

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	Plot
			1-g	10-g						
1RB										
Front Side	132322/1745	20M QPSK(1,49)	0.238	0.125	-3.95	23.48	24.00	0.268	2025/9/04	
Back Side	132322/1745	20M QPSK(1,49)	0.224	0.118	2.26	23.48	24.00	0.252	2025/9/04	
Left Side	132322/1745	20M QPSK(1,49)	0.039	0.020	1.51	23.48	24.00	0.044	2025/9/04	
Right Side	132322/1745	20M QPSK(1,49)	0.387	0.210	-0.28	23.48	24.00	0.436	2025/9/04	16#
Right Side	132072/1720	20M QPSK(1,49)	0.337	0.184	-1.25	23.12	24.00	0.413	2025/9/04	
Right Side	132572/1770	20M QPSK(1,49)	0.348	0.192	-2.68	23.55	24.00	0.386	2025/9/04	
Bottom Side	132322/1745	20M QPSK(1,49)	0.160	0.082	-2.34	23.48	24.00	0.180	2025/9/04	
50%RB										
Front Side	132322/1745	20M QPSK(50,0)	0.123	0.071	0.80	22.13	22.50	0.134	2025/9/04	
Back Side	132322/1745	20M QPSK(50,0)	0.121	0.065	-4.53	22.13	22.50	0.132	2025/9/04	
Left Side	132322/1745	20M QPSK(50,0)	0.022	0.011	-4.18	22.13	22.50	0.024	2025/9/04	
Right Side	132322/1745	20M QPSK(50,0)	0.228	0.114	-4.90	22.13	22.50	0.248	2025/9/04	
Bottom Side	132322/1745	20M QPSK(50,0)	0.093	0.049	-4.78	22.13	22.50	0.101	2025/9/04	

9.1.13. SAR measurement Result of WLAN2.4G

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	Plot
			1-g	10-g						
Front Side	6/2437	802.11b	0.043	0.020	1.82	15.77	16.00	0.045	2025/9/01	
Back Side	6/2437	802.11b	0.060	0.025	-1.37	15.77	16.00	0.063	2025/9/14	

NOTE: Body-worn SAR test results of WLAN 2.4G

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	Plot
			1-g	10-g						
Front Side	6/2437	802.11b	0.043	0.020	1.82	15.77	16.00	0.045	2025/9/01	
Back Side	6/2437	802.11b	0.060	0.025	-1.37	15.77	16.00	0.063	2025/9/01	
Left Side	6/2437	802.11b	0.151	0.063	-2.28	15.77	16.00	0.159	2025/9/01	7#
Left Side	1/2412	802.11b	0.137	0.072	-1.41	15.57	16.00	0.151	2025/9/01	
Left Side	11/2462	802.11b	0.138	0.062	-1.57	15.67	16.00	0.149	2025/9/01	
Bottom Side	6/2437	802.11b	0.039	0.016	0.93	15.77	16.00	0.041	2025/9/01	

NOTE: 1.Hotspot SAR test results of WLAN2.4G

2. Tested by : Max Zhou

9.1.14. SAR measurement Result of Bluetooth EDR

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	Plot
			1-g	10-g						
Front Side	78/2480	GFSK	0.028	0.012	-0.41	8.77	9.00	0.030	2025/9/01	
Back Side	78/2480	GFSK	0.046	0.020	1.75	8.77	9.00	0.049	2025/9/01	

NOTE: Body-worn SAR test results of Bluetooth EDR

Test Position of Body-Worn with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	78/2480	GFSK	0.028	0.012	-0.41	8.77	9.00	0.030	2025/9/01	
Back Side	78/2480	GFSK	0.046	0.020	1.75	8.77	9.00	0.049	2025/9/01	
Left Side	78/2480	GFSK	0.100	0.046	-4.07	8.77	9.00	0.105	2025/9/01	5#
Bottom Side	78/2480	GFSK	0.030	0.013	3.15	8.77	9.00	0.032	2025/9/01	
Left Side	0/2402	GFSK	0.085	0.041	-1.25	7.22	9.00	0.128	2025/9/01	
Left Side	39/2441	GFSK	0.074	0.034	2.61	8.10	9.00	0.091	2025/9/01	

NOTE: 1.Hotspot SAR test results of Bluetooth EDR

2. Tested by : Max Zhou

9.1.15. SAR measurement Result of Bluetooth BLE

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	Plot
			1-g	10-g						
Front Side	19/2440	GFSK	0.020	0.018	-1.28	6.77	7.00	0.021	2025/9/01	
Back Side	19/2440	GFSK	0.032	0.017	-2.84	6.77	7.00	0.034	2025/9/01	

NOTE: Body-worn SAR test results of Bluetooth BLE

Test Position of Body-Worn with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	19/2440	GFSK	0.020	0.018	-1.28	6.77	7.00	0.021	2025/9/01	
Back Side	19/2440	GFSK	0.032	0.017	-2.84	6.77	7.00	0.034	2025/9/01	
Left Side	19/2440	GFSK	0.062	0.033	3.22	6.77	7.00	0.065	2025/9/01	4#
Left Side	0/2402	GFSK	0.052	0.029	-1.54	6.33	7.00	0.061	2025/9/01	
Left Side	39/2480	GFSK	0.054	0.031	-1.40	6.95	7.00	0.055	2025/9/01	
Bottom Side	19/2440	GFSK	0.021	0.011	0.13	6.77	7.00	0.022	2025/9/01	

NOTE: 1.Hotspot SAR test results of Bluetooth BLE

2. Tested by : Max Zhou

9.1.16. SAR measurement Result of WLAN5.2G

Test Position of Body-Worn with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	40/5200	802.11a	0.060	0.020	0.88	9.47	10.00	0.068	2025/9/15	
Back Side	40/5200	802.11a	0.088	0.030	-2.66	9.47	10.00	0.099	2025/9/15	

NOTE: Body-worn SAR test results of WLAN5.2G

Test Position of Hotspot with 10mm	Test channel /Freq.	Mode	SAR Value (W/kg)		Power Drift(%)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR 1-g (W/Kg)	Date	Plot
			1-g	10-g						
Front Side	40/5200	802.11a	0.060	0.020	0.88	9.47	10.00	0.068	2025/9/15	
Back Side	40/5200	802.11a	0.088	0.030	-2.66	9.47	10.00	0.099	2025/9/15	
Left Side	40/5200	802.11a	0.208	0.071	1.34	9.47	10.00	0.235	2025/9/15	6#
Left Side	36/5180	802.11a	0.177	0.063	-1.69	9.67	10.00	0.191	2025/9/15	
Left Side	48/5240	802.11a	0.182	0.052	1.34	8.96	10.00	0.231	2025/9/15	
Bottom Side	40/5200	802.11a	0.051	0.017	2.45	9.47	10.00	0.058	2025/9/15	

NOTE: 1.Hotspot SAR test results of WLAN5.2G

2. Tested by : Jack Peng

9.2. Simultaneous Transmission Analysis

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

- 1) Scalar SAR summation $< 1.6\text{W/kg}$.
- 2) $\text{SPLSR} = (\text{SAR}_1 + \text{SAR}_2)^{1.5} / (\text{min. separation distance, mm})$, 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 $\text{SPLSR} \leq 0.04$, 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	0.65	0.045	0.695	N/A	N/A
	Back Side	0.823	0.063	0.886	N/A	N/A
Hotspot	Front Side	0.65	0.045	0.695	N/A	N/A
	Back Side	0.823	0.063	0.886	N/A	N/A
	Left Side	0.111	0.162	0.273	N/A	N/A
	Right Side	1.102	N/A	1.102	N/A	N/A
	Top Side	N/A	N/A	N/A	N/A	N/A
	Bottom Side	0.452	0.041	0.493	N/A	N/A

Test Position		Scaled SAR _{MAX}		Σ 1-g SAR (W/Kg)	SPLSR	Remark
		WWAN	NII			
Body-Worn	Front Side	0.65	0.068	0.718	N/A	N/A
	Back Side	0.823	0.099	0.922	N/A	N/A
Hotspot	Front Side	0.65	0.068	0.718	N/A	N/A
	Back Side	0.823	0.099	0.922	N/A	N/A
	Left Side	0.111	0.235	0.346	N/A	N/A
	Right Side	1.102	N/A	1.102	N/A	N/A
	Top Side	N/A	N/A	N/A	N/A	N/A
	Bottom Side	0.452	0.058	0.510	N/A	N/A

Test Position		Scaled SAR _{MAX}		Σ 1-g SAR (W/Kg)	SPLSR	Remark
		WWAN	DSS			
Body-Worn	Front Side	0.65	0.03	0.68	N/A	N/A
	Back Side	0.823	0.049	0.872	N/A	N/A
Hotspot	Front Side	0.65	0.03	0.68	N/A	N/A
	Back Side	0.823	0.049	0.872	N/A	N/A
	Left Side	0.111	0.128	0.239	N/A	N/A

	Right Side	1.102	N/A	1.102	N/A	N/A
	Top Side	N/A	N/A	N/A	N/A	N/A
	Bottom Side	0.452	0.032	0.484	N/A	N/A

Test Position		Scaled SAR _{MAX}		Σ 10-g SAR (W/Kg)	SPLSR	Remark
		WWAN	DSS			
Extremity	Back Side	2.379	0.181	2.560	N/A	N/A

10. Appendix A. Photo documentation

Refer to appendix Test Setup photo---SAR

11. Appendix B. System Check Plots

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MEASUREMENT 6 System Performance Check - 2600MHz
MEASUREMENT 7 System Performance Check - 5200MHz

1# System check at 750 MHz
Date of measurement: 5/9/2025

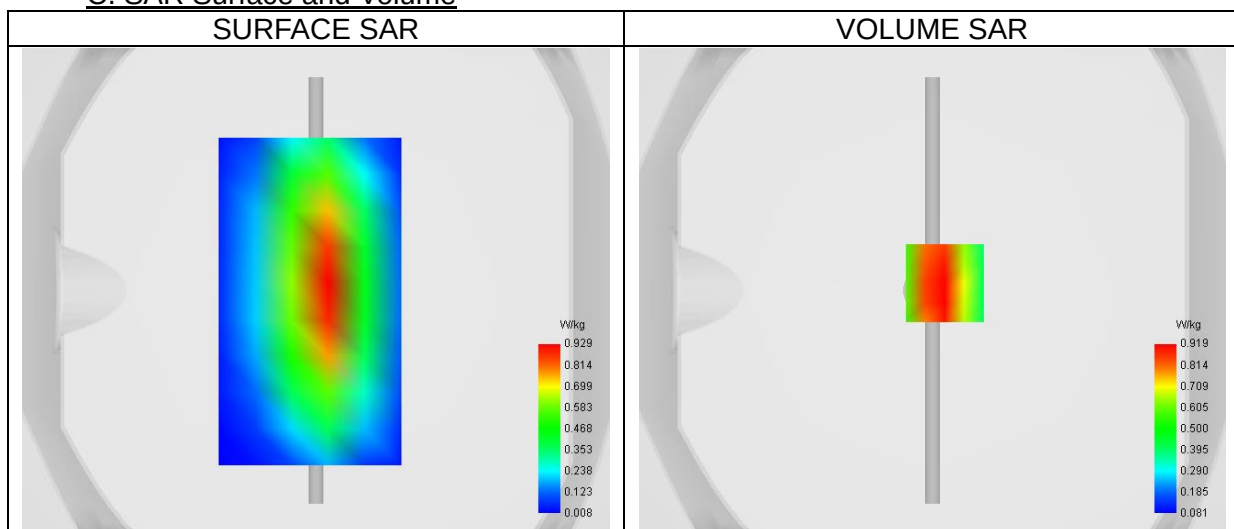
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.39
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW750
Signal	CW
Channels/Frequency	Middle

B. Permittivity

Middle TX Frequency (MHz)	750.00
Relative permittivity (real part)	40.84
Relative permittivity (imaginary part)	21.53
Conductivity (S/m)	0.90

C. SAR Surface and Volume



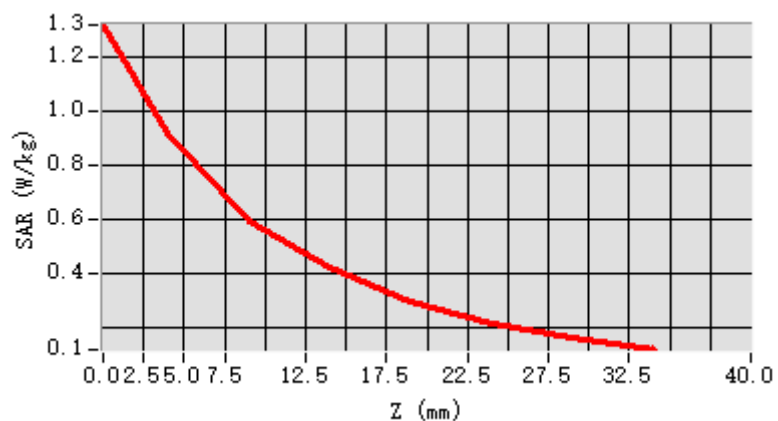
Maximum location: X=5.00, Y=3.00 ; SAR Peak: 1.31 W/kg

D. SAR 1g & 10g

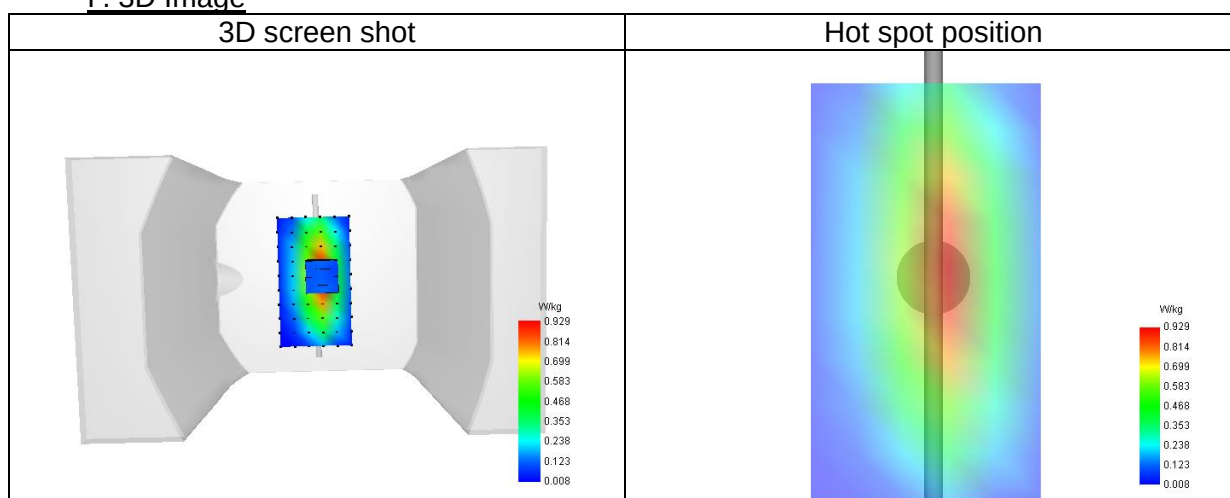
SAR 10g (W/Kg)	0.564
SAR 1g (W/Kg)	0.894
Variation (%)	-0.34
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	67.25

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.317	0.919	0.592	0.423	0.295	0.214	0.166



F. 3D Image



2# System check at 835 MHz
Date of measurement: 2/9/2025

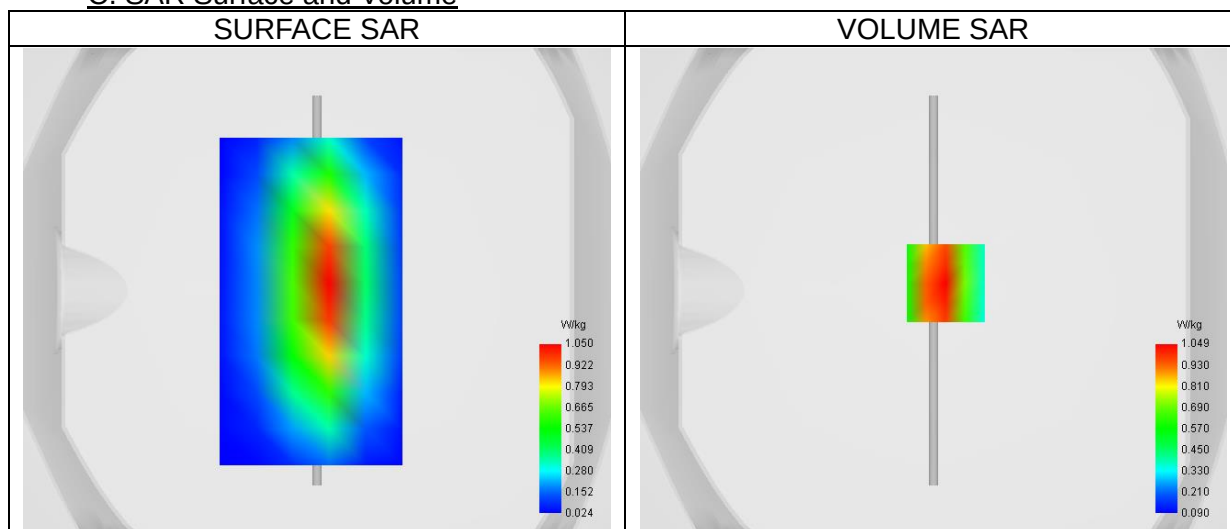
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.32
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW835
Signal	CW
Channels/Frequency	Middle

B. Permittivity

Middle TX Frequency (MHz)	835.00
Relative permittivity (real part)	41.77
Relative permittivity (imaginary part)	19.61
Conductivity (S/m)	0.91

C. SAR Surface and Volume



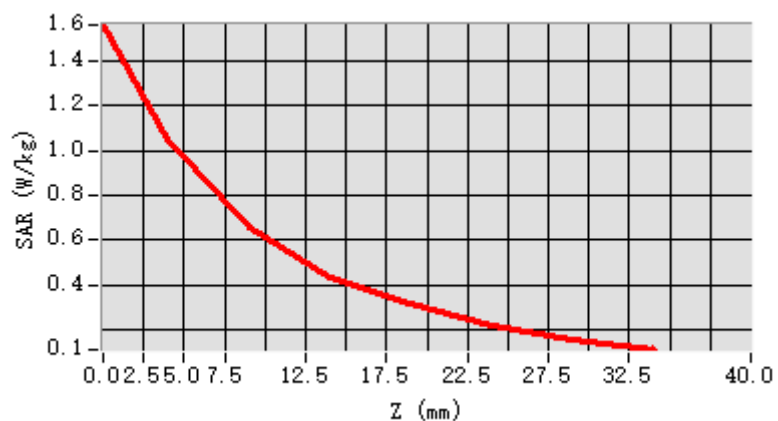
Maximum location: X=5.00, Y=3.00 ; SAR Peak: 1.59 W/kg

D. SAR 1g & 10g

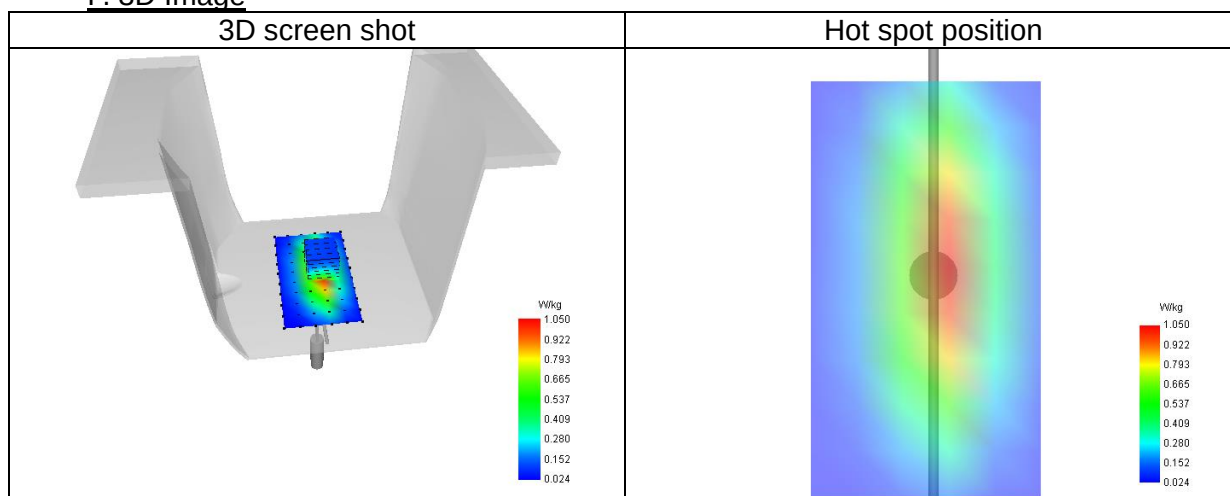
SAR 10g (W/Kg)	0.606
SAR 1g (W/Kg)	1.016
Variation (%)	0.12
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	62.70

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.563	1.049	0.658	0.431	0.313	0.216	0.154



F. 3D Image



3# System check at 1800 MHz
Date of measurement: 1/10/2025

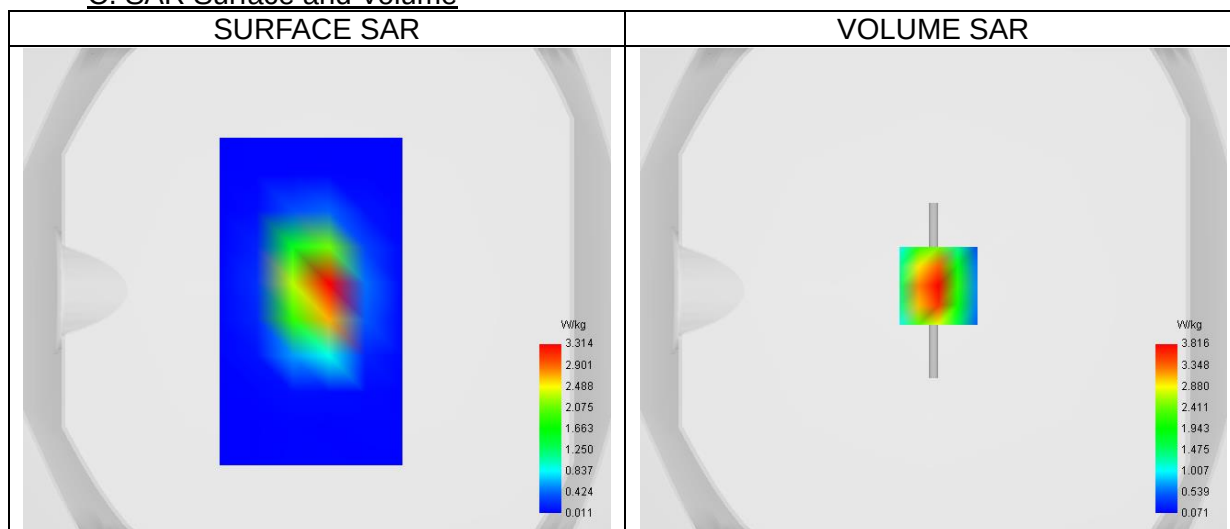
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.50
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW1800
Signal	CW
Channels/Frequency	Middle

B. Permittivity

Middle TX Frequency (MHz)	1800.00
Relative permittivity (real part)	38.55
Relative permittivity (imaginary part)	13.66
Conductivity (S/m)	1.37

C. SAR Surface and Volume



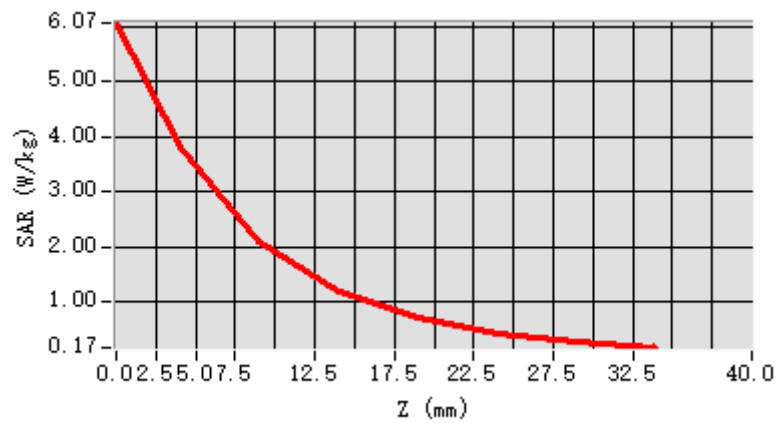
Maximum location: X=2.00, Y=2.00 ; SAR Peak: 6.24 W/kg

D. SAR 1g & 10g

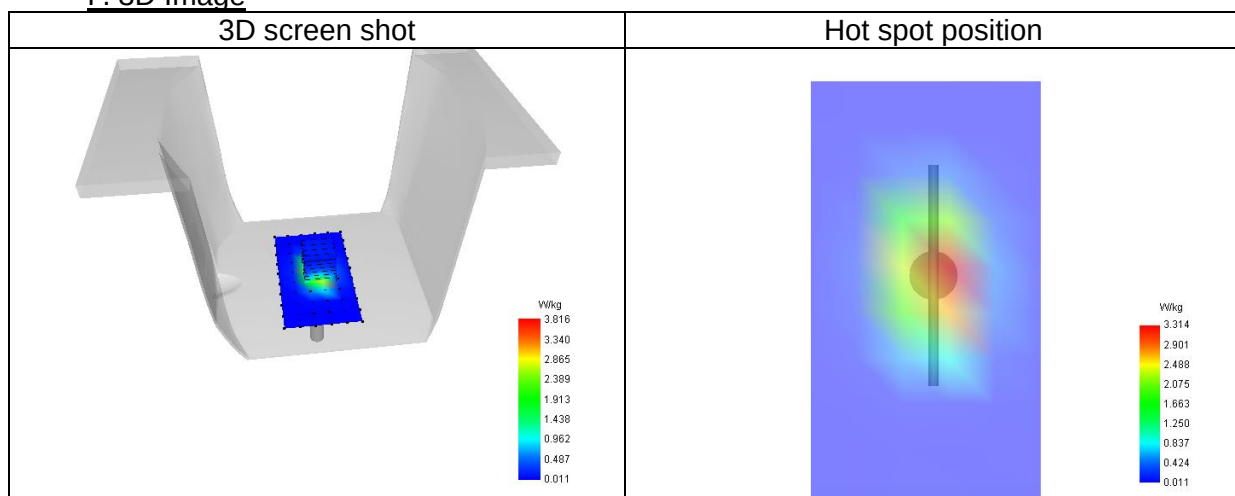
SAR 10g (W/Kg)	1.847
SAR 1g (W/Kg)	3.655
Variation (%)	-0.33
Horizontal validation criteria: minimum distance (mm)	11.31
Vertical validation criteria: SAR ratio M2/M1 (%)	54.61

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.073	3.816	2.084	1.190	0.702	0.419	0.271



F. 3D Image



4# System check at 1900 MHz

Date of measurement: 3/9/2025

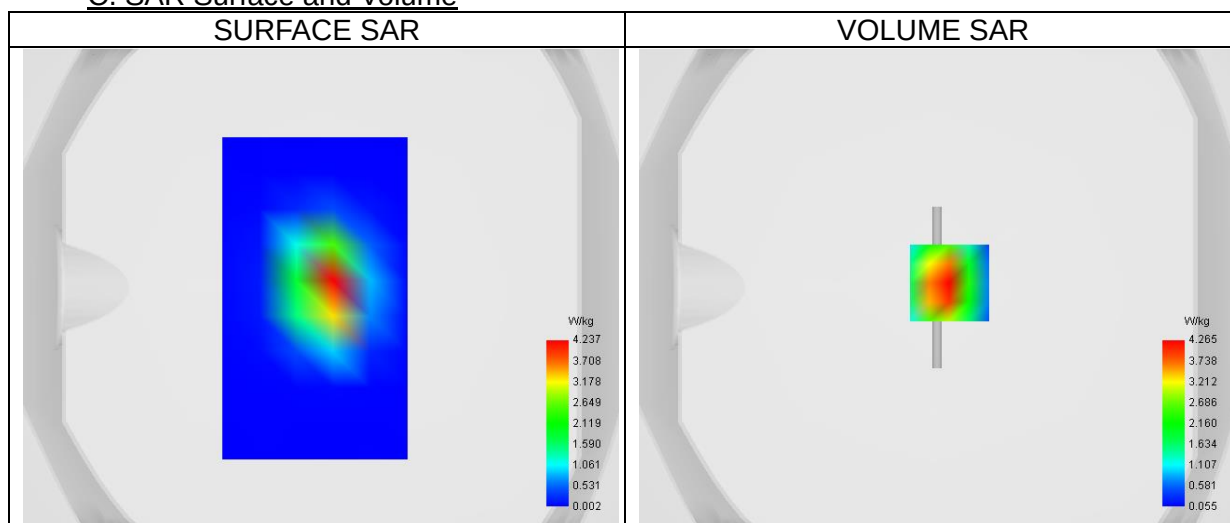
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.58
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW1900
Signal	CW
Channels/Frequency	Middle

B. Permittivity

Middle TX Frequency (MHz)	1900.00
Relative permittivity (real part)	38.08
Relative permittivity (imaginary part)	13.34
Conductivity (S/m)	1.41

C. SAR Surface and Volume



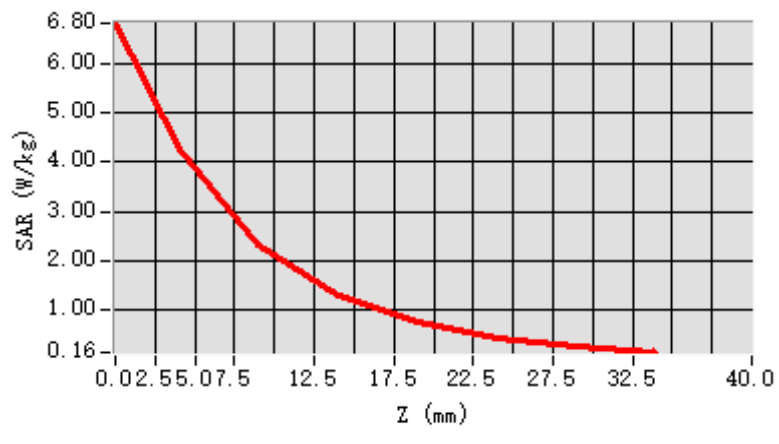
Maximum location: X=5.00, Y=2.00 ; SAR Peak: 6.99 W/kg

D. SAR 1g & 10g

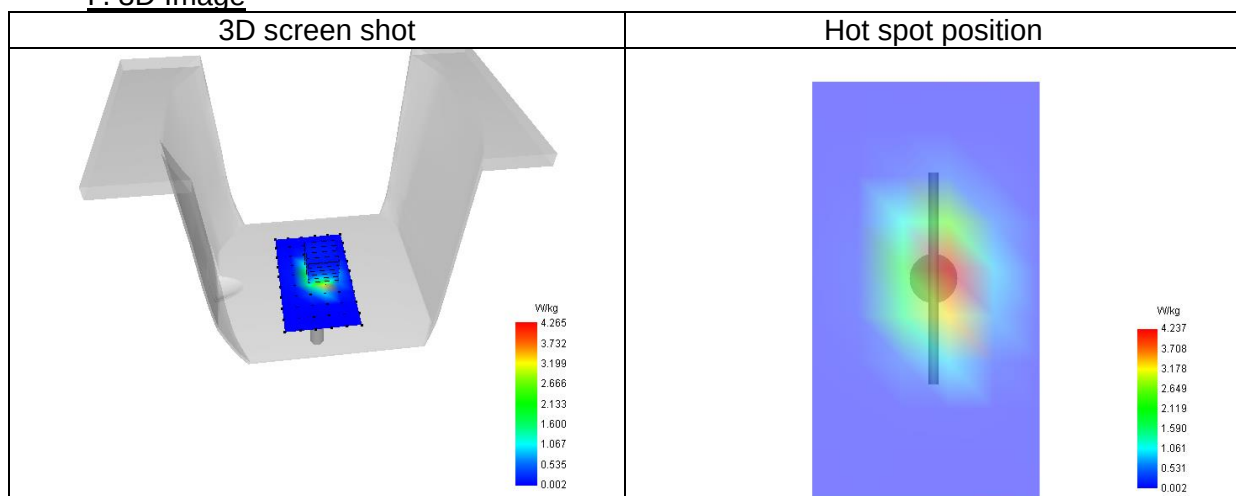
SAR 10g (W/Kg)	2.068
SAR 1g (W/Kg)	4.201
Variation (%)	-0.02
Horizontal validation criteria: minimum distance (mm)	11.31
Vertical validation criteria: SAR ratio M2/M1 (%)	54.38

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	6.803	4.265	2.319	1.316	0.756	0.444	0.264



F. 3D Image



5# System check at 2450 MHz

Date of measurement: 1/9/2025

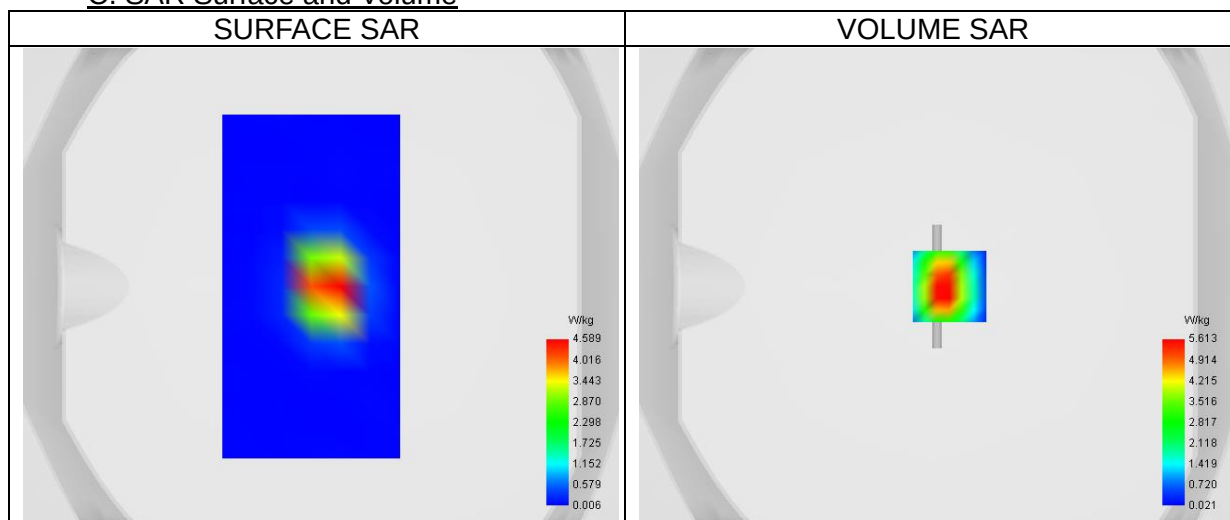
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.63
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW2450
Signal	CW
Channels/Frequency	Middle

B. Permittivity

Middle TX Frequency (MHz)	2450.00
Relative permittivity (real part)	37.92
Relative permittivity (imaginary part)	13.09
Conductivity (S/m)	1.78

C. SAR Surface and Volume



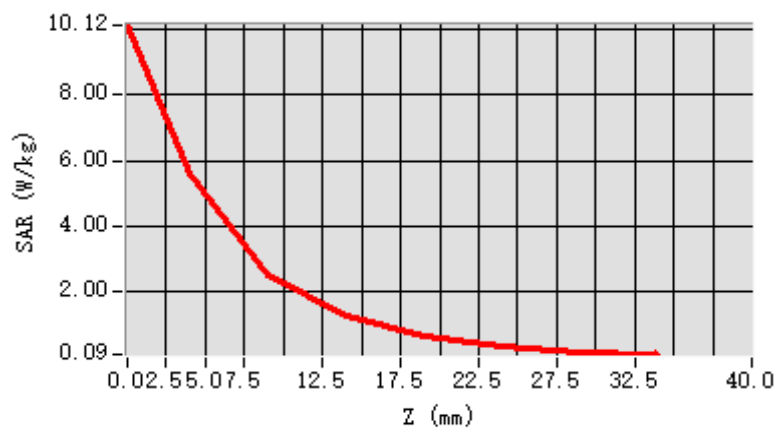
Maximum location: X=5.00, Y=0.00 ; SAR Peak: 10.14 W/kg

D. SAR 1g & 10g

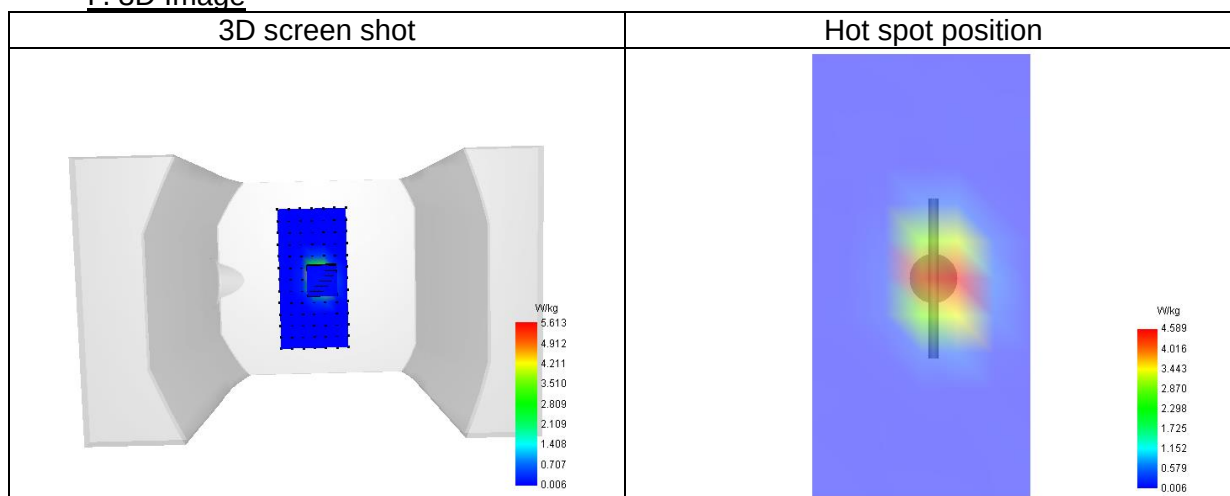
SAR 10g (W/Kg)	2.322
SAR 1g (W/Kg)	5.359
Variation (%)	-1.32
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	48.28

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	10.116	5.613	2.517	1.265	0.673	0.358	0.180



F. 3D Image



6# System check at 2600 MHz
Date of measurement: 14/9/2025

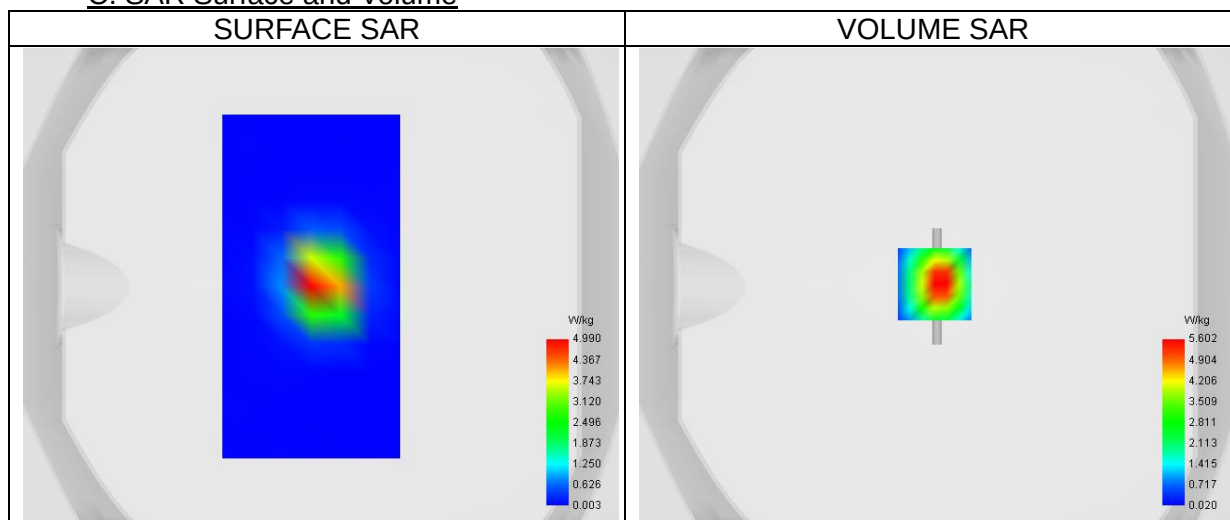
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.52
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW2600
Signal	CW
Channels/Frequency	Middle

B. Permittivity

Middle TX Frequency (MHz)	2600.00
Relative permittivity (real part)	39.84
Relative permittivity (imaginary part)	13.65
Conductivity (S/m)	1.97

C. SAR Surface and Volume



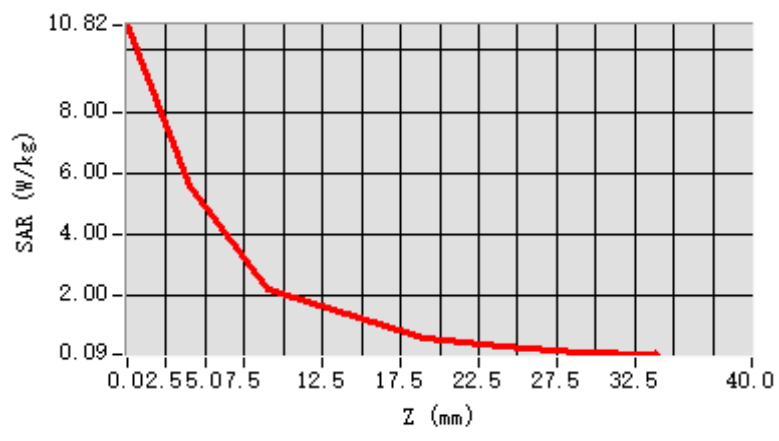
Maximum location: X=-1.00, Y=1.00 ; SAR Peak: 9.55 W/kg

D. SAR 1g & 10g

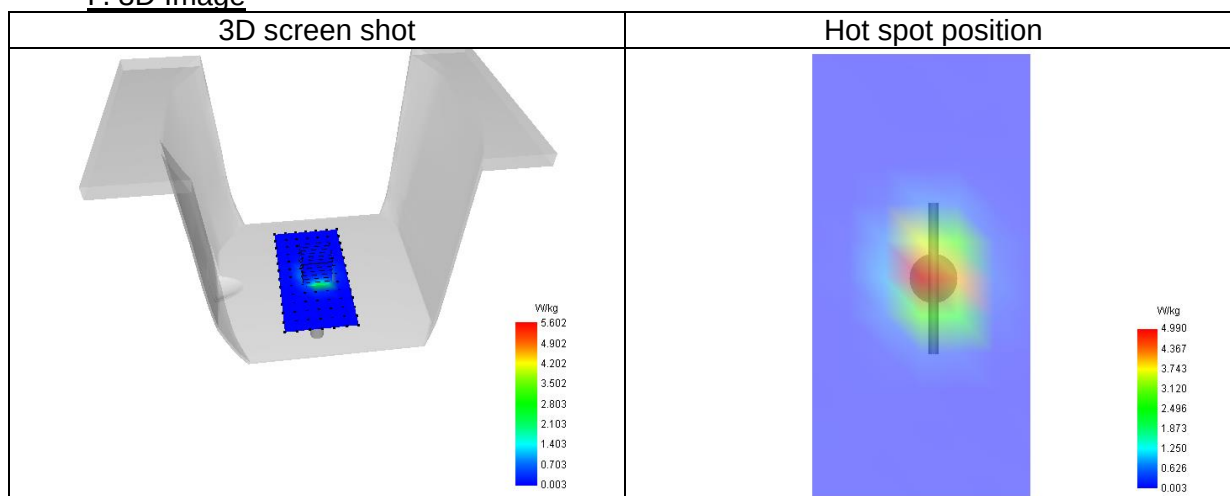
SAR 10g (W/Kg)	2.321
SAR 1g (W/Kg)	5.262
Variation (%)	0.14
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	51.44

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	10.821	5.602	2.174	1.419	0.626	0.345	0.149



F. 3D Image



7# System check at 5200 MHz
Date of measurement: 15/9/2025

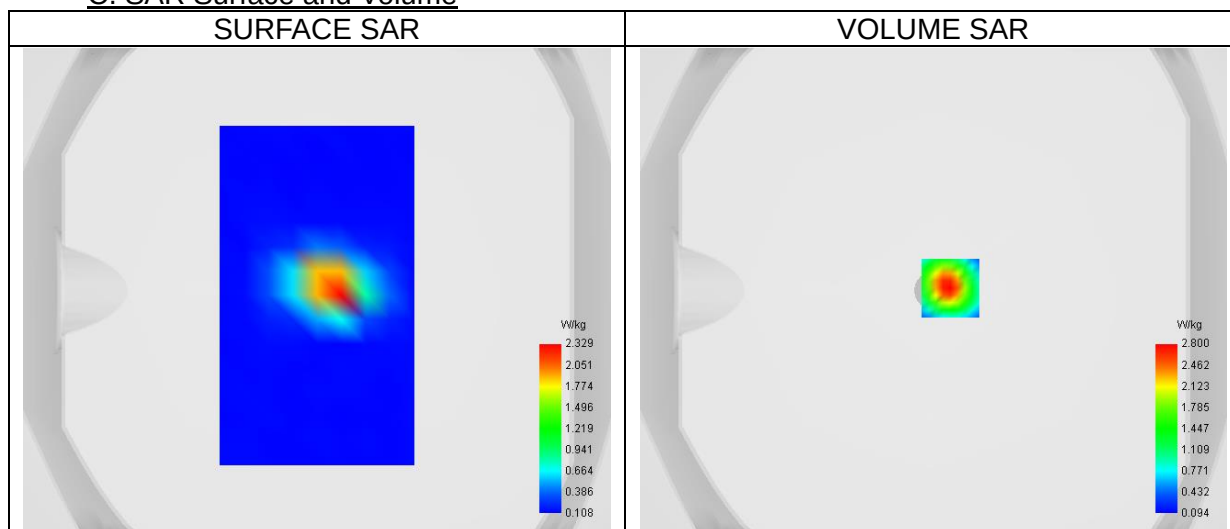
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.37
Area Scan	dx=10mm dy=10mm, Complete
Zoom Scan	9x9x16,dx=3mm dy=3mm dz=1.5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	CW5200
Channels/Frequency	Middle
Signal	CW

B. Permittivity

Middle TX Frequency (MHz)	5200.000
Relative permittivity (real part)	37.12
Relative permittivity (imaginary part)	15.82
Conductivity (S/m)	4.57

C. SAR Surface and Volume



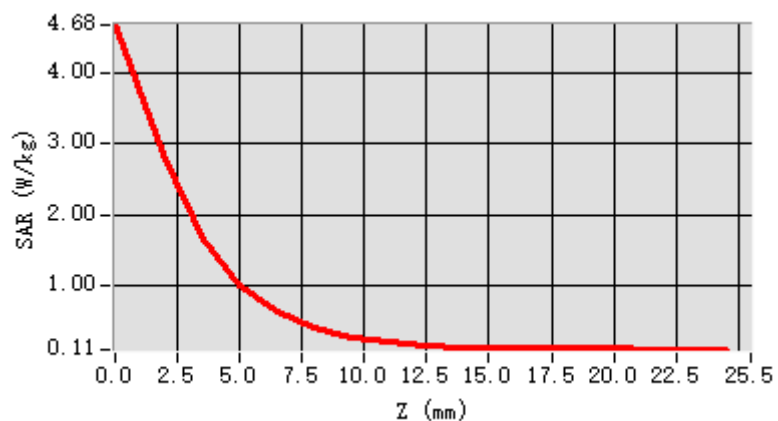
Maximum location: X=7.00, Y=1.00 ; SAR Peak: 5.04 W/kg

D. SAR 1g & 10g

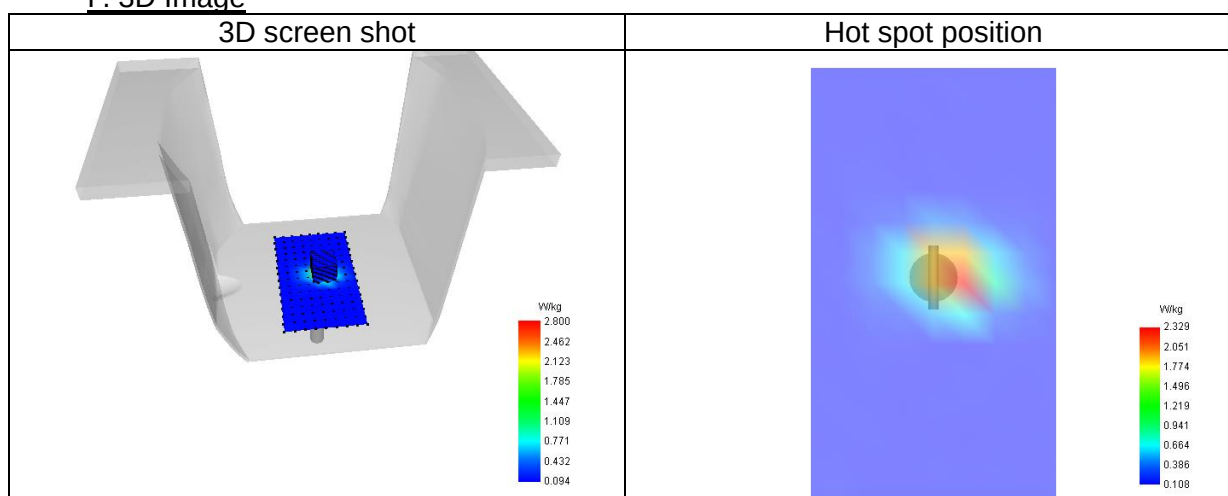
SAR 10g (W/Kg)	0.553
SAR 1g (W/Kg)	1.621
Variation (%)	1.28
Horizontal validation criteria: minimum distance (mm)	9.00
Vertical validation criteria: SAR ratio M2/M1 (%)	58.75

E. Z Axis Scan

Z (mm)	0.0	2.0	3.5	5.0	6.5	8.0	9.5	11.	12.	14.	15.	17.	18.	20.	21.	23.
	0	0	0	0	0	0	0	00	50	00	50	00	50	00	50	00
SAR (W/Kg)	4.6	2.8	1.6	1.0	0.6	0.4	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	75	00	45	12	41	12	86	15	78	39	40	30	27	25	08	15



F. 3D Image



12. Appendix C. Plots of High SAR Measurement

- 1# SAR Measurement at Band 2 (1900) (Body, Validation Plane)**
- 2# SAR Measurement at Band 4 (1700) (Body, Validation Plane)**
- 3# SAR Measurement at Band 5 (850) (Body, Validation Plane)**
- 4# SAR Measurement at Bluetooth (Body, Validation Plane)**
- 5# SAR Measurement at Bluetooth (Body, Validation Plane)**
- 6# SAR Measurement at U-NII-1 (Body, Validation Plane)**
- 7# SAR Measurement at ISM (Body, Validation Plane)**
- 8# SAR Measurement at LTE band 2 (Body, Validation Plane)**
- 9# SAR Measurement at LTE band 4 (Body, Validation Plane)**
- 10# SAR Measurement at LTE band 5 (Body, Validation Plane)**
- 11# SAR Measurement at LTE band 7 (Body, Validation Plane)**
- 12# SAR Measurement at LTE band 12 (Body, Validation Plane)**
- 13# SAR Measurement at LTE band 13 (Body, Validation Plane)**
- 14# SAR Measurement at LTE band 19 (Body, Validation Plane)**
- 15# SAR Measurement at LTE band 41 (Body, Validation Plane)**
- 16# SAR Measurement at LTE band 66 (Body, Validation Plane)**

1# SAR Measurement at Band 2 (1900) (Body, Validation Plane)

Date of measurement: 3/9/2025

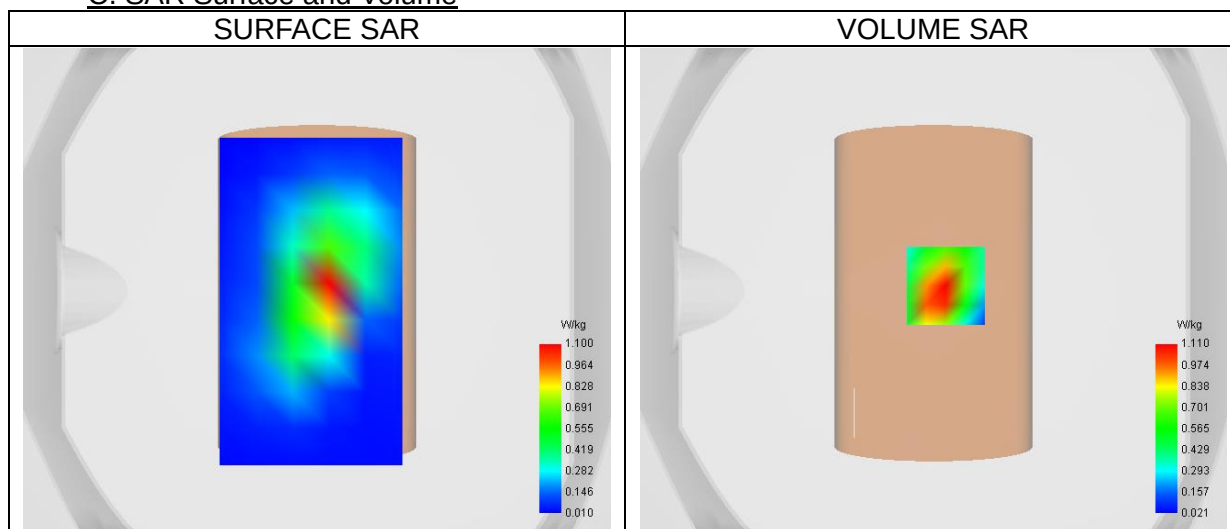
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.58
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Body
Band	Band 2 (1900)
Signal	WCDMA
Channels/Frequency	Middle (9400)/ frequency 1880.00 Mhz
Mode	Release 99
Connection Type	RMC, 12.2 kbps

B. Permittivity

Middle TX Frequency (MHz)	1880.00
Relative permittivity (real part)	38.17
Relative permittivity (imaginary part)	13.36
Conductivity (S/m)	1.40

C. SAR Surface and Volume



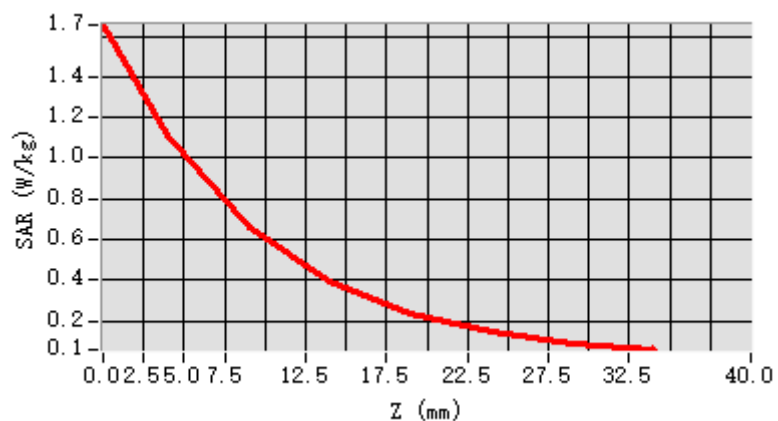
Maximum location: X=5.00, Y=2.00 ; SAR Peak: 1.72 W/kg

D. SAR 1g & 10g

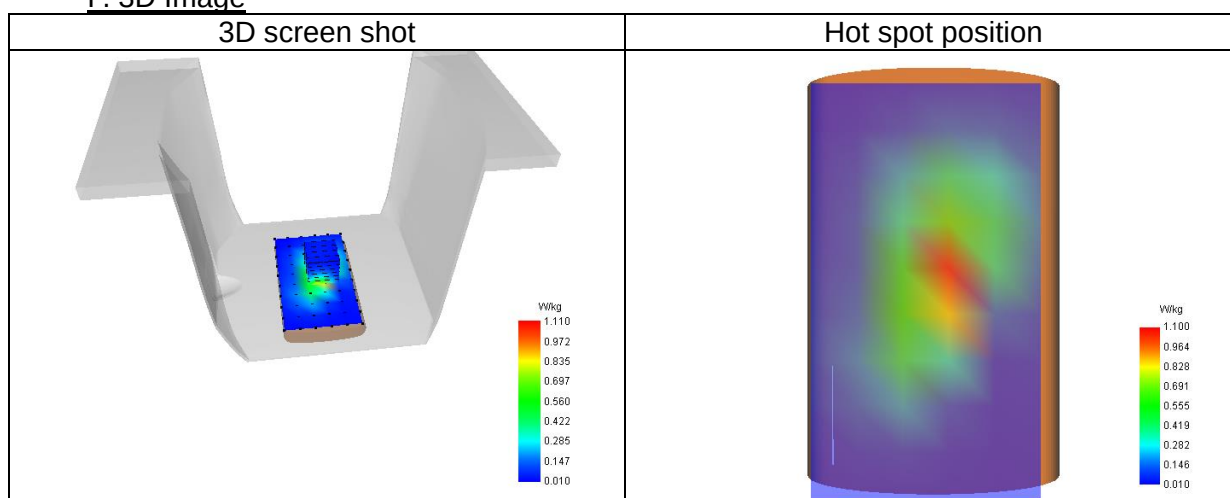
SAR 10g (W/Kg)	0.556
SAR 1g (W/Kg)	1.072
Variation (%)	-0.76
Horizontal validation criteria: minimum distance (mm)	11.31
Vertical validation criteria: SAR ratio M2/M1 (%)	59.35

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.656	1.110	0.659	0.396	0.235	0.145	0.090



F. 3D Image



2# SAR Measurement at Band 4 (1700) (Body, Validation Plane)

Date of measurement: 1/10/2025

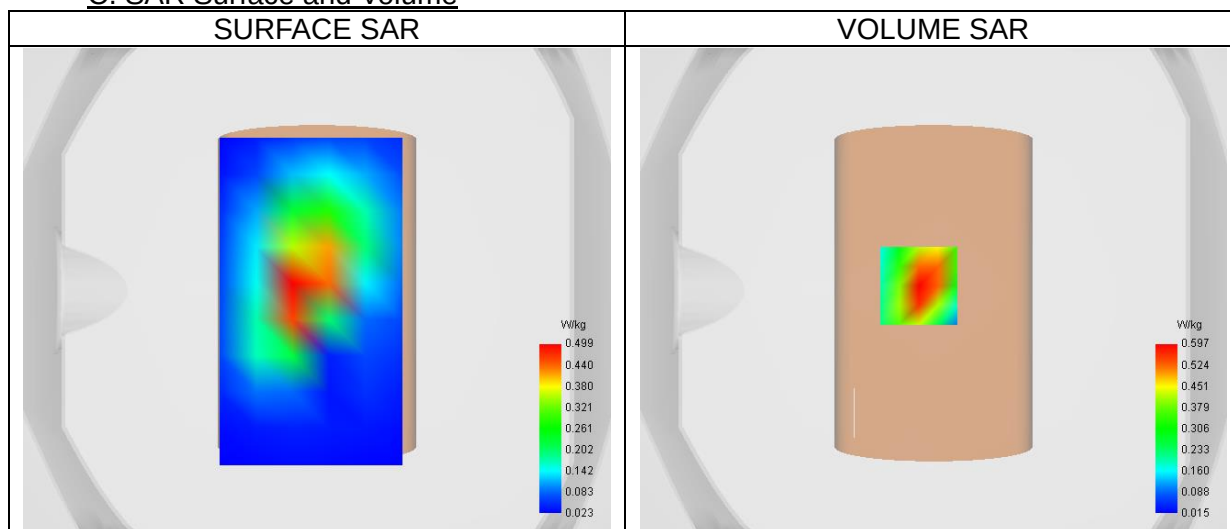
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.50
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Body
Band	Band 4 (1700)
Signal	WCDMA
Channels/Frequency	Middle (1413)/ frequency 1732.60 Mhz
Mode	Release 99
Connection Type	RMC, 12.2 kbps

B. Permittivity

Middle TX Frequency (MHz)	1732.60
Relative permittivity (real part)	39.00
Relative permittivity (imaginary part)	13.66
Conductivity (S/m)	1.31

C. SAR Surface and Volume



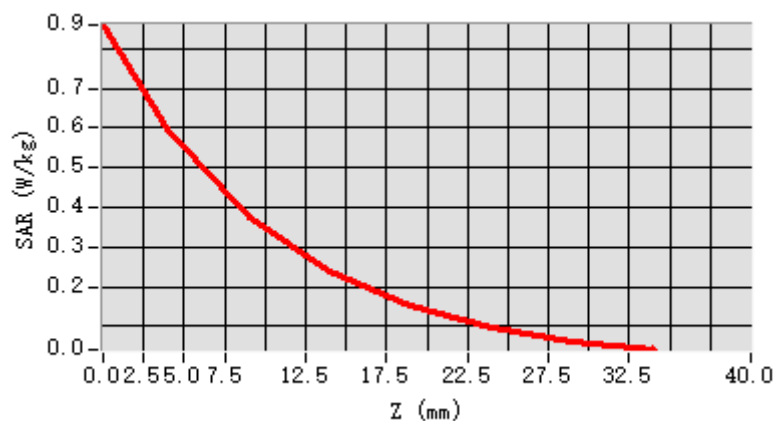
Maximum location: X=-6.00, Y=2.00 ; SAR Peak: 0.89 W/kg

D. SAR 1g & 10g

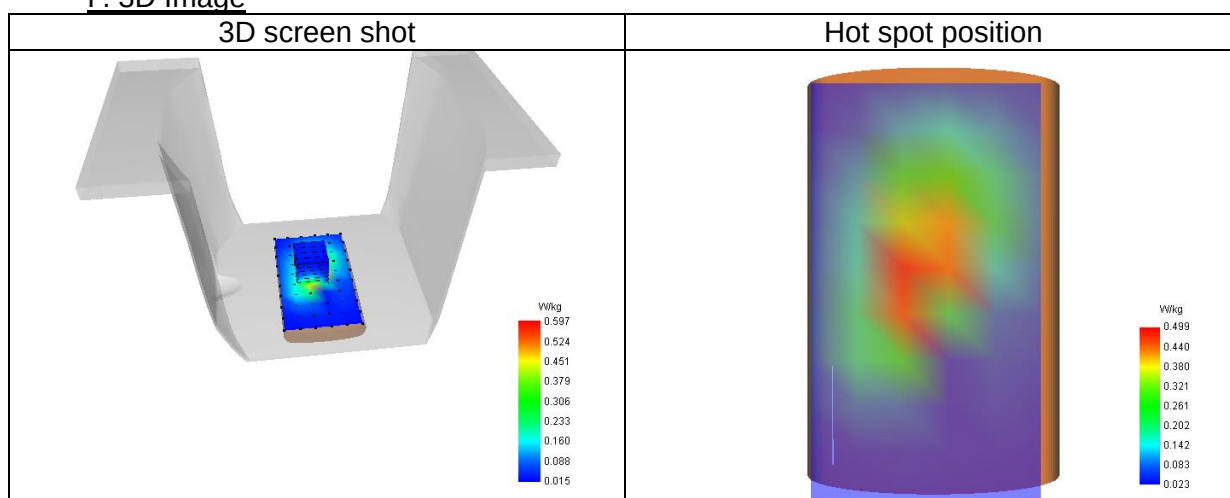
SAR 10g (W/Kg)	0.317
SAR 1g (W/Kg)	0.568
Variation (%)	0.23
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	62.85

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.860	0.597	0.375	0.237	0.152	0.099	0.063



F. 3D Image



3# SAR Measurement at Band 5 (850) (Body, Validation Plane)

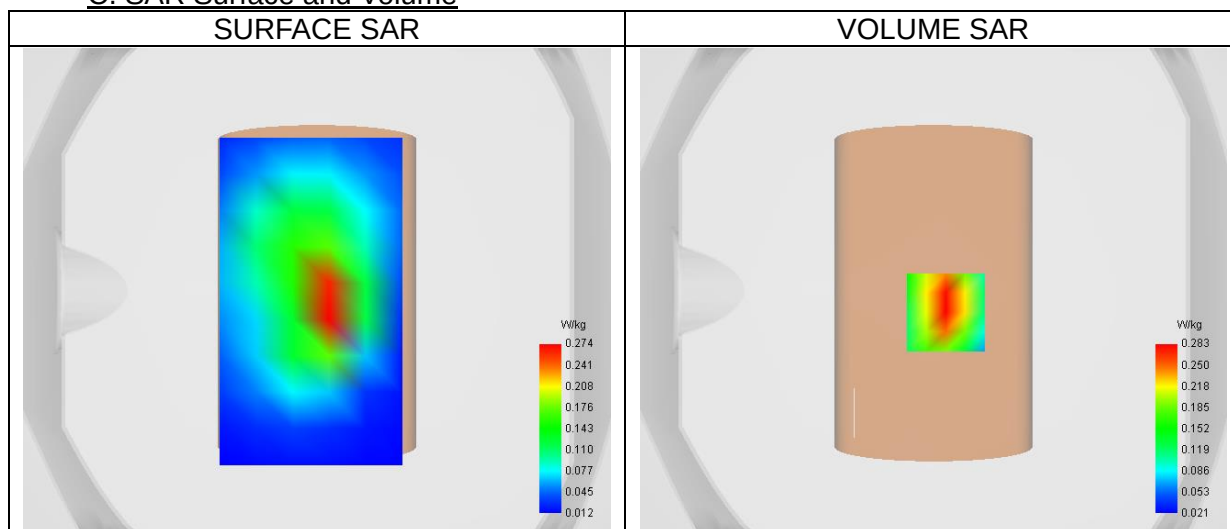
Date of measurement: 2/9/2025

A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.32
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Body
Band	Band 5 (850)
Signal	WCDMA
Channels/Frequency	Middle (4182)/ frequency 836.40 Mhz
Mode	Release 99
Connection Type	RMC, 12.2 kbps

B. Permittivity

Middle TX Frequency (MHz)	836.40
Relative permittivity (real part)	41.69
Relative permittivity (imaginary part)	19.64
Conductivity (S/m)	0.91

C. SAR Surface and Volume

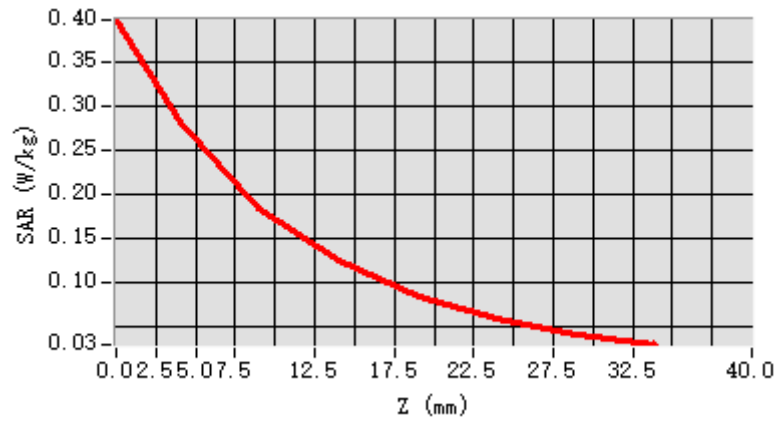
Maximum location: X=5.00, Y=-9.00 ; SAR Peak: 0.40 W/kg

D. SAR 1g & 10g

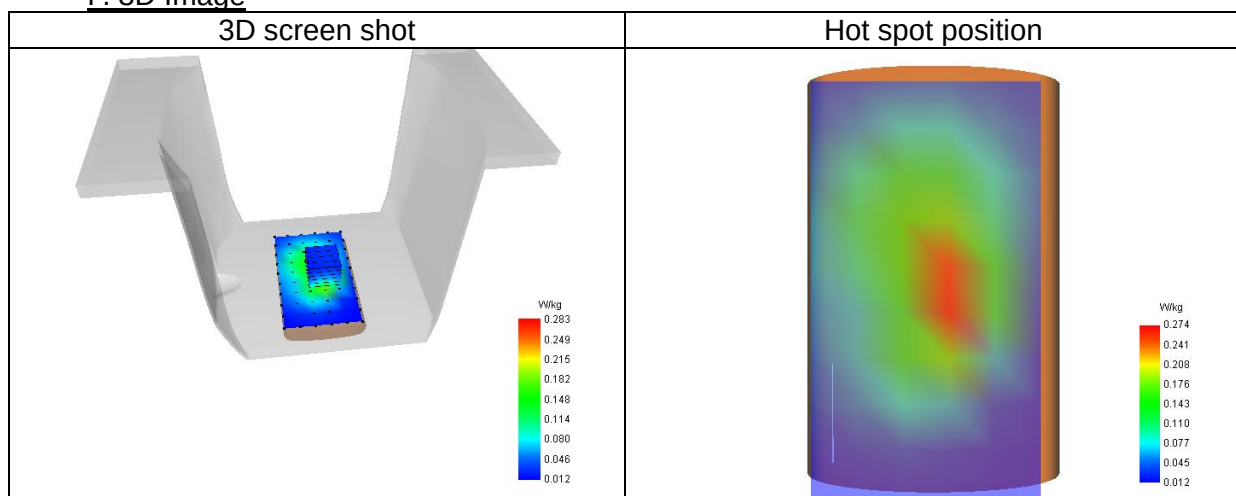
SAR 10g (W/Kg)	0.163
SAR 1g (W/Kg)	0.270
Variation (%)	0.21
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	65.44

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.399	0.283	0.185	0.125	0.086	0.061	0.043



F. 3D Image



4# SAR Measurement at Bluetooth (Body, Validation Plane)

Date of measurement: 1/9/2025

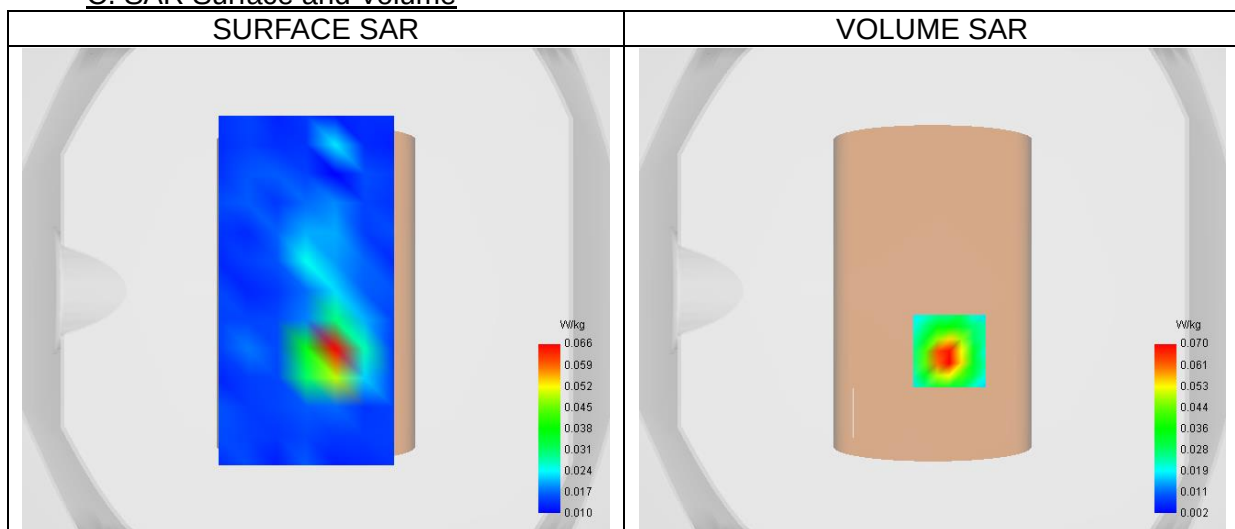
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.63
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	Bluetooth
Signal	Bluetooth
Channels/Frequency	Middle (39)/ frequency 2440.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	2440.00
Relative permittivity (real part)	37.98
Relative permittivity (imaginary part)	13.06
Conductivity (S/m)	1.77

C. SAR Surface and Volume



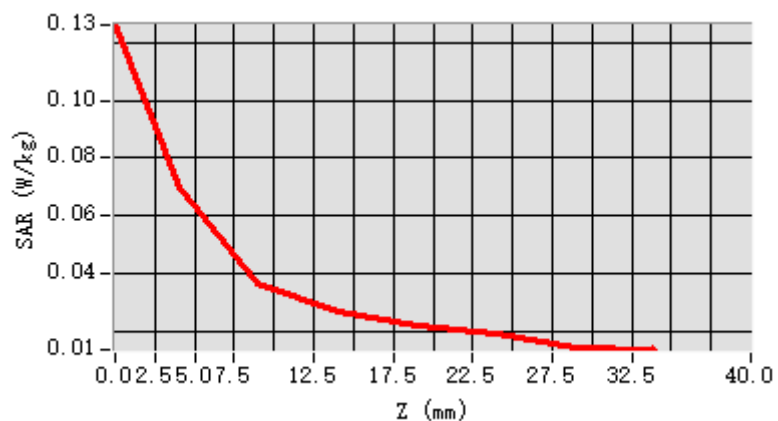
Maximum location: X=7.00, Y=-25.00 ; SAR Peak: 0.12 W/kg

D. SAR 1g & 10g

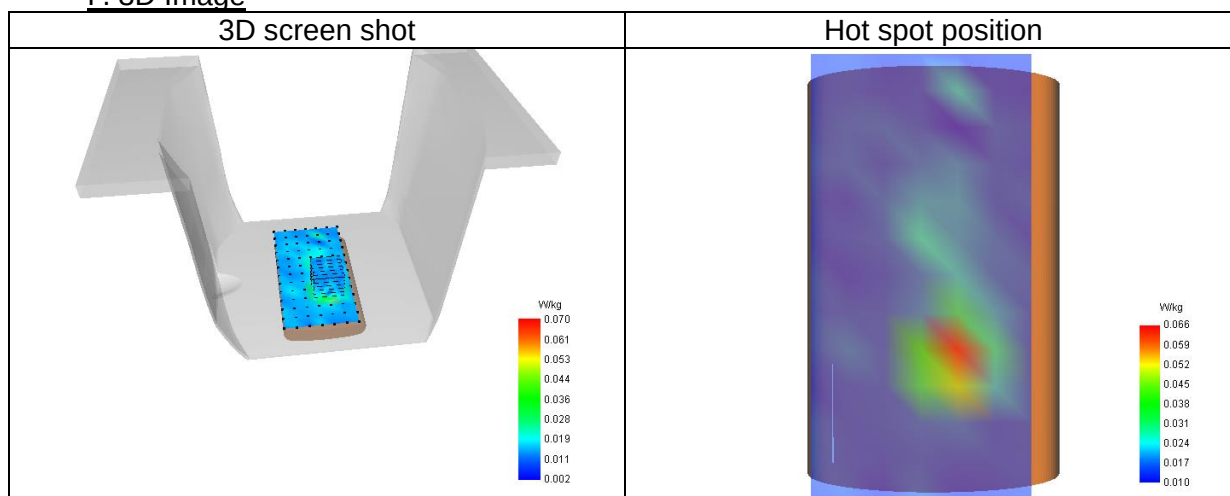
SAR 10g (W/Kg)	0.033
SAR 1g (W/Kg)	0.062
Variation (%)	3.22
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	75.39

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.126	0.070	0.036	0.026	0.022	0.019	0.014



F. 3D Image



5# SAR Measurement at Bluetooth (Body, Validation Plane)

Date of measurement: 1/9/2025

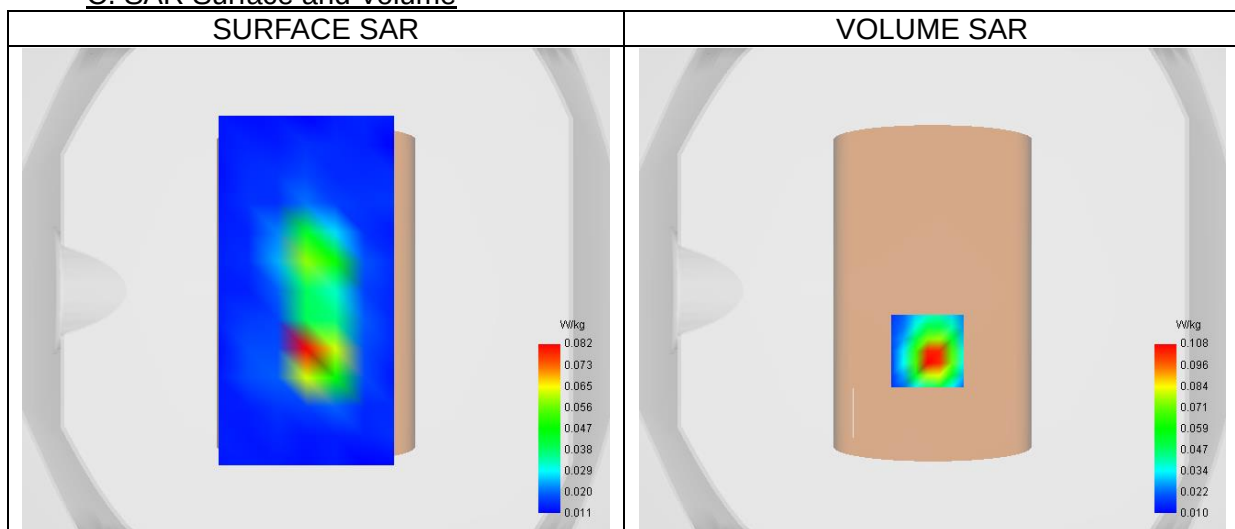
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.63
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	Bluetooth
Signal	Bluetooth
Channels/Frequency	High (78)/ frequency 2480.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	2480.00
Relative permittivity (real part)	37.82
Relative permittivity (imaginary part)	13.24
Conductivity (S/m)	1.82

C. SAR Surface and Volume



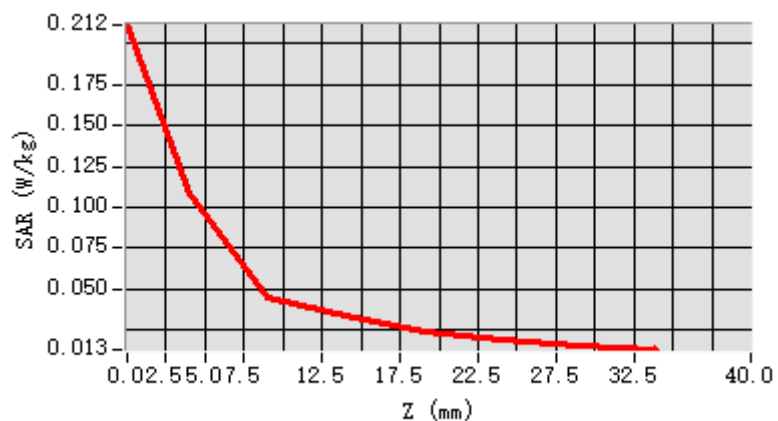
Maximum location: X=-2.00, Y=-25.00 ; SAR Peak: 0.19 W/kg

D. SAR 1g & 10g

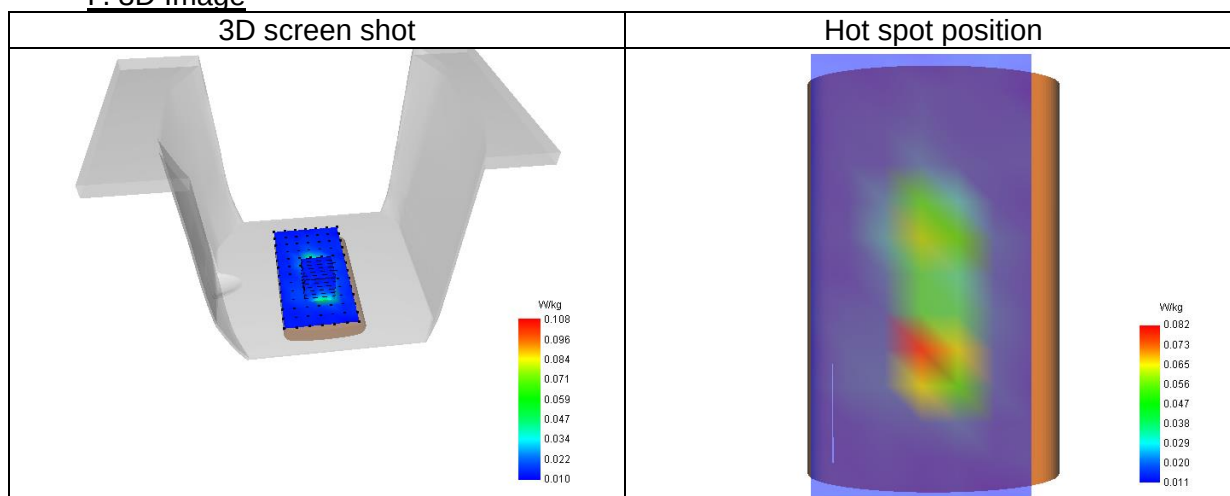
SAR 10g (W/Kg)	0.046
SAR 1g (W/Kg)	0.100
Variation (%)	-4.07
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	54.73

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.212	0.108	0.045	0.034	0.024	0.019	0.015



F. 3D Image



6# SAR Measurement at U-NII-1 (Body, Validation Plane)

Date of measurement: 15/9/2025

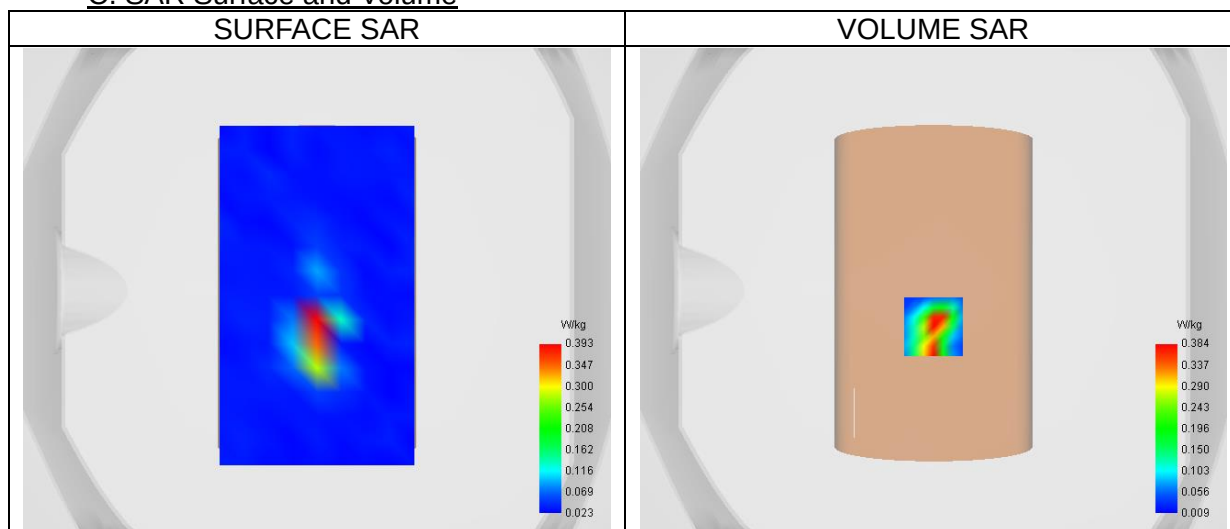
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.37
Area Scan	dx=10mm dy=10mm, Complete
Zoom Scan	7x7x12,dx=4mm dy=4mm dz=2.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	U-NII-1
Signal	IEEE 802.11 a
Channels/Frequency	Middle (40)/ frequency 5200.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5200.00
Relative permittivity (real part)	37.12
Relative permittivity (imaginary part)	15.82
Conductivity (S/m)	4.57

C. SAR Surface and Volume



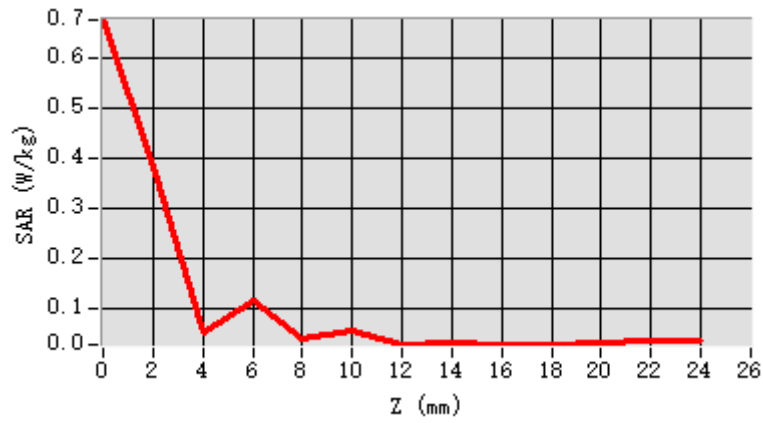
Maximum location: X=0.00, Y=-15.00 ; SAR Peak: 0.66 W/kg

D. SAR 1g & 10g

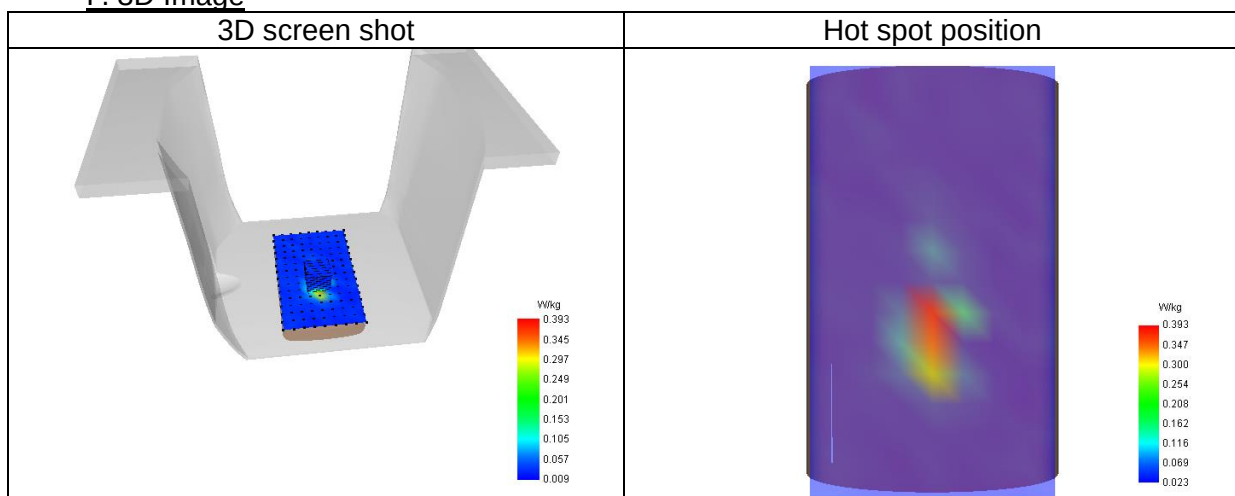
SAR 10g (W/Kg)	0.071
SAR 1g (W/Kg)	0.208
Variation (%)	1.34
Horizontal validation criteria: minimum distance (mm)	5.66
Vertical validation criteria: SAR ratio M2/M1 (%)	60.24

E. Z Axis Scan

Z (mm)	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)	0.67 6	0.38 4	0.04 9	0.11 6	0.03 9	0.05 6	0.02 7	0.03 0	0.02 8	0.02 7	0.03 1	0.03 3



F. 3D Image



7# SAR Measurement at ISM (Body, Validation Plane)

Date of measurement: 1/9/2025

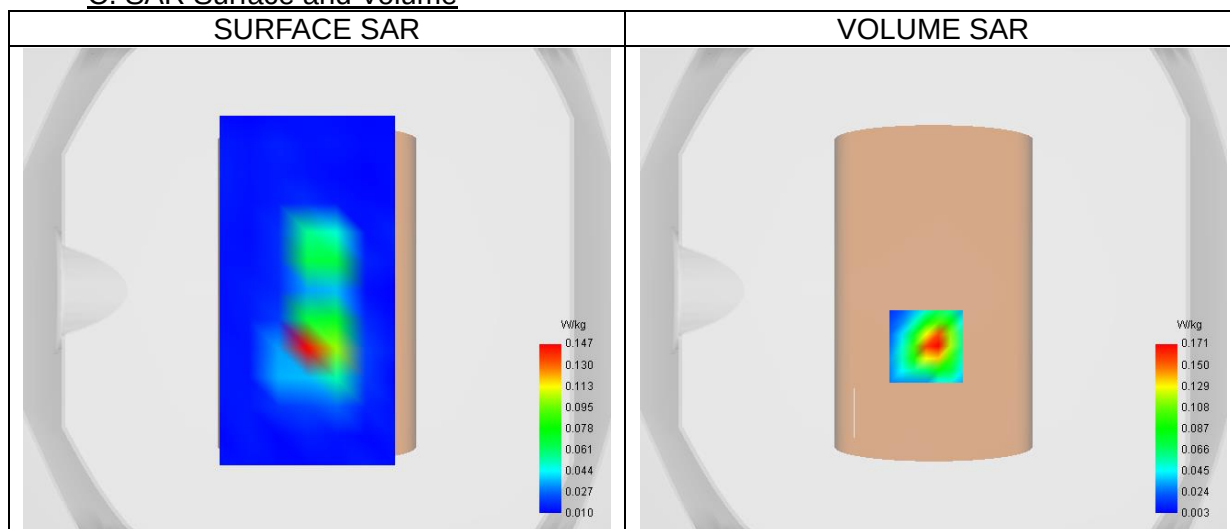
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.63
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	ISM
Signal	IEEE 802.11 b
Channels/Frequency	Middle (6)/ frequency 2437.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	2437.00
Relative permittivity (real part)	37.97
Relative permittivity (imaginary part)	13.01
Conductivity (S/m)	1.76

C. SAR Surface and Volume



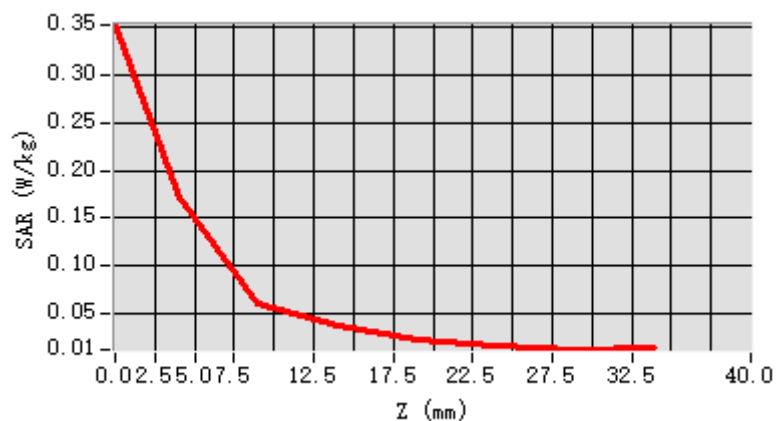
Maximum location: X=-3.00, Y=-23.00 ; SAR Peak: 0.31 W/kg

D. SAR 1g & 10g

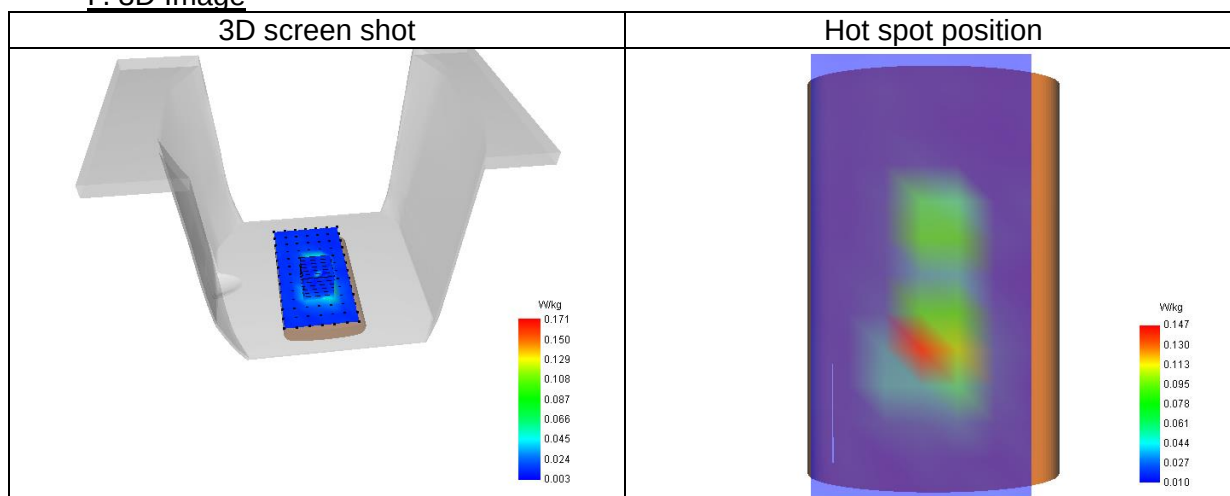
SAR 10g (W/Kg)	0.063
SAR 1g (W/Kg)	0.151
Variation (%)	-2.28
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	46.19

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.352	0.171	0.060	0.038	0.023	0.017	0.012



F. 3D Image



8# SAR Measurement at LTE band 2 (Body, Validation Plane)

Date of measurement: 3/9/2025

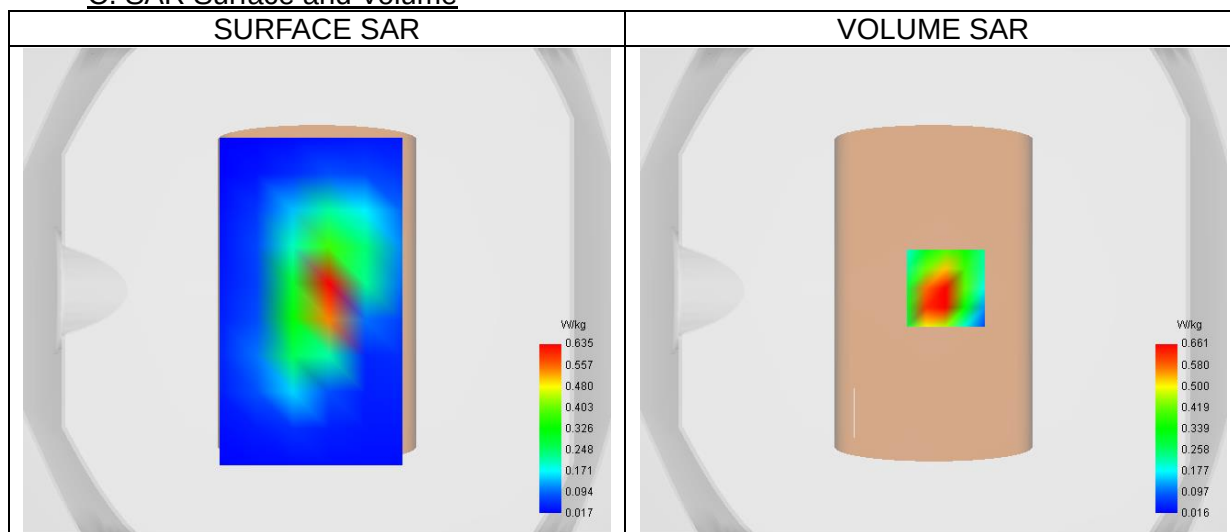
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.58
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 2
Signal	LTE FDD
Channel Center [EARFCN] / Channel Center [MHz]	Middle (18900)/ frequency 1880.00 Mhz
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK
Middle TX Frequency (MHz)	1880.00

B. Permittivity

Middle TX Frequency (MHz)	1880.00
Relative permittivity (real part)	38.17
Relative permittivity (imaginary part)	13.36
Conductivity (S/m)	1.40

C. SAR Surface and Volume



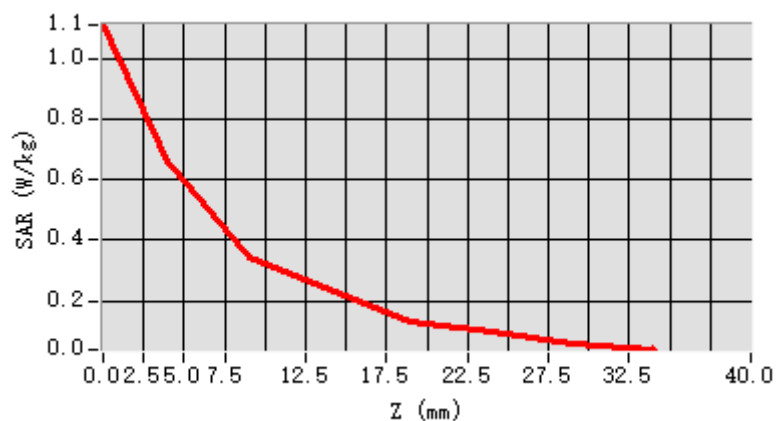
Maximum location: X=5.00, Y=1.00 ; SAR Peak: 1.10 W/kg

D. SAR 1g & 10g

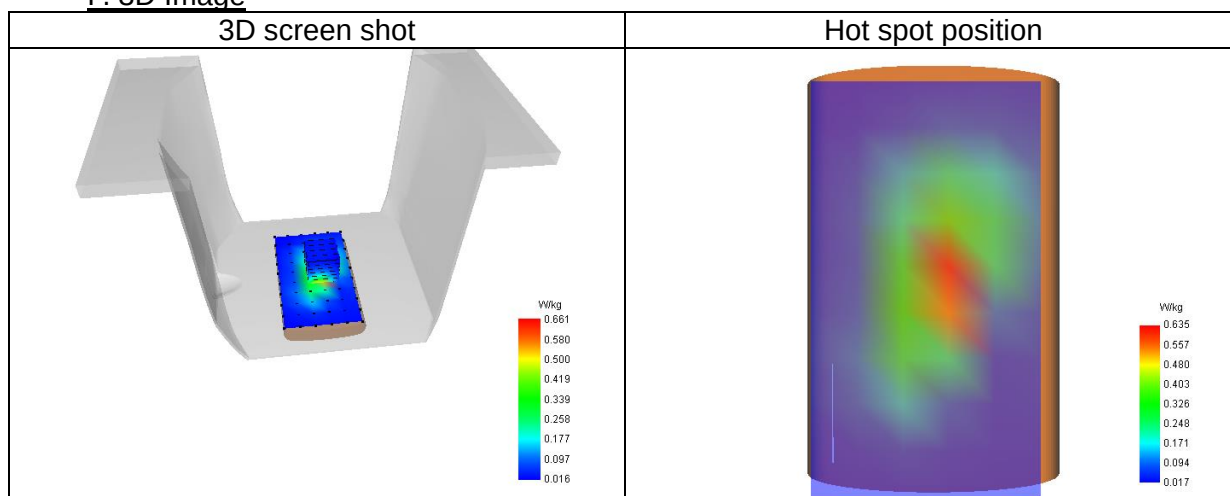
SAR 10g (W/Kg)	0.341
SAR 1g (W/Kg)	0.667
Variation (%)	-0.95
Horizontal validation criteria: minimum distance (mm)	11.31
Vertical validation criteria: SAR ratio M2/M1 (%)	60.66

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.110	0.661	0.339	0.238	0.132	0.094	0.055



F. 3D Image



9# SAR Measurement at LTE band 4 (Body, Validation Plane)

Date of measurement: 1/10/2025

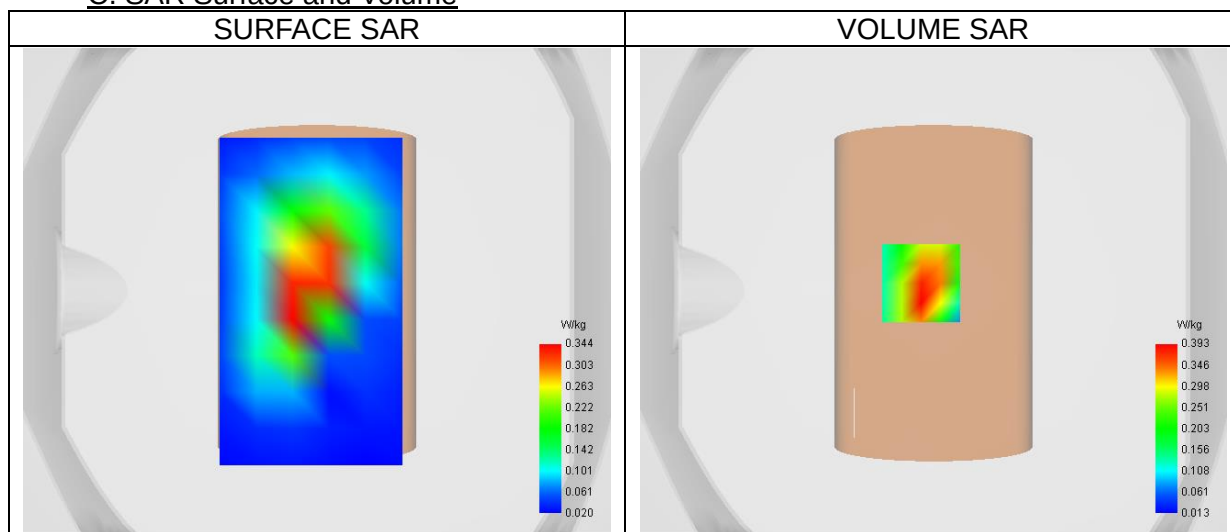
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.50
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 4
Signal	LTE FDD
Channel Center [EARFCN] / Channel Center [MHz]	Middle (20175)/ frequency 1732.50 Mhz
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK
Middle TX Frequency (MHz)	1732.50

B. Permittivity

Middle TX Frequency (MHz)	1732.50
Relative permittivity (real part)	39.00
Relative permittivity (imaginary part)	13.58
Conductivity (S/m)	1.31

C. SAR Surface and Volume



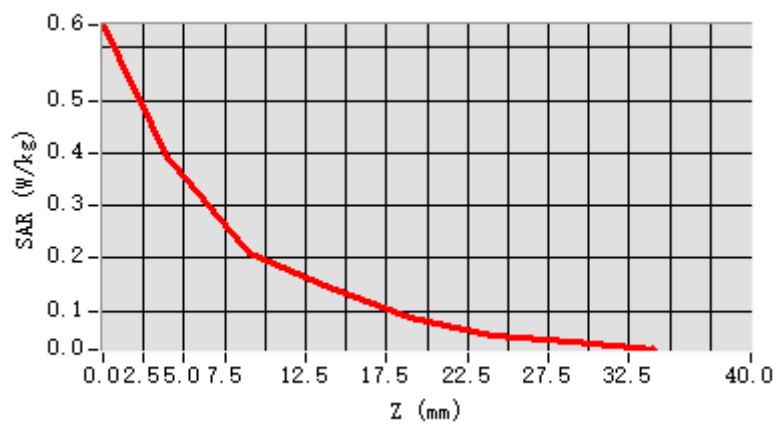
Maximum location: X=-5.00, Y=3.00 ; SAR Peak: 0.59 W/kg

D. SAR 1g & 10g

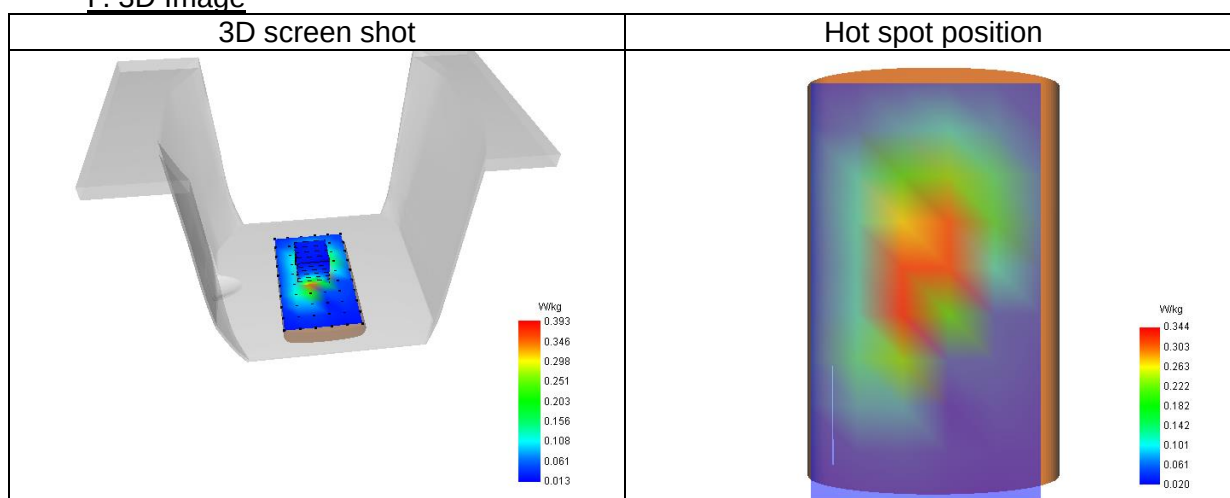
SAR 10g (W/Kg)	0.201
SAR 1g (W/Kg)	0.368
Variation (%)	-2.52
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	58.71

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.643	0.393	0.208	0.146	0.087	0.054	0.041



F. 3D Image



10# SAR Measurement at LTE band 5 (Body, Validation Plane)

Date of measurement: 2/9/2025

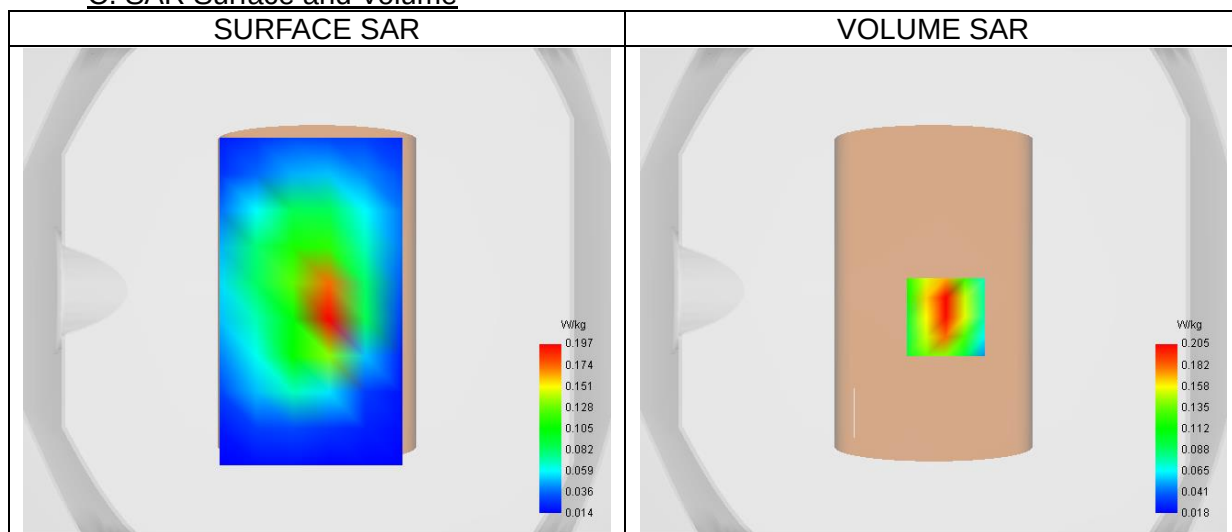
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.32
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 5
Signal	LTE FDD
Channel Center [EARFCN] / Channel Center [MHz]	Middle (20525)/ frequency 836.50 Mhz
Cell Bandwidth	10 Mhz
Modulation	SC-OFDM - QPSK
Middle TX Frequency (MHz)	836.50

B. Permittivity

Middle TX Frequency (MHz)	836.50
Relative permittivity (real part)	41.69
Relative permittivity (imaginary part)	19.64
Conductivity (S/m)	0.91

C. SAR Surface and Volume



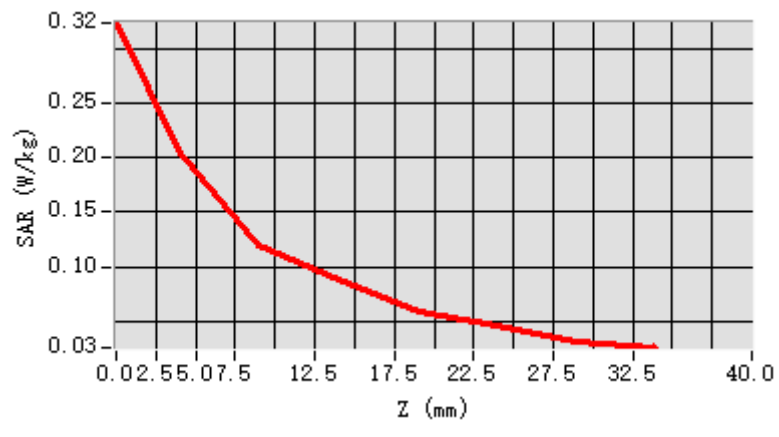
Maximum location: X=5.00, Y=-11.00 ; SAR Peak: 0.30 W/kg

D. SAR 1g & 10g

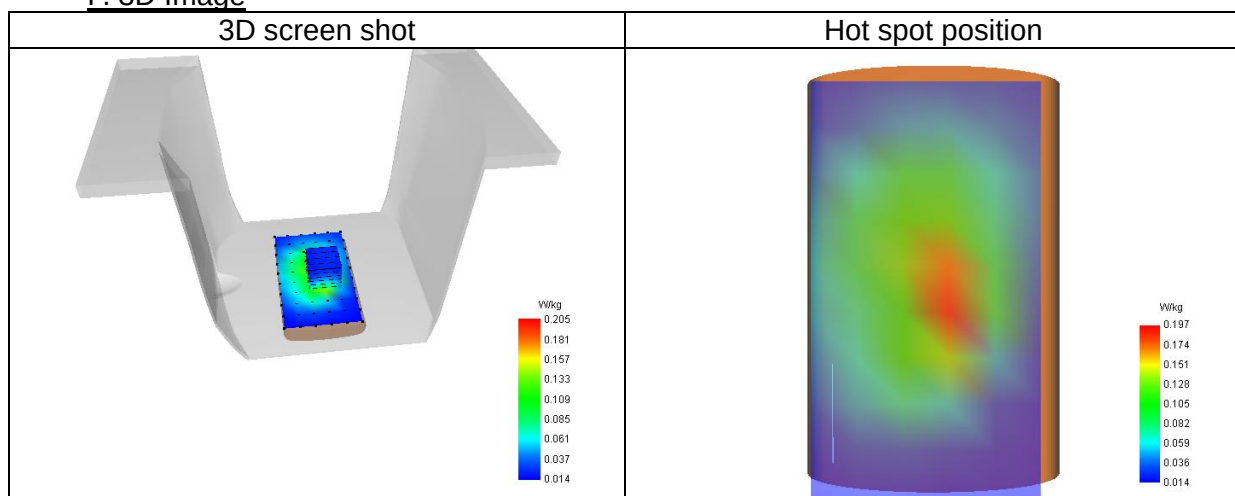
SAR 10g (W/Kg)	0.117
SAR 1g (W/Kg)	0.195
Variation (%)	-1.02
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	65.48

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.324	0.205	0.120	0.088	0.059	0.045	0.031



F. 3D Image



11# SAR Measurement at LTE band 7 (Body, Validation Plane)

Date of measurement: 14/9/2025

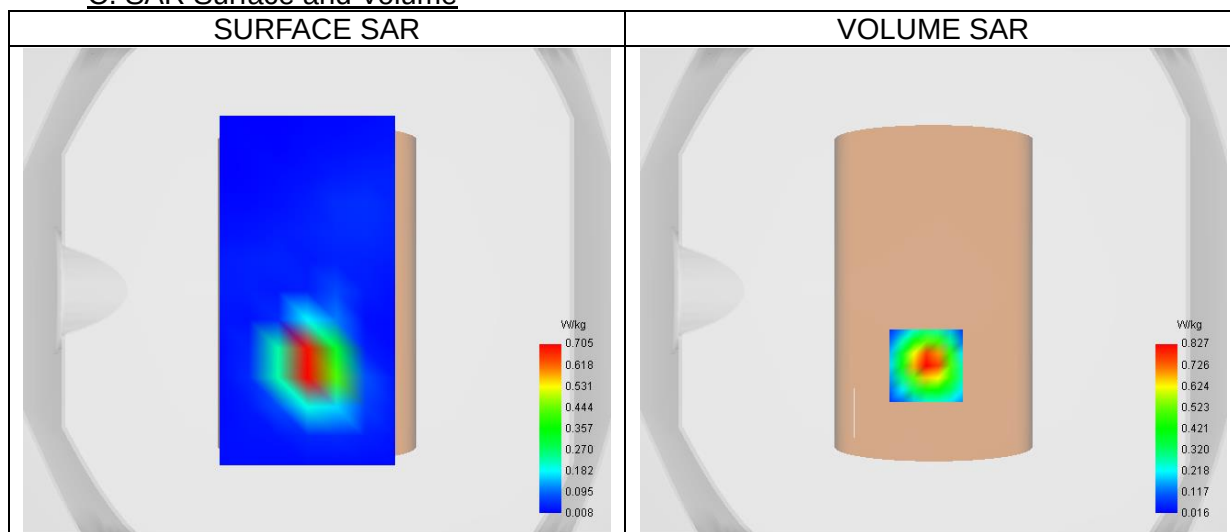
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.52
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 7
Signal	LTE FDD
Channel Center [EARFCN] / Channel Center [MHz]	Middle (21100)/ frequency 2535.00 Mhz
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK
Middle TX Frequency (MHz)	2535.00

B. Permittivity

Middle TX Frequency (MHz)	2535.00
Relative permittivity (real part)	40.17
Relative permittivity (imaginary part)	13.52
Conductivity (S/m)	1.90

C. SAR Surface and Volume



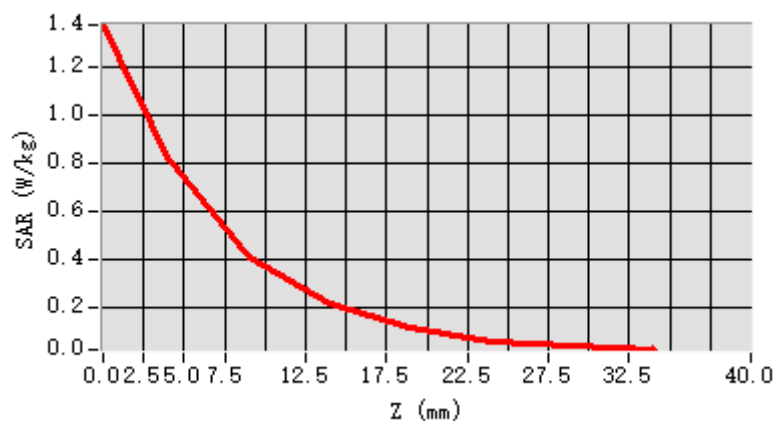
Maximum location: X=-3.00, Y=-31.00 ; SAR Peak: 1.41 W/kg

D. SAR 1g & 10g

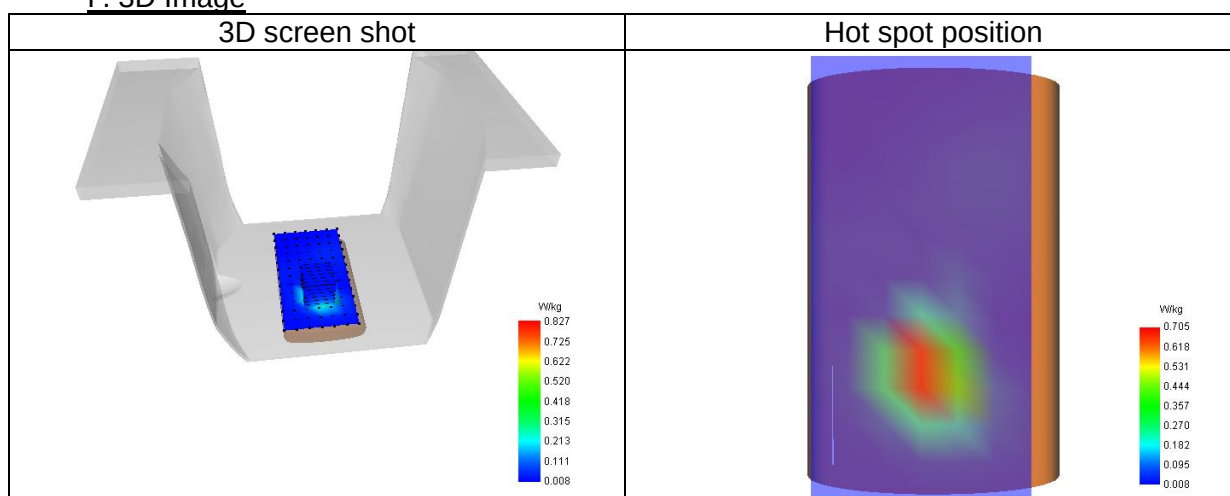
SAR 10g (W/Kg)	0.317
SAR 1g (W/Kg)	0.743
Variation (%)	2.93
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	49.91

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.378	0.827	0.413	0.221	0.116	0.063	0.044



F. 3D Image



12# SAR Measurement at LTE band 12 (Body, Validation Plane)

Date of measurement: 5/9/2025

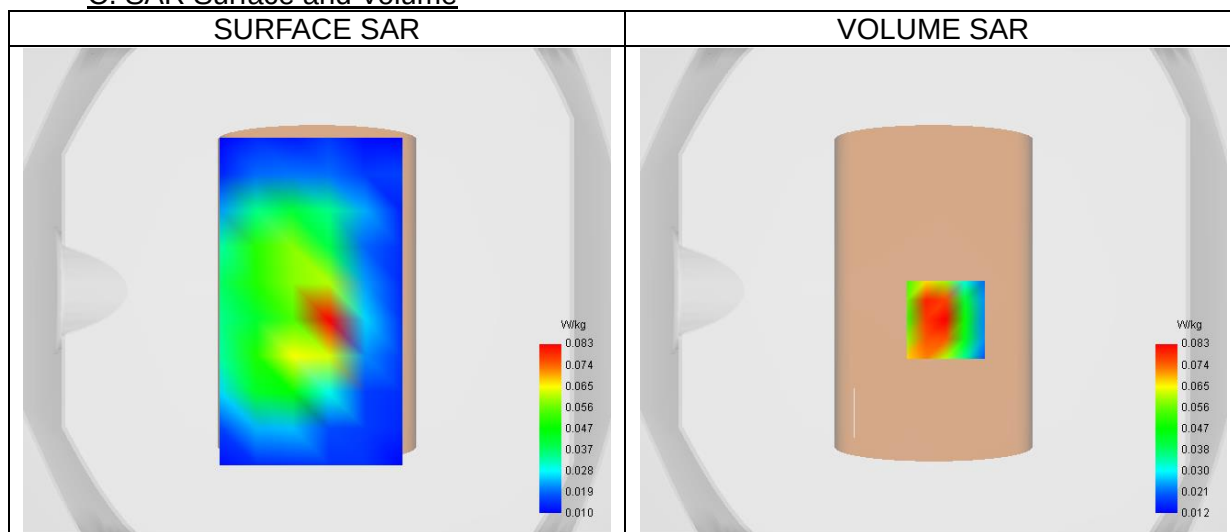
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.39
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 12
Signal	LTE FDD
Channel Center [EARFCN] / Channel Center [MHz]	Middle (23095)/ frequency 707.50 Mhz
Cell Bandwidth	10 Mhz
Modulation	SC-OFDM - QPSK
Middle TX Frequency (MHz)	707.50

B. Permittivity

Middle TX Frequency (MHz)	707.50
Relative permittivity (real part)	41.38
Relative permittivity (imaginary part)	21.84
Conductivity (S/m)	0.86

C. SAR Surface and Volume



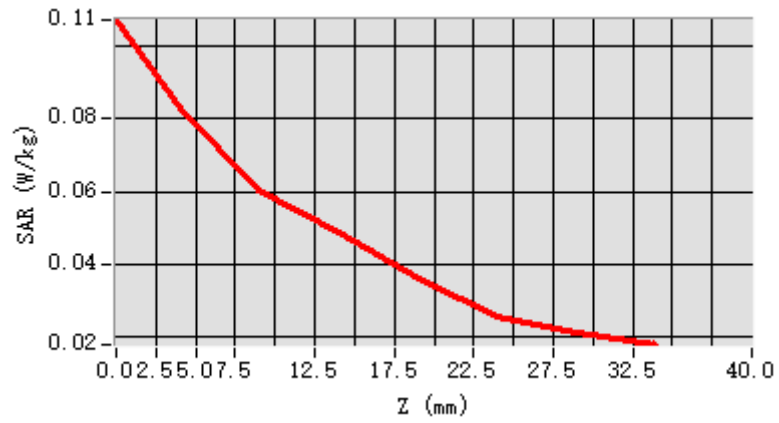
Maximum location: X=5.00, Y=-12.00 ; SAR Peak: 0.11 W/kg

D. SAR 1g & 10g

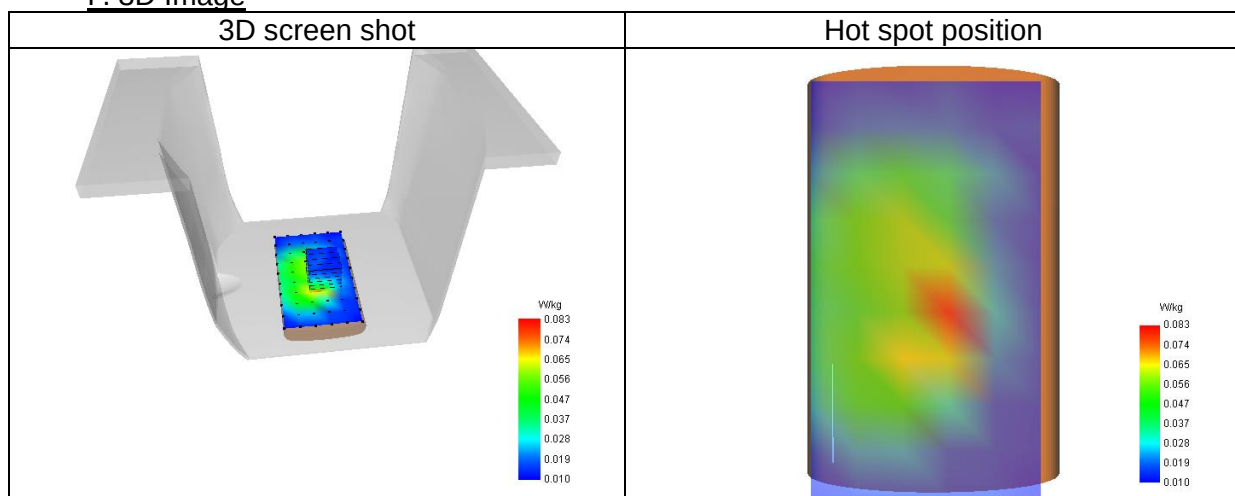
SAR 10g (W/Kg)	0.054
SAR 1g (W/Kg)	0.082
Variation (%)	-2.94
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	74.03

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.107	0.083	0.061	0.049	0.036	0.026	0.021



F. 3D Image



13# SAR Measurement at LTE band 13 (Body, Validation Plane)

Date of measurement: 5/9/2025

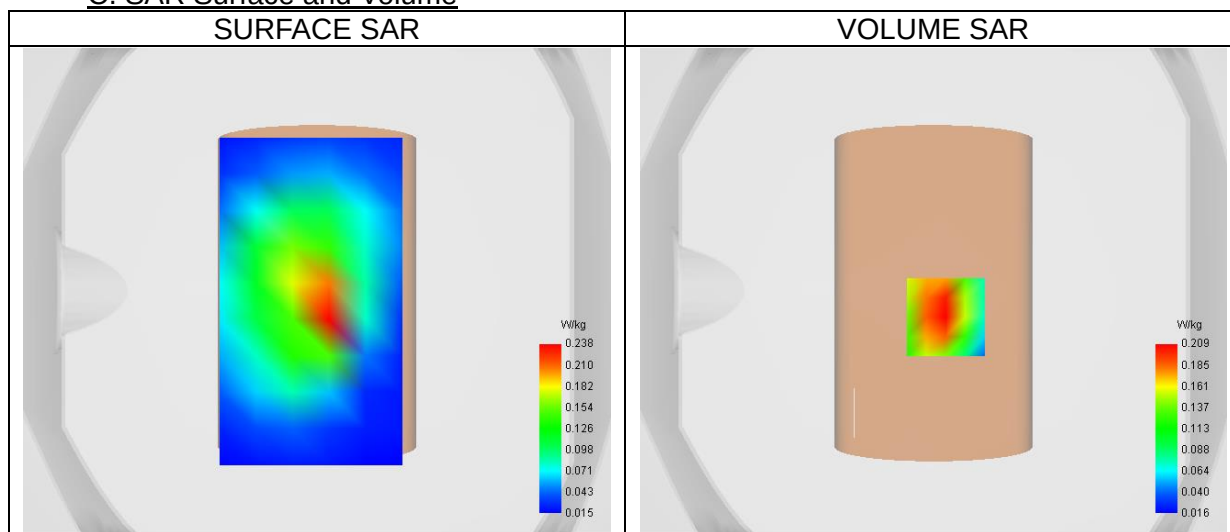
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.39
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 13
Signal	LTE FDD
Channel Center [EARFCN] / Channel Center [MHz]	Middle (23230)/ frequency 782.00 Mhz
Cell Bandwidth	10 Mhz
Modulation	SC-OFDM - QPSK
Middle TX Frequency (MHz)	782.00

B. Permittivity

Middle TX Frequency (MHz)	782.00
Relative permittivity (real part)	40.49
Relative permittivity (imaginary part)	21.10
Conductivity (S/m)	0.92

C. SAR Surface and Volume



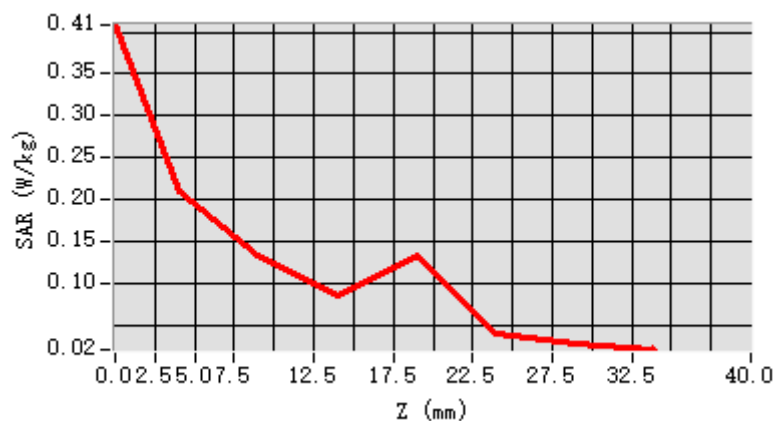
Maximum location: X=5.00, Y=-11.00 ; SAR Peak: 0.39 W/kg

D. SAR 1g & 10g

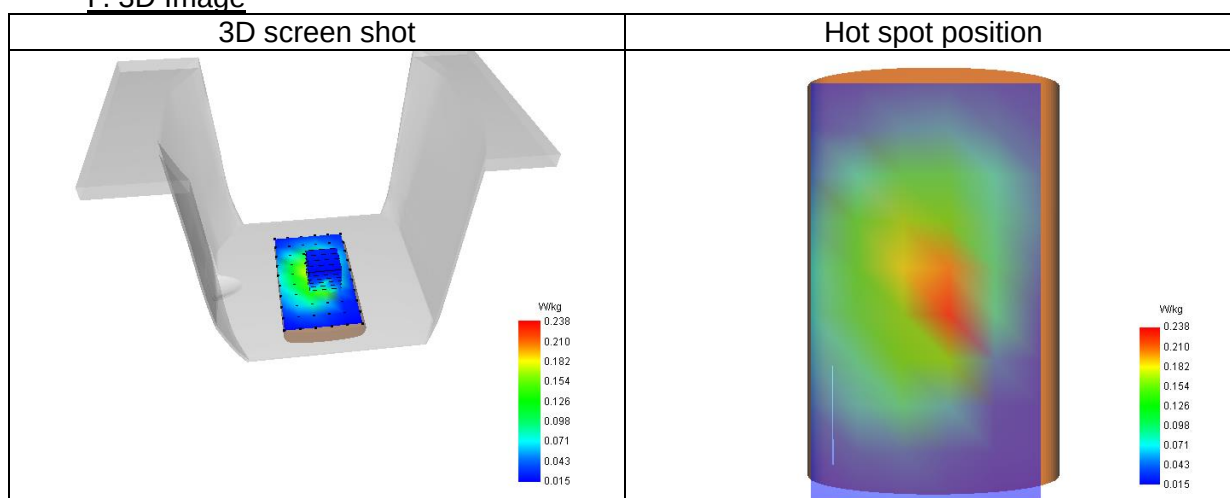
SAR 10g (W/Kg)	0.125
SAR 1g (W/Kg)	0.224
Variation (%)	-3.29
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	64.07

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.408	0.209	0.134	0.087	0.133	0.041	0.030



F. 3D Image



14# SAR Measurement at LTE band 19 (Body, Validation Plane)

Date of measurement: 2/9/2025

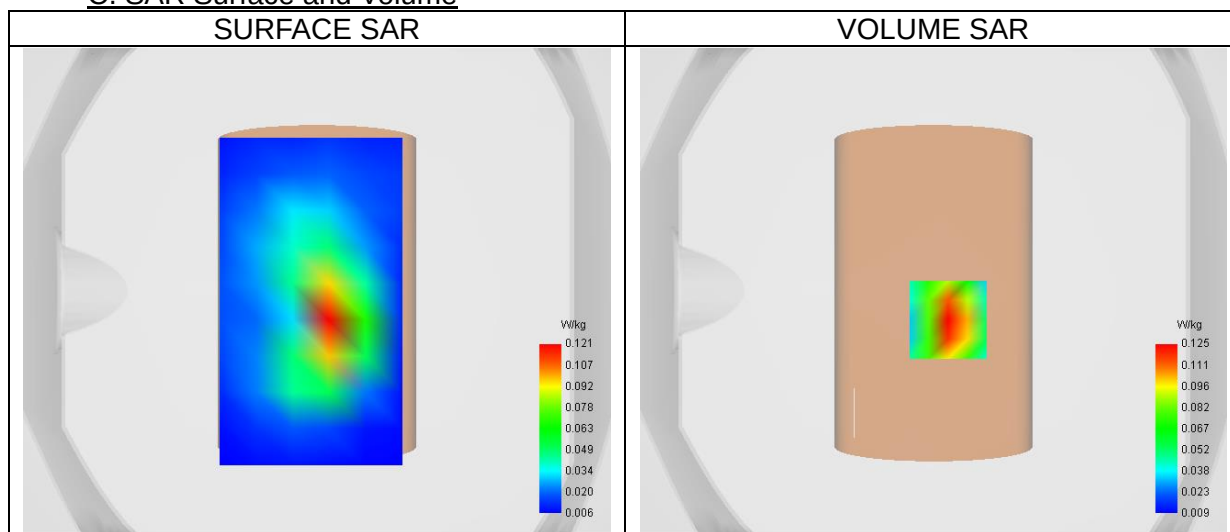
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.32
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 19
Signal	LTE FDD
Channel Center [EARFCN] / Channel Center [MHz]	Middle (24075)/ frequency 837.50 Mhz
Cell Bandwidth	15 Mhz
Modulation	SC-OFDM - QPSK
Middle TX Frequency (MHz)	837.50

B. Permittivity

Middle TX Frequency (MHz)	837.50
Relative permittivity (real part)	41.69
Relative permittivity (imaginary part)	19.62
Conductivity (S/m)	0.91

C. SAR Surface and Volume



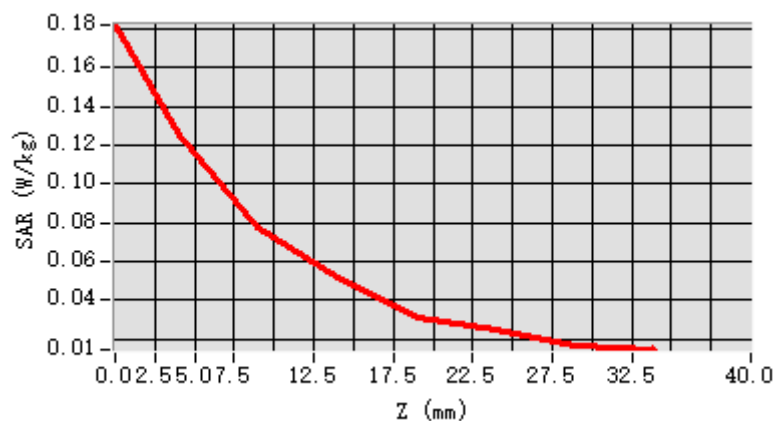
Maximum location: X=6.00, Y=-12.00 ; SAR Peak: 0.19 W/kg

D. SAR 1g & 10g

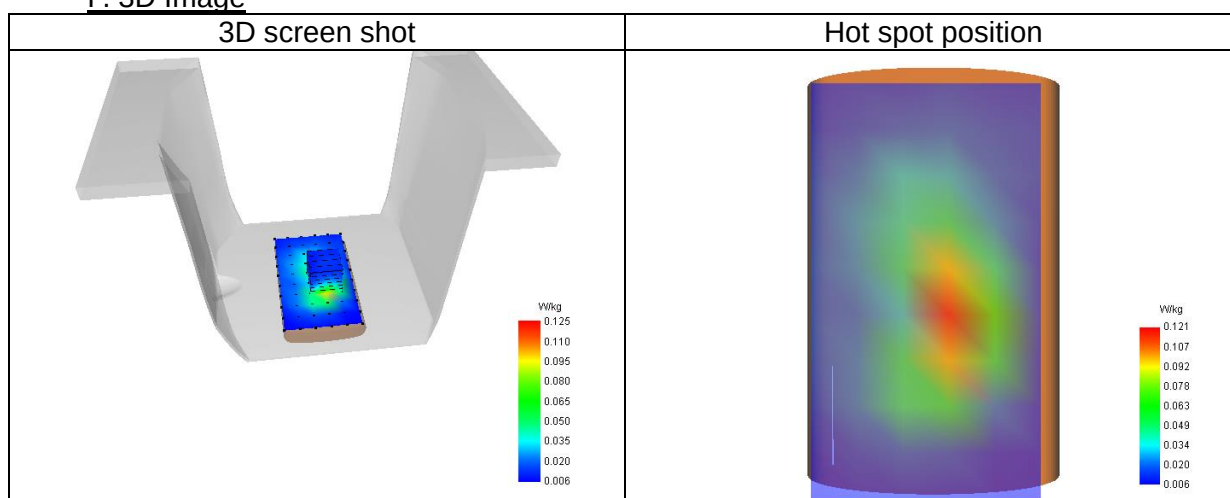
SAR 10g (W/Kg)	0.067
SAR 1g (W/Kg)	0.119
Variation (%)	-1.17
Horizontal validation criteria: minimum distance (mm)	16.00
Vertical validation criteria: SAR ratio M2/M1 (%)	61.71

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.182	0.125	0.077	0.052	0.031	0.025	0.017



F. 3D Image



15# SAR Measurement at LTE band 41 (Body, Validation Plane)

Date of measurement: 14/9/2025

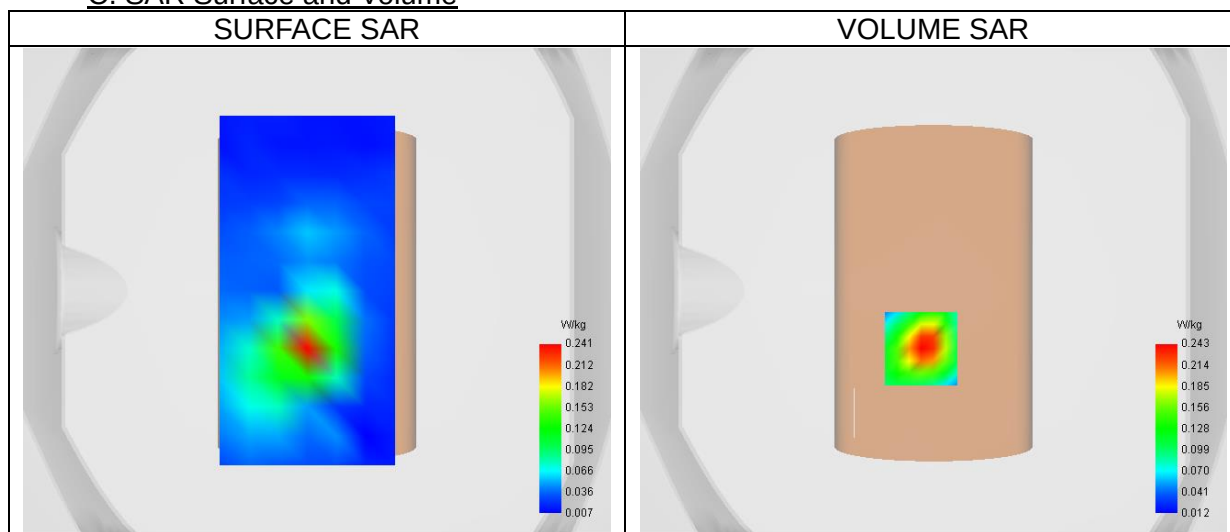
A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.52
Area Scan	dx=12mm dy=12mm, Complete
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5.0mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 41
Signal	LTE TDD
Channel Center [EARFCN] / Channel Center [MHz]	Middle (40620)/ frequency 2593.00 Mhz
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK
Middle TX Frequency (MHz)	2593.00

B. Permittivity

Middle TX Frequency (MHz)	2593.00
Relative permittivity (real part)	39.89
Relative permittivity (imaginary part)	13.68
Conductivity (S/m)	1.97

C. SAR Surface and Volume



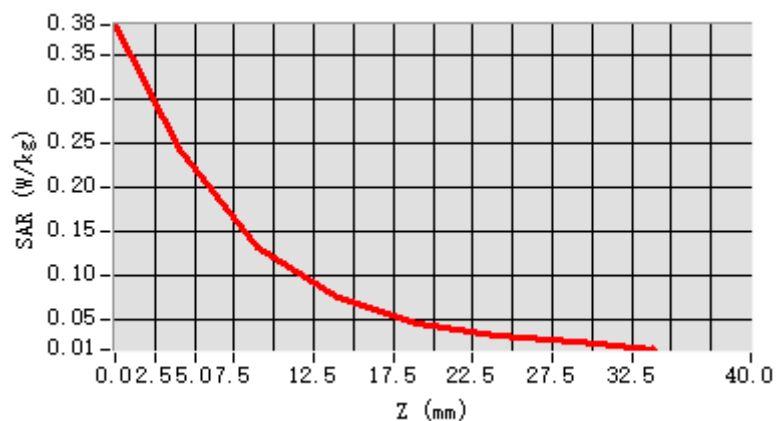
Maximum location: X=-5.00, Y=-24.00 ; SAR Peak: 0.38 W/kg

D. SAR 1g & 10g

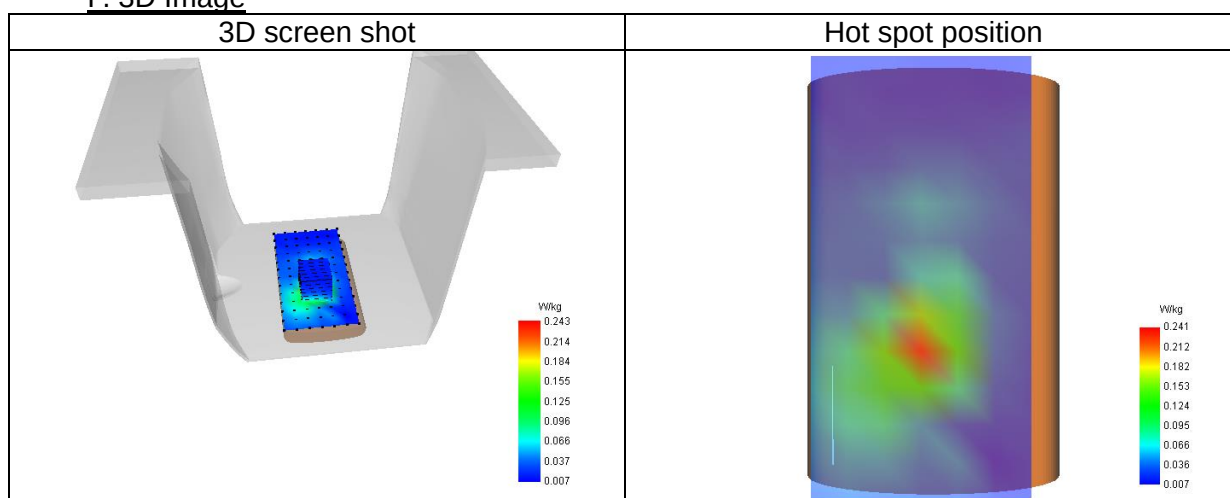
SAR 10g (W/Kg)	0.112
SAR 1g (W/Kg)	0.223
Variation (%)	-1.69
Horizontal validation criteria: minimum distance (mm)	14.14
Vertical validation criteria: SAR ratio M2/M1 (%)	54.25

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.384	0.243	0.132	0.073	0.044	0.031	0.024



F. 3D Image



16# SAR Measurement at LTE band 66 (Body, Validation Plane)

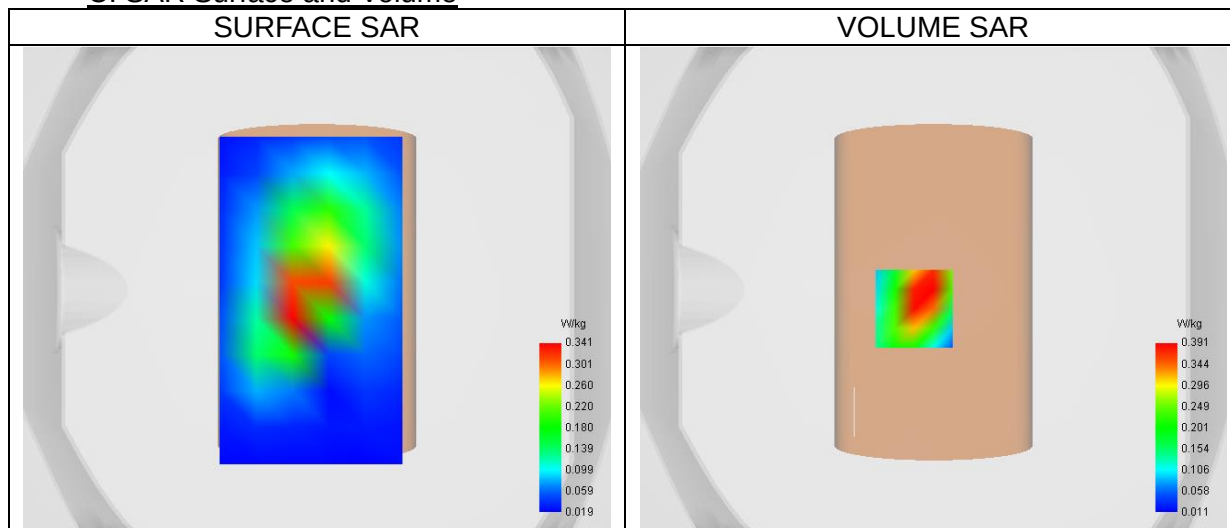
Date of measurement: 4/9/2025

A. Experimental conditions.

Probe	0725-EPGO-448
ConvF	1.50
Area Scan	dx=15mm dy=15mm, Complete
Zoom Scan	5x5x7, dx=8mm dy=8mm dz=5.0mm, Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 66
Signal	LTE FDD
Channel Center [EARFCN] / Channel Center [MHz]	Middle (132322)/ frequency 1745.00 Mhz
Cell Bandwidth	20 Mhz
Modulation	SC-OFDM - QPSK
Middle TX Frequency (MHz)	1745.00

B. Permittivity

Middle TX Frequency (MHz)	1745.00
Relative permittivity (real part)	39.24
Relative permittivity (imaginary part)	13.51
Conductivity (S/m)	1.31

C. SAR Surface and Volume

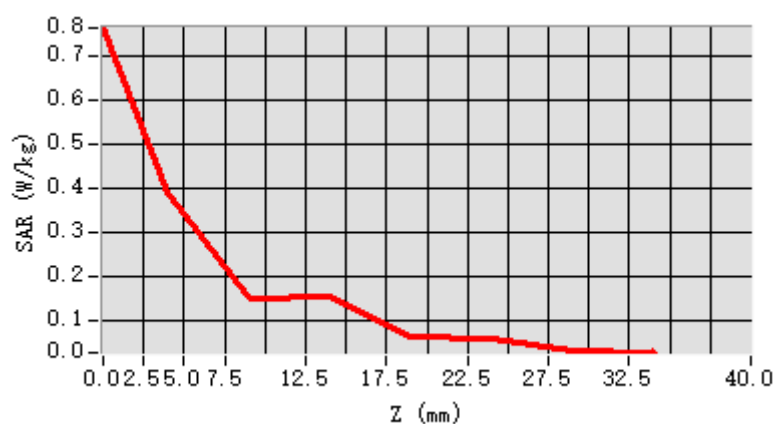
Maximum location: X=-8.00, Y=-8.00 ; SAR Peak: 0.61 W/kg

D. SAR 1g & 10g

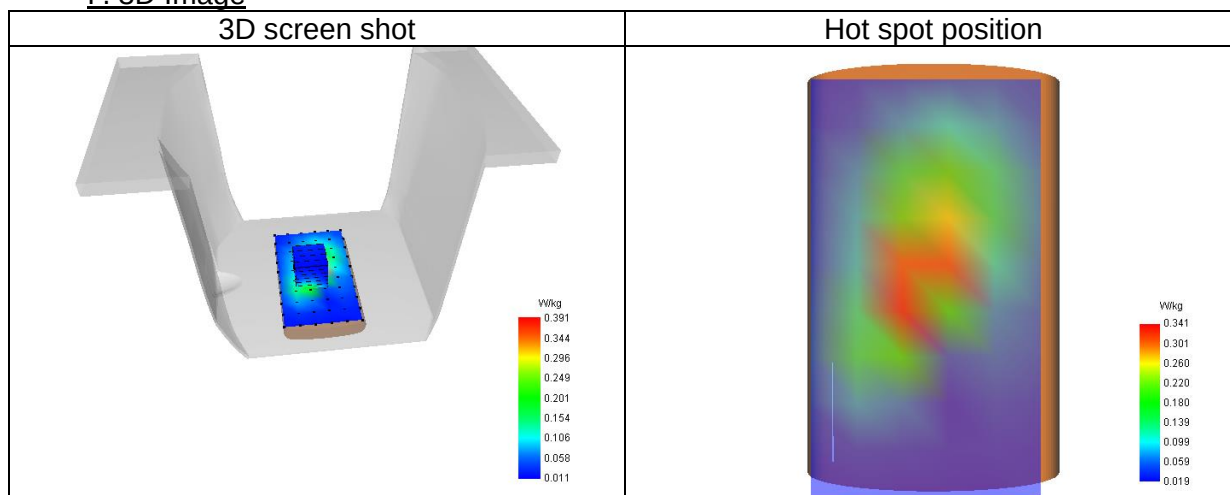
SAR 10g (W/Kg)	0.210
SAR 1g (W/Kg)	0.387
Variation (%)	-0.28
Horizontal validation criteria: minimum distance (mm)	11.31
Vertical validation criteria: SAR ratio M2/M1 (%)	62.50

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.764	0.391	0.152	0.154	0.066	0.060	0.031



F. 3D Image



13. Appendix D. Calibration Certificate

Table of contents
E Field Probe - 0725-EPGO-448
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
5000-6000 MHz Dipole - SN 13/14 WGA 33
Justification of the extended calibration

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COMOSAR E-Field Probe Calibration Report

Ref : ACR.108.1.25.BES.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.: 0725-EPGO-448

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 04/15/2025



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

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Summary:

This document presents the method and results from an accredited COMOSAR Dosimetric 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).

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.108.1.25.BES.A

	Name	Function	Date	Signature
Prepared by :	Pedro Ruiz	Technical Manager	4/18/2025	
Checked & approved by:	Pedro Ruiz	Technical Manager	4/18/2025	
Authorized by:	Kim Rutkowski	Quality Manager	4/23/2025	Signed by: Kimberly ROTKOWSKI 2B9B8547AD1743* ...

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

Issue	Name	Date	Modifications
A	Pedro Ruiz	4/18/2025	Initial release

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.108.1.25.BES.A

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.108.1.25.BES.A

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	0725-EPGO-448
Product Condition (new / used)	New
Frequency Range of Probe	0.15 GHz-7.5GHz
Resistance of Three Dipoles at Connector	Dipole 1: R1=0.191 MΩ Dipole 2: R2=0.212 MΩ Dipole 3: R3=0.208 MΩ

2 PRODUCT DESCRIPTION**2.1 GENERAL INFORMATION**

MVG's COMOSAR E field Probes are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards.



Figure 1 – MVG COMOSAR Dosimetric E field Probe

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

3.1 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 for frequency range 600-7500MHz and using the calorimeter cell method (transfer method) as outlined in the standards for frequency 150-450 MHz.

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3.2 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.

3.3 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°).

3.4 BOUNDARY EFFECT

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

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

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

where

$\Delta SAR_{uncertainty}$	is the uncertainty in percent of the probe boundary effect
d_{be}	is the distance between the surface and the closest <i>zoom-scan</i> 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.

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

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3.5 PROBE MODULATION RESPONSE

MVG's probe were evaluated experimentally with various modulated signal and the deviation from CW response were found neglectable in the used power range of the probe. So the correction to taking into account the linearization parameters for different modulation is null, therefore the CW factor given in this report can be used whatever the measured modulation

4 MEASUREMENT UNCERTAINTY

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty associated with a SAR probe calibration using the waveguide or calorimetric cell technique depending on the frequency.

The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-11% for the frequency range 150-450MHz.

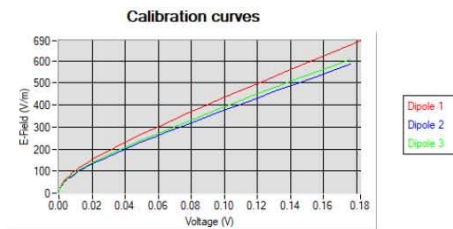
The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-14% for the frequency range 600-7500MHz.

5 CALIBRATION RESULTS

Ambient condition	
Liquid Temperature	20 +/- 1 °C
Lab Temperature	20 +/- 1 °C
Lab Humidity	30-70 %

5.1 CALIBRATION IN AIR

The following curve represents the measurement in waveguide of the voltage picked up by the probe toward the E-field generated inside the waveguide.



From this curve, the sensitivity in air is calculated using the below formula.

$$E^2 = \sum_{i=1}^3 \frac{V_i (1 + V_i / DCP_i)}{Norm_i}$$

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where

V_i =voltage readings on the 3 channels of the probe

DCPi=diode compression point given below for the 3 channels of the probe

Normi=dipole sensitivity given below for the 3 channels of the probe

Normx dipole 1 ($\mu\text{V}/(\text{V}/\text{m})^2$)	Normy dipole 2 ($\mu\text{V}/(\text{V}/\text{m})^2$)	Normz dipole 3 ($\mu\text{V}/(\text{V}/\text{m})^2$)
1.03	1.37	1.26

DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
109	107	108

5.2 CALIBRATION IN LIQUID

The calorimeter cell or the waveguide is used to determine the calibration in liquid using the formula below.

$$\text{ConvF} = \frac{E_{\text{liquid}}^2}{E_{\text{air}}^2}$$

The E-field in the liquid is determined from the SAR measurement according to the below formula.

$$E_{\text{liquid}}^2 = \frac{\rho \text{ SAR}}{\sigma}$$

where

σ =the conductivity of the liquid

ρ =the volumetric density of the liquid

SAR=the SAR measured from the formula that depends on the setup used. The SAR formulas are given below

For the calorimeter cell (150-450 MHz), the formula is:

$$\text{SAR} = c \frac{dT}{dt}$$

where

c =the specific heat for the liquid

dT/dt =the temperature rises over the time

For the waveguide setup (600-75000 MHz), the formula is:

$$\text{SAR} = \frac{4P_{\text{W}}}{ab\delta} e^{-\frac{2z}{\delta}}$$

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where

a=the larger cross-sectional of the waveguide

b=the smaller cross-sectional of the waveguide

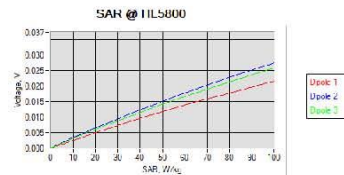
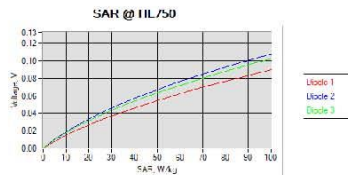
δ =the skin depth for the liquid in the waveguide

Pw=the power delivered to the liquid

The below table summarize the ConvF for the calibrated liquid. The curves give examples for the measured SAR depending on the voltage in some liquid.

Liquid	Frequency (MHz*)	ConvF
HL750	750	1.39
HL850	850	1.32
HL900	900	1.33
HL1800	1800	1.50
HL1900	1900	1.58
HL2000	2000	1.63
HL2300	2300	1.64
HL2450	2450	1.63
HL2600	2600	1.52
HL3300	3300	1.36
HL3500	3500	1.39
HL3700	3700	1.35
HL3900	3900	1.41
HL4200	4200	1.58
HL4600	4600	1.61
HL4900	4900	1.38
HL5200	5200	1.37
HL5400	5400	1.37
HL5600	5600	1.36
HL5800	5800	1.35

(*) Frequency validity is ± 50 MHz below 600MHz, ± 100 MHz from 600MHz to 6GHz and ± 700 MHz above 6GHz



6 VERIFICATION RESULTS

The figures below represent the measured linearity and axial isotropy for this probe. The probe specification is ± 0.2 dB for linearity and ± 0.15 dB for axial isotropy.

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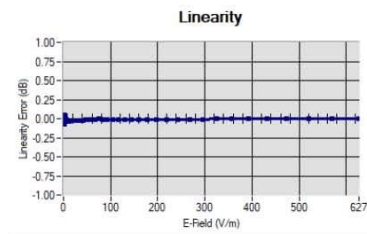
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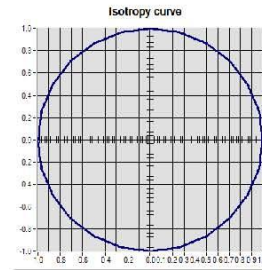


COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.108.1.25.BES.A



Linearity: $\pm 1.54\%$ ($\pm 0.07\text{dB}$)



Isotropy: $\pm 0.1\%$ ($\pm 0.01\text{dB}$)