

SAR Measurement at CUSTOM (5.6GHz 802.11a) (Cheek, Left)

Date of measurement: 28/10/2025

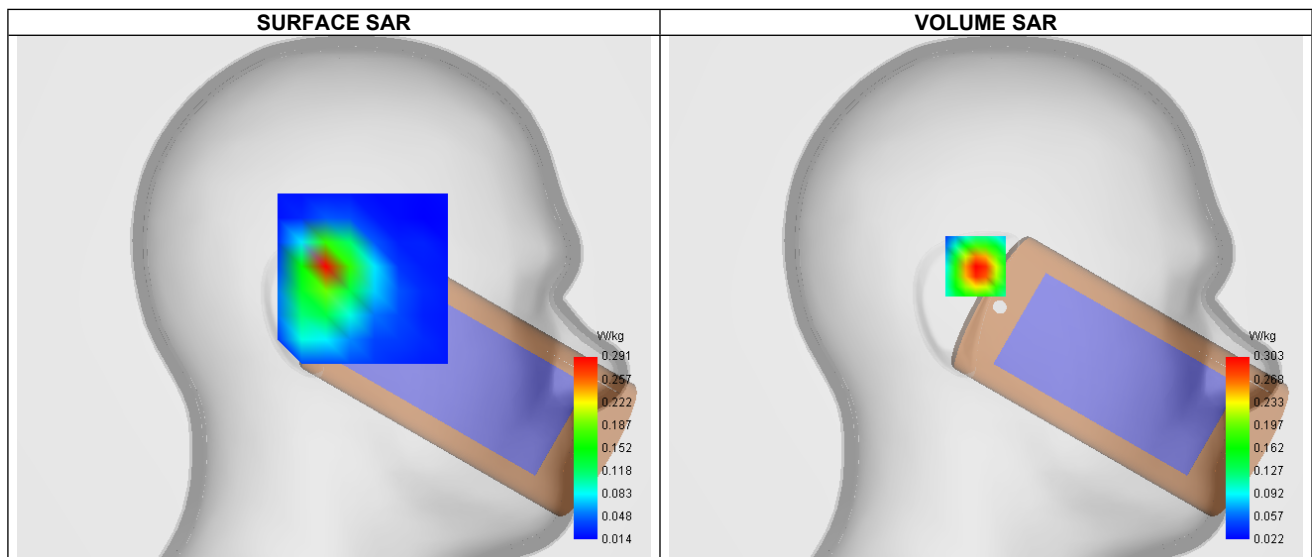
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	2.29
Area Scan	dx=10mm dy=10mm
Zoom Scan	7x7x12,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Left head
Device Position	Tilt
Band	IEEE 802.11a
Channels	Low
Signal	IEEE802.b (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	5500.000000
Relative permittivity (real part)	36.326001
Conductivity (S/m)	5.186388

C. SAR Surface and Volume

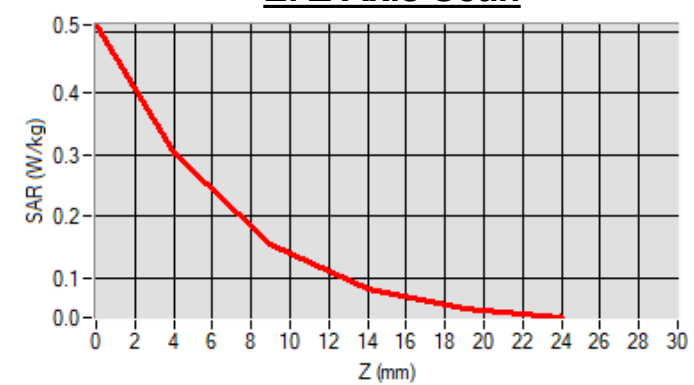


Maximum location: X=5.00, Y=16.00 ; SAR Peak: 0.52 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.141055
SAR 1g (W/Kg)	0.262377
Variation (%)	-1.910000

E. Z Axis Scan



SAR Measurement at CUSTOM (5.8GHz 802.11a) (Cheek, Left)

Date of measurement: 28/10/2025

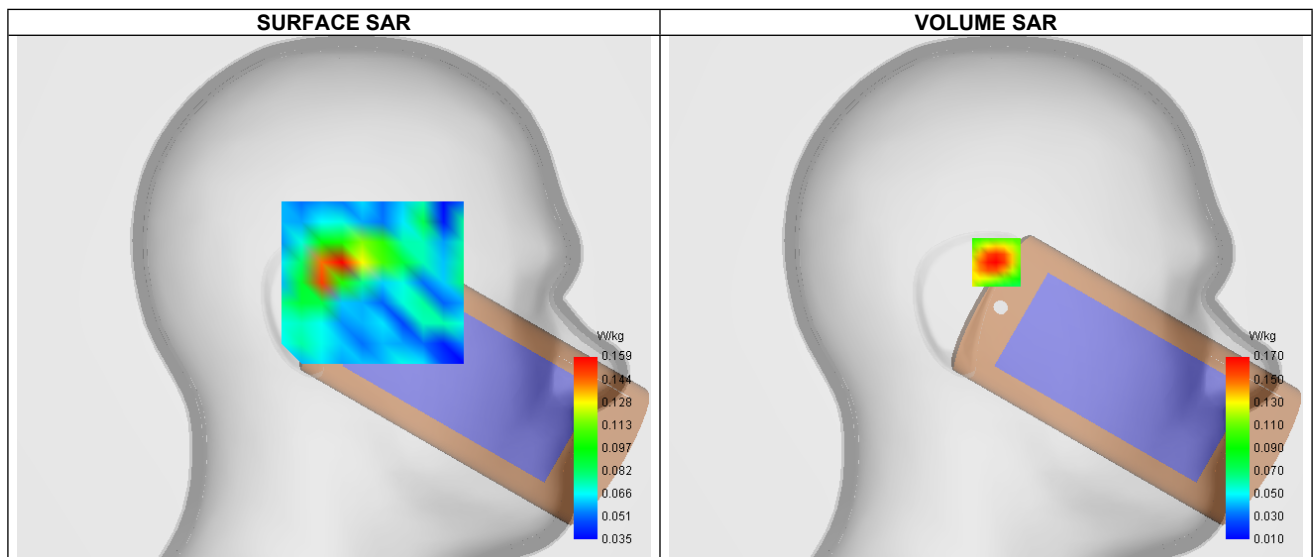
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	2.27
Area Scan	dx=10mm dy=10mm
Zoom Scan	7x7x12,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Left head
Device Position	Cheek
Band	IEEE802.a
Channels	Low
Signal	IEEE802.a (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	5745.000000
Relative permittivity (real part)	36.006000
Conductivity (S/m)	5.406583

C. SAR Surface and Volume

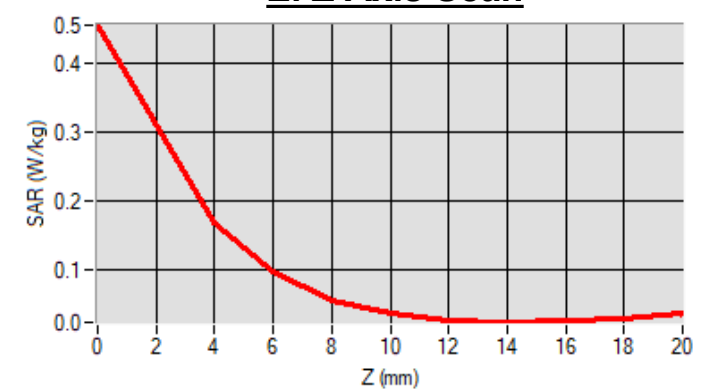


Maximum location: X=-5.00, Y=18.00 ; SAR Peak: 0.47 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.088552
SAR 1g (W/Kg)	0.147976
Variation (%)	-2.690000

E. Z Axis Scan



SAR Measurement at CUSTOM (GPRS850 3Txslots) (Body, Validation Plane)

Date of measurement: 14/10/2025

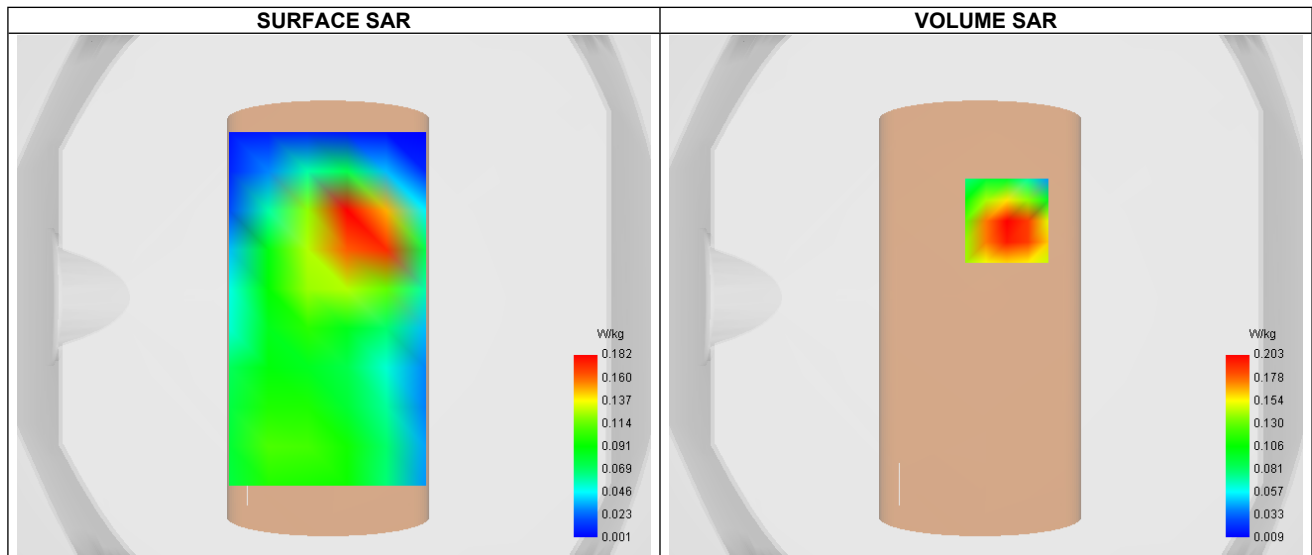
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	1.66
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	GSM 850
Channels	Middle
Signal	TDMA (Crest factor: 2.7)

B. Permittivity

Frequency (MHz)	836.599976
Relative permittivity (real part)	41.143152
Conductivity (S/m)	0.880552

C. SAR Surface and Volume

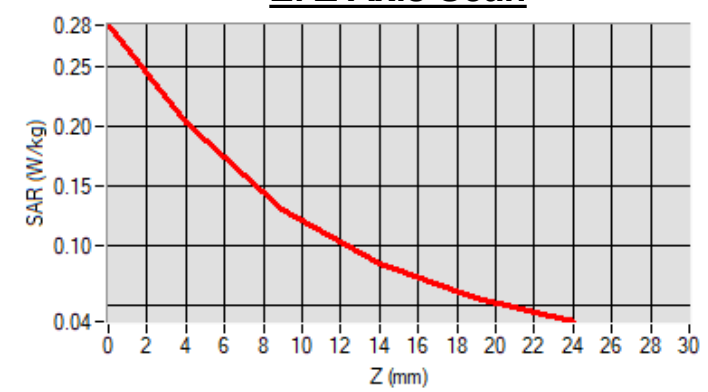


Maximum location: X=8.00, Y=29.00 ; SAR Peak: 0.29 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.083834
SAR 1g (W/Kg)	0.147072
Variation (%)	-4.180000

E. Z Axis Scan



SAR Measurement at CUSTOM (GPRS1900 2Tx slot) (Body, Validation Plane)

Date of measurement: 20/10/2025

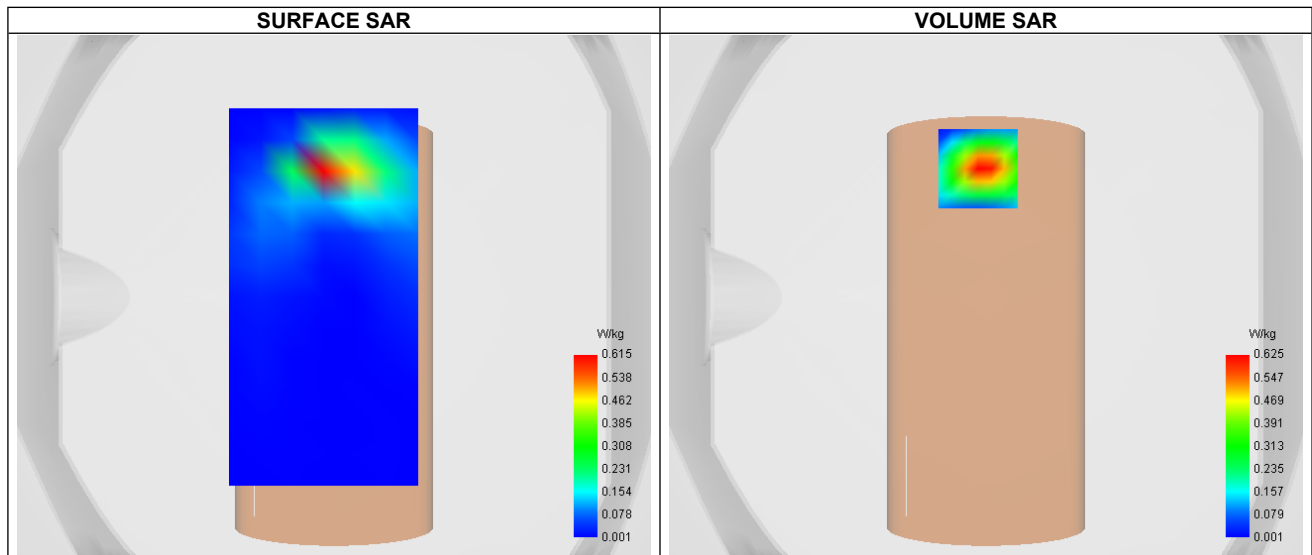
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	2.05
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	GSM 1900
Channels	High
Signal	TDMA (Crest factor: 4.0)

B. Permittivity

Frequency (MHz)	1909.8.000000
Relative permittivity (real part)	39.390000
Conductivity (S/m)	1.400024

C. SAR Surface and Volume

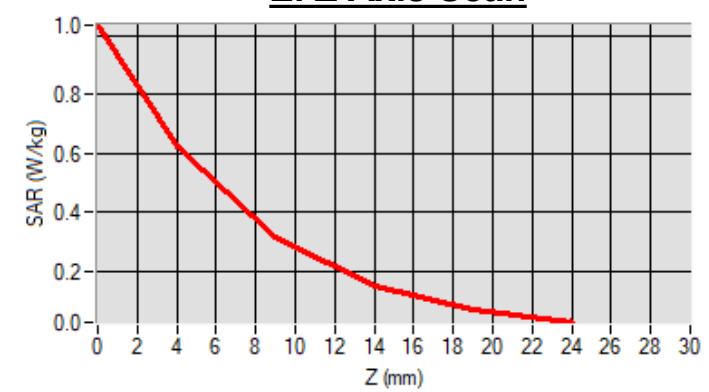


Maximum location: X=-3.00, Y=49.00 ; SAR Peak: 1.05 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.224239
SAR 1g (W/Kg)	0.547123
Variation (%)	-0.220000

E. Z Axis Scan



SAR Measurement at Band2 WCDMA1900 (Body, Validation Plane)

Date of measurement: 20/10/2025

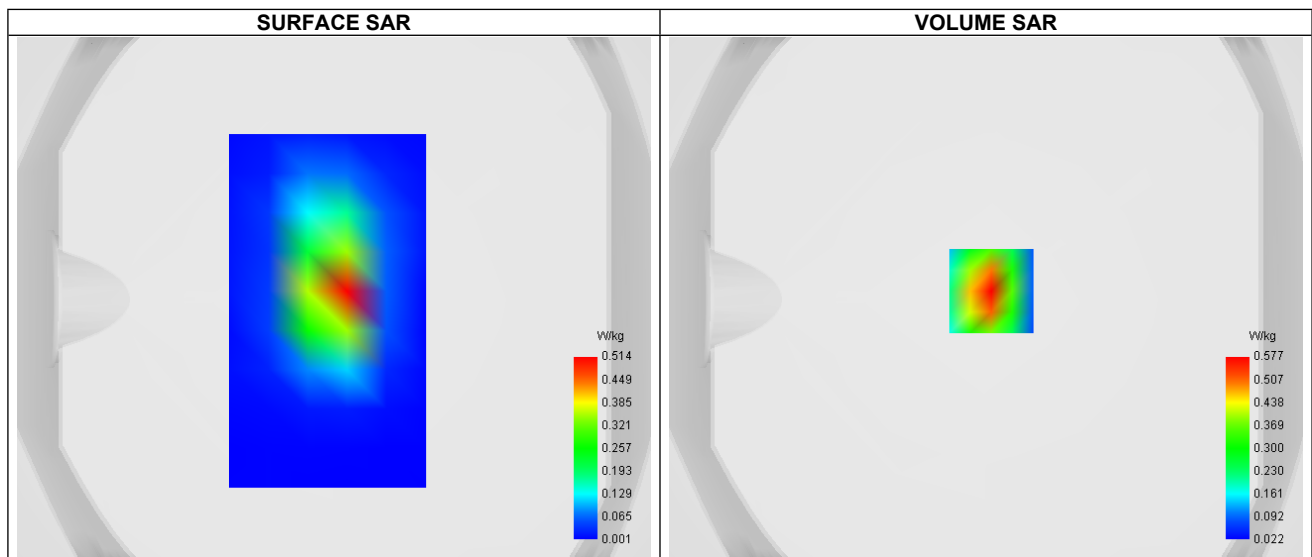
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	2.05
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	Band2 WCDMA1900
Channels	High
Signal	WCDMA (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1907.600000
Relative permittivity (real part)	39.392150
Conductivity (S/m)	1.465102

C. SAR Surface and Volume

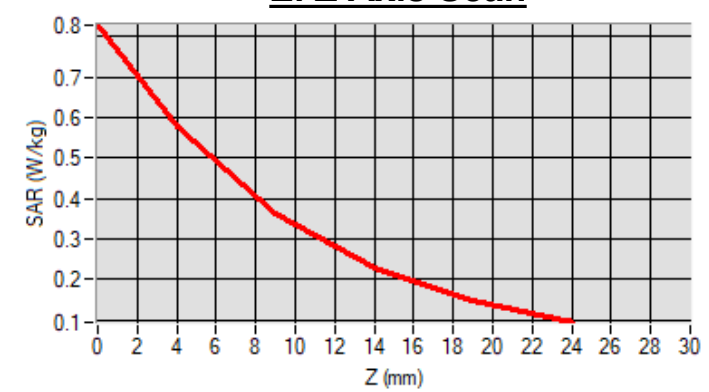


Maximum location: X=2.00, Y=3.00 ; SAR Peak: 0.84 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.222873
SAR 1g (W/Kg)	0.449432
Variation (%)	-2.640000

E. Z Axis Scan



SAR Measurement at Band4 WCDMA1700 (Body, Validation Plane)

Date of measurement: 20/10/2025

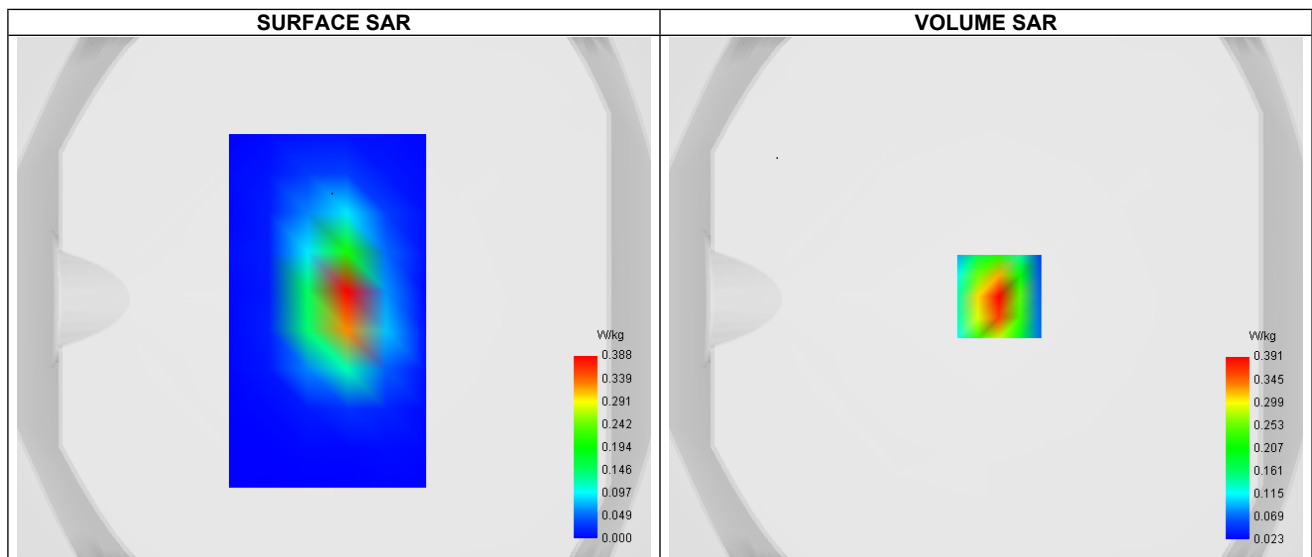
A. Experimental conditions.

Probe	SN 39/21 EPGO0523-403
ConvF	2.09
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	Band4 WCDMA1700
Channels	Low
Signal	WCDMA (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1712.400000
Relative permittivity (real part)	39.553218
Conductivity (S/m)	1.385056

C. SAR Surface and Volume

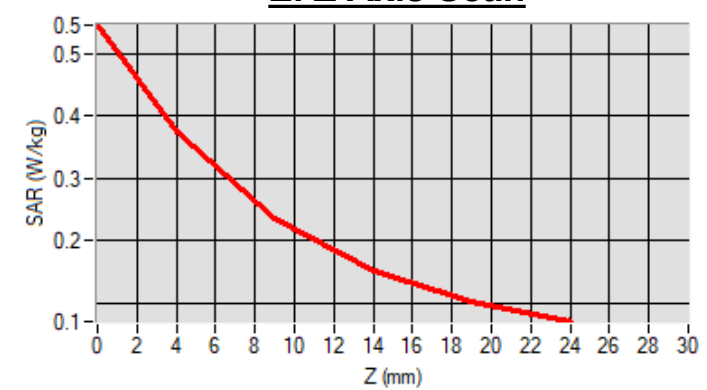


Maximum location: X=5.00, Y=1.00 ; SAR Peak: 0.51 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.189141
SAR 1g (W/Kg)	0.338806
Variation (%)	0.690000

E. Z Axis Scan



SAR Measurement at Band5 WCDMA850 (Body, Validation Plane)

Date of measurement: 14/10/2025

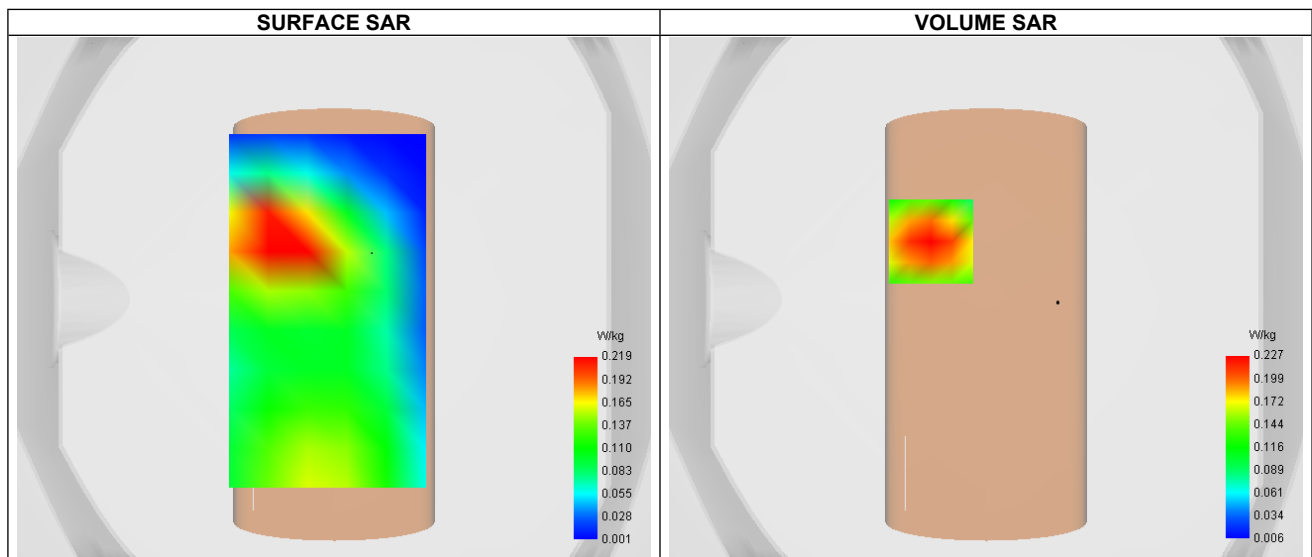
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	1.66
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	Band5 WCDMA850
Channels	Middle
Signal	WCDMA (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	836.599976
Relative permittivity (real part)	41.142325
Conductivity (S/m)	0.880644

C. SAR Surface and Volume

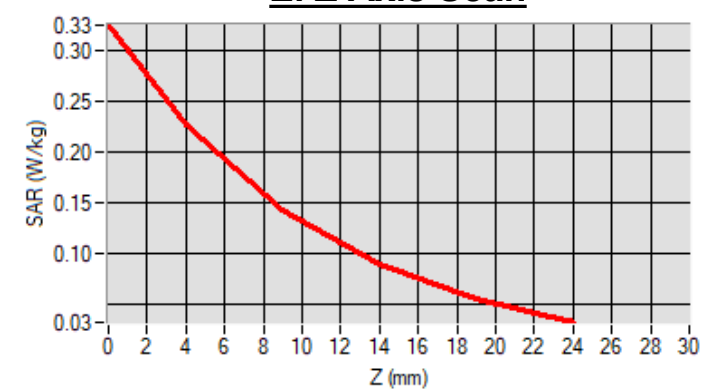


Maximum location: X=-21.00, Y=22.00 ; SAR Peak: 0.33 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.095034
SAR 1g (W/Kg)	0.163180
Variation (%)	-0.040000

E. Z Axis Scan



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

Date of measurement: 20/10/2025

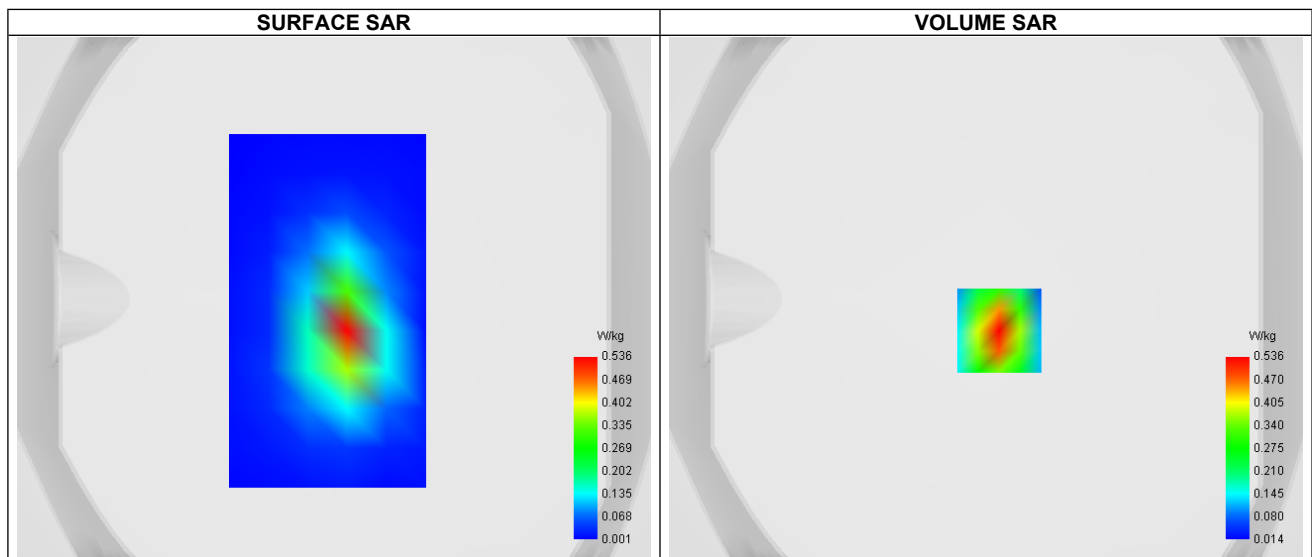
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	2.05
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 2
Channels	High
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1900.000000
Relative permittivity (real part)	39.393000
Conductivity (S/m)	1.461211

C. SAR Surface and Volume

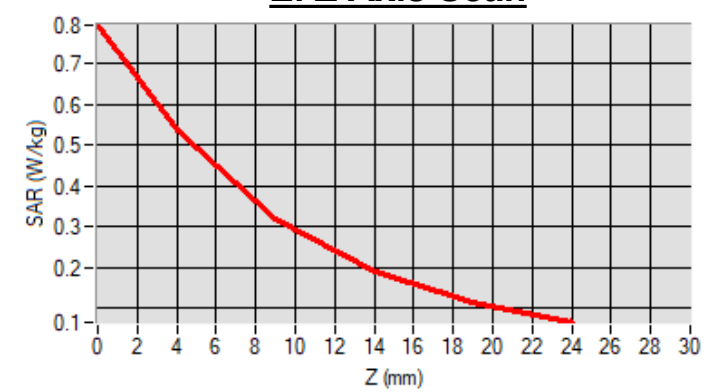


Maximum location: X=5.00, Y=-12.00 ; SAR Peak: 0.79 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.306071
SAR 1g (W/Kg)	0.445037
Variation (%)	-1.130000

E. Z Axis Scan



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

Date of measurement: 20/10/2025

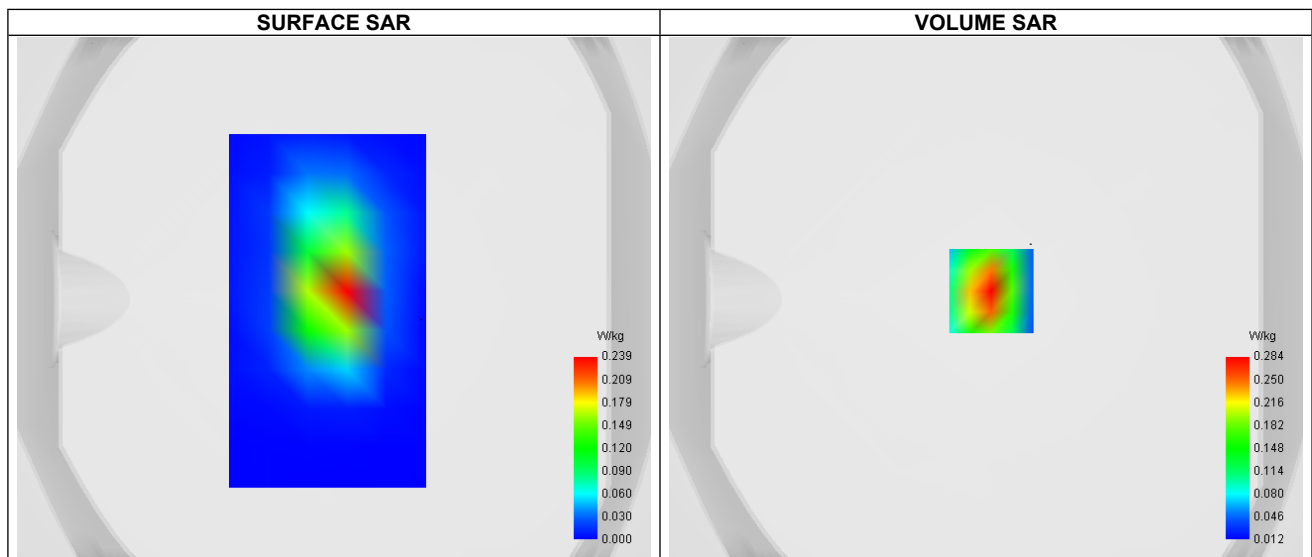
A. Experimental conditions.

Probe	SN 39/21 EPGO0523-403
ConvF	2.09
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 4
Channels	High
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1745.000000
Relative permittivity (real part)	39.531591
Conductivity (S/m)	1.392363

C. SAR Surface and Volume

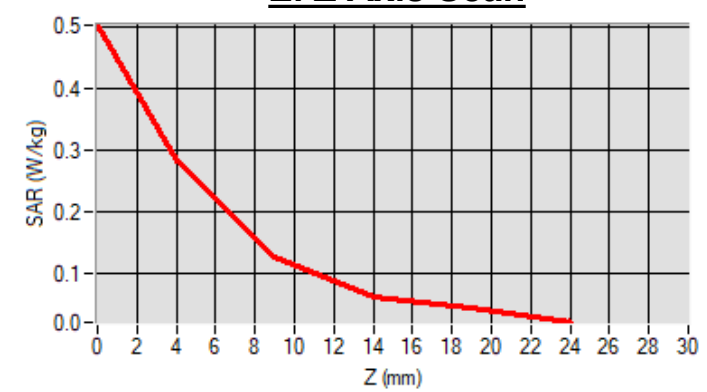


Maximum location: X=2.00, Y=3.00 ; SAR Peak: 0.51 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.142490
SAR 1g (W/Kg)	0.270070
Variation (%)	0.360000

E. Z Axis Scan



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

Date of measurement: 14/10/2025

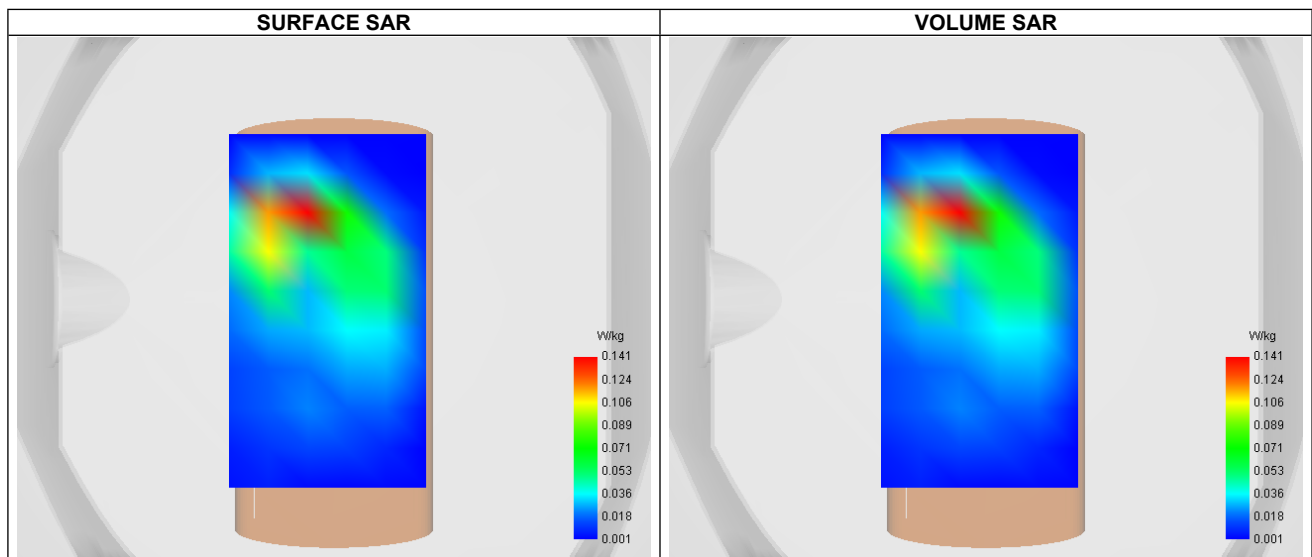
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	1.66
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 5
Channels	Middle
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	836.500000
Relative permittivity (real part)	41.143152
Conductivity (S/m)	0.880552

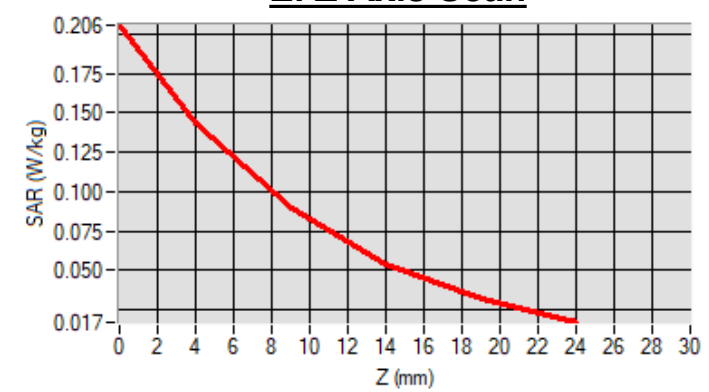
C. SAR Surface and Volume



D. SAR 1g & 10g

SAR 10g (W/Kg)	0.072827
SAR 1g (W/Kg)	0.139133
Variation (%)	-0.560000

E. Z Axis Scan



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

Date of measurement: 22/10/2025

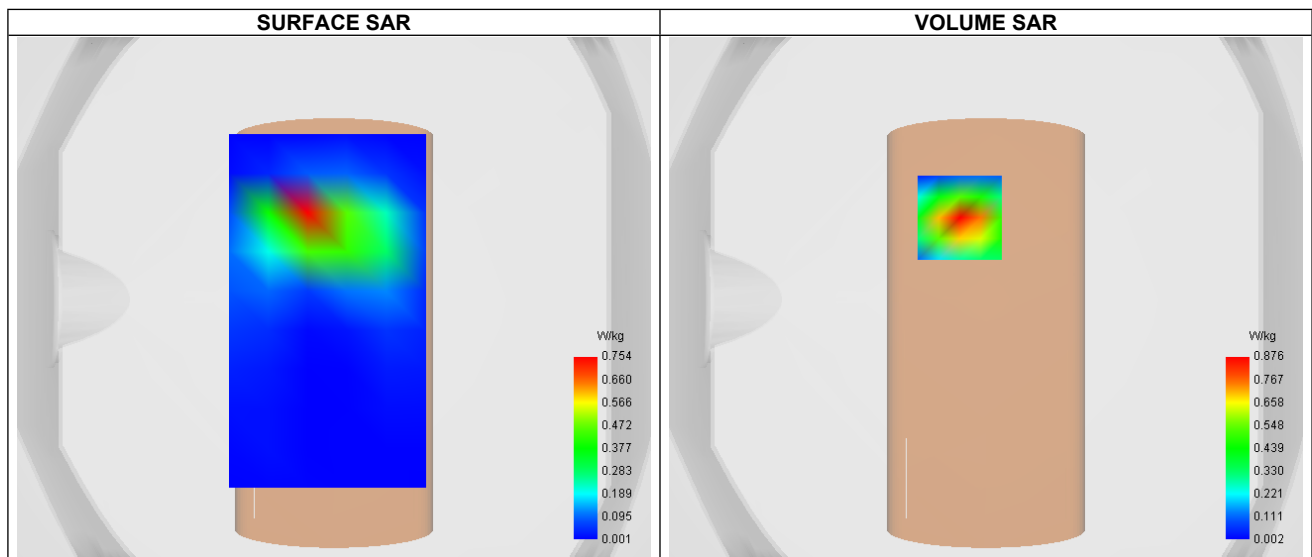
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	2.35
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 7
Channels	Middle
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	2535.000000
Relative permittivity (real part)	38.511358
Conductivity (S/m)	1.986159

C. SAR Surface and Volume

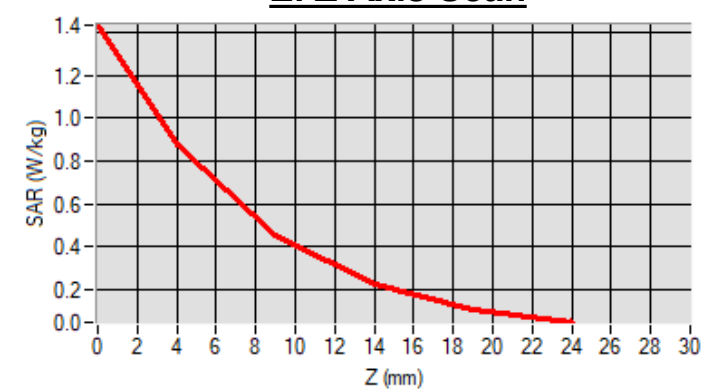


Maximum location: X=-10.00, Y=31.00 ; SAR Peak: 1.45 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.371674
SAR 1g (W/Kg)	0.853172
Variation (%)	0.960000

E. Z Axis Scan



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

Date of measurement: 12/10/2025

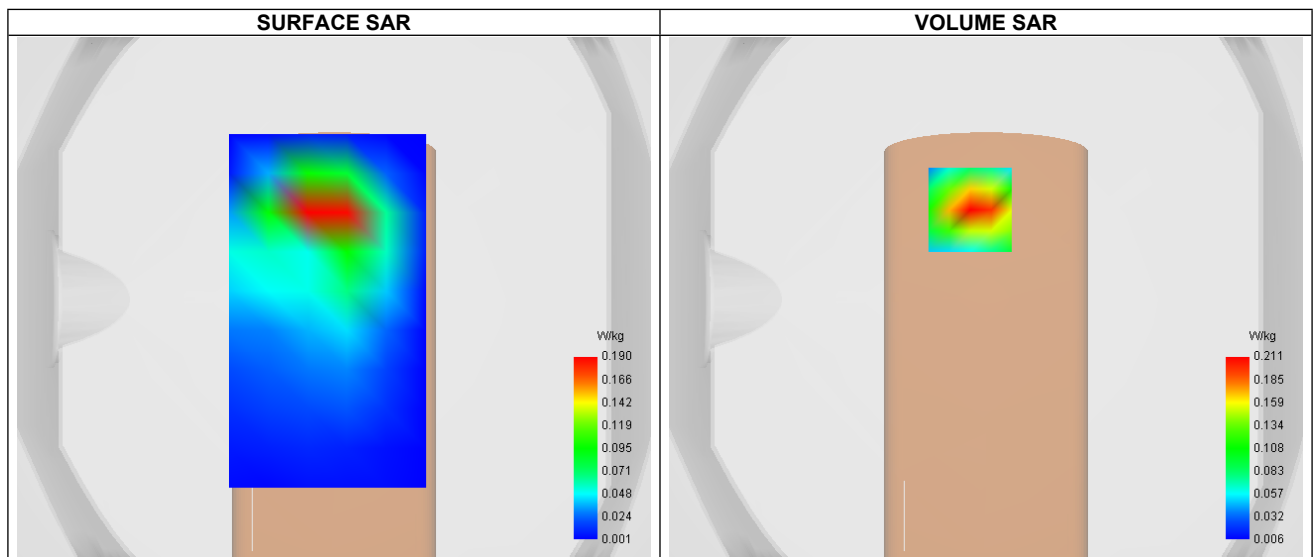
A. Experimental conditions.

Probe	SN 39/21 EPGO0523-403
ConvF	1.65
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 12
Channels	Middle
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	707.500000
Relative permittivity (real part)	41.326044
Conductivity (S/m)	0.891440

C. SAR Surface and Volume

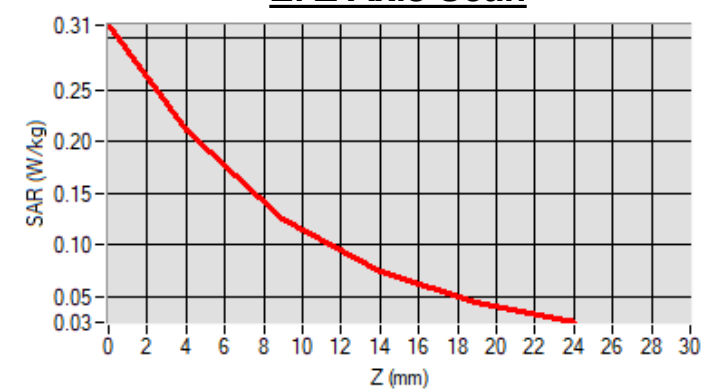


Maximum location: X=-6.00, Y=34.00 ; SAR Peak: 0.32 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.056306
SAR 1g (W/Kg)	0.143175
Variation (%)	-0.660000

E. Z Axis Scan



SAR Measurement at LTE band 17 (Body, Validation Plane)

Date of measurement: 12/10/2025

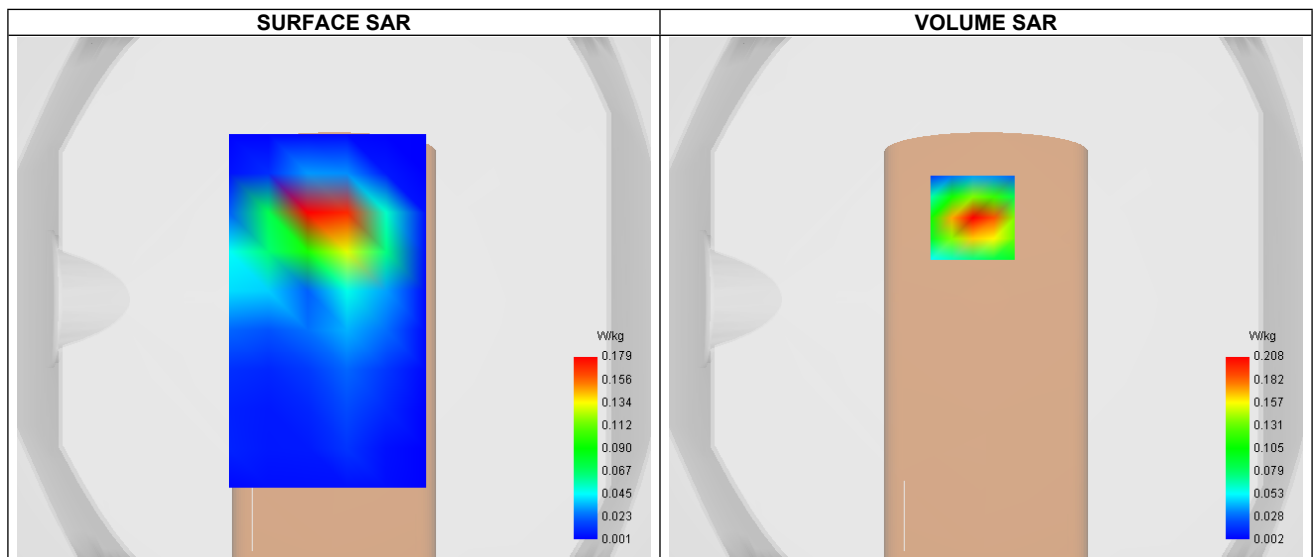
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	1.65
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 17
Channels	Middle
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	710.000000
Relative permittivity (real part)	41.323453
Conductivity (S/m)	0.892222

C. SAR Surface and Volume

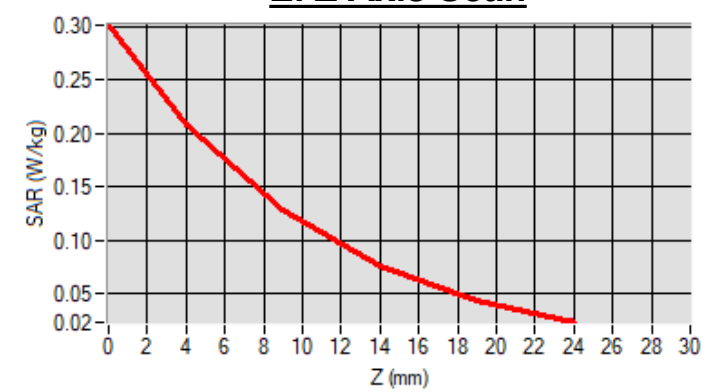


Maximum location: X=-5.00, Y=31.00 ; SAR Peak: 0.30 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.060882
SAR 1g (W/Kg)	0.151031
Variation (%)	-0.580000

E. Z Axis Scan



SAR Measurement at LTE band 26 (Body, Validation Plane)

Date of measurement: 14/10/2025

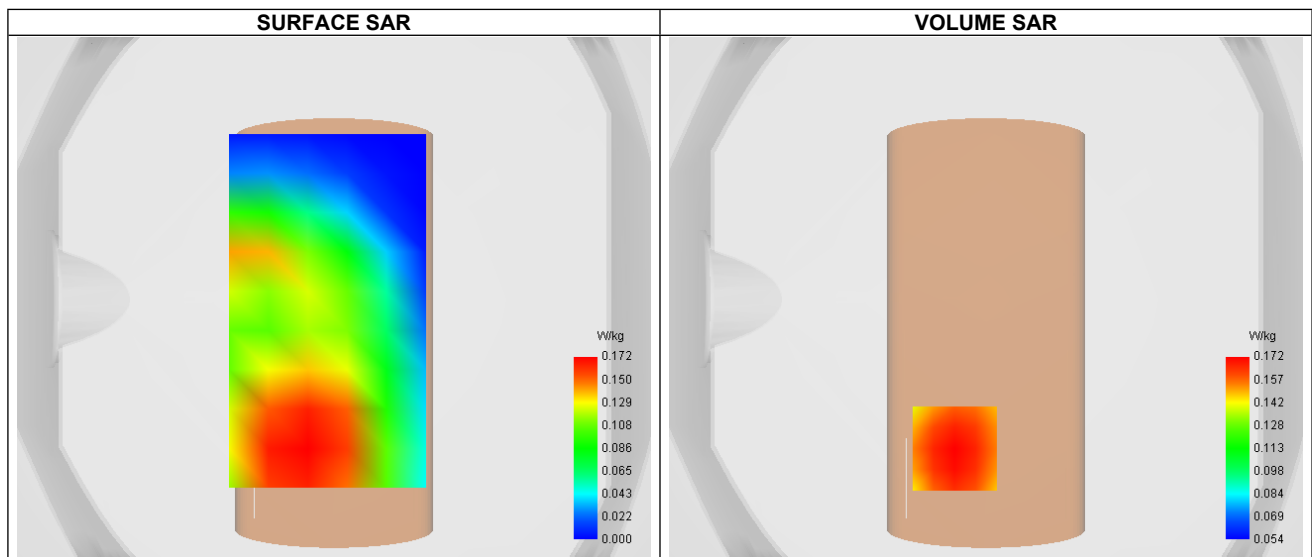
A. Experimental conditions.

Probe	SN 39/21 EPGO0523-403
ConvF	1.66
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 26
Channels	Middle
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	831.500000
Relative permittivity (real part)	41.146212
Conductivity (S/m)	0.881349

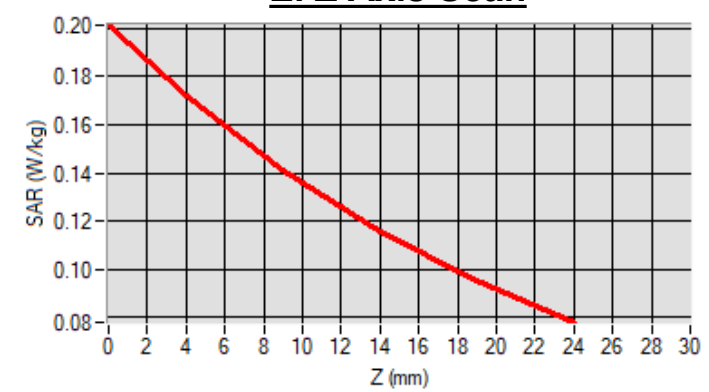
C. SAR Surface and Volume



D. SAR 1g & 10g

SAR 10g (W/Kg)	0.073414
SAR 1g (W/Kg)	0.128127
Variation (%)	-3.340000

E. Z Axis Scan



SAR Measurement at LTE band 38 (Body, Validation Plane)

Date of measurement: 22/10/2025

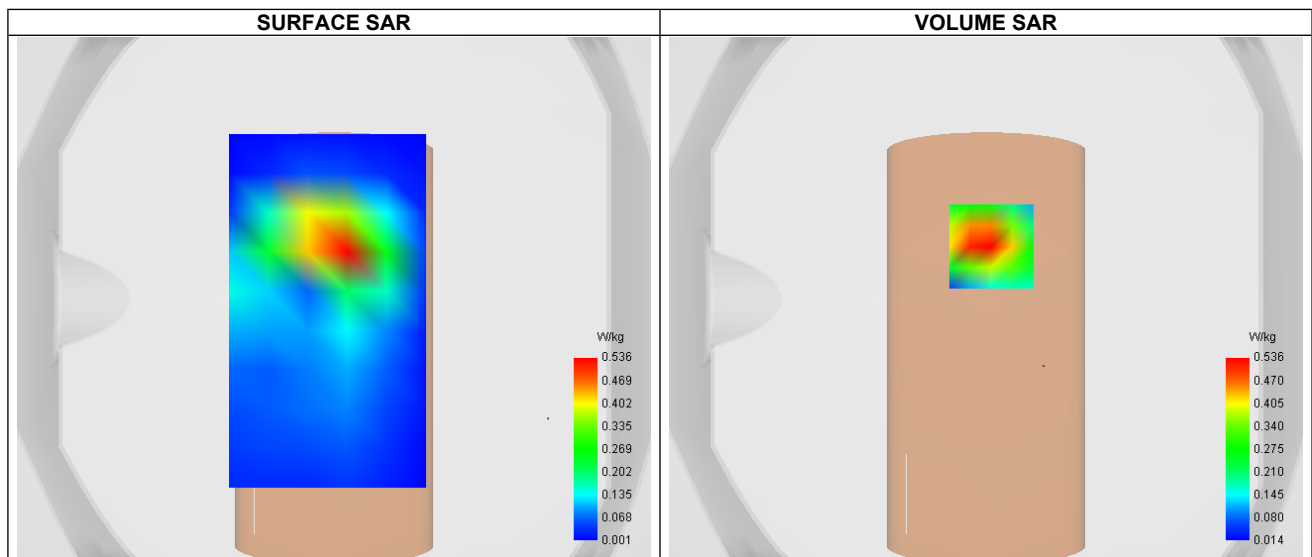
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	2.35
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 38
Channels	Low
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	2580.000000
Relative permittivity (real part)	38.510021
Conductivity (S/m)	1.989660

C. SAR Surface and Volume

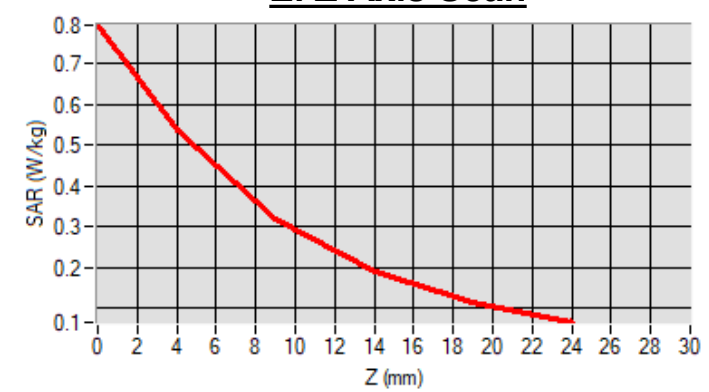


Maximum location: X=2.00, Y=20.00 ; SAR Peak: 0.79 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.286999
SAR 1g (W/Kg)	0.502847
Variation (%)	-2.790000

E. Z Axis Scan



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

Date of measurement: 22/10/2025

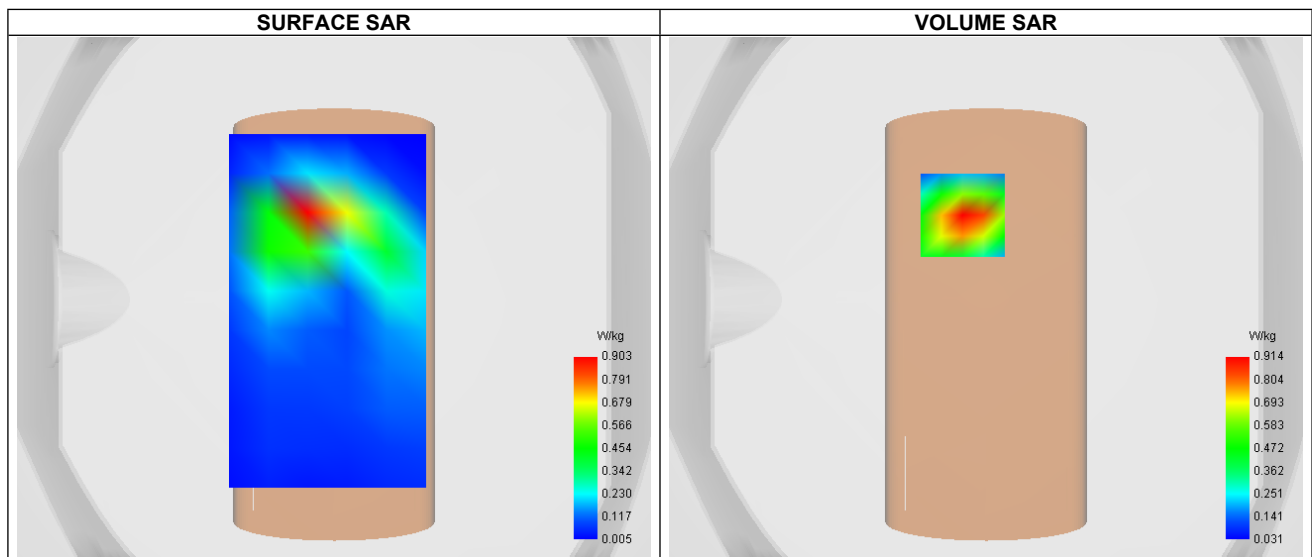
A. Experimental conditions.

Probe	SN 39/21 EPGO0523-403
ConvF	2.35
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 41
Channels	Low
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	2545.000000
Relative permittivity (real part)	38.621511
Conductivity (S/m)	1.948123

C. SAR Surface and Volume

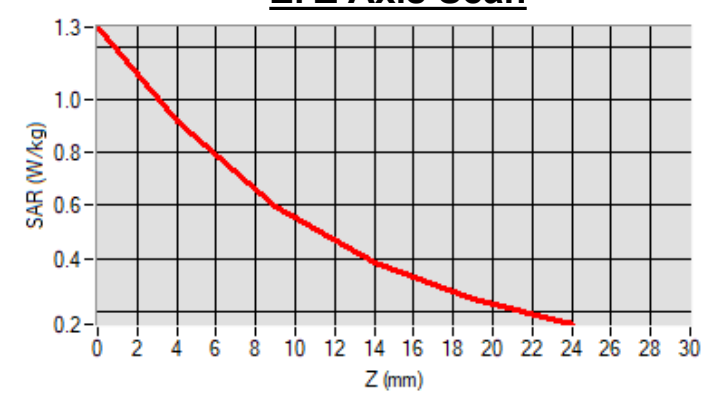


Maximum location: X=-9.00, Y=32.00 ; SAR Peak: 1.30 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.474018
SAR 1g (W/Kg)	0.868121
Variation (%)	-3.260000

E. Z Axis Scan



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

Date of measurement: 20/10/2025

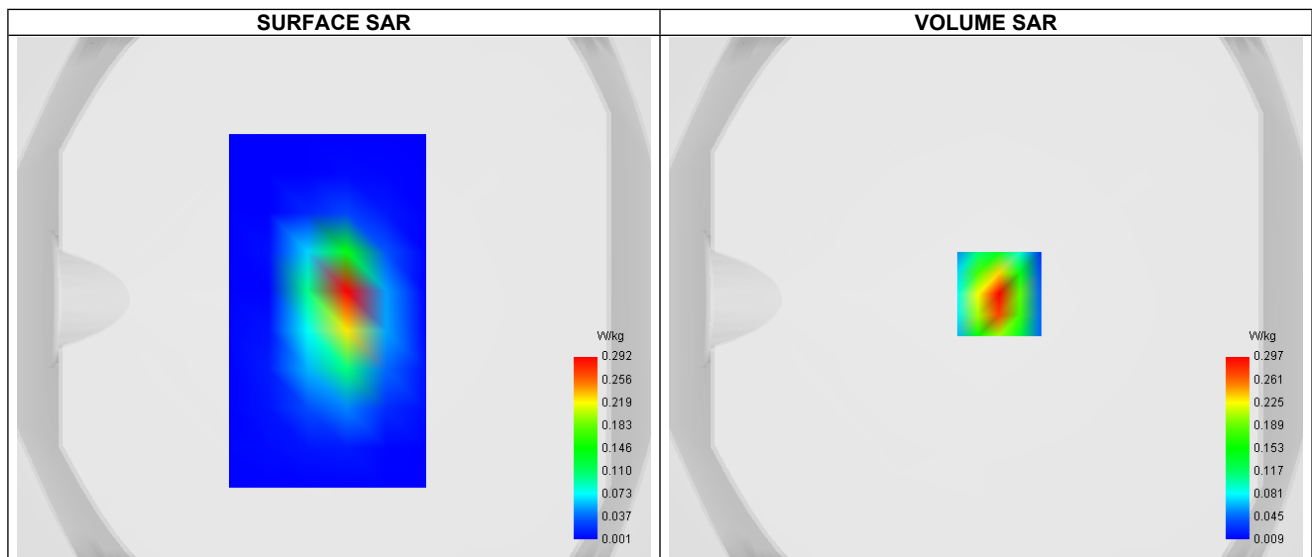
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	2.09
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	LTE band 66
Channels	High
Signal	LTE (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	1745.000000
Relative permittivity (real part)	39.531591
Conductivity (S/m)	1.392363

C. SAR Surface and Volume

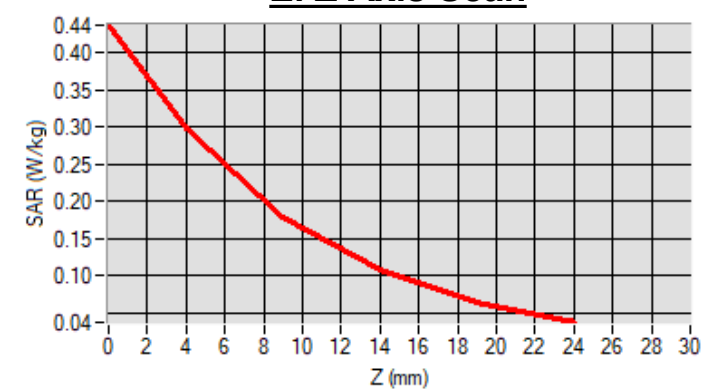


Maximum location: X=5.00, Y=2.00 ; SAR Peak: 0.44 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.123315
SAR 1g (W/Kg)	0.266124
Variation (%)	-1.110000

E. Z Axis Scan



SAR Measurement at IEEE 802.11b ISM (Body, Validation Plane)

Date of measurement: 22/10/2025

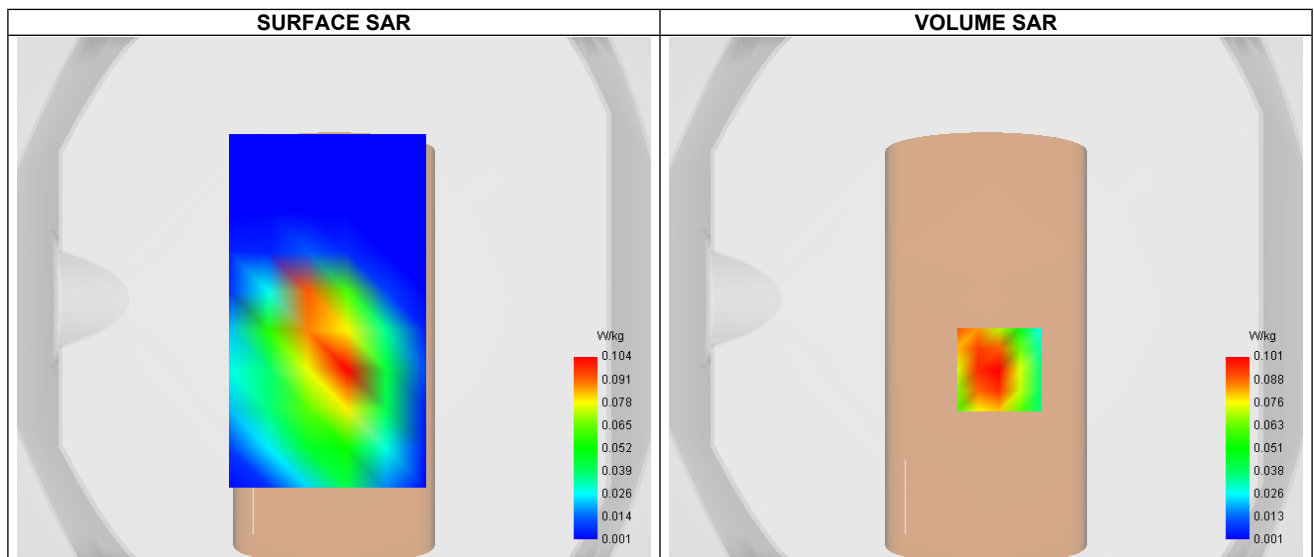
A. Experimental conditions.

Probe	SN 39/21 EPGO0523-403
ConvF	2.38
Area Scan	surf_sam_plan.txt
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11b ISM
Channels	High
Signal	IEEE802.b (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	2462.000000
Relative permittivity (real part)	38.763000
Conductivity (S/m)	1.834028

C. SAR Surface and Volume

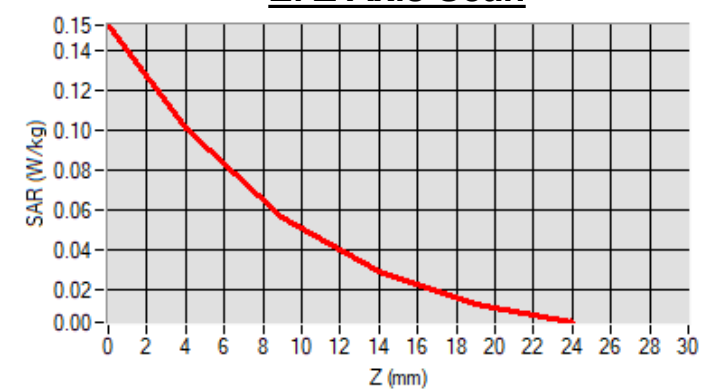


Maximum location: X=5.00, Y=-27.00 ; SAR Peak: 0.16 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.040582
SAR 1g (W/Kg)	0.067194
Variation (%)	-2.389999

E. Z Axis Scan



SAR Measurement at CUSTOM (5.2GHz 802.11a) (Body, Validation Plane)

Date of measurement: 27/10/2025

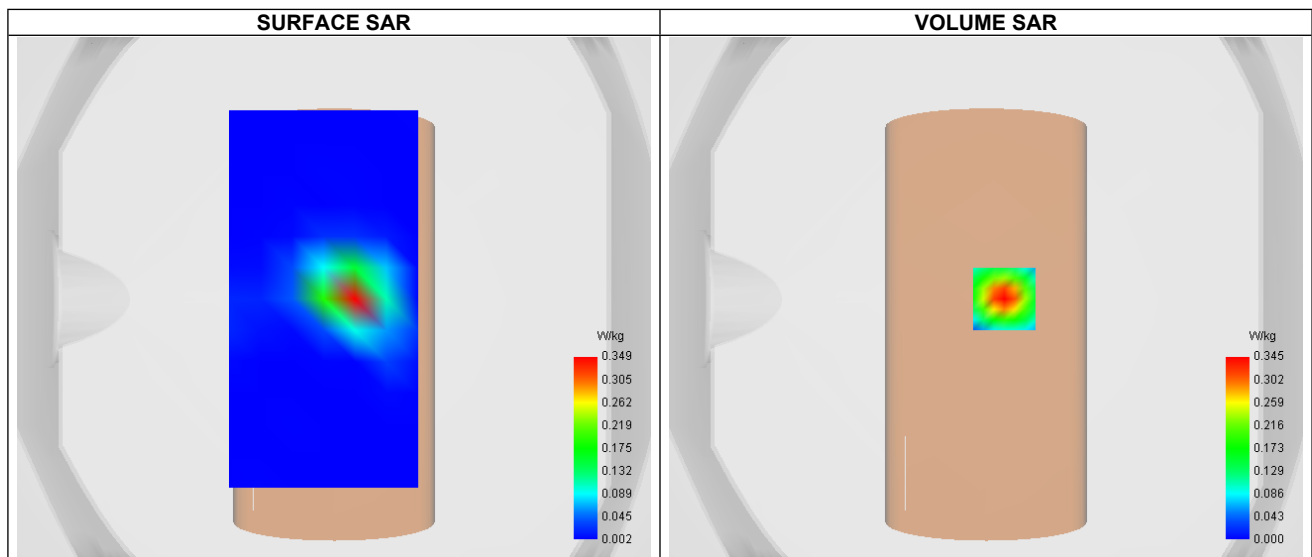
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	2.30
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x12,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11a
Channels	High
Signal	IEEE802.a (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	5240.000000
Relative permittivity (real part)	36.859999
Conductivity (S/m)	4.741564

C. SAR Surface and Volume

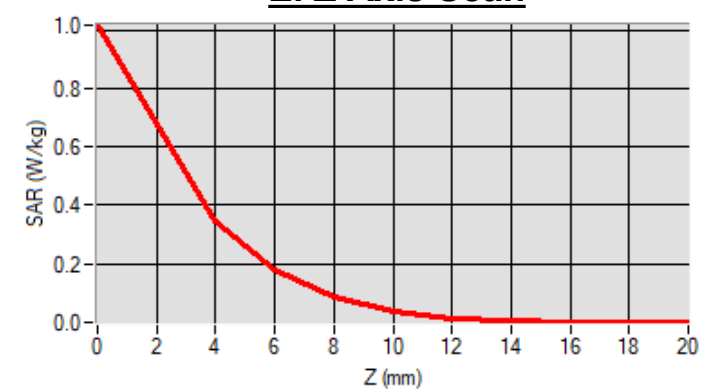


Maximum location: X=7.00, Y=0.00 ; SAR Peak: 0.64 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.051097
SAR 1g (W/Kg)	0.168572
Variation (%)	2.720000

E. Z Axis Scan



SAR Measurement at CUSTOM (5.3GHz 802.11a) (Body, Validation Plane)

Date of measurement: 27/10/2025

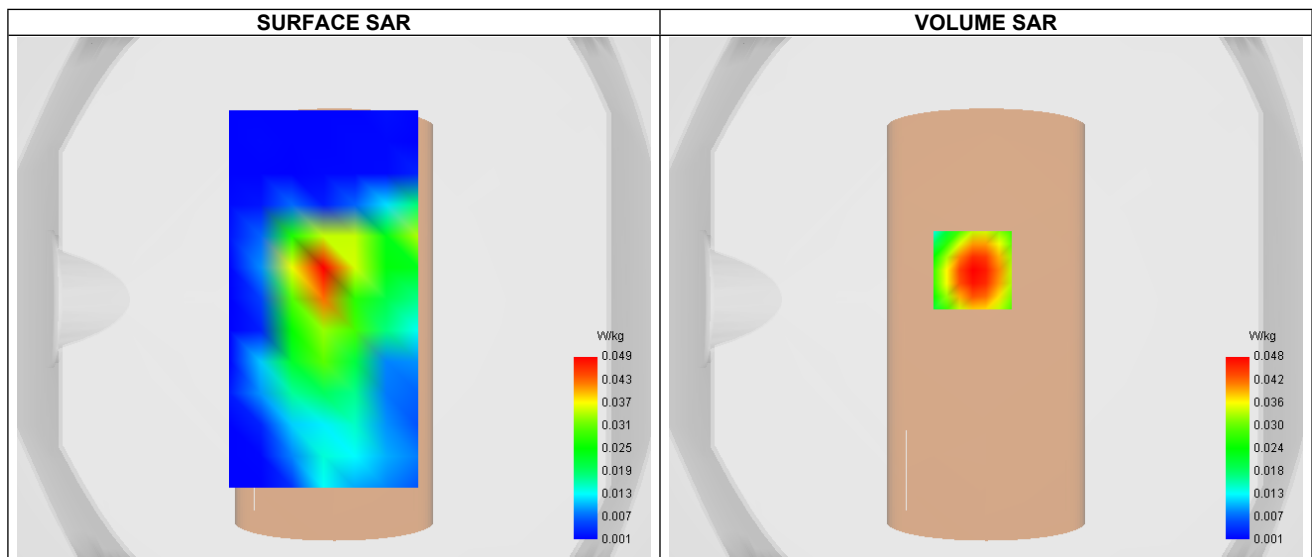
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	2.30
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x12,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11a
Channels	High
Signal	IEEE802.a (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	5320.000000
Relative permittivity (real part)	36.71236
Conductivity (S/m)	4.85869

C. SAR Surface and Volume

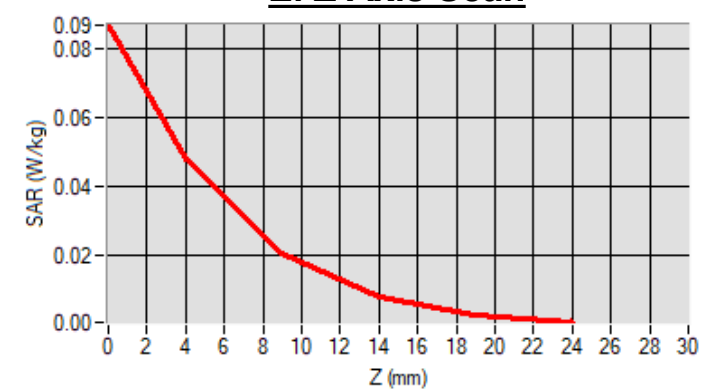


Maximum location: X=-5.00, Y=11.00 ; SAR Peak: 0.09 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.018758
SAR 1g (W/Kg)	0.029408
Variation (%)	-1.100000

E. Z Axis Scan



SAR Measurement at CUSTOM (5.6GHz 802.11a) (Body, Validation Plane)

Date of measurement: 28/10/2025

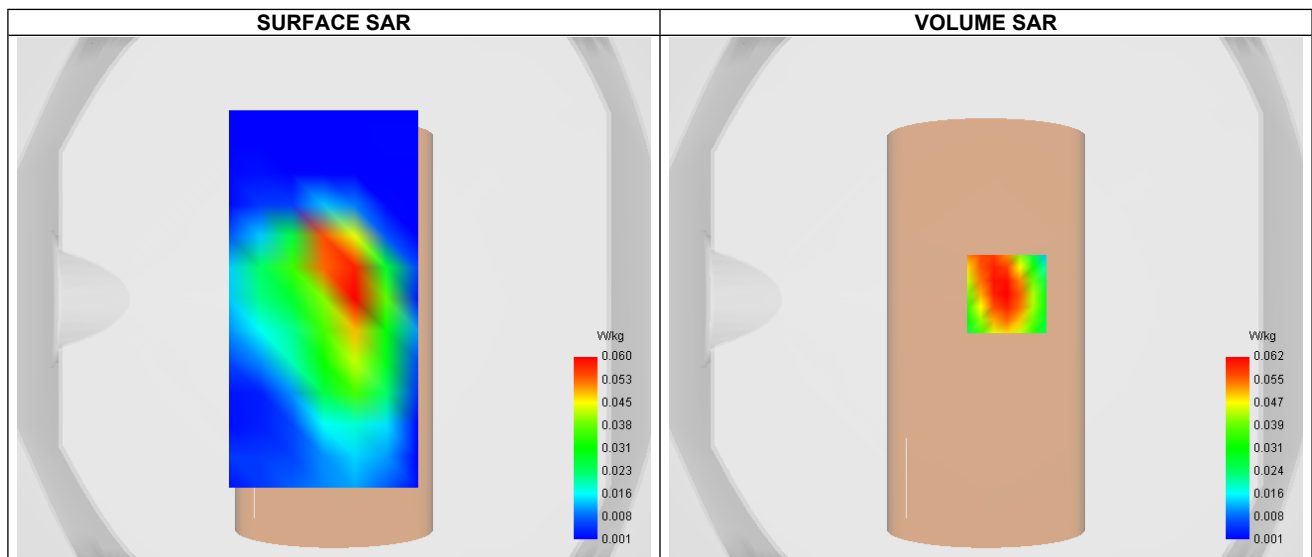
A. Experimental conditions.

Probe	SN 39/21 EPGO0523-403
ConvF	2.29
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x12,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11a
Channels	Low
Signal	IEEE802.a (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	5500.000000
Relative permittivity (real part)	36.326001
Conductivity (S/m)	5.186388

C. SAR Surface and Volume

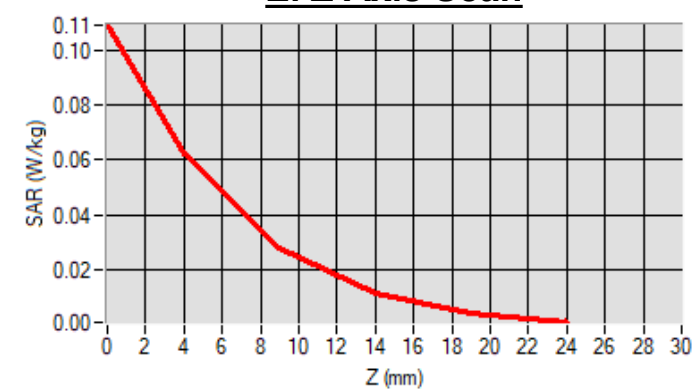


Maximum location: X=8.00, Y=2.00 ; SAR Peak: 0.11 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.021257
SAR 1g (W/Kg)	0.052292
Variation (%)	2.240000

E. Z Axis Scan



SAR Measurement at CUSTOM (5.8GHz 802.11a) (Body, Validation Plane)

Date of measurement: 28/10/2025

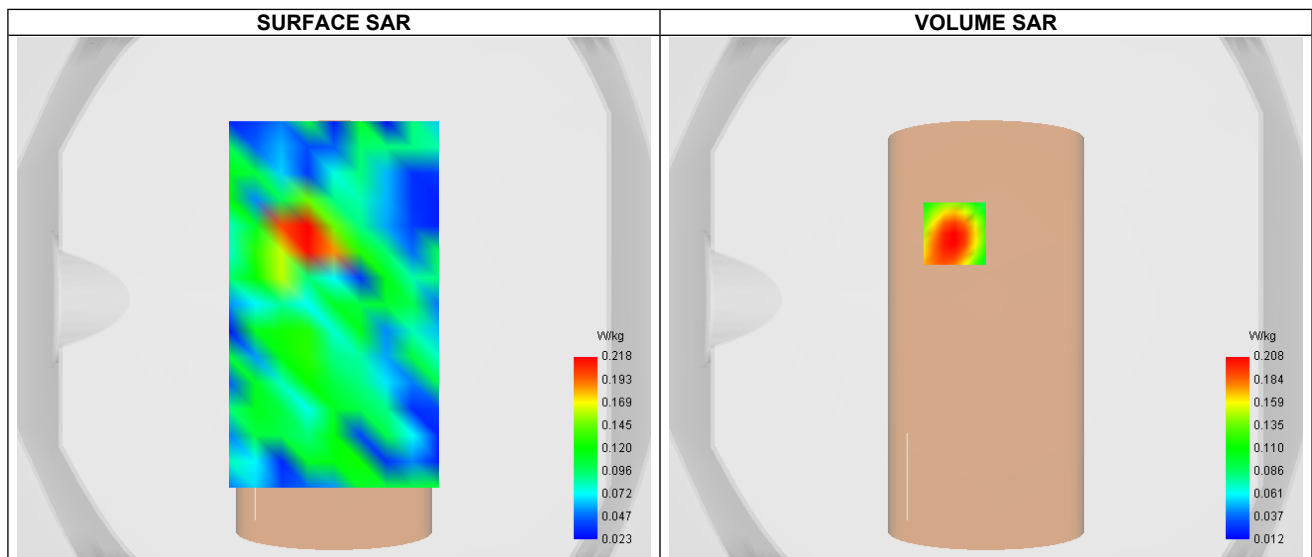
A. Experimental conditions.

Probe	SN 39/21 EPG00523-403
ConvF	2.27
Area Scan	surf_sam_plan.txt
Zoom Scan	7x7x12,dx=4mm dy=4mm dz=2mm,Complete
Phantom	Validation plane
Device Position	Body
Band	IEEE 802.11a
Channels	Low
Signal	IEEE802.a (Crest factor: 1.0)

B. Permittivity

Frequency (MHz)	5745.000000
Relative permittivity (real part)	36.006000
Conductivity (S/m)	5.406583

C. SAR Surface and Volume

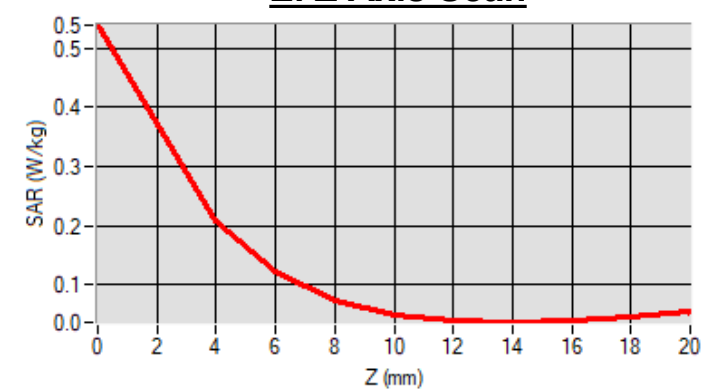


Maximum location: X=-12.00, Y=25.00 ; SAR Peak: 0.51 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.077758
SAR 1g (W/Kg)	0.164062
Variation (%)	2.020000

E. Z Axis Scan



Appendix D. Calibration Certificate

Table of contents
E Field Probe - EPGO0523-403
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 03/14 WGA33



COMOSAR E-Field Probe Calibration Report

Ref : ACR.307.3.24.BES.A

**GUANGDONG ASIA HONGKE TEST
TECHNOLOGY CO., LTD**
NO.1/F,BUILDING B1, JUNFENG INDUSTRIAL PARK,
CHONGQING ROAD, HEPING COMMUNITY,
FUHAIHAI STREET, BAO'AN DISTRICT,SHENZHEN,
GUANGDONG 518055, P.R.CHINA
MVG COMOSAR DOSIMETRIC E-FIELD PROBE
SERIAL NO.: SN 39/21 EPG00523-403

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

Calibration date: 09/09/2025



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 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.307.3.24.BES.A

	<i>Name</i>	<i>Function</i>	<i>Date</i>	<i>Signature</i>
<i>Prepared by :</i>	Jérôme Le Gall	Measurement Responsible	09/08/2025	
<i>Checked by :</i>	Jérôme Luc	Technical Manager	09/08/2025	
<i>Approved by :</i>	Yann Toutain	Laboratory Director	09/09/2025	<i>Yann TOUTAIN</i>

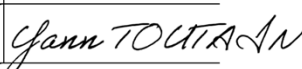
	<i>Customer Name</i>
<i>Distribution :</i>	Shenzhen Asia Hongke

<i>Issue</i>	<i>Name</i>	<i>Date</i>	<i>Modifications</i>
A	Jérôme Luc	9/09/2025	Initial release



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.307.3.24.BES.A

	<i>Name</i>	<i>Function</i>	<i>Date</i>	<i>Signature</i>
<i>Prepared by :</i>	Jérôme Le Gall	Measurement Responsible	09/08/2025	
<i>Checked by :</i>	Jérôme Luc	Technical Manager	09/08/2025	
<i>Approved by :</i>	Yann Toutain	Laboratory Director	09/09/2025	

	<i>Customer Name</i>
<i>Distribution :</i>	Shenzhen Asia Hongke

<i>Issue</i>	<i>Name</i>	<i>Date</i>	<i>Modifications</i>
A	Jérôme Luc	9/09/2025	Initial release



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.307.3.24.BES.A

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref. ACR.307.3.24.BES.A

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	SN 39/21 EPG00523-403
Product Condition (new / used)	New
Frequency Range of Probe	0.15 GHz-6GHz
Resistance of Three Dipoles at Connector	Dipole 1: $R1=0.199\text{ M}\Omega$ Dipole 2: $R2=0.218\text{ M}\Omega$ Dipole 3: $R3=0.210\text{ M}\Omega$

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 affect. All calibrations / measurements performed meet the fore mentioned standards.

3.1 LINEARITY

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

3.2 SENSITIVITY

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

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR_307.3.24.BES.A

3.3 LOWER DETECTION LIMIT

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

3.4 ISOTROPY

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

3.1 BOUNDARY EFFECT

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

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

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

where

$SAR_{uncertainty}$	is the uncertainty in percent of the probe boundary effect
d_{be}	is the distance between the surface and the closest <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%).



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR_307.3.24.BES.A

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 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 ($\mu\text{V}/(\text{V}/\text{m})^2$)	Normy dipole 2 ($\mu\text{V}/(\text{V}/\text{m})^2$)	Normz dipole 3 ($\mu\text{V}/(\text{V}/\text{m})^2$)
1.26	0.87	0.77

DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
113	108	113

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

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