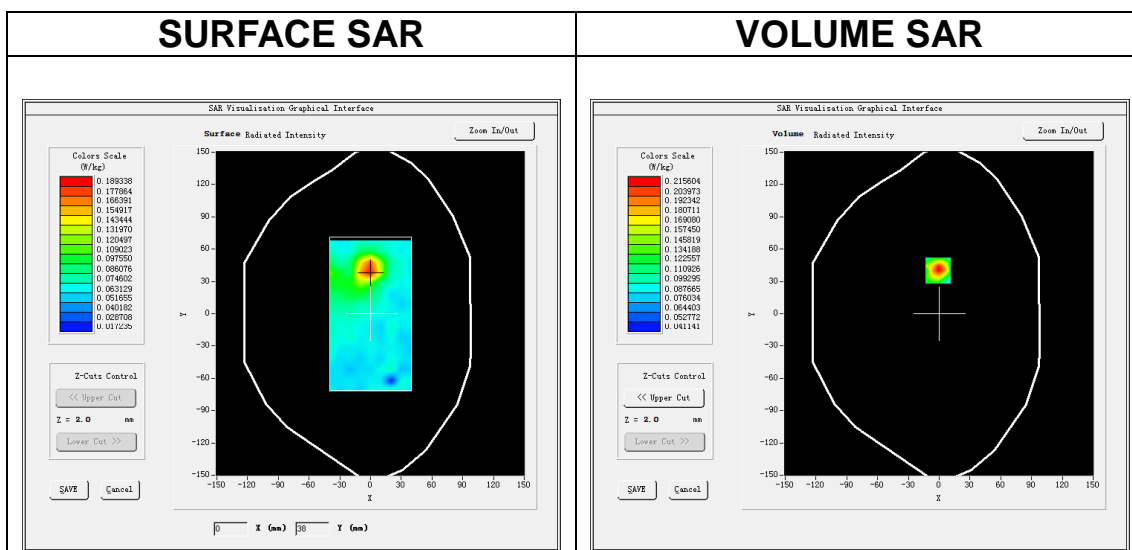
Date of measurement: 16/2/2022

A. Experimental conditions.

Area Scan	<u>dx=10mm dy=10mm, h= 2.00 mm</u>
ZoomScan	<u>7x7x12,dx=4mm dy=4mm dz=2mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>IEEE 802.11n U-NII</u>
Channels	<u>Middle</u>
Signal	<u>IEEE802.11n (Crest factor: 1.0)</u>

B. SAR Measurement Results

Frequency (MHz)	5785.000000
Relative permittivity (real part)	35.929649
Relative permittivity (imaginary part)	16.594423
Conductivity (S/m)	5.333263
Variation (%)	-1.320000

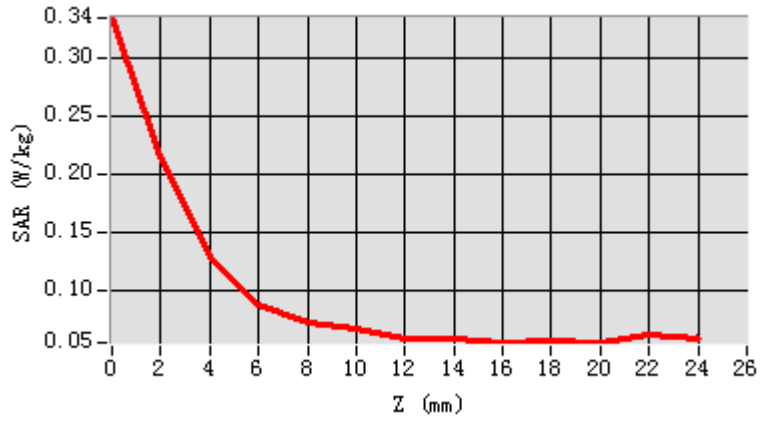


Maximum location: X=-1.00, Y=40.00

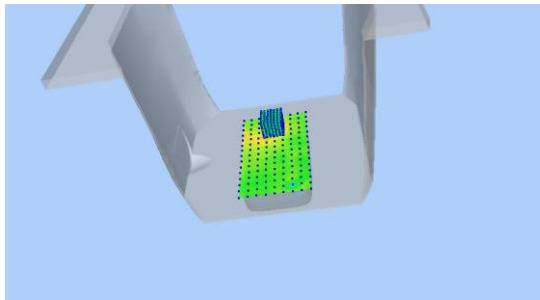
SAR Peak: 0.36 W/kg

SAR 10g (W/Kg)	0.086491
SAR 1g (W/Kg)	0.143712

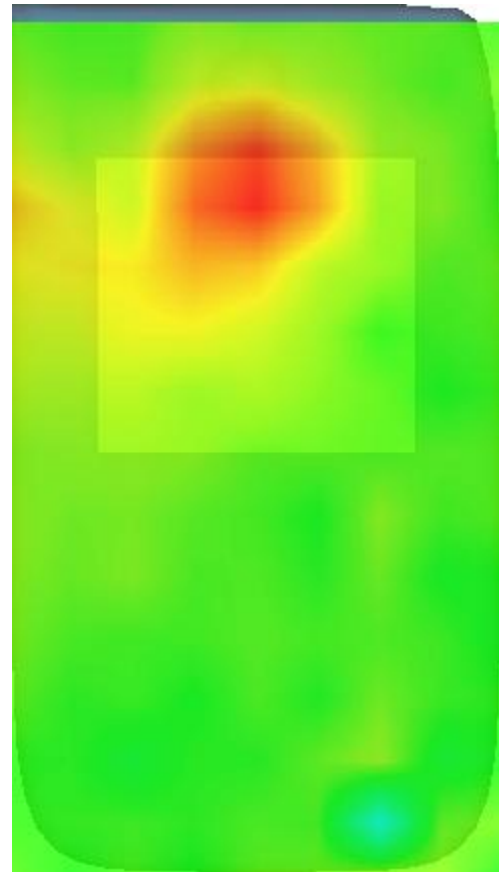
Z (m)	0.00	2.00	4.00	6.00	8.00	10.0	12.0	14.0	16.0	18.0	20.0	22.0
SAR (W/Kg)	0.3352	0.2156	0.1289	0.0874	0.0712	0.0674	0.0583	0.0572	0.0549	0.0563	0.0545	0.0621



3D screen shot



Hot spot position



MEASUREMENT 6

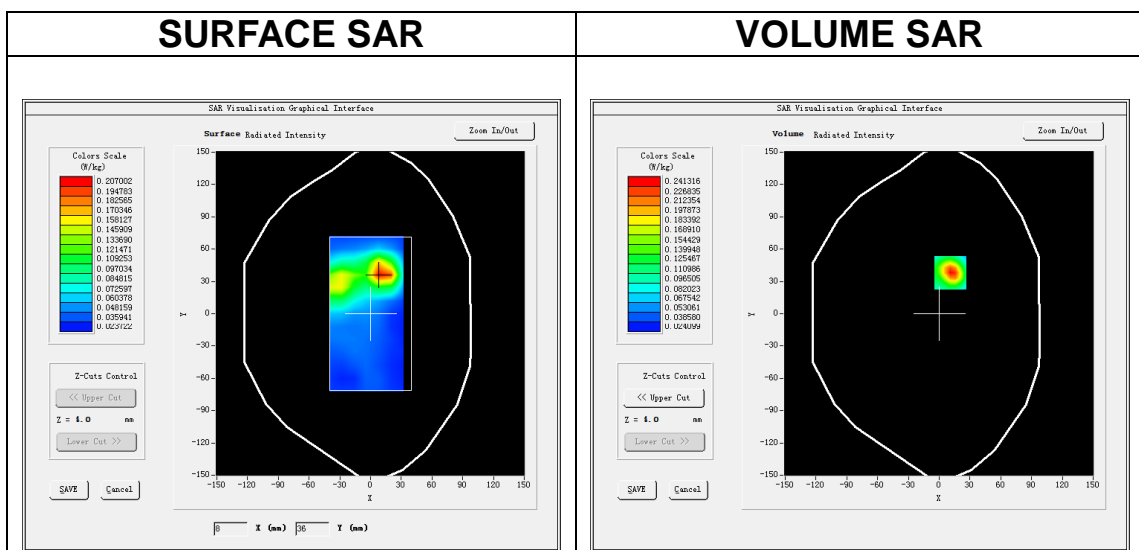
Date of measurement: 11/2/2022

A. Experimental conditions.

Area Scan	<u>dx=12mm dy=12mm, h= 5.00 mm</u>
ZoomScan	<u>7x7x7, dx=5mm dy=5mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>IEEE 802.11n ISM</u>
Channels	<u>Middle</u>
Signal	<u>IEEE802.11n (Crest factor: 1.0)</u>

B. SAR Measurement Results

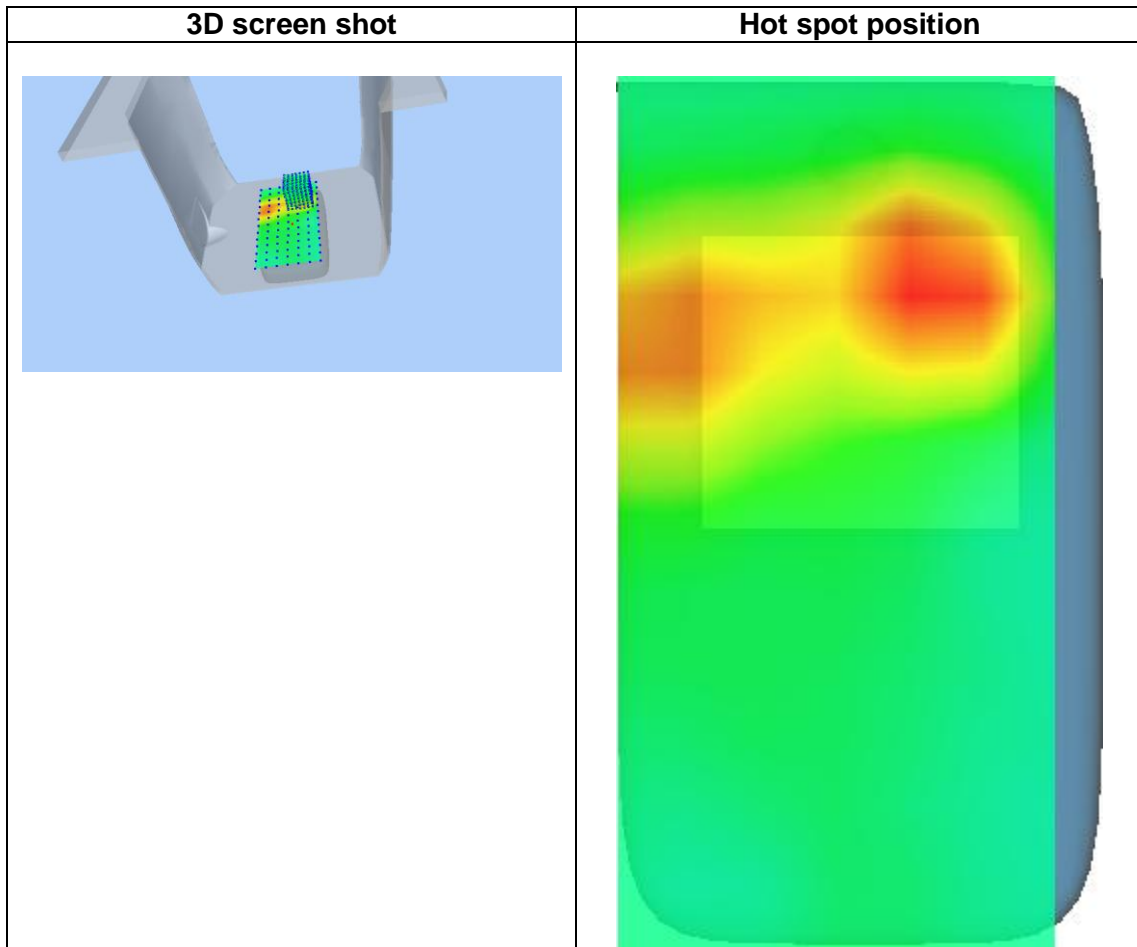
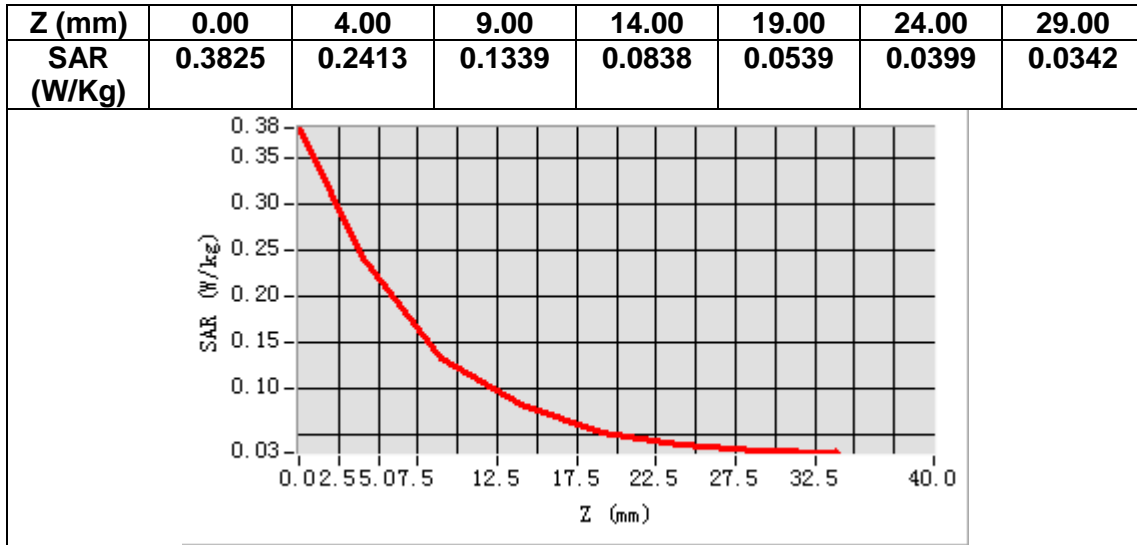
Frequency (MHz)	2437.000000
Relative permittivity (real part)	39.126862
Relative permittivity (imaginary part)	13.346903
Conductivity (S/m)	1.807022
Variation (%)	-3.590000



Maximum location: X=11.00, Y=38.00

SAR Peak: 0.38 W/kg

SAR 10g (W/Kg)	0.117715
SAR 1g (W/Kg)	0.223704



MEASUREMENT 7

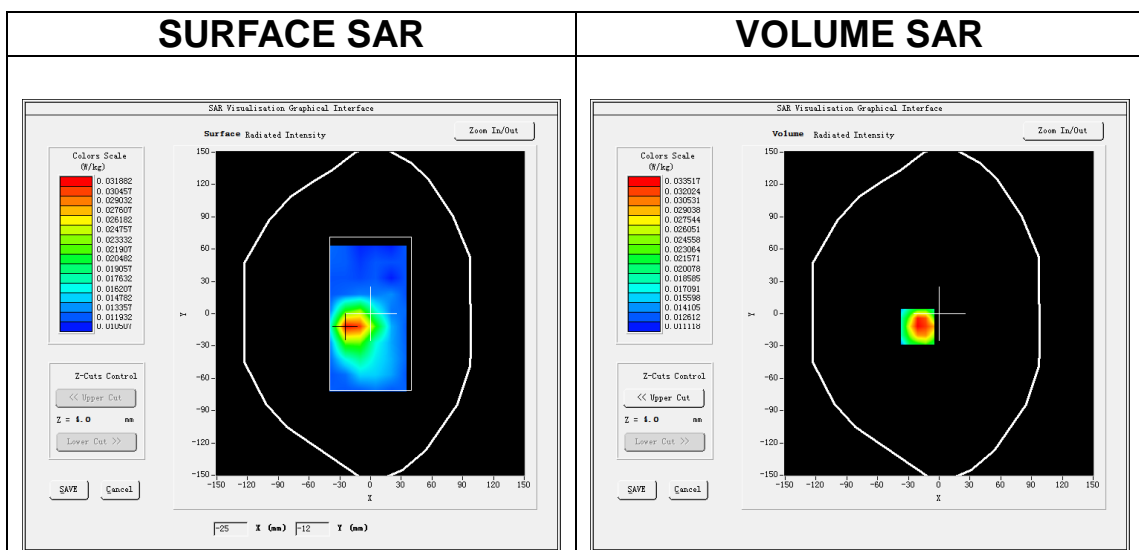
Date of measurement: 25/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>LTE band 2</u>
Channels	<u>Middle</u>
Signal	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

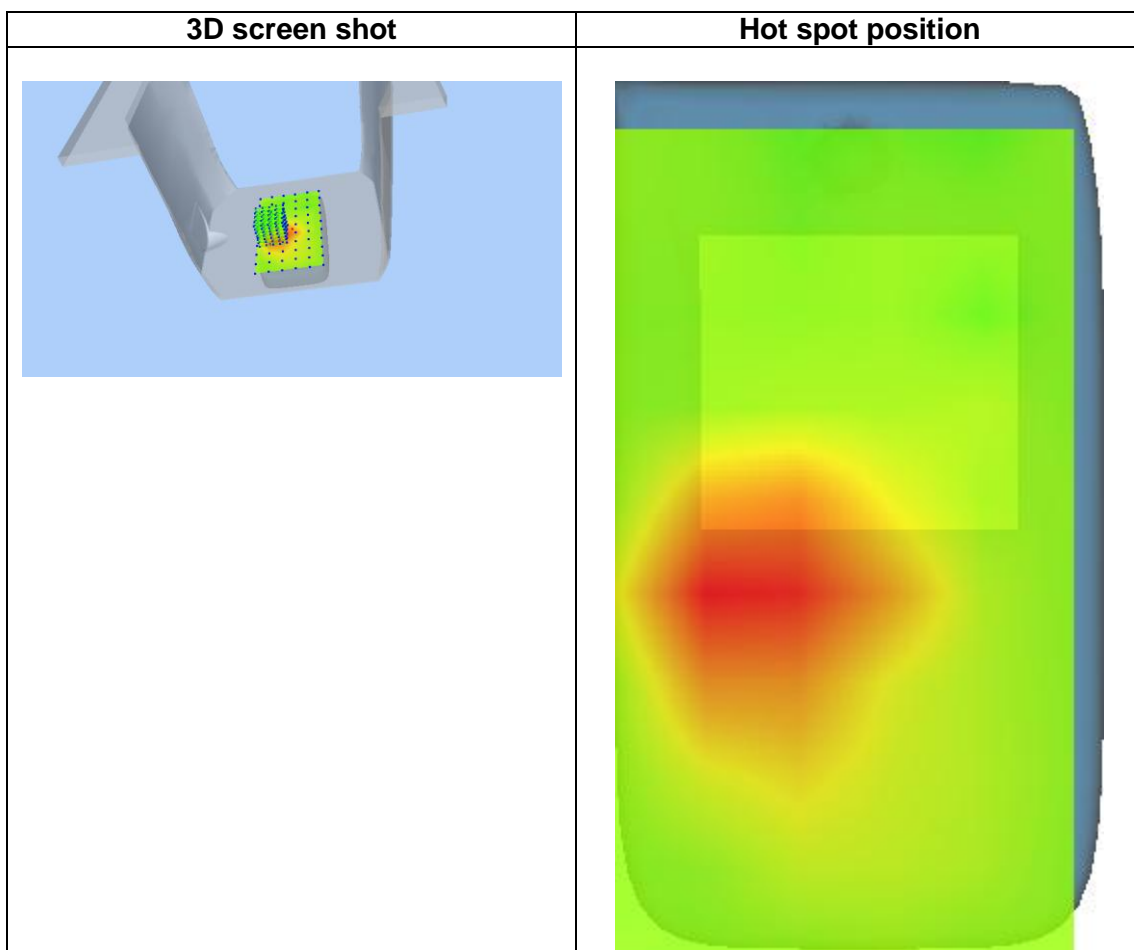
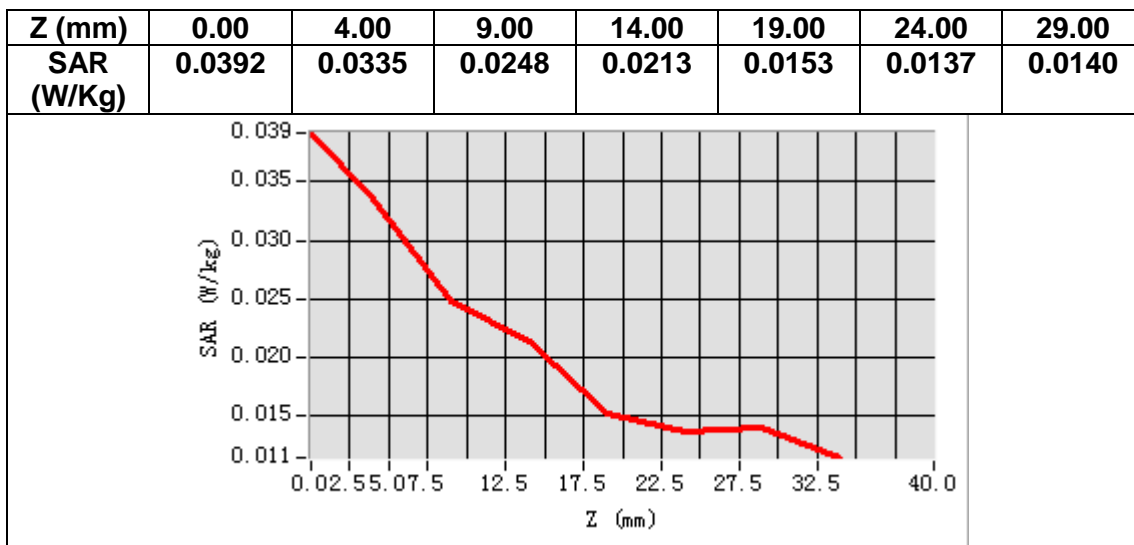
Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.927872
Relative permittivity (imaginary part)	13.868348
Conductivity (S/m)	1.448472
Variation (%)	0.490000



Maximum location: X=-21.00, Y=-12.00

SAR Peak: 0.05 W/kg

SAR 10g (W/Kg)	0.023312
SAR 1g (W/Kg)	0.033389



MEASUREMENT 8

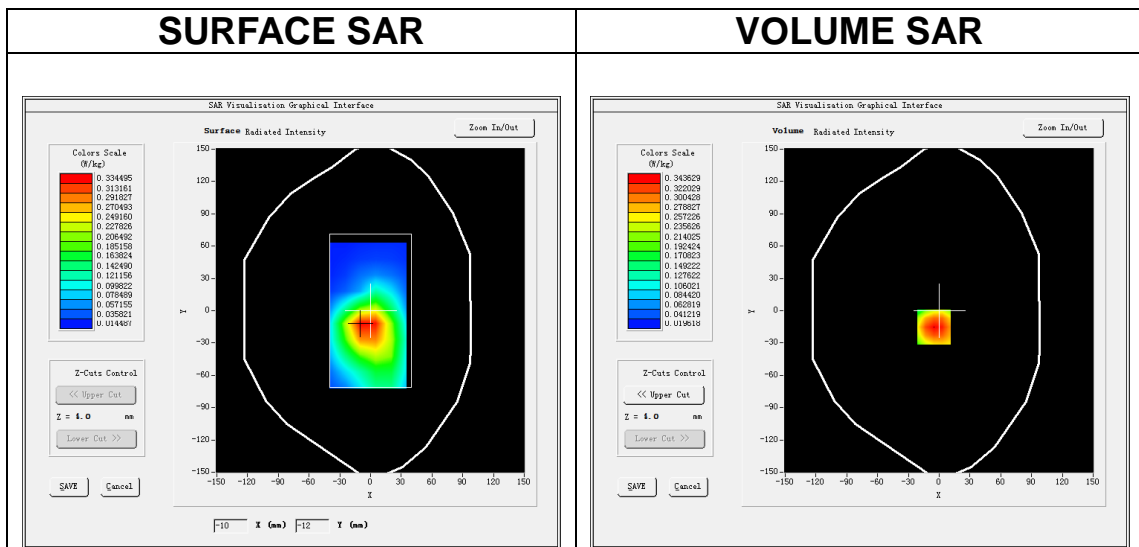
Date of measurement: 14/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>LTE band 4</u>
Channels	<u>Middle</u>
Signal	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

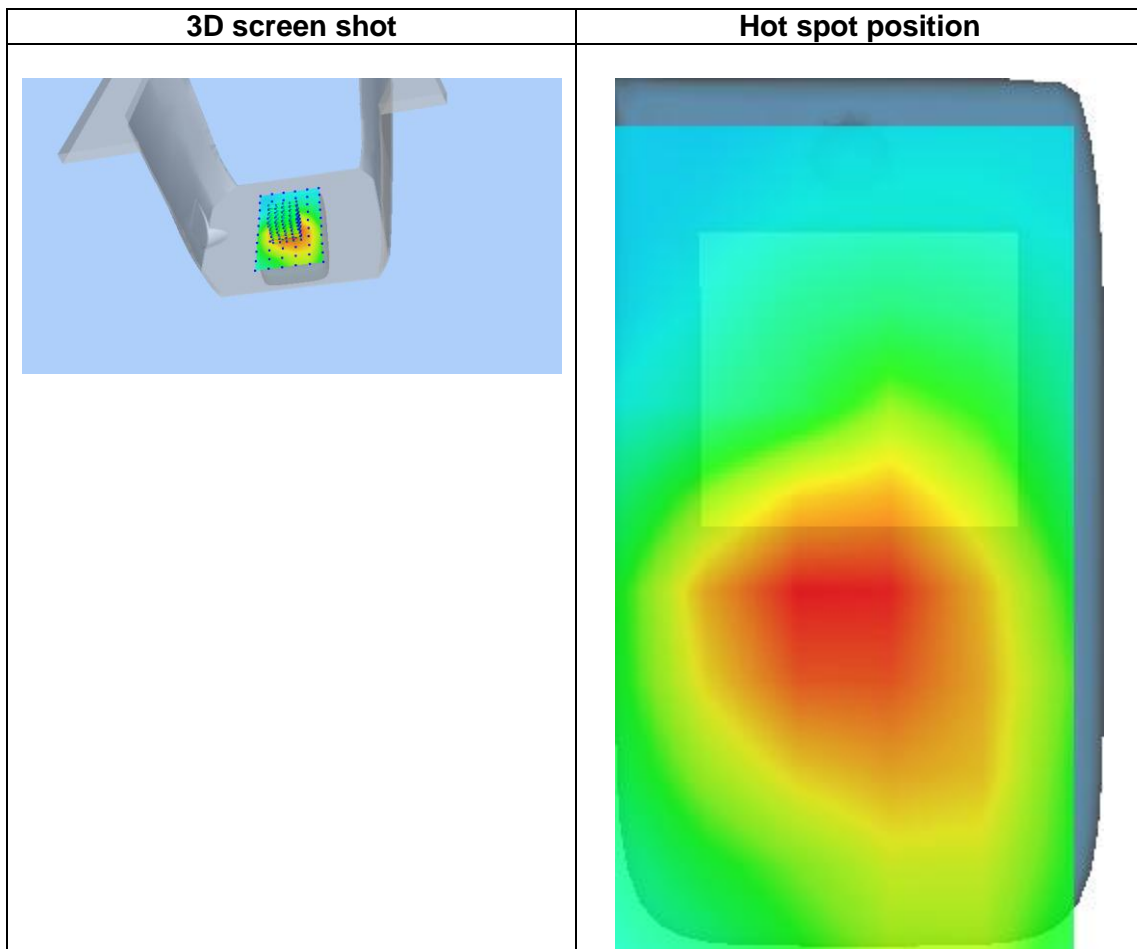
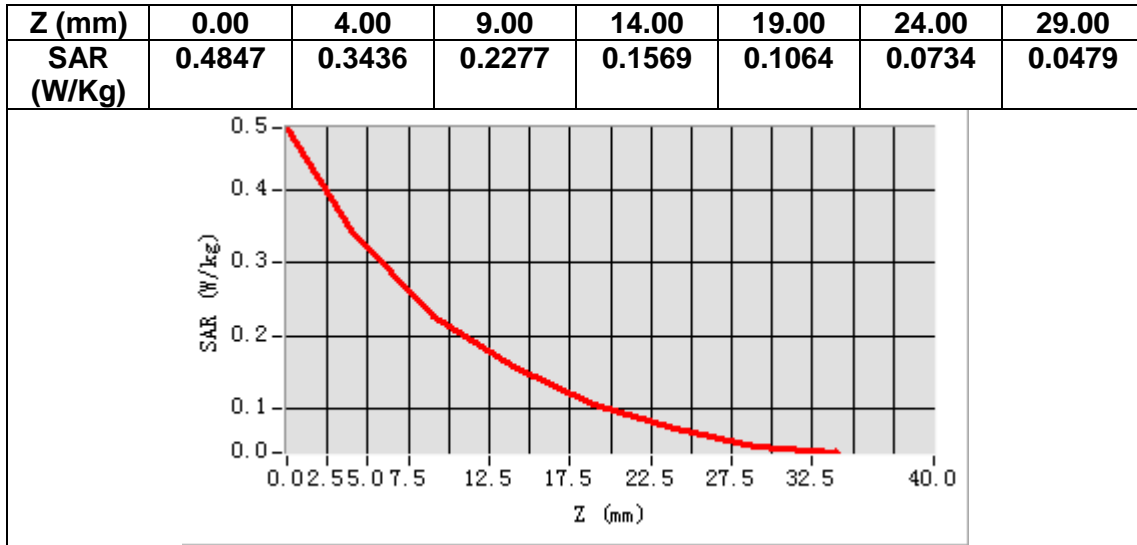
Frequency (MHz)	1732.500000
Relative permittivity (real part)	39.832848
Relative permittivity (imaginary part)	13.896428
Conductivity (S/m)	1.337531
Variation (%)	-0.380000



Maximum location: X=-5.00, Y=-15.00

SAR Peak: 0.48 W/kg

SAR 10g (W/Kg)	0.216097
SAR 1g (W/Kg)	0.333248



MEASUREMENT 9

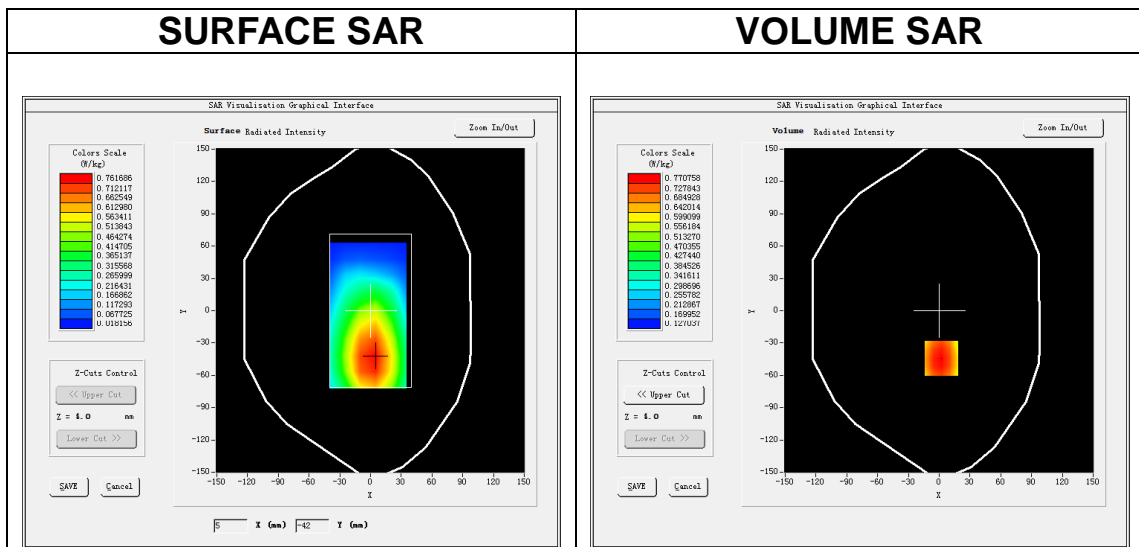
Date of measurement: 13/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>LTE band 5</u>
Channels	<u>Middle</u>
Signal	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

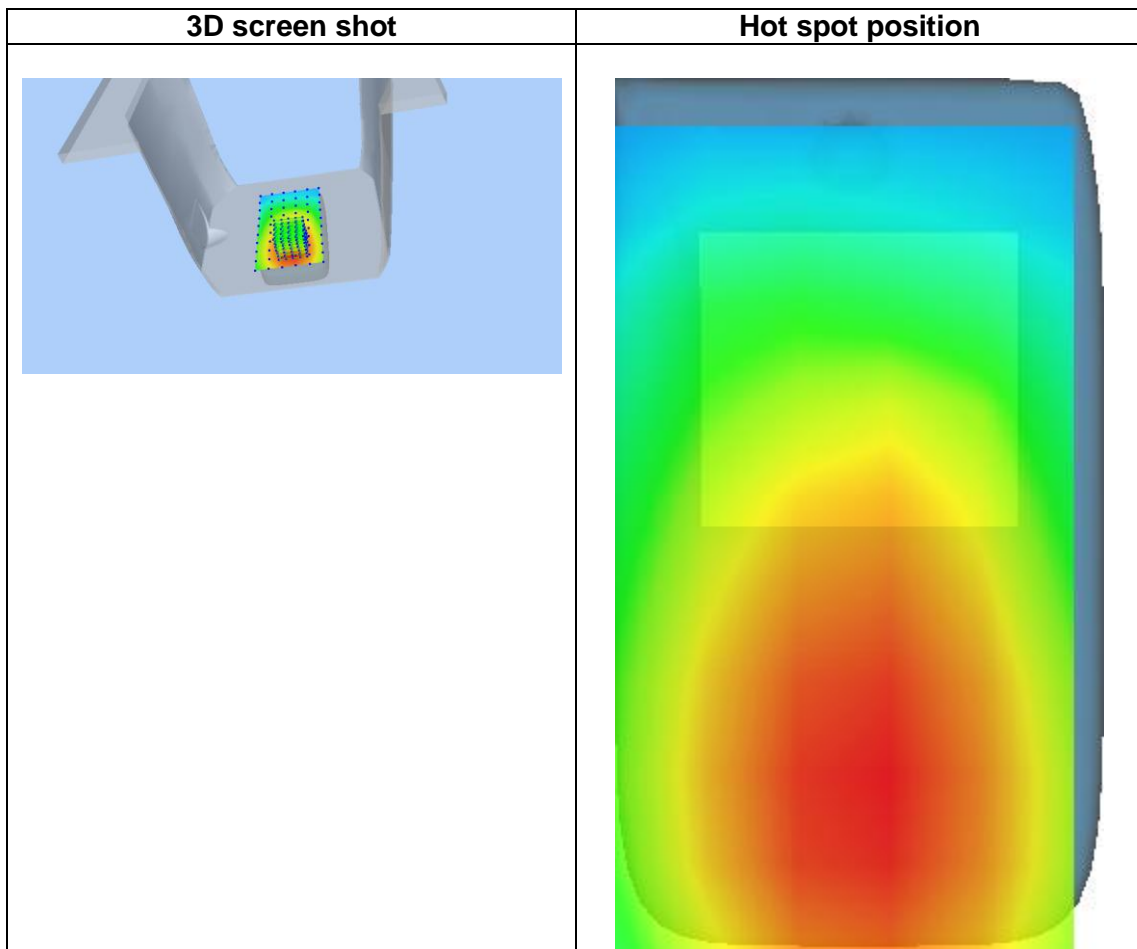
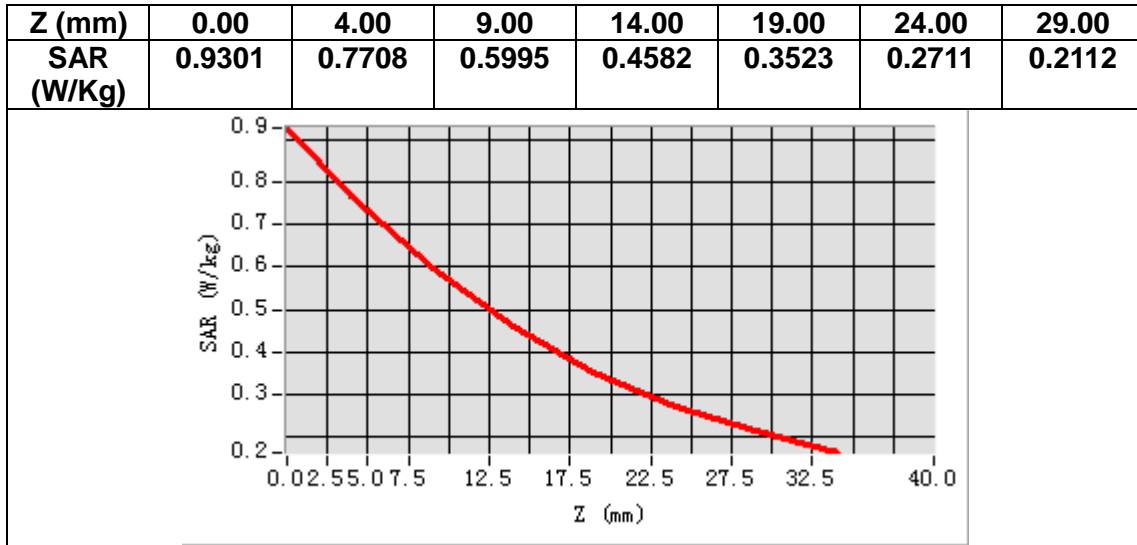
Frequency (MHz)	836.500000
Relative permittivity (real part)	42.696724
Relative permittivity (imaginary part)	19.951105
Conductivity (S/m)	0.927172
Variation (%)	0.420000



Maximum location: X=2.00, Y=-44.00

SAR Peak: 0.93 W/kg

SAR 10g (W/Kg)	0.558237
SAR 1g (W/Kg)	0.755045



MEASUREMENT 10

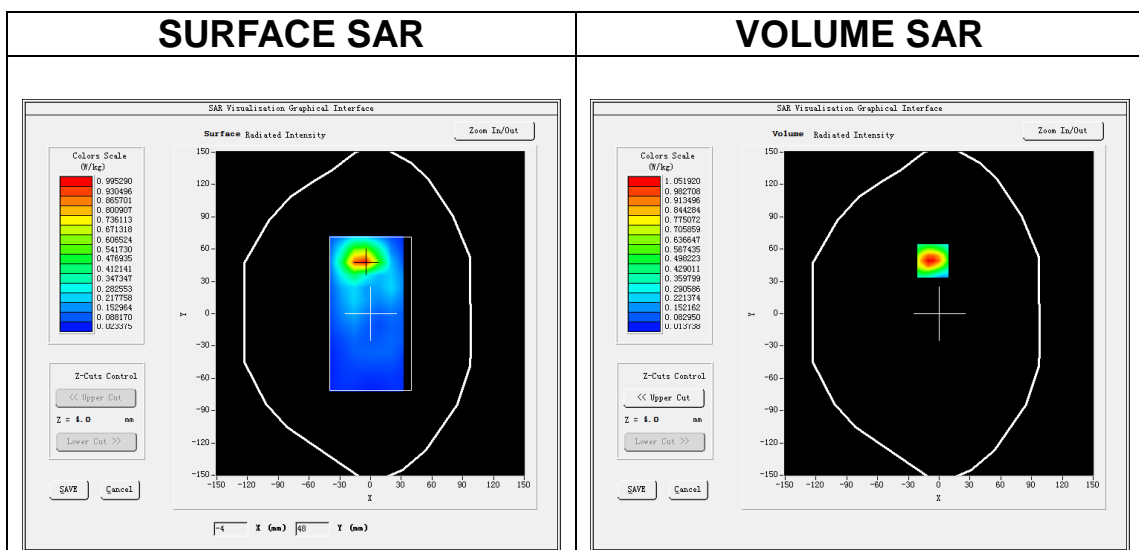
Date of measurement: 20/1/2022

A. Experimental conditions.

Area Scan	<u>dx=12mm dy=12mm, h= 5.00 mm</u>
ZoomScan	<u>7x7x7, dx=5mm dy=5mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>LTE band 7</u>
Channels	<u>High</u>
Signal	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

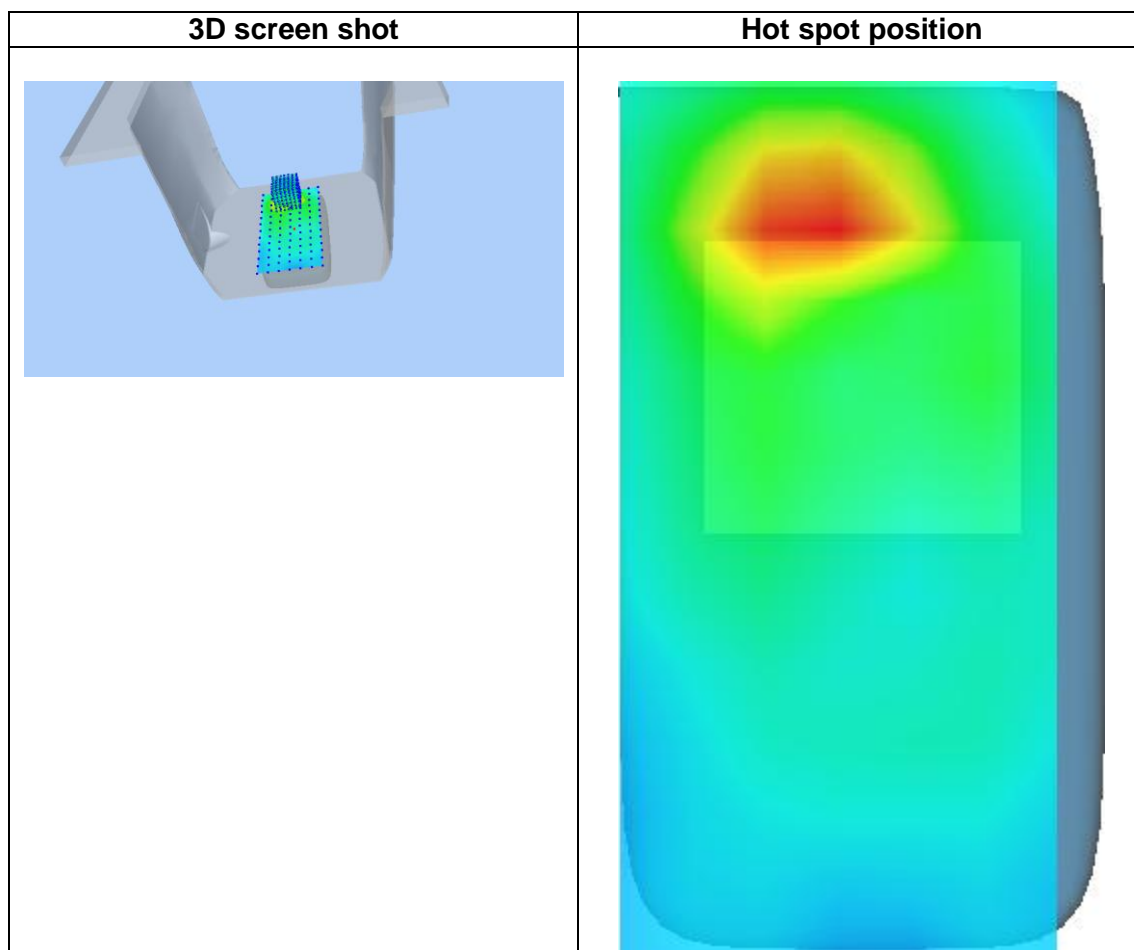
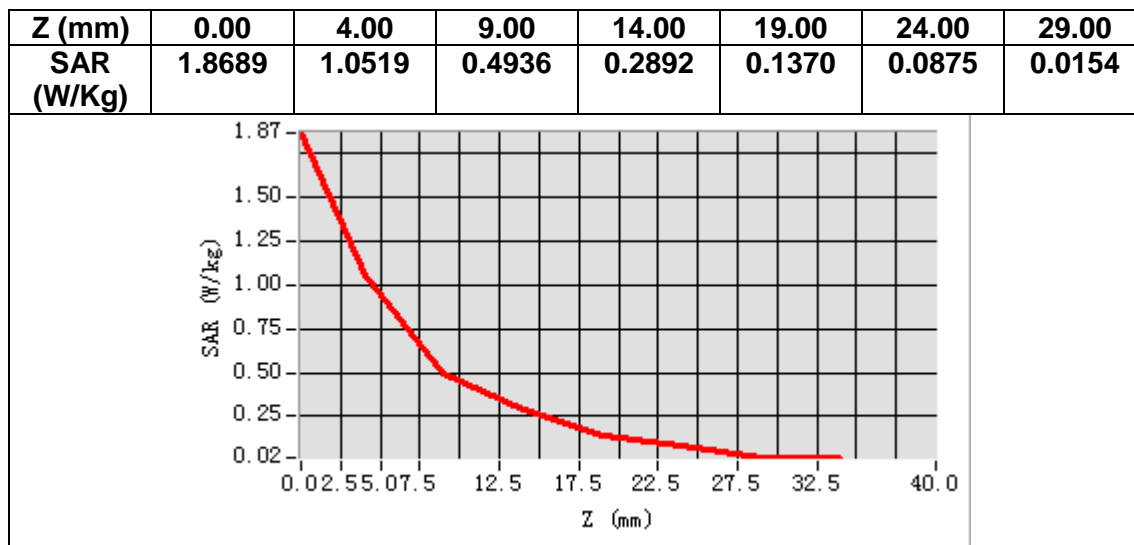
Frequency (MHz)	2560.000000
Relative permittivity (real part)	39.249088
Relative permittivity (imaginary part)	13.918215
Conductivity (S/m)	1.979479
Variation (%)	-3.710000



Maximum location: X=-6.00, Y=49.00

SAR Peak: 1.73 W/kg

SAR 10g (W/Kg)	0.471617
SAR 1g (W/Kg)	0.988643



MEASUREMENT 11

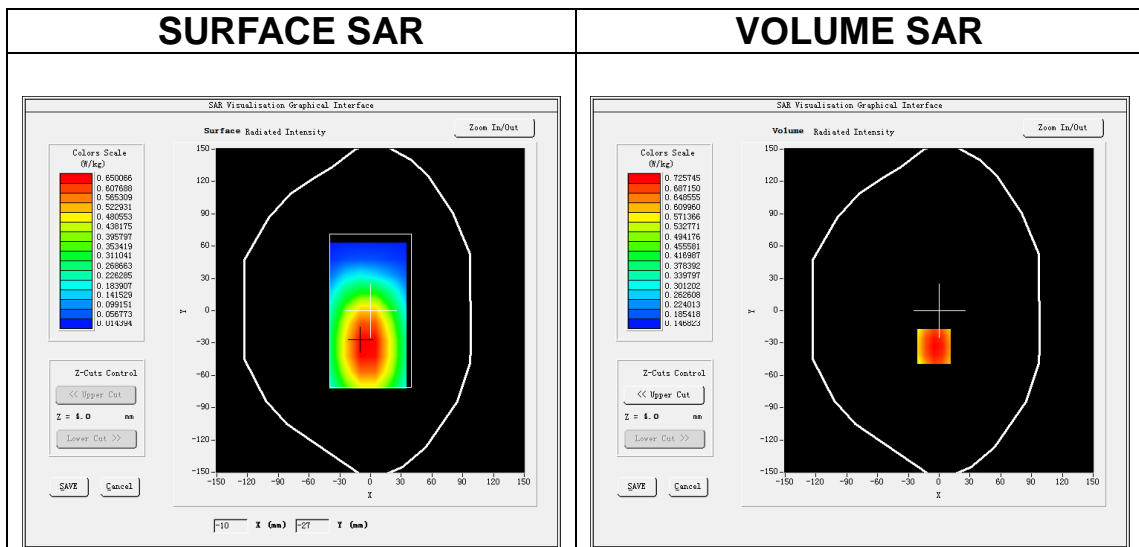
Date of measurement: 18/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>LTE band 12</u>
Channels	<u>Middle</u>
Signal	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

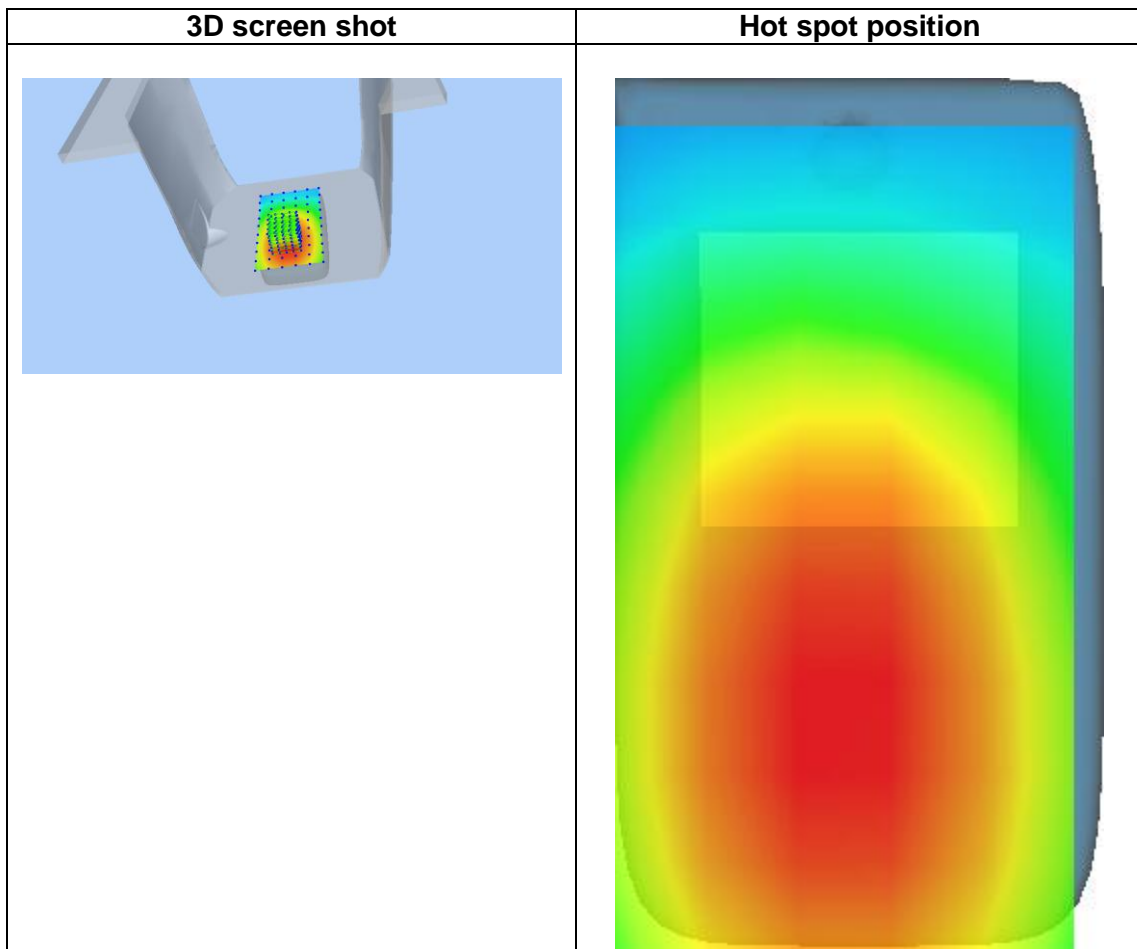
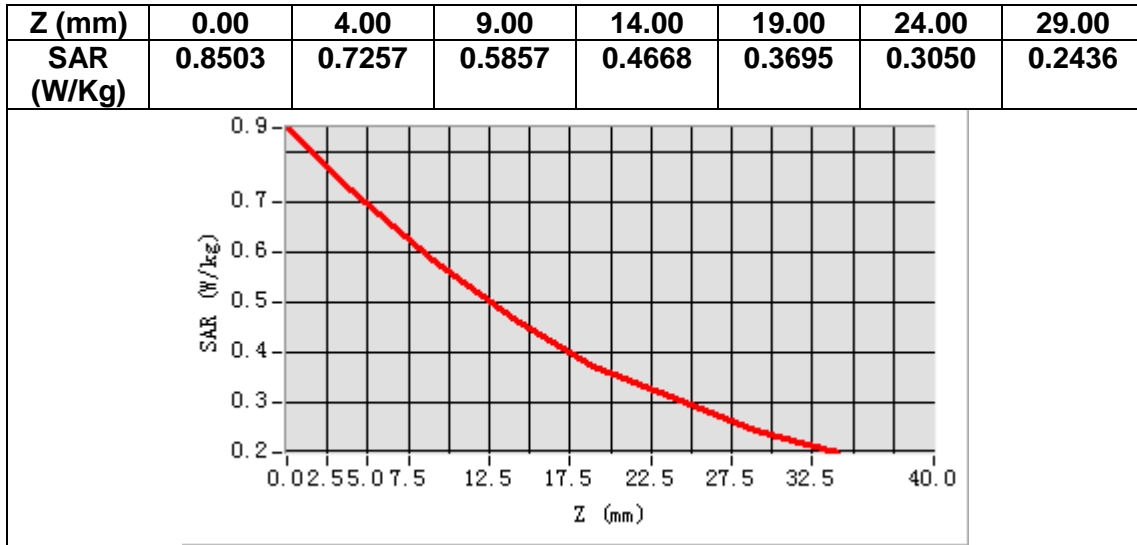
Frequency (MHz)	707.500000
Relative permittivity (real part)	42.110218
Relative permittivity (imaginary part)	21.865681
Conductivity (S/m)	0.859443
Variation (%)	2.870000



Maximum location: X=-5.00, Y=-33.00

SAR Peak: 0.86 W/kg

SAR 10g (W/Kg)	0.541231
SAR 1g (W/Kg)	0.702153



MEASUREMENT 12

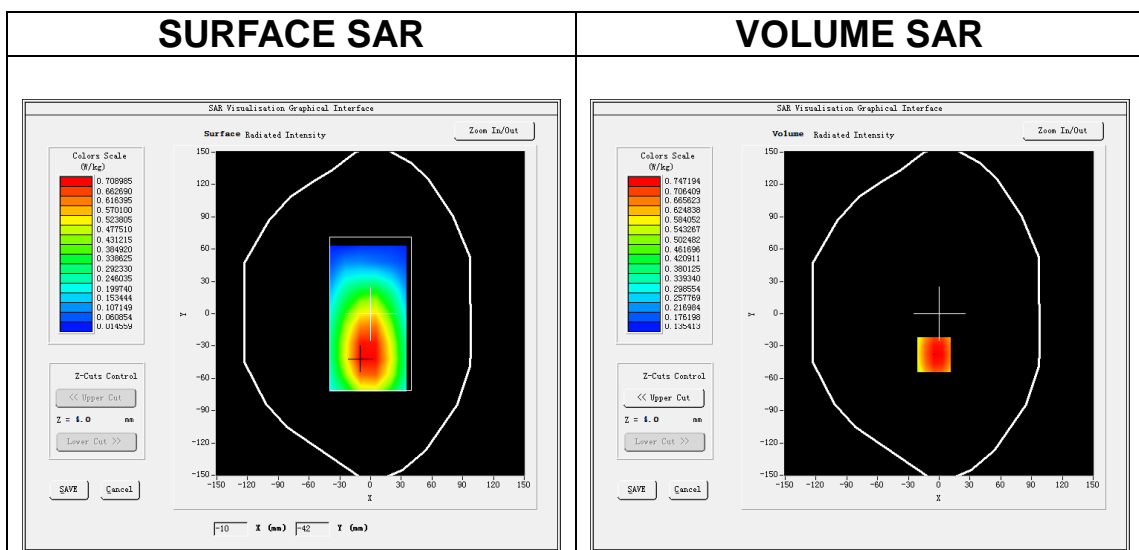
Date of measurement: 18/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>LTE band 13</u>
Channels	<u>Middle</u>
Signal	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

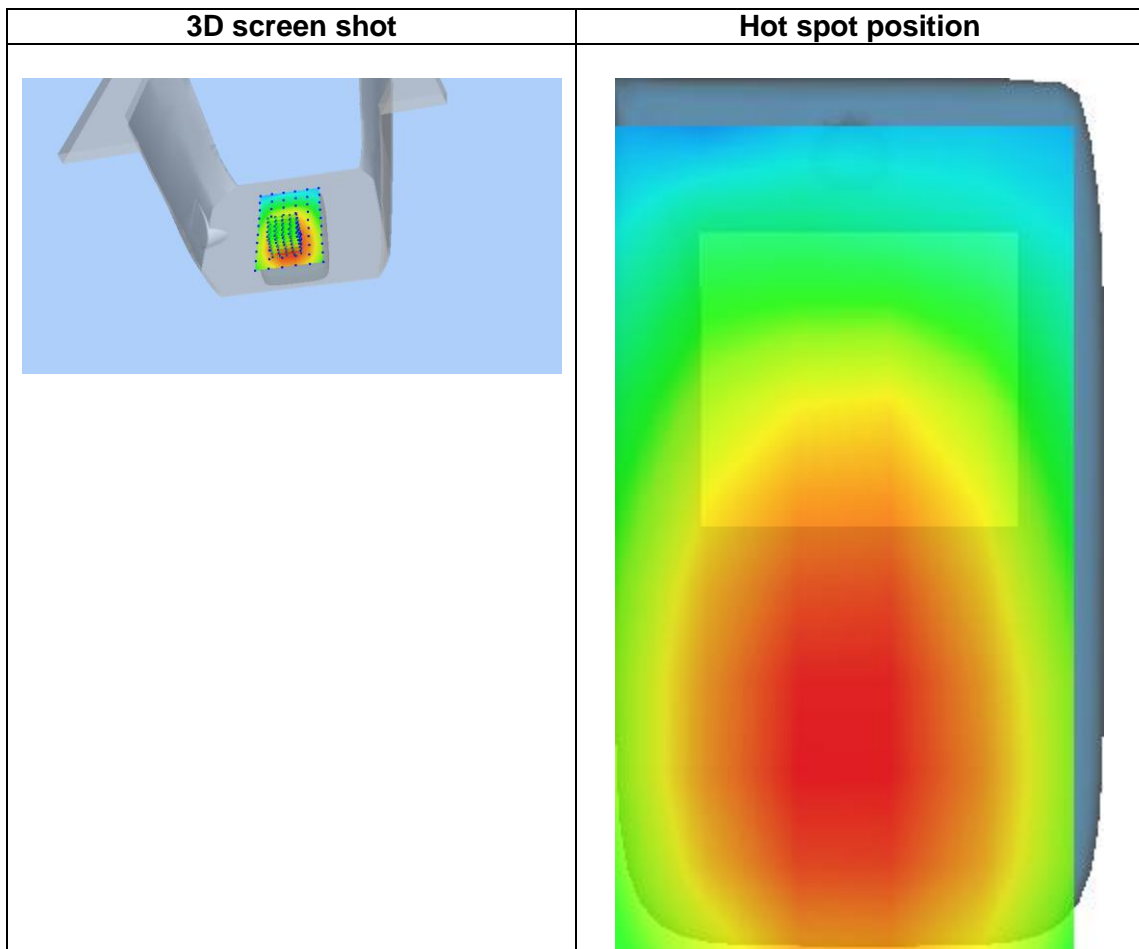
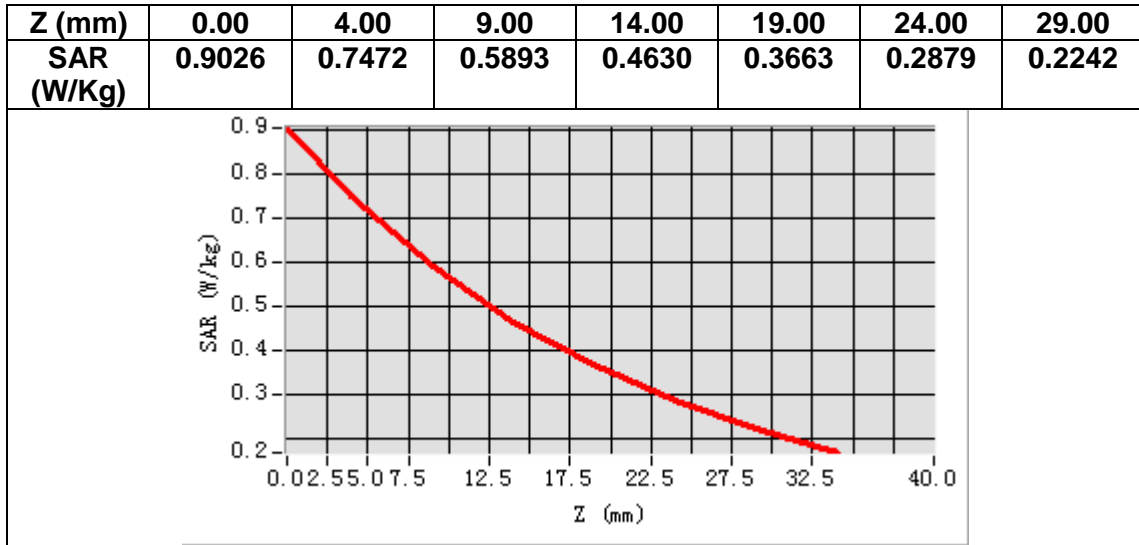
Frequency (MHz)	782.000000
Relative permittivity (real part)	41.222567
Relative permittivity (imaginary part)	21.123231
Conductivity (S/m)	0.917687
Variation (%)	1.450000



Maximum location: X=-5.00, Y=-38.00

SAR Peak: 0.92 W/kg

SAR 10g (W/Kg)	0.550297
SAR 1g (W/Kg)	0.731772



MEASUREMENT 13

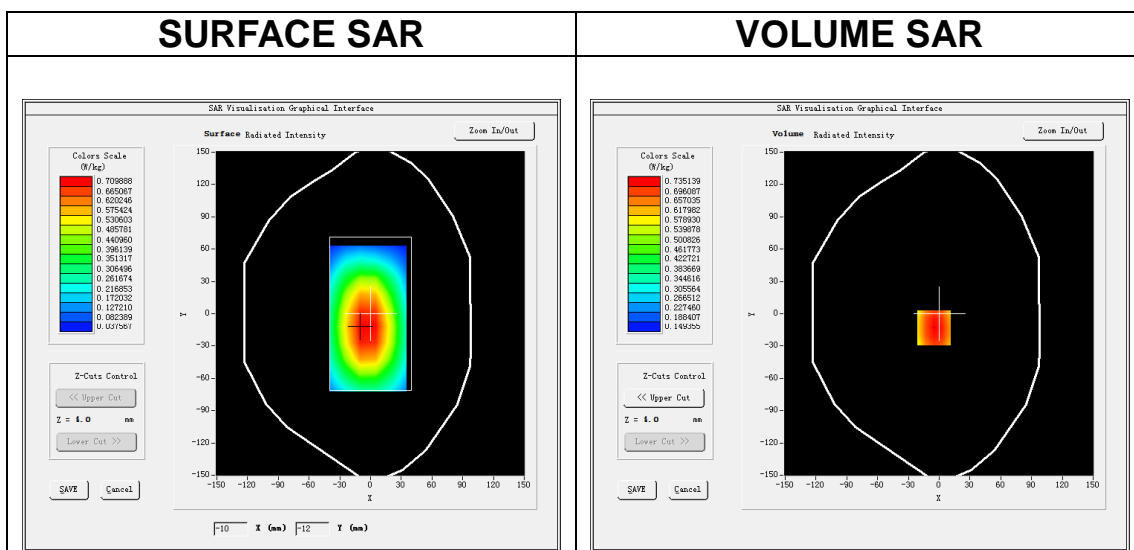
Date of measurement: 18/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>LTE band 17</u>
Channels	<u>Middle</u>
Signal	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

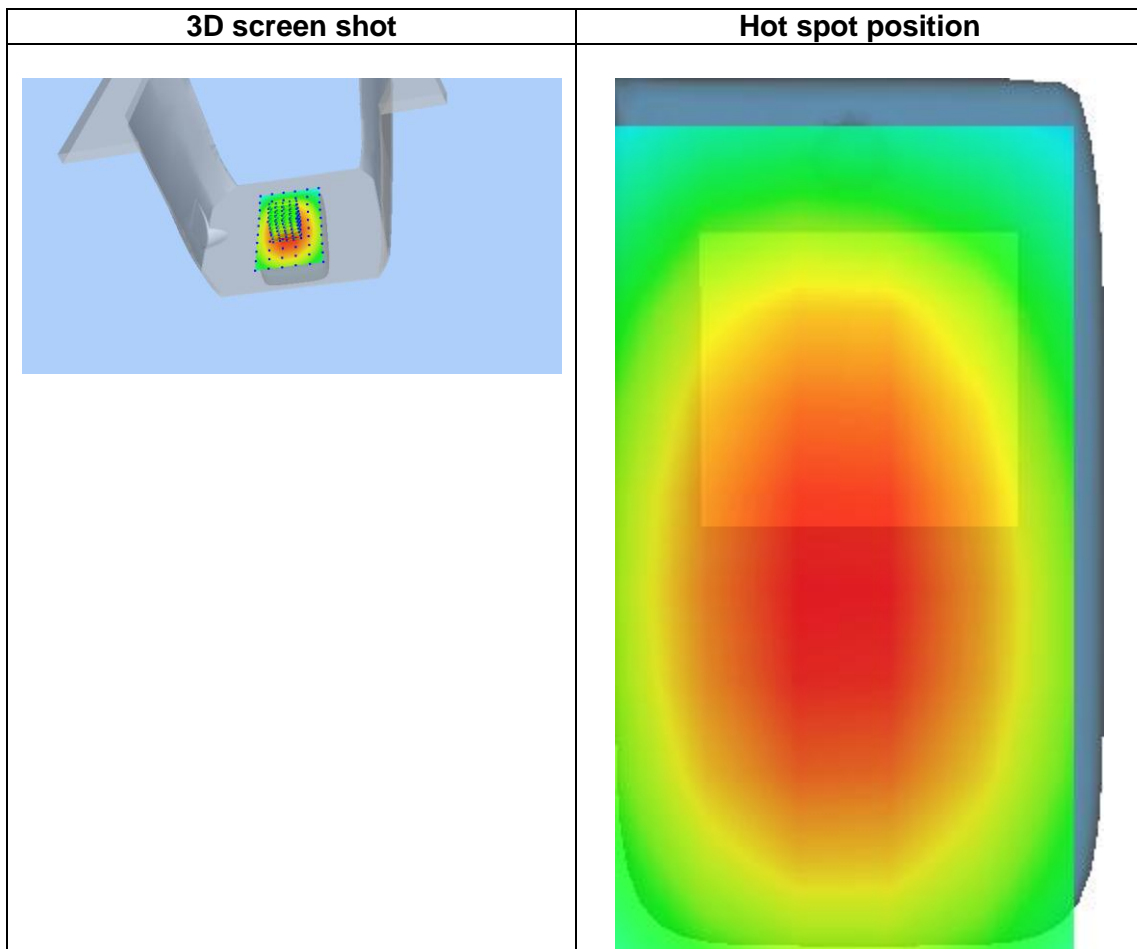
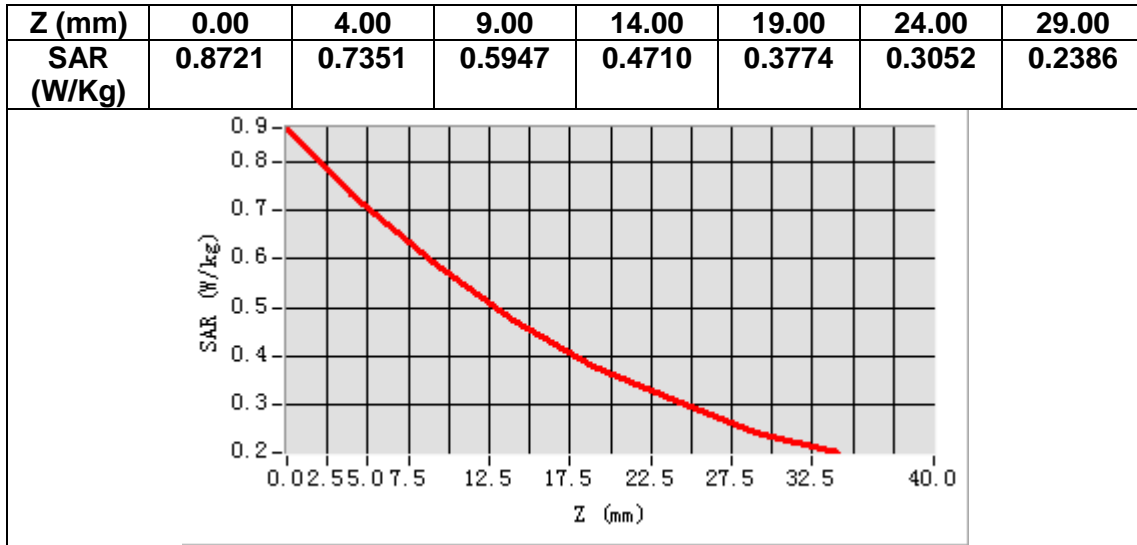
Frequency (MHz)	710.000000
Relative permittivity (real part)	42.094868
Relative permittivity (imaginary part)	21.806131
Conductivity (S/m)	0.860131
Variation (%)	0.220000



Maximum location: X=-5.00, Y=-13.00

SAR Peak: 0.88 W/kg

SAR 10g (W/Kg)	0.548011
SAR 1g (W/Kg)	0.710452



MEASUREMENT 14

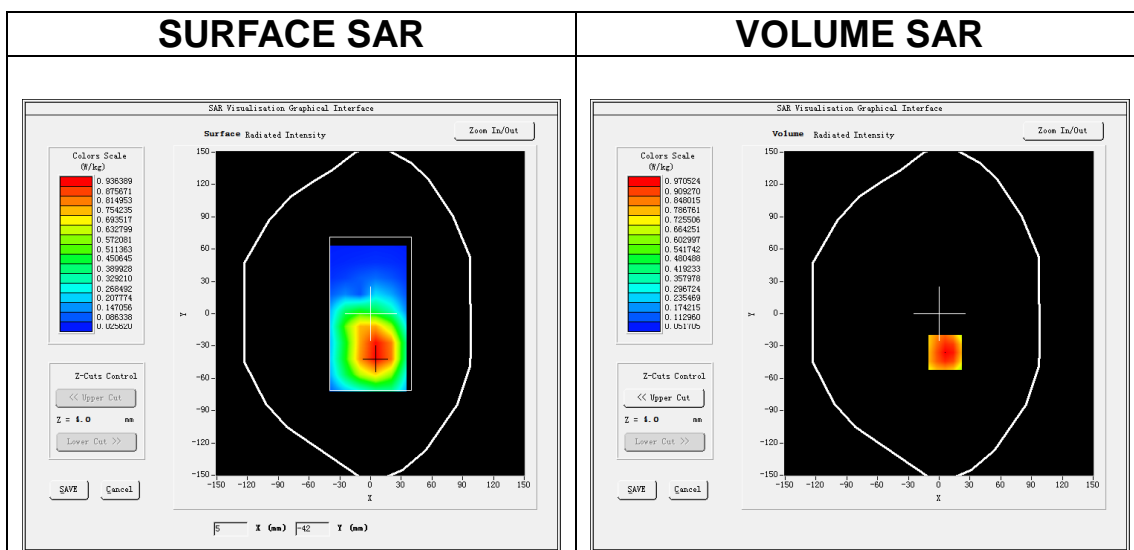
Date of measurement: 25/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>LTE band 25</u>
Channels	<u>Middle</u>
Signal	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

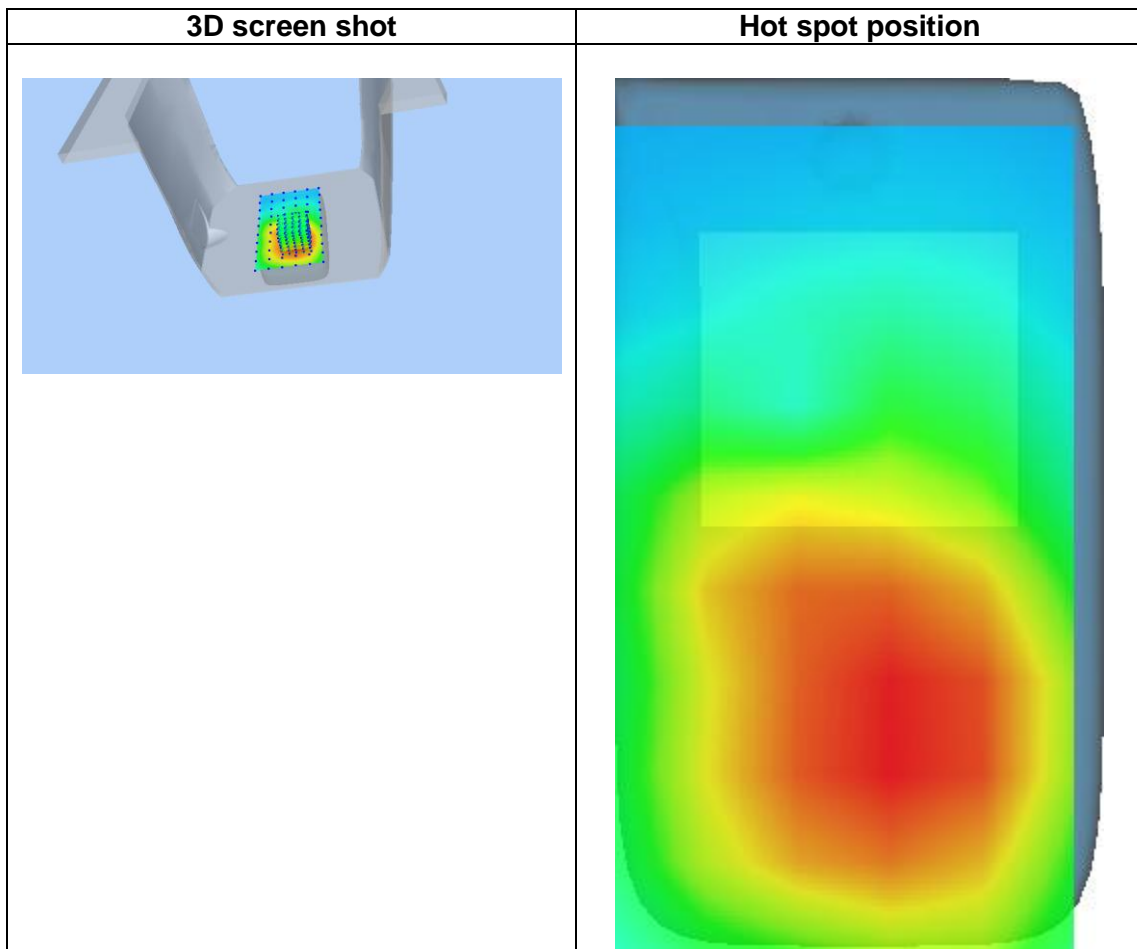
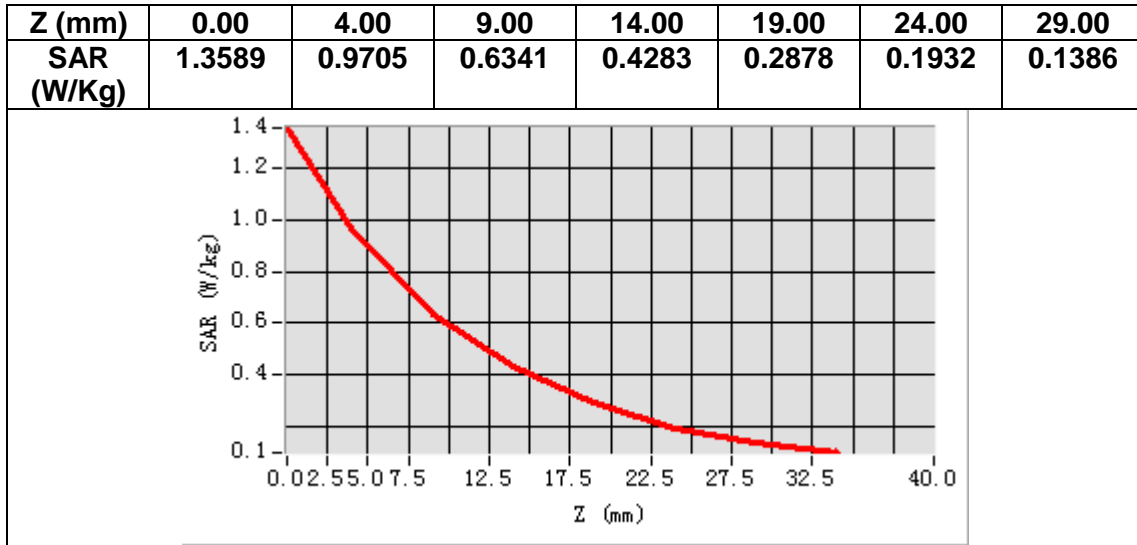
Frequency (MHz)	1882.500000
Relative permittivity (real part)	38.927971
Relative permittivity (imaginary part)	13.897148
Conductivity (S/m)	1.453024
Variation (%)	1.630000



Maximum location: X=6.00, Y=-36.00

SAR Peak: 1.38 W/kg

SAR 10g (W/Kg)	0.607026
SAR 1g (W/Kg)	0.965991



MEASUREMENT 15

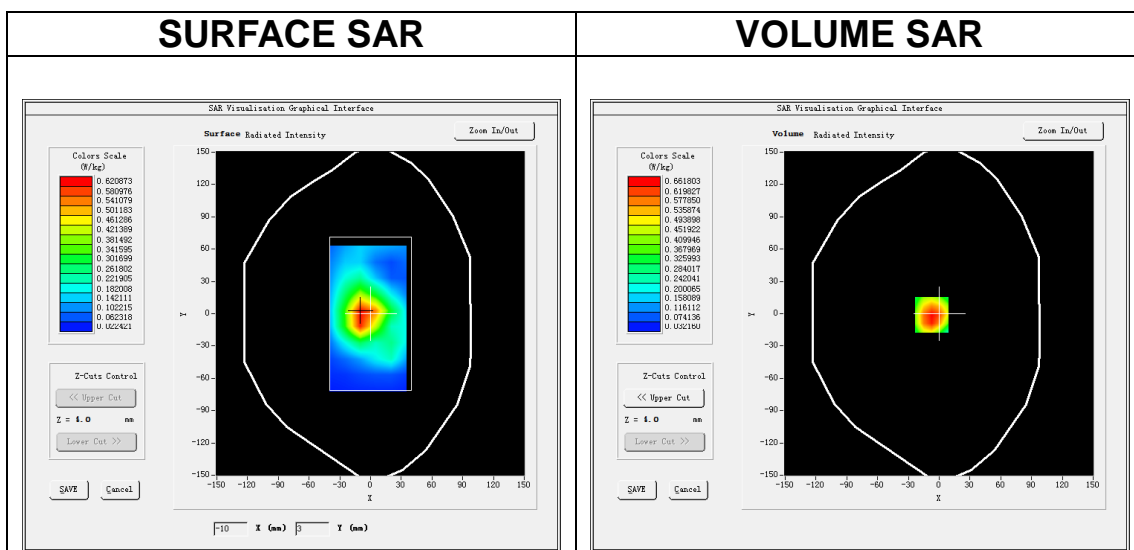
Date of measurement: 13/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>LTE band 26A</u>
Channels	<u>Middle</u>
Signal	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

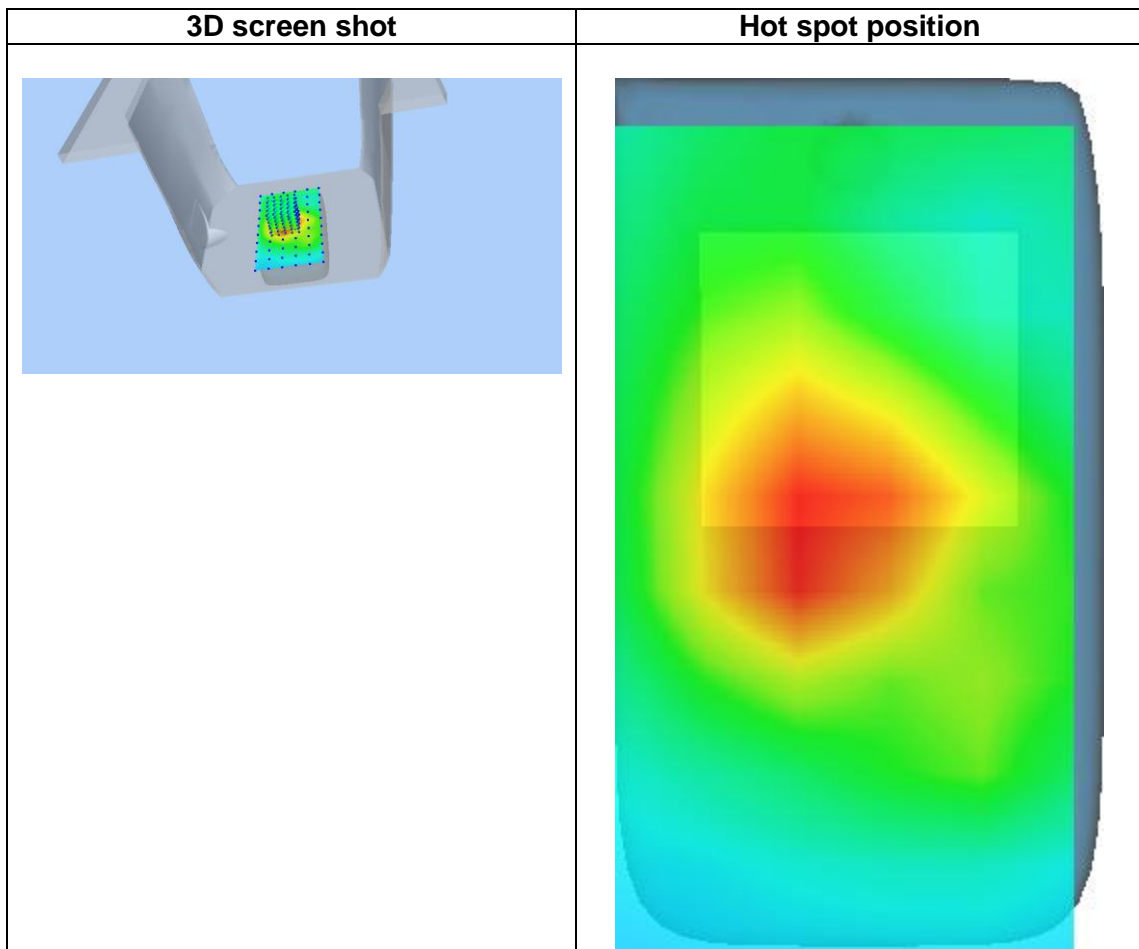
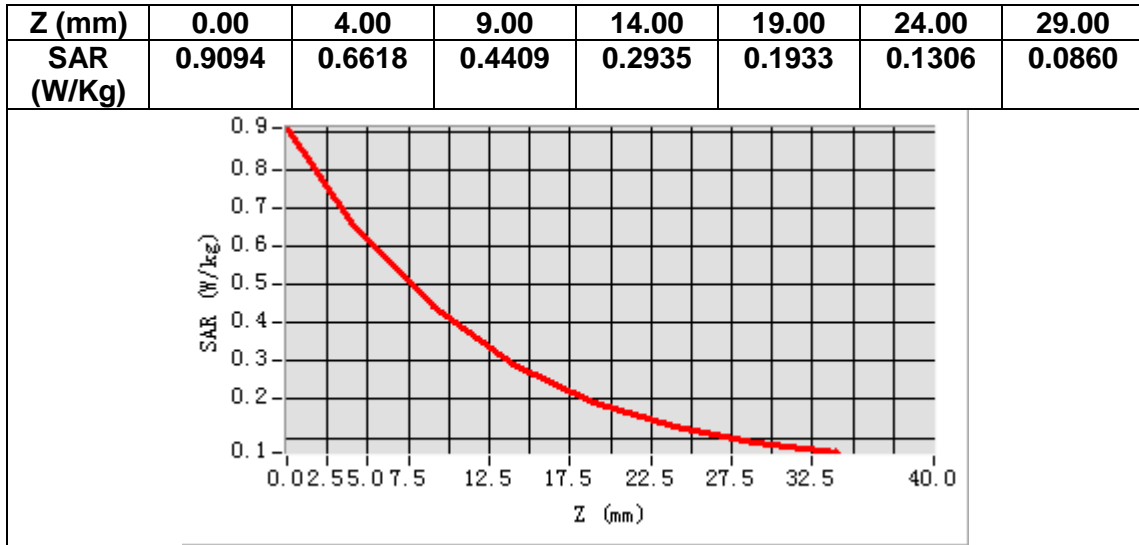
Frequency (MHz)	819.000000
Relative permittivity (real part)	42.963373
Relative permittivity (imaginary part)	19.934905
Conductivity (S/m)	0.907038
Variation (%)	0.140000



Maximum location: X=-7.00, Y=-1.00

SAR Peak: 0.95 W/kg

SAR 10g (W/Kg)	0.355943
SAR 1g (W/Kg)	0.638025



MEASUREMENT 16

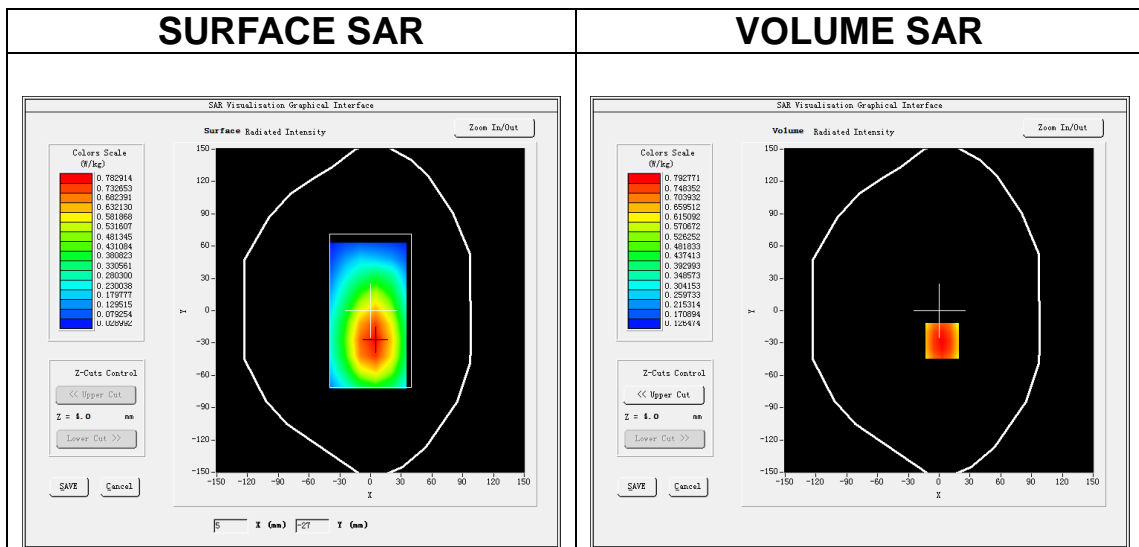
Date of measurement: 13/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>LTE band 26B</u>
Channels	<u>Middle</u>
Signal	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

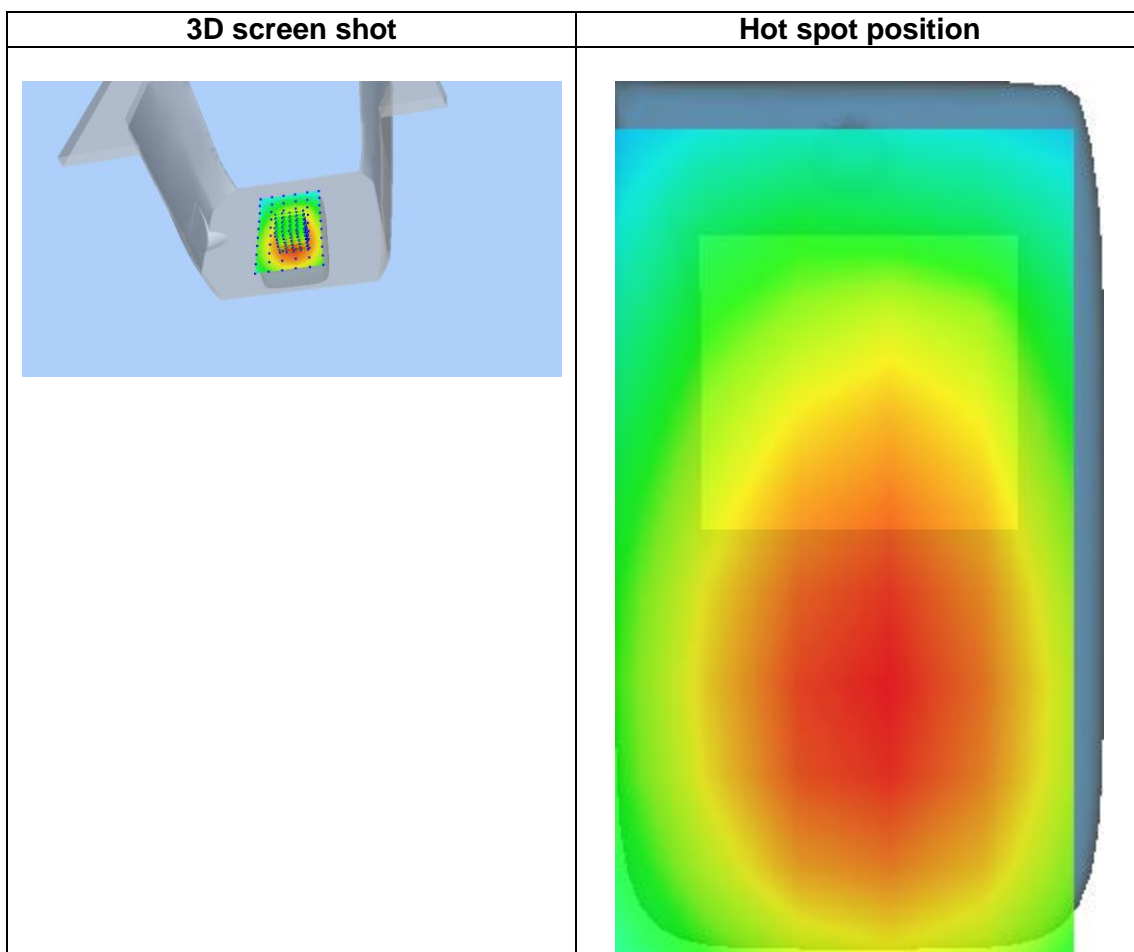
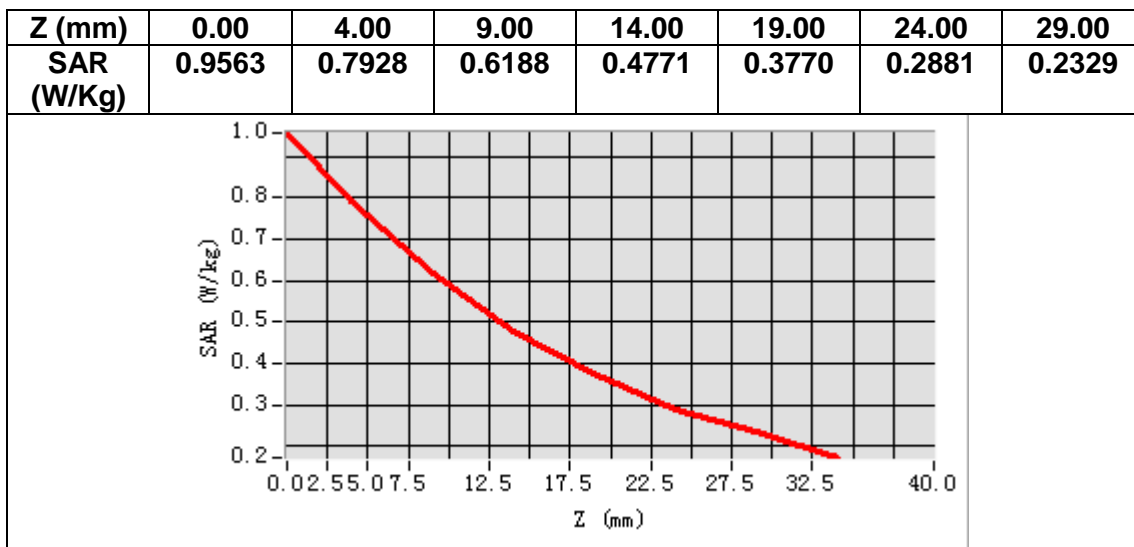
Frequency (MHz)	836.500000
Relative permittivity (real part)	42.709673
Relative permittivity (imaginary part)	19.944405
Conductivity (S/m)	0.926861
Variation (%)	2.430000



Maximum location: X=3.00, Y=-28.00

SAR Peak: 0.97 W/kg

SAR 10g (W/Kg)	0.574954
SAR 1g (W/Kg)	0.773302



MEASUREMENT 17

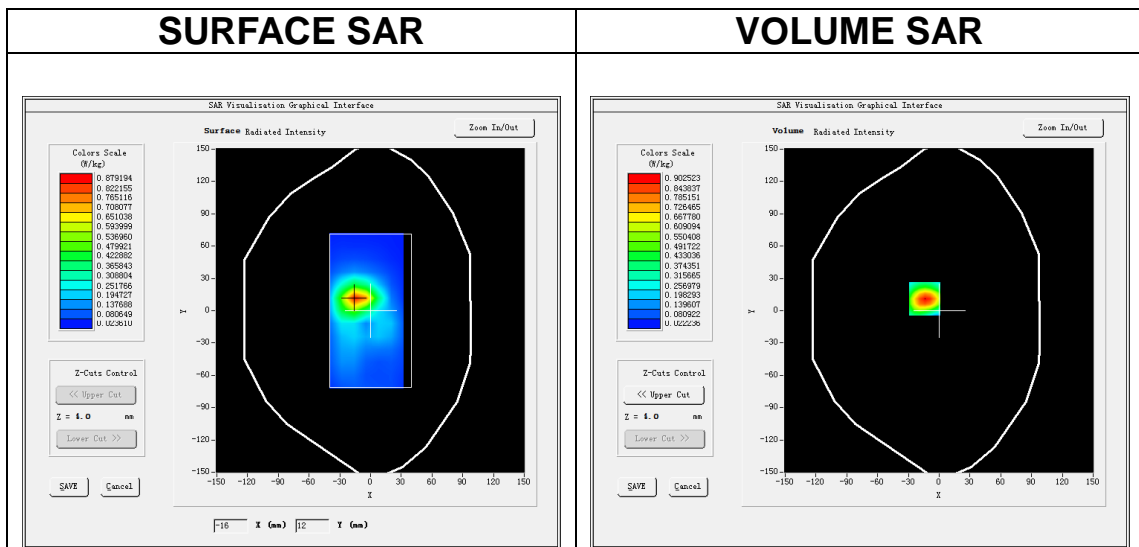
Date of measurement: 20/1/2022

A. Experimental conditions.

Area Scan	<u>dx=12mm dy=12mm, h= 5.00 mm</u>
ZoomScan	<u>7x7x7, dx=5mm dy=5mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>LTE band 41</u>
Channels	<u>Middle</u>
Signal	<u>LTE (Crest factor: 1.6)</u>

B. SAR Measurement Results

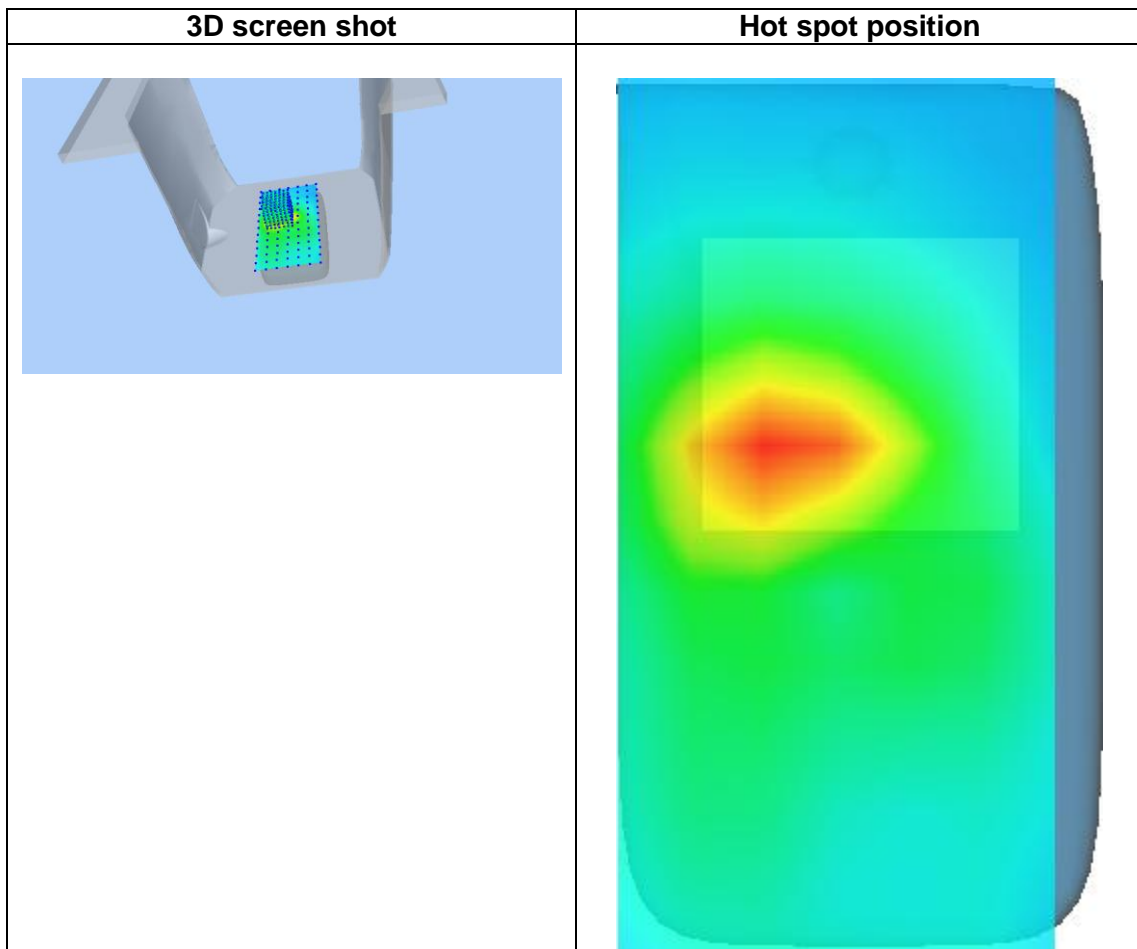
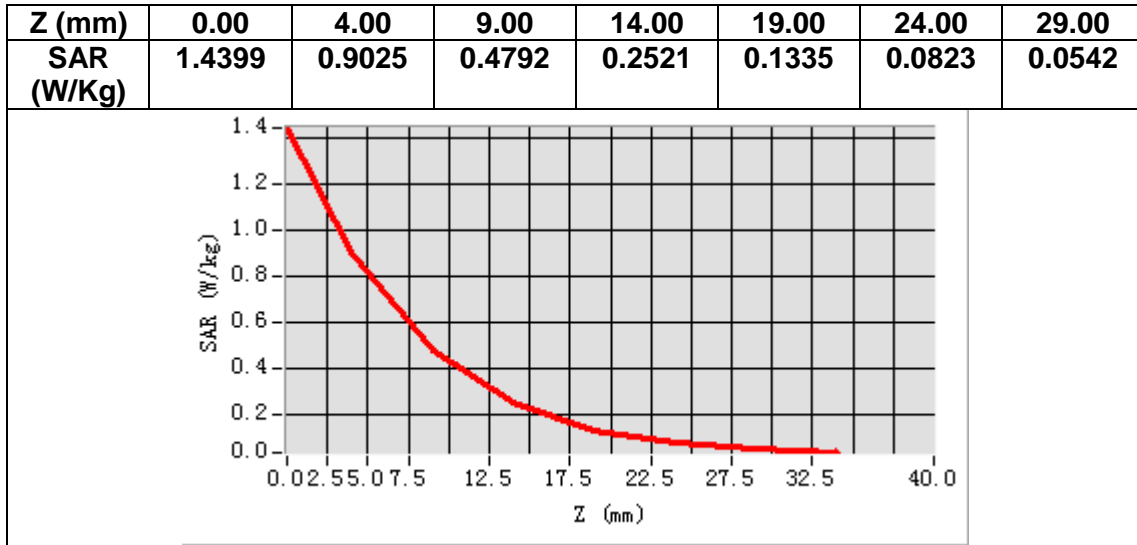
Frequency (MHz)	2593.000000
Relative permittivity (real part)	39.120090
Relative permittivity (imaginary part)	14.014115
Conductivity (S/m)	2.018811
Variation (%)	0.080000



Maximum location: X=-14.00, Y=11.00

SAR Peak: 1.44 W/kg

SAR 10g (W/Kg)	0.412072
SAR 1g (W/Kg)	0.835866



MEASUREMENT 18

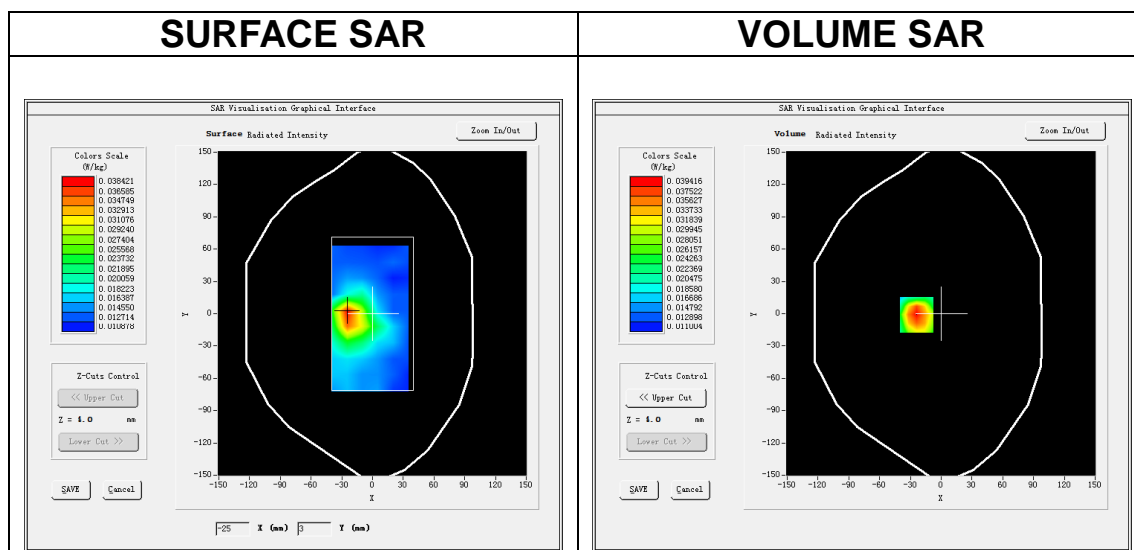
Date of measurement: 14/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>LTE band 66</u>
Channels	<u>Middle</u>
Signal	<u>LTE (Crest factor: 1.0)</u>

B. SAR Measurement Results

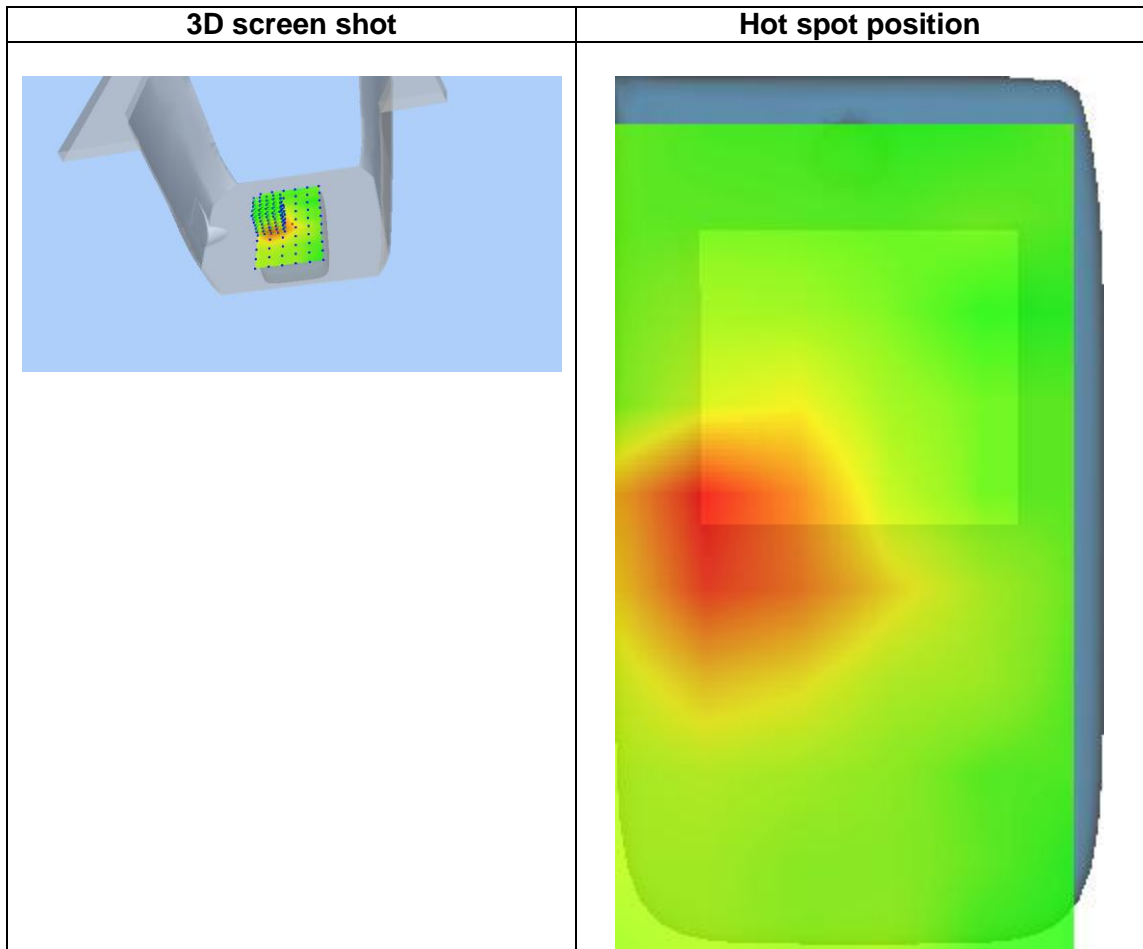
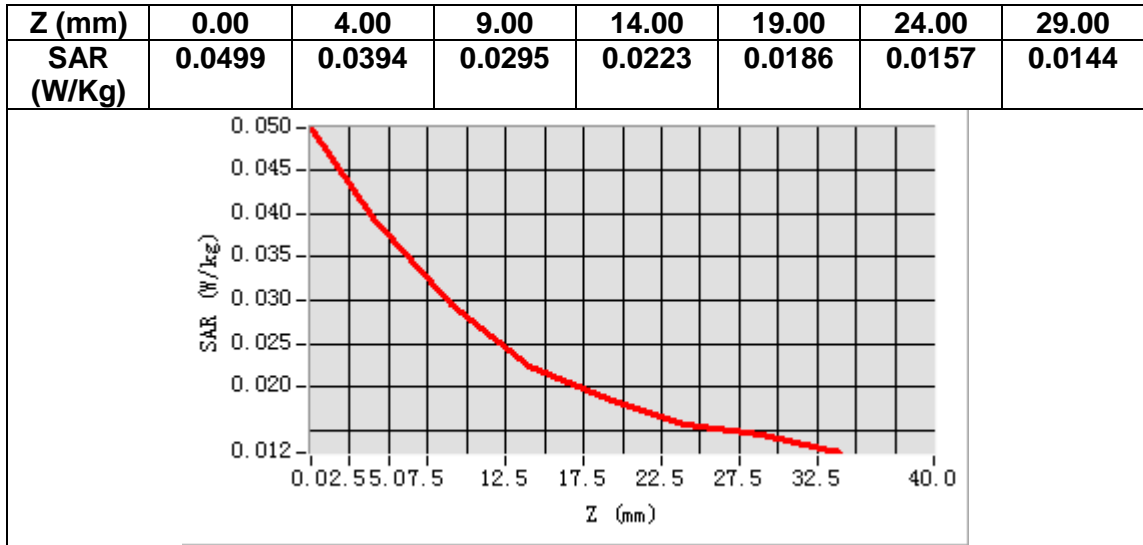
Frequency (MHz)	1745.000000
Relative permittivity (real part)	39.761047
Relative permittivity (imaginary part)	13.893978
Conductivity (S/m)	1.346944
Variation (%)	1.730000



Maximum location: X=-24.00, Y=-1.00

SAR Peak: 0.06 W/kg

SAR 10g (W/Kg)	0.026760
SAR 1g (W/Kg)	0.038895



MEASUREMENT 19

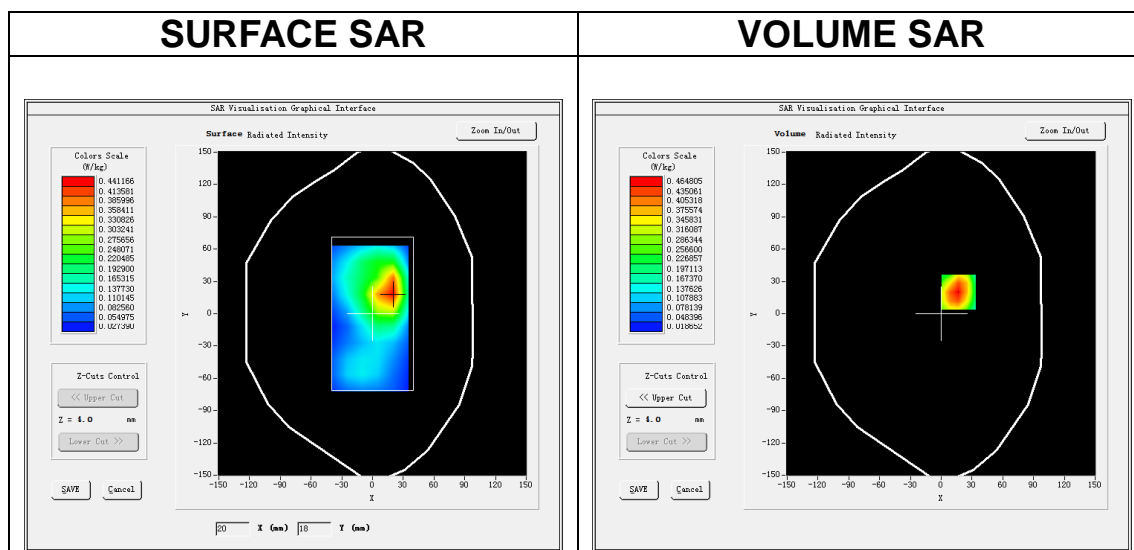
Date of measurement: 25/1/2022

A. Experimental conditions.

<u>Area Scan</u>	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
<u>ZoomScan</u>	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
<u>Phantom</u>	<u>Validation plane</u>
<u>Device Position</u>	<u>Body</u>
<u>Band</u>	<u>NR N2</u>
<u>Channels</u>	<u>Middle</u>
<u>Signal</u>	<u>(Crest factor: 1.0)</u>

B. SAR Measurement Results

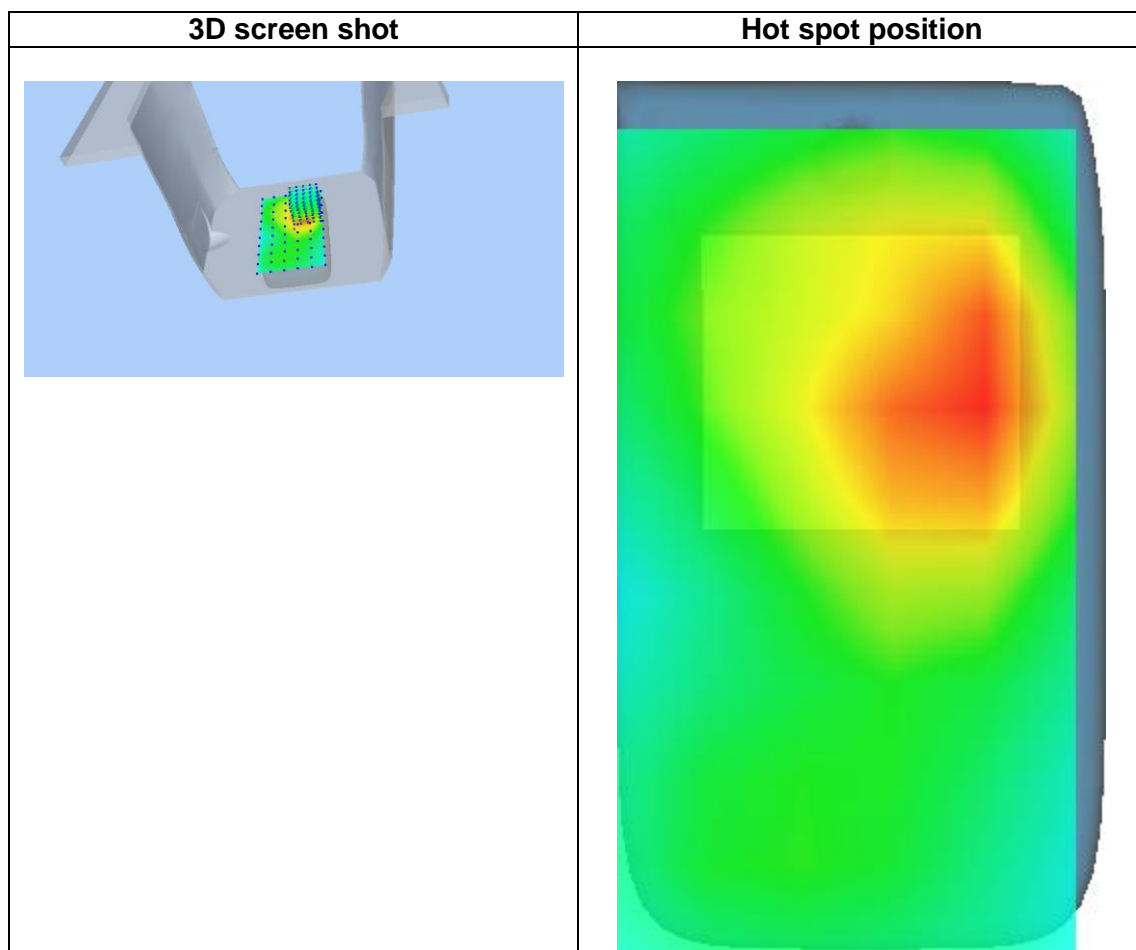
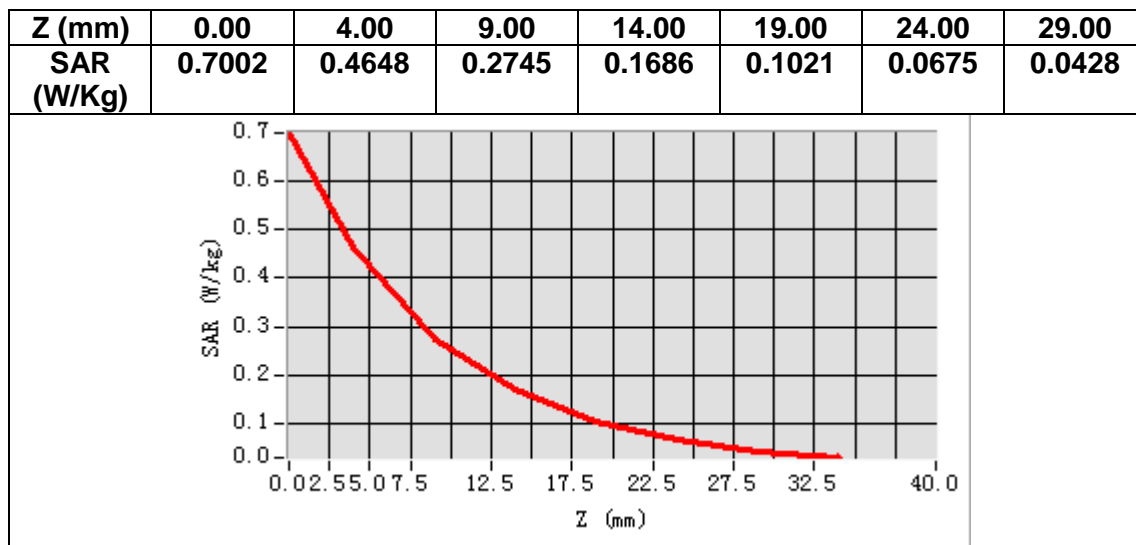
Frequency (MHz)	1880.000000
Relative permittivity (real part)	38.927872
Relative permittivity (imaginary part)	13.868348
Conductivity (S/m)	1.448472
Variation (%)	2.040000



Maximum location: X=17.00, Y=20.00

SAR Peak: 0.70 W/kg

SAR 10g (W/Kg)	0.258604
SAR 1g (W/Kg)	0.455011



MEASUREMENT 20

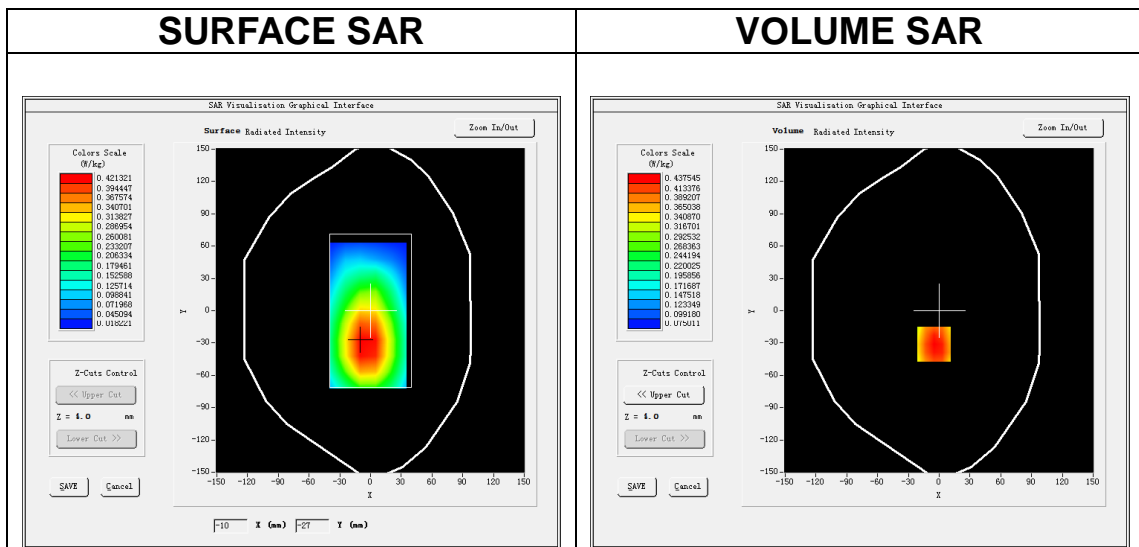
Date of measurement: 13/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>NR N5</u>
Channels	<u>Middle</u>
Signal	<u>(Crest factor: 1.0)</u>

B. SAR Measurement Results

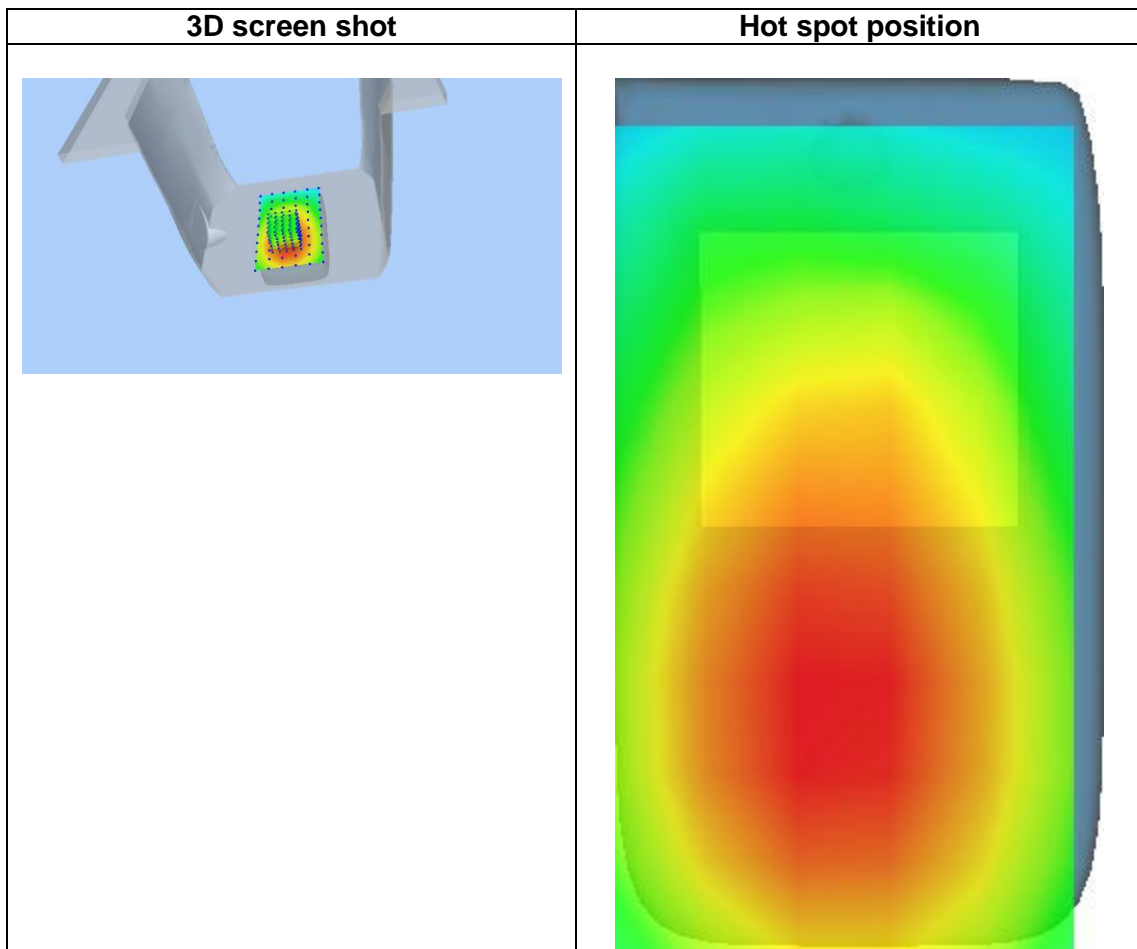
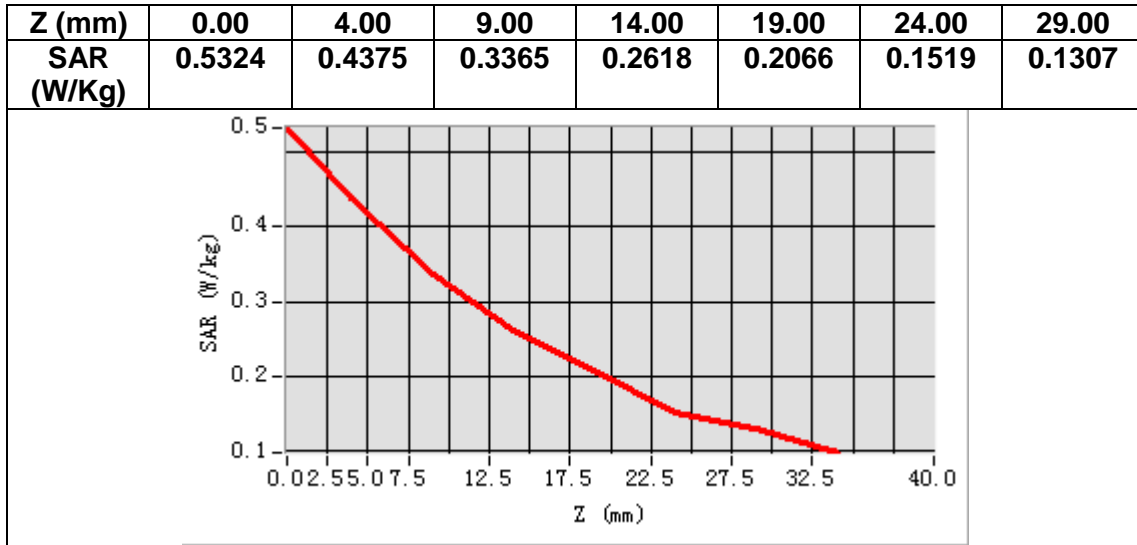
Frequency (MHz)	836.500000
Relative permittivity (real part)	42.696724
Relative permittivity (imaginary part)	19.951105
Conductivity (S/m)	0.927172
Variation (%)	2.280000



Maximum location: X=-5.00, Y=-31.00

SAR Peak: 0.62 W/kg

SAR 10g (W/Kg)	0.312851
SAR 1g (W/Kg)	0.431631



MEASUREMENT 21

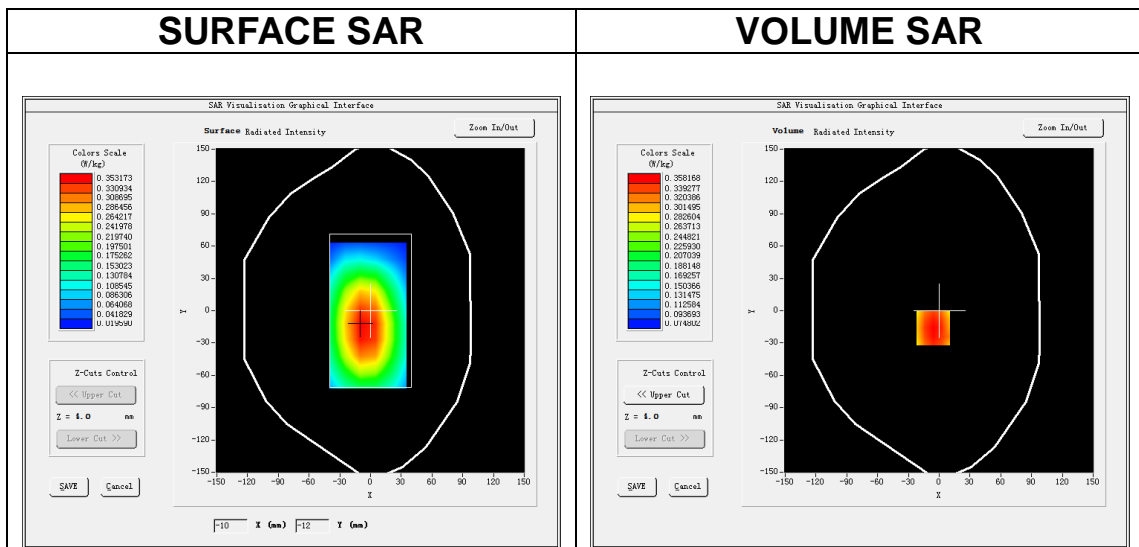
Date of measurement: 18/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>NR N12</u>
Channels	<u>Middle</u>
Signal	<u>(Crest factor: 1.0)</u>

B. SAR Measurement Results

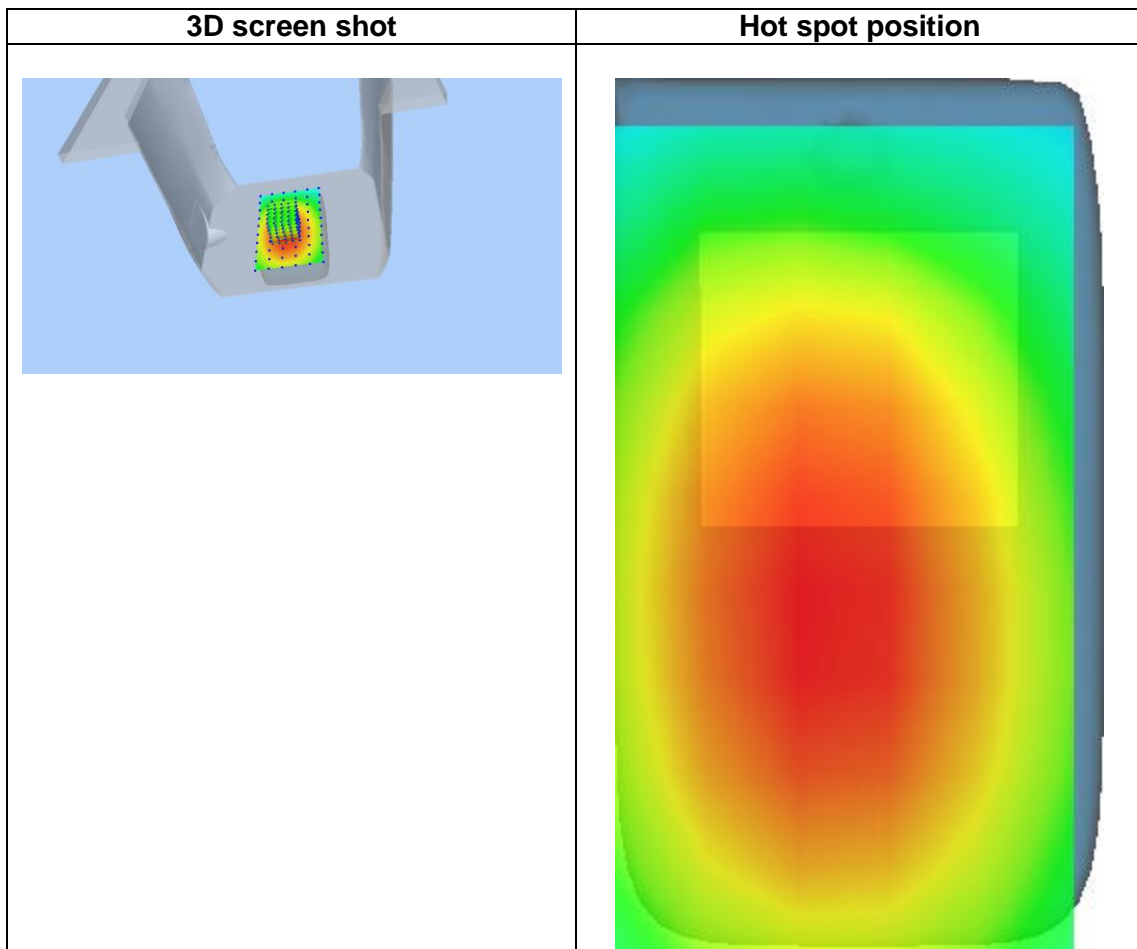
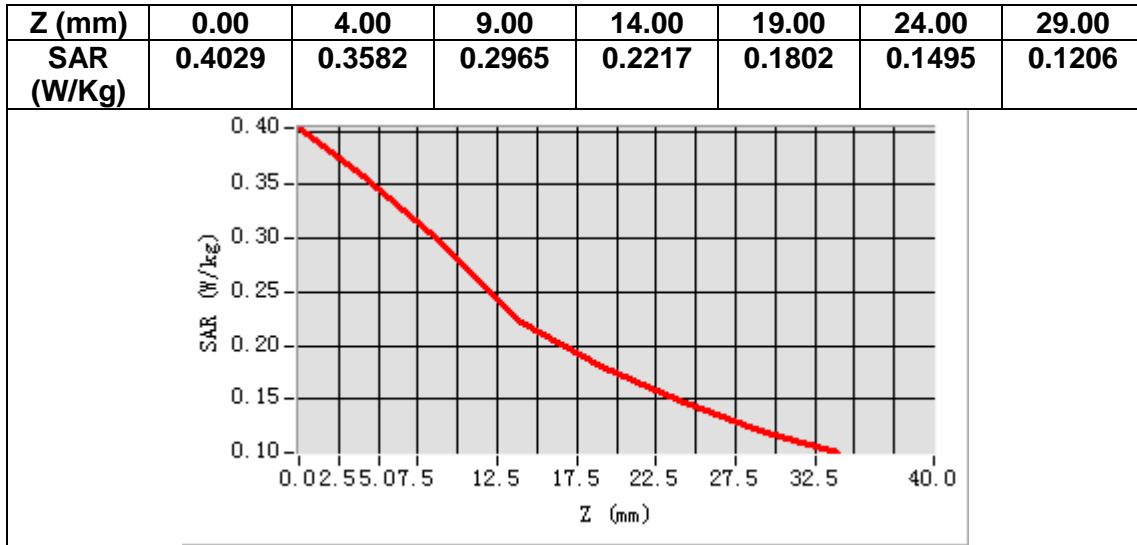
Frequency (MHz)	707.500000
Relative permittivity (real part)	42.110218
Relative permittivity (imaginary part)	21.865681
Conductivity (S/m)	0.859443
Variation (%)	-3.010000



Maximum location: X=-6.00, Y=-16.00

SAR Peak: 0.43 W/kg

SAR 10g (W/Kg)	0.264684
SAR 1g (W/Kg)	0.344767



MEASUREMENT 22

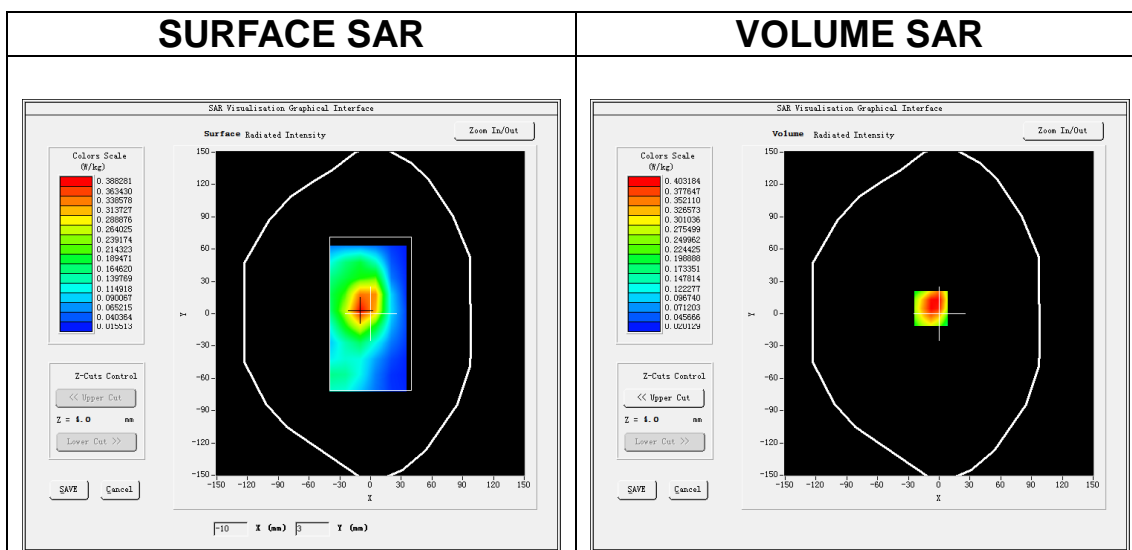
Date of measurement: 25/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>NR N25</u>
Channels	<u>Middle</u>
Signal	<u>(Crest factor: 1.0)</u>

B. SAR Measurement Results

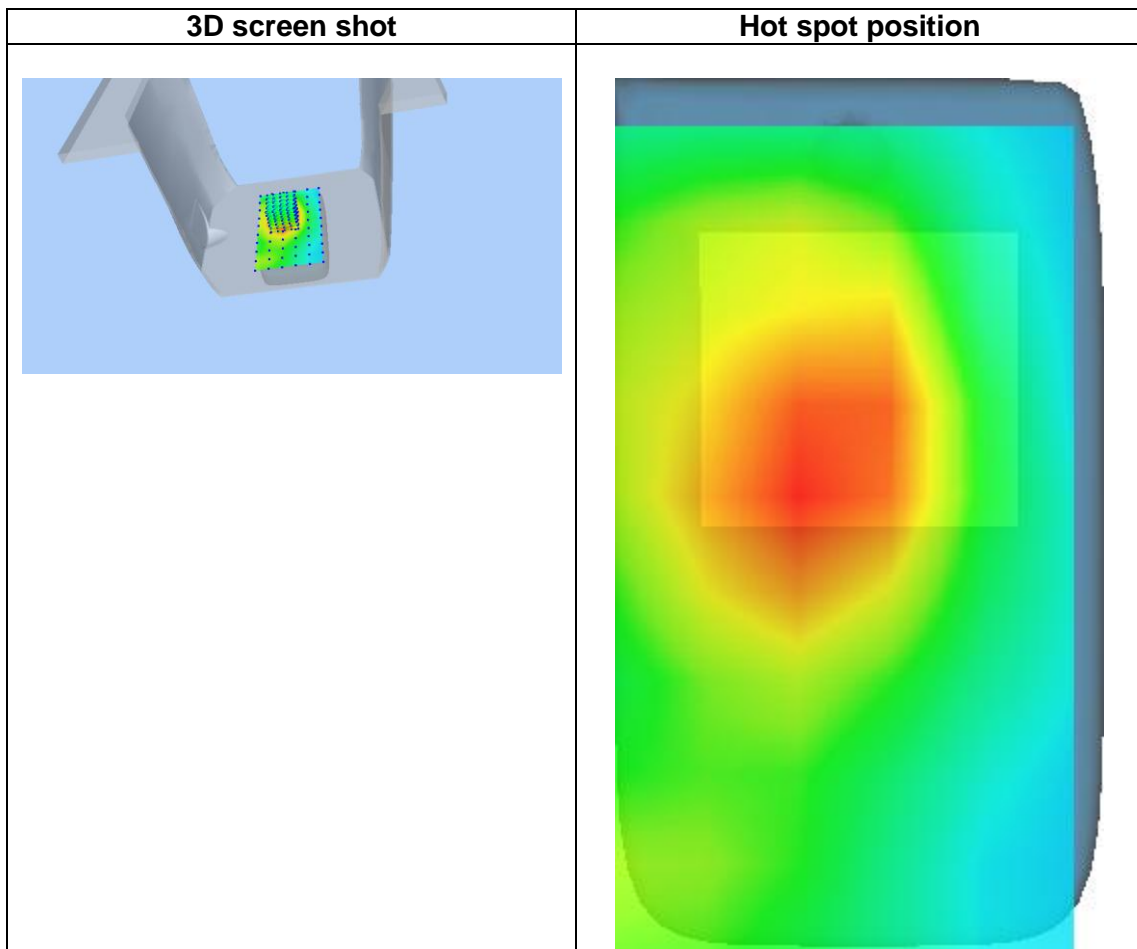
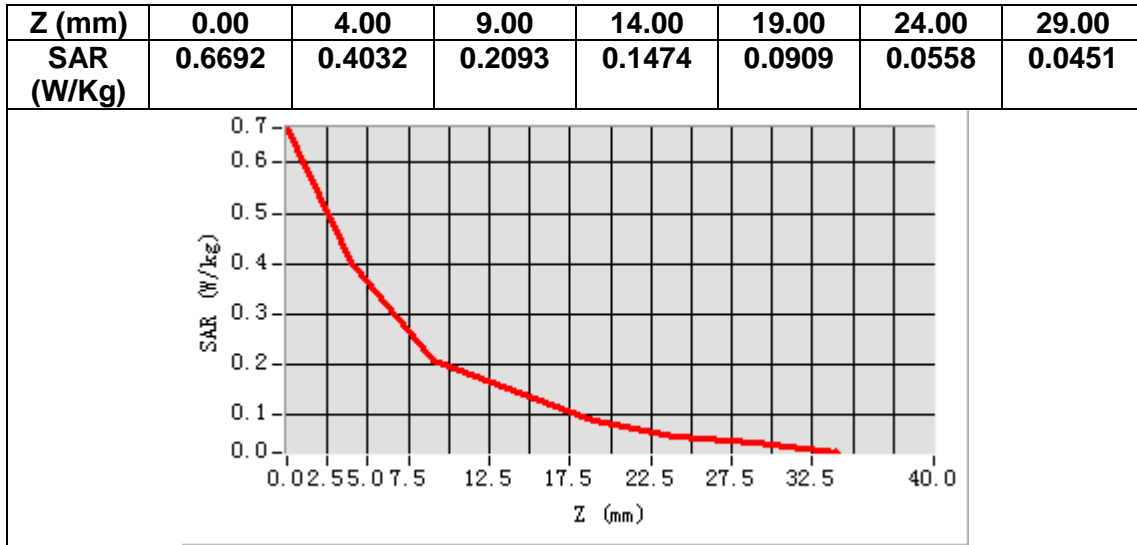
Frequency (MHz)	1882.500000
Relative permittivity (real part)	38.917271
Relative permittivity (imaginary part)	13.878898
Conductivity (S/m)	1.451501
Variation (%)	0.820000



Maximum location: X=-8.00, Y=5.00

SAR Peak: 0.63 W/kg

SAR 10g (W/Kg)	0.235602
SAR 1g (W/Kg)	0.409877



MEASUREMENT 23

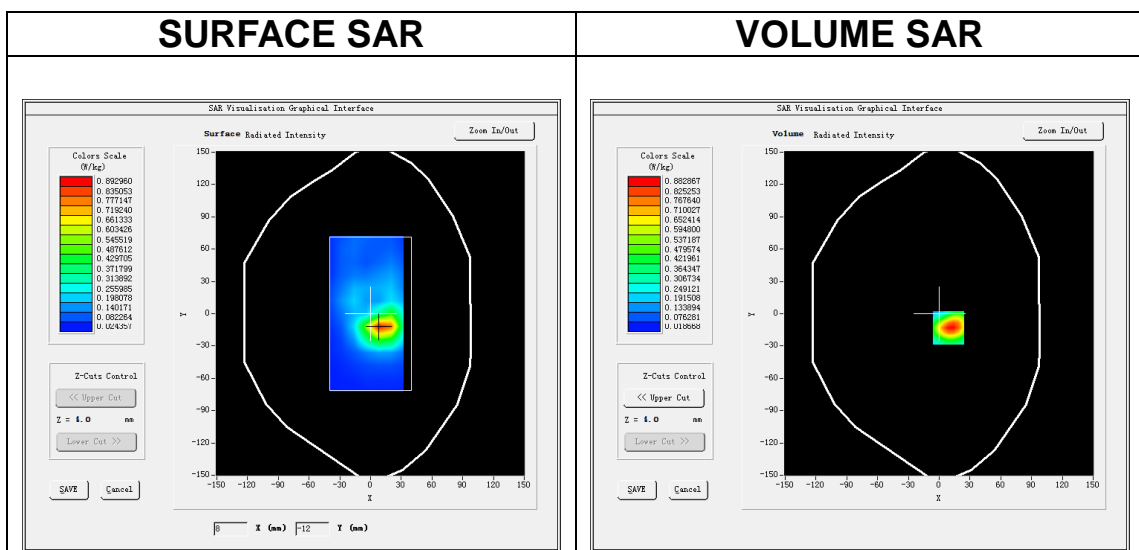
Date of measurement: 20/1/2022

A. Experimental conditions.

Area Scan	<u>dx=12mm dy=12mm, h= 5.00 mm</u>
ZoomScan	<u>7x7x7, dx=5mm dy=5mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>NR N41</u>
Channels	<u>Middle</u>
Signal	<u>(Crest factor: 1.6)</u>

B. SAR Measurement Results

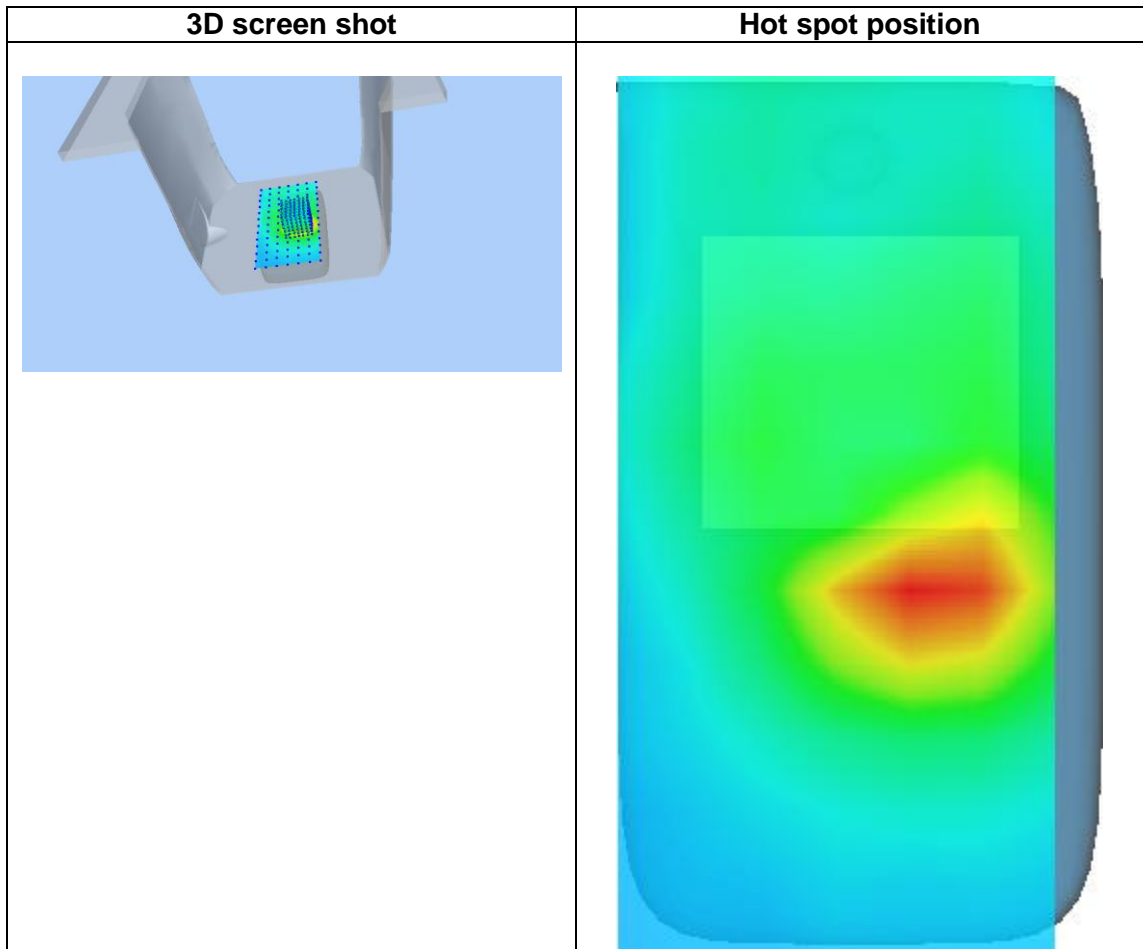
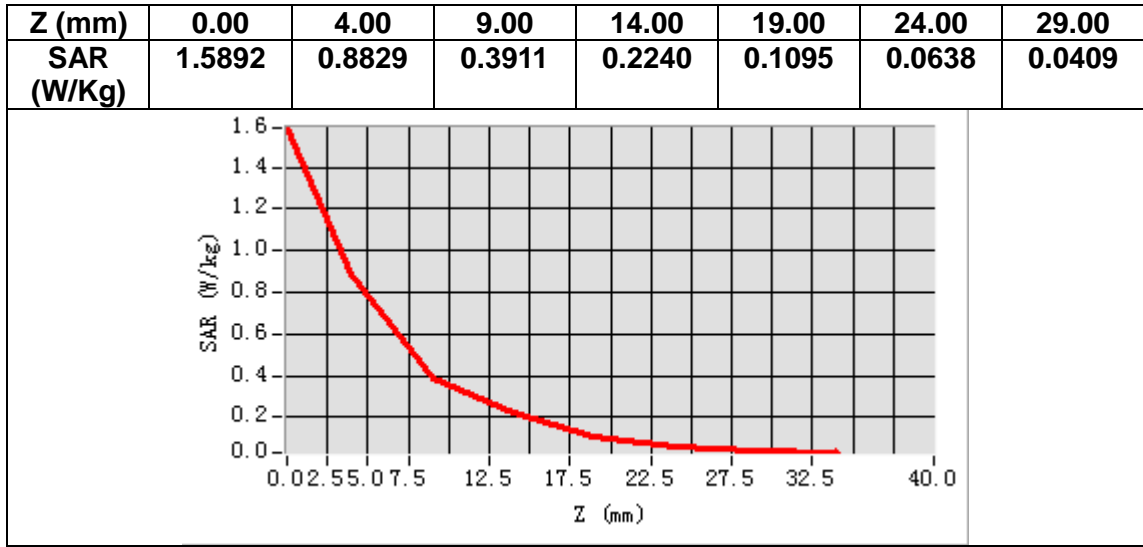
Frequency (MHz)	2592.990000
Relative permittivity (real part)	39.119408
Relative permittivity (imaginary part)	14.014356
Conductivity (S/m)	2.018838
Variation (%)	-0.240000



Maximum location: X=9.00, Y=-13.00

SAR Peak: 1.48 W/kg

SAR 10g (W/Kg)	0.395476
SAR 1g (W/Kg)	0.833766



MEASUREMENT 24

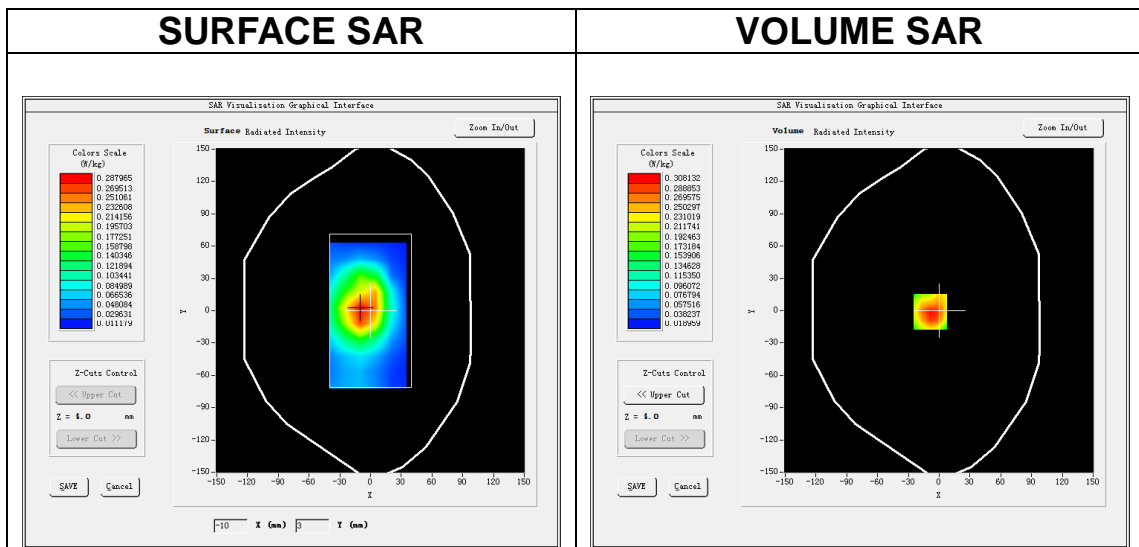
Date of measurement: 14/1/2022

A. Experimental conditions.

Area Scan	<u>dx=15mm dy=15mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>NR N66</u>
Channels	<u>Middle</u>
Signal	<u>(Crest factor: 1.0)</u>

B. SAR Measurement Results

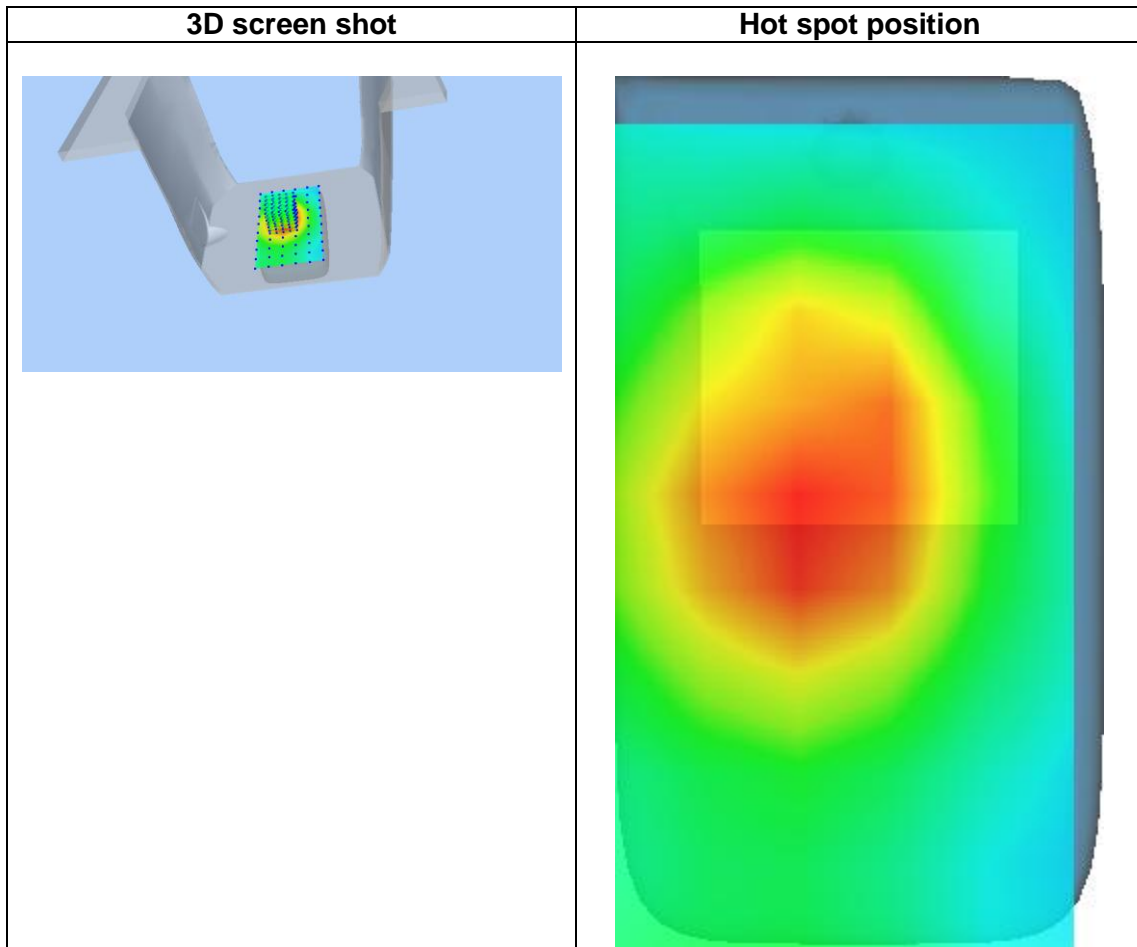
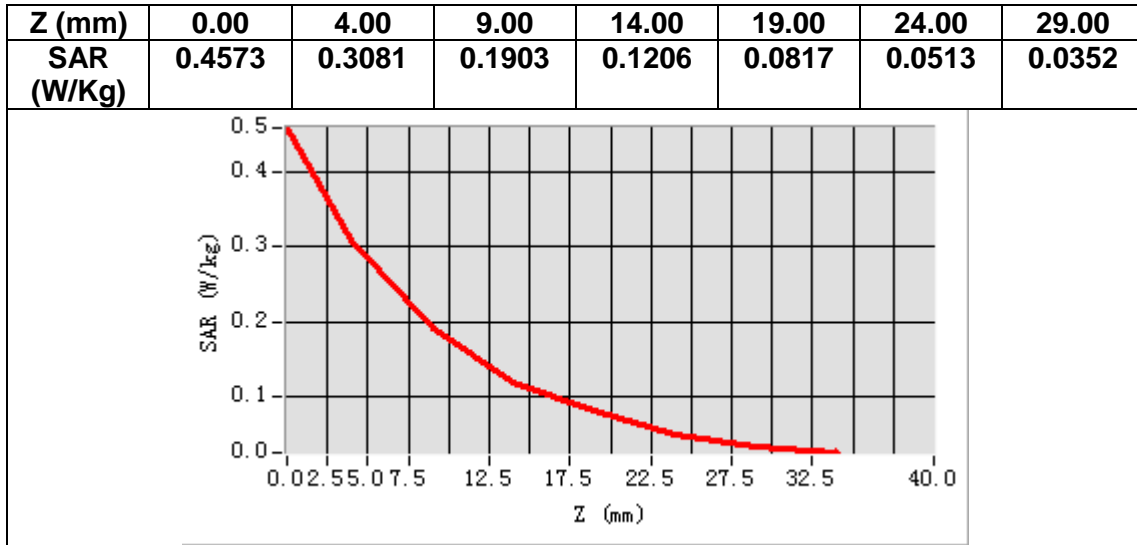
Frequency (MHz)	1745.000000
Relative permittivity (real part)	39.761047
Relative permittivity (imaginary part)	13.893978
Conductivity (S/m)	1.346944
Variation (%)	-1.940000



Maximum location: X=-9.00, Y=-1.00

SAR Peak: 0.47 W/kg

SAR 10g (W/Kg)	0.178347
SAR 1g (W/Kg)	0.299317



MEASUREMENT 25

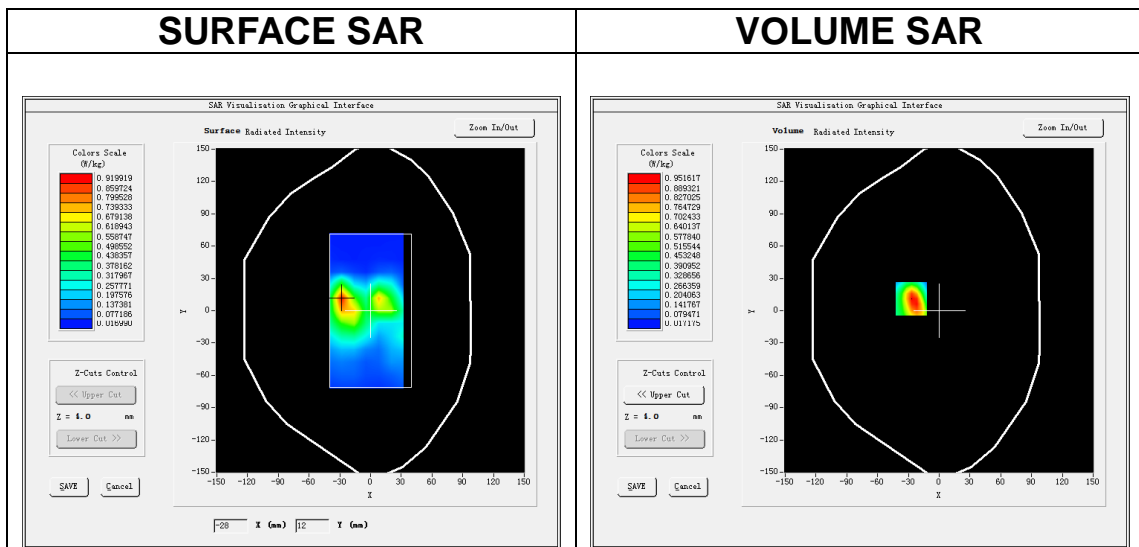
Date of measurement: 18/2/2022

A. Experimental conditions.

Area Scan	<u>dx=12mm dy=12mm, h= 5.00 mm</u>
ZoomScan	<u>7x7x7, dx=5mm dy=5mm dz=5mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>NR N77</u>
Channels	<u>Middle</u>
Signal	<u>(Crest factor: 1.6)</u>

B. SAR Measurement Results

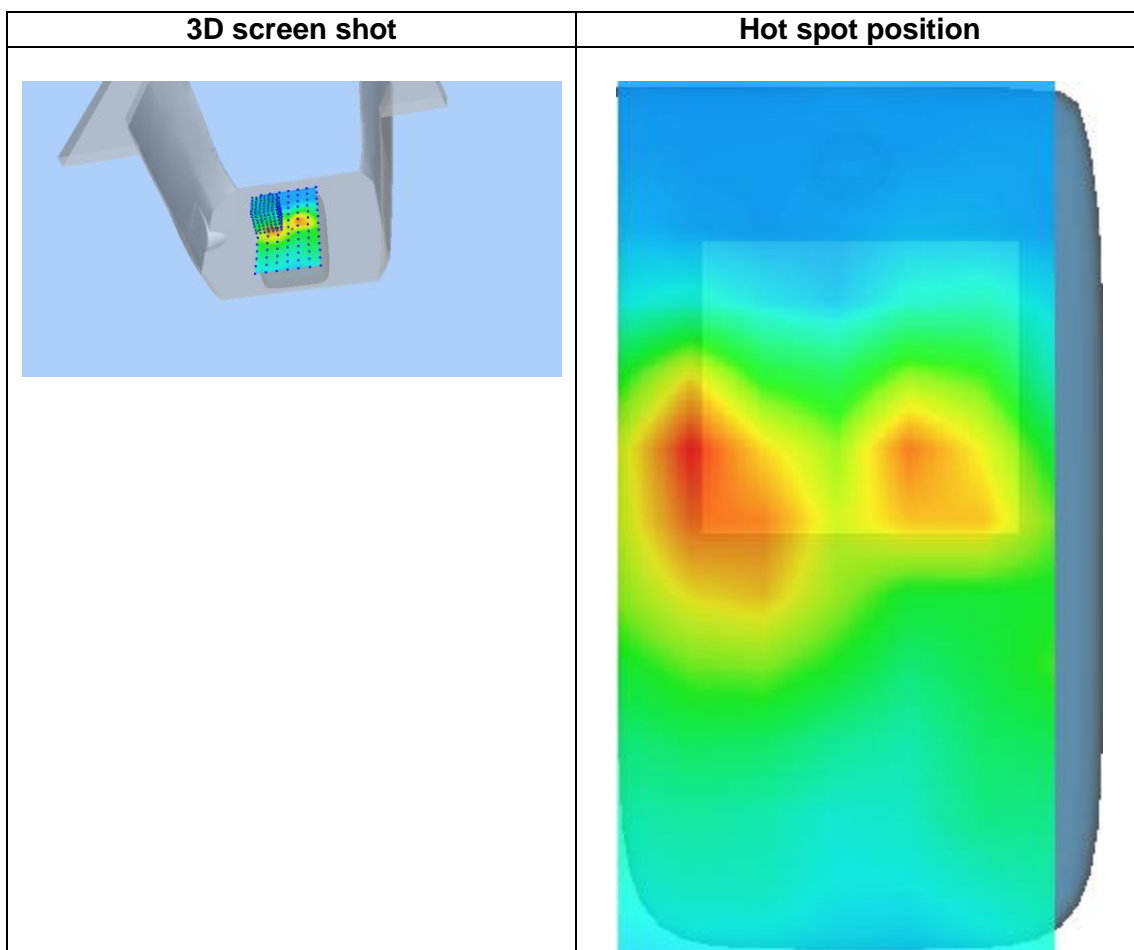
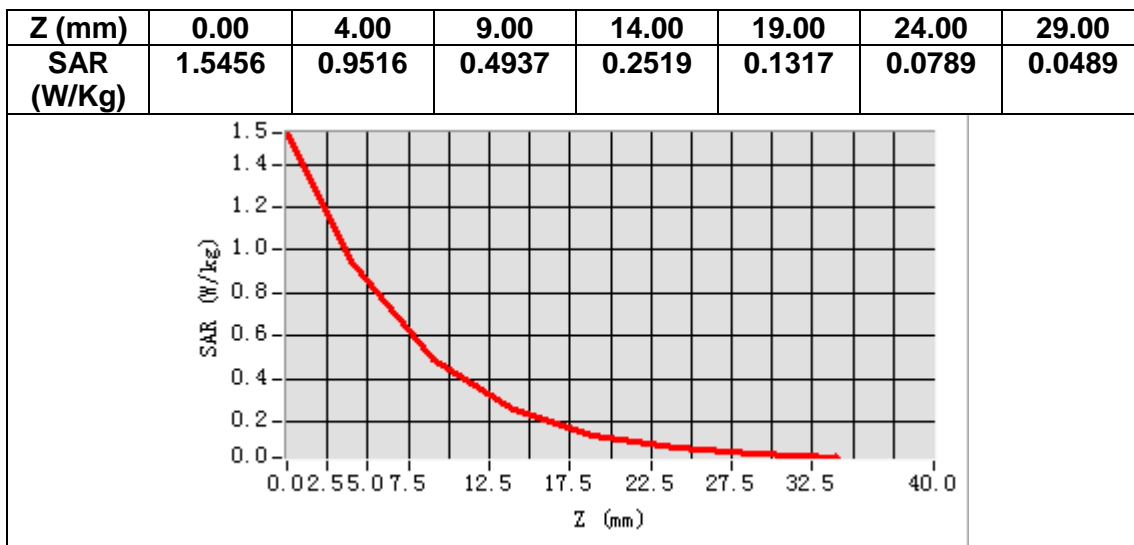
Frequency (MHz)	3840.000000
Relative permittivity (real part)	38.305117
Relative permittivity (imaginary part)	15.053060
Conductivity (S/m)	3.211319
Variation (%)	-4.520000



Maximum location: X=-27.00, Y=11.00

SAR Peak: 1.61 W/kg

SAR 10g (W/Kg)	0.435597
SAR 1g (W/Kg)	0.899462



MEASUREMENT 26

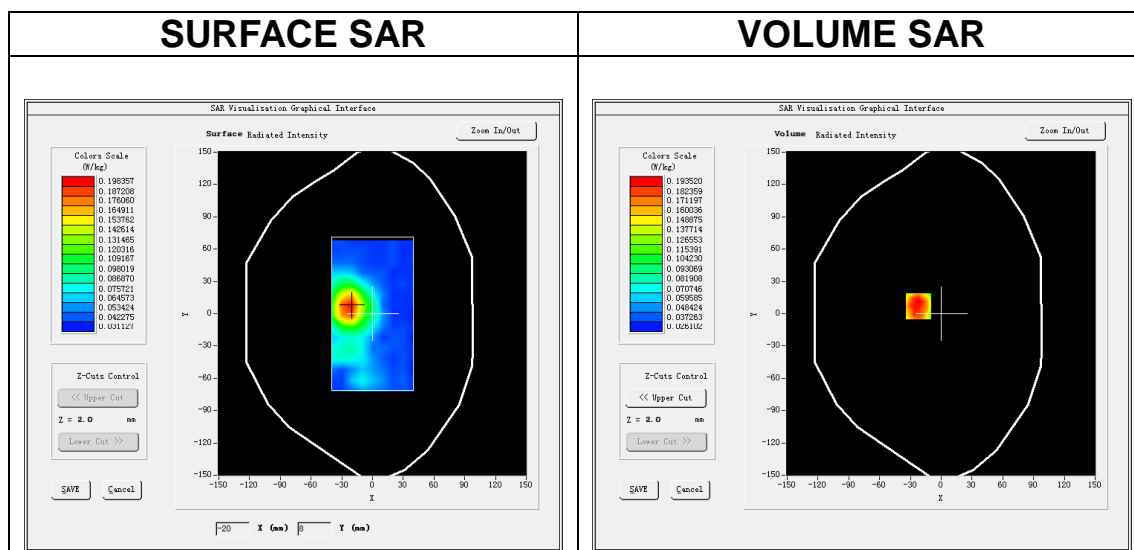
Date of measurement: 15/2/2022

A. Experimental conditions.

Area Scan	<u>dx=10mm dy=10mm, h= 2.00 mm</u>
ZoomScan	<u>7x7x12,dx=4mm dy=4mm dz=2mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>IEEE 802.11n U-NII</u>
Channels	<u>Middle</u>
Signal	<u>IEEE802.11n (Crest factor: 1.0)</u>

B. SAR Measurement Results

Frequency (MHz)	5280.000000
Relative permittivity (real part)	36.753083
Relative permittivity (imaginary part)	16.449798
Conductivity (S/m)	4.825274
Variation (%)	1.080000

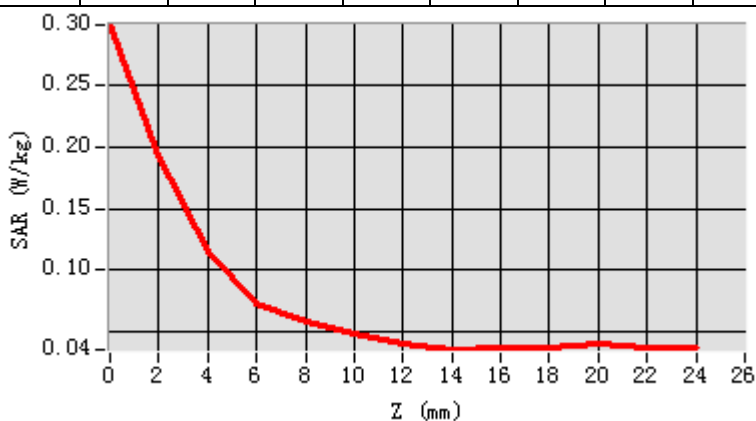


Maximum location: X=-22.00, Y=7.00

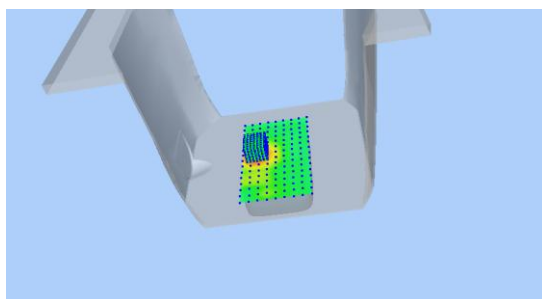
SAR Peak: 0.32 W/kg

SAR 10g (W/Kg)	0.074776
SAR 1g (W/Kg)	0.125325

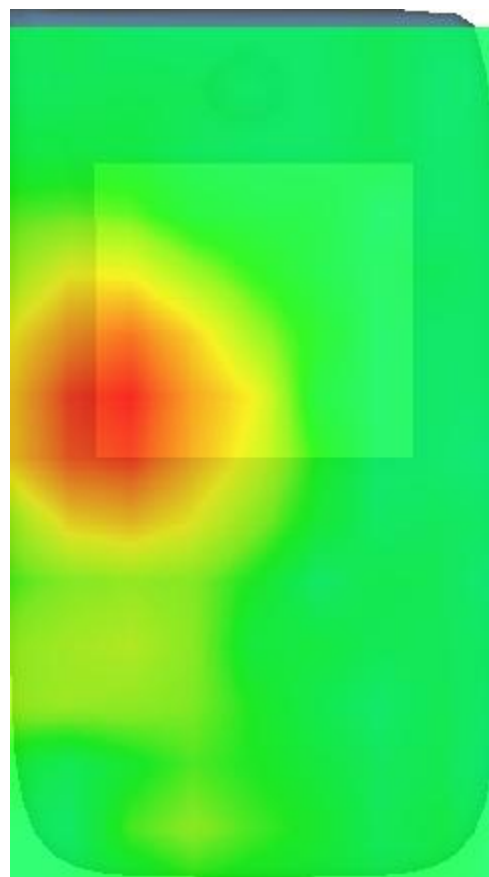
Z (m)	0.00	2.00	4.00	6.00	8.00	10.0	12.0	14.0	16.0	18.0	20.0	22.0
SAR (W/Kg)	0.2996	0.1935	0.1157	0.0735	0.0582	0.0489	0.0410	0.0354	0.0364	0.0366	0.0404	0.0363



3D screen shot



Hot spot position



MEASUREMENT 27

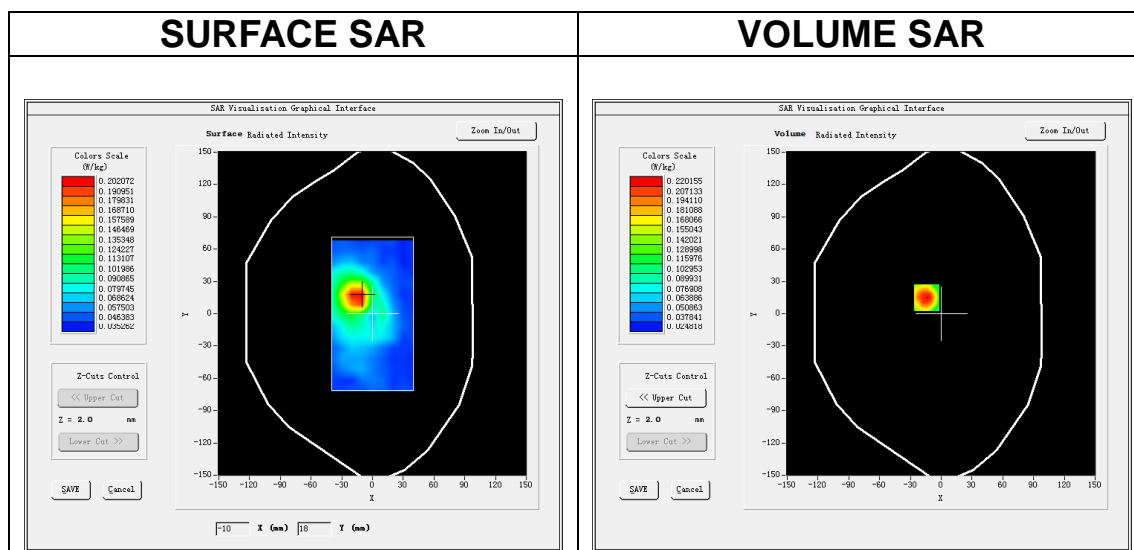
Date of measurement: 17/2/2022

A. Experimental conditions.

Area Scan	<u>dx=10mm dy=10mm, h= 2.00 mm</u>
ZoomScan	<u>7x7x12,dx=4mm dy=4mm dz=2mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body</u>
Band	<u>IEEE 802.11n U-NII</u>
Channels	<u>Middle</u>
Signal	<u>IEEE802.11n (Crest factor: 1.0)</u>

B. SAR Measurement Results

Frequency (MHz)	5580.000000
Relative permittivity (real part)	36.148825
Relative permittivity (imaginary part)	16.156569
Conductivity (S/m)	5.008536
Variation (%)	-3.510000

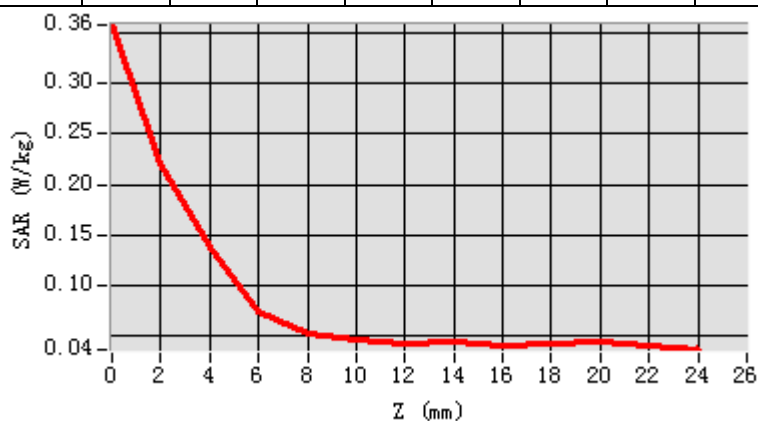


Maximum location: X=-14.00, Y=15.00

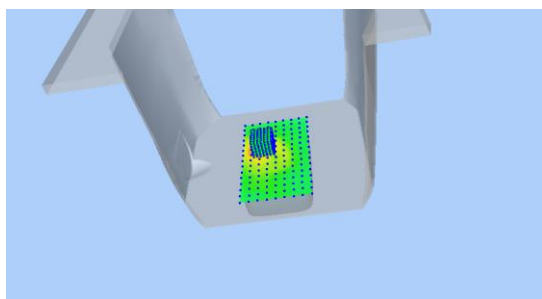
SAR Peak: 0.38 W/kg

SAR 10g (W/Kg)	0.078823
SAR 1g (W/Kg)	0.141380

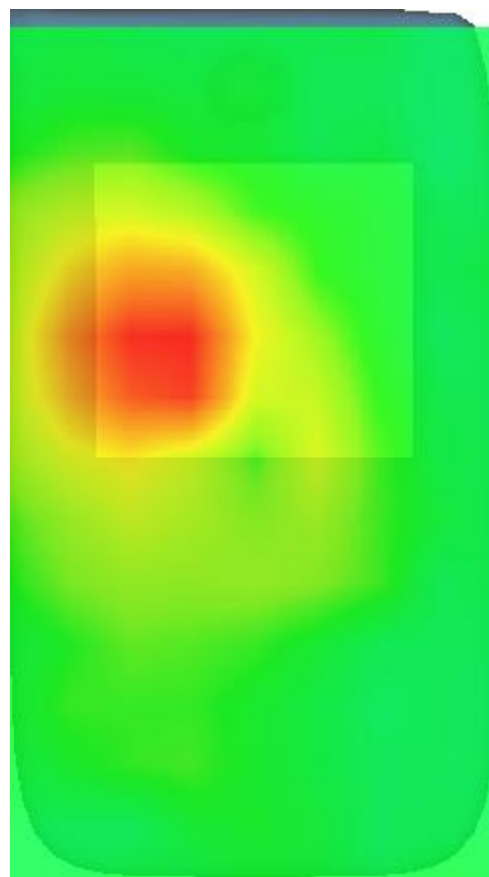
Z (m)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	0.3585	0.2202	0.1372	0.0735	0.0521	0.0455	0.0417	0.0445	0.0408	0.0412	0.0445	0.0402



3D screen shot



Hot spot position



14. Appendix D. Calibration Certificate

Table of contents
E Field Probe - SN 08/16 EPGO287
750 MHz Dipole - SN 03/15 DIP 0G750-355
835 MHz Dipole - SN 03/15 DIP 0G835-347
1800 MHz Dipole - SN 03/15 DIP 1G800-349
1900 MHz Dipole - SN 03/15 DIP 1G900-350
2450 MHz Dipole - SN 03/15 DIP 2G450-352
2600 MHz Dipole - SN 03/15 DIP 2G600-356
3700 MHz Dipole - SN 09/12 DIP 3G700-361
3900 MHz Dipole - SN 09/12 DIP 3G900-362
5000-6000 MHz Dipole - SN 13/14 WGA 33



COMOSAR E-Field Probe Calibration Report

Ref : ACR.60.1.21.MVGB.A

SHENZHEN NTEK TESTING TECHNOLOGY CO., LTD.

BUILDING E, FENDA SCIENCE PARK, SANWEI
COMMUNITY, XIXIANG STREET,
BAO'AN DISTRICT, SHENZHEN GUANGDONG, CHINA
MVG COMOSAR DOSIMETRIC E-FIELD PROBE
SERIAL NO.: SN 08/16 EPGO287

Calibrated at MVG

Z.I. de la pointe du diable
Technopôle Brest Iroise – 295 avenue Alexis de Rochon
29280 PLOUZANE - FRANCE

Calibration date: 03/01/2021



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

Summary:

This document presents the method and results from an accredited COMOSAR E-Field Probe calibration performed at MVG, using the CALIPROBE test bench, for use with a MVG COMOSAR system only. The test results covered by accreditation are traceable to the International System of Units (SI).



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.60.1.21.MVGB.A

	Name	Function	Date	Signature
Prepared by :	Jérôme Luc	Technical Manager	3/1/2021	<i>JLS</i>
Checked by :	Jérôme Luc	Technical Manager	3/1/2021	<i>JLS</i>
Approved by :	Yann Toutain	Laboratory Director	3/1/2021	<i>Yann Toutain</i>

2021.03.0
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+01'00'

PHILIPS

	Customer Name
Distribution :	SHENZHEN NTEK TESTING TECHNOLOGY CO., LTD.

Issue	Name	Date	Modifications
A	Jérôme Luc	3/1/2021	Initial release



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.60.1.21.MVGB.A

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.60.1.21.MVGB.A

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	SN 08/16 EPGO287
Product Condition (new / used)	Used
Frequency Range of Probe	0.15 GHz-6GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.211 MΩ Dipole 2: R2=0.199 MΩ Dipole 3: R3=0.199 MΩ

2 PRODUCT DESCRIPTION

2.1 GENERAL INFORMATION

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



Figure 1 – MVG COMOSAR Dosimetric E field Dipole

Probe Length	330 mm
Length of Individual Dipoles	2 mm
Maximum external diameter	8 mm
Probe Tip External Diameter	2.5 mm
Distance between dipoles / probe extremity	1 mm

3 MEASUREMENT METHOD

The IEEE 1528, FCC KDB865664 D01, CENELEC EN62209 and CEI/IEC 62209 standards provide recommended practices for the probe calibrations, including the performance characteristics of interest and methods by which to assess their affect. All calibrations / measurements performed meet the fore mentioned standards.

3.1 LINEARITY

The evaluation of the linearity was done in free space using the waveguide, performing a power sweep to cover the SAR range 0.01W/kg to 100W/kg.



COMOSAR E-FIELD PROBE CALIBRATION REPORT

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3.2 SENSITIVITY

The sensitivity factors of the three dipoles were determined using a two step calibration method (air and tissue simulating liquid) using waveguides as outlined in the standards.

3.3 LOWER DETECTION LIMIT

The lower detection limit was assessed using the same measurement set up as used for the linearity measurement. The required lower detection limit is 10 mW/kg.

3.4 ISOTROPY

The axial isotropy was evaluated by exposing the probe to a reference wave from a standard dipole with the dipole mounted under the flat phantom in the test configuration suggested for system validations and checks. The probe was rotated along its main axis from 0 to 360 degrees in 15-degree steps. The hemispherical isotropy is determined by inserting the probe in a thin plastic box filled with tissue-equivalent liquid, with the plastic box illuminated with the fields from a half wave dipole. The dipole is rotated about its axis (0°–180°) in 15° increments. At each step the probe is rotated about its axis (0°–360°).

3.1 BOUNDARY EFFECT

The boundary effect is defined as the deviation between the SAR measured data and the expected exponential decay in the liquid when the probe is oriented normal to the interface. To evaluate this effect, the liquid filled flat phantom is exposed to fields from either a reference dipole or waveguide. With the probe normal to the phantom surface, the peak spatial average SAR is measured and compared to the analytical value at the surface.

The boundary effect uncertainty can be estimated according to the following uncertainty approximation formula based on linear and exponential extrapolations between the surface and $d_{be} + d_{step}$ along lines that are approximately normal to the surface:

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

where

- SAR_{uncertainty} is the uncertainty in percent of the probe boundary effect
- d_{be} is the distance between the surface and the closest *zoom-scan* measurement point, in millimetre
- Δ_{step} is the separation distance between the first and second measurement points that are closest to the phantom surface, in millimetre, assuming the boundary effect at the second location is negligible
- δ is the minimum penetration depth in millimetres of the head tissue-equivalent liquids defined in this standard, i.e., $\delta \approx 14$ mm at 3 GHz;
- ΔSAR_{be} in percent of SAR is the deviation between the measured SAR value, at the distance d_{be} from the boundary, and the analytical SAR value.



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.60.1.21.MVGB.A

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

4 MEASUREMENT UNCERTAINTY

The guidelines outlined in the IEEE 1528, OET 65 Bulletin C, CENELEC EN50361 and CEI/IEC 62209 standards were followed to generate the measurement uncertainty associated with an E-field probe calibration using the waveguide technique. All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

Uncertainty analysis of the probe calibration in waveguide					
ERROR SOURCES	Uncertainty value (%)	Probability Distribution	Divisor	ci	Standard Uncertainty (%)
Expanded uncertainty 95 % confidence level k = 2					14 %

5 CALIBRATION MEASUREMENT RESULTS

Calibration Parameters	
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

5.1 SENSITIVITY IN AIR

Normx dipole 1 (µV/(V/m) ²)	Normy dipole 2 (µV/(V/m) ²)	Normz dipole 3 (µV/(V/m) ²)
0.72	0.66	0.77

DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
107	110	110

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

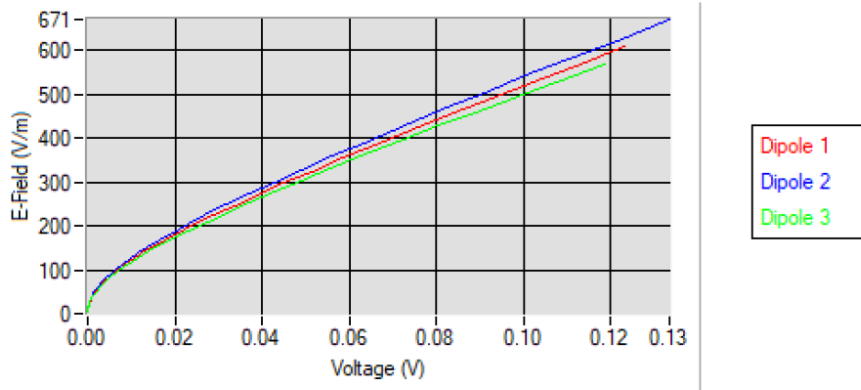
$$E = \sqrt{E_1^2 + E_2^2 + E_3^2}$$



COMOSAR E-FIELD PROBE CALIBRATION REPORT

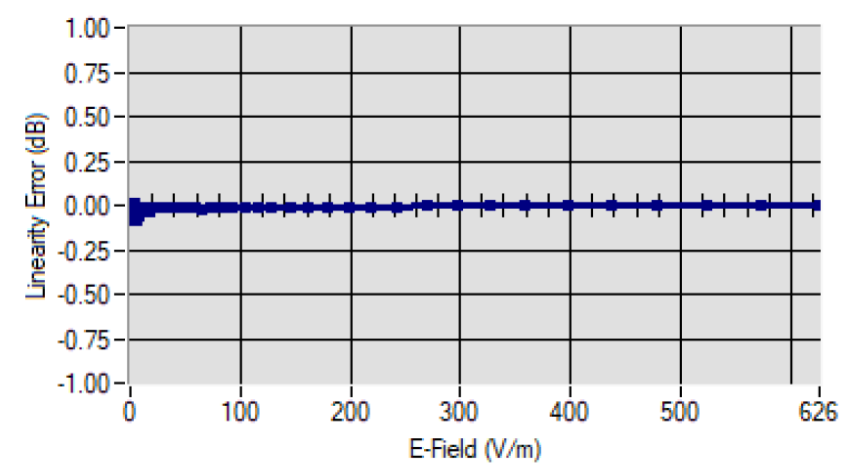
Ref: ACR.60.1.21.MVGB.A

Calibration curves



5.2 LINEARITY

Linearity



Linearity: +/-1.90% (+/-0.08dB)