

FCC SAR EVALUATION REPORT

**In accordance with the requirements of
FCC 47 CFR Part 2(2.1093) and
IEEE Std 1528-2013**

Product Name : Notebook

Trademark : acer

Model Name : Acer One Z14-55N

Family Model : N/A

Report No. : S25031302506001

FCC ID : 2BGQ7-Z1455N

Prepared for

Acer India Private Limited

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TEST RESULT CERTIFICATION

Applicant's name Acer India Private Limited

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Manufacturer's Name Acer India Pvt Ltd.

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Product description

Product name Notebook

Trademark acer

Model Name Acer One Z14-55N

Family Model N/A

FCC 47 CFR Part 2(2.1093)

Standards IEEE Std 1528-2013

Published RF exposure KDB procedures

This device described above has been tested by Shenzhen NTEK. In accordance with the measurement methods and procedures specified in IEEE Std 1528-2013 and KDB 865664 D01. Testing has shown that this device is capable of compliance with localized specific absorption rate (SAR) specified in FCC 47 CFR Part 2(2.1093). The test results in this report apply only to the tested sample of the stated device/equipment. Other similar device/equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

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Test Sample Number S250313025007

Date of Test

Date (s) of performance of tests ... Mar. 16, 2025~ Mar. 23, 2025

Date of Issue Apr. 2, 2025

Test Result **Pass**

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※ ※ Revision History ※ ※

REV.	DESCRIPTION	ISSUED DATE	REMARK
Rev.1.0	Initial Test Report Release	Apr. 2, 2025	Owen Xiao

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1. General Information

1.1. RF exposure limits

(A).Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

(B).Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

NOTE: **Whole-Body SAR** is averaged over the entire body, **partial-body SAR** is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. **SAR for hands, wrists, feet and ankles** is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

Occupational/Controlled Environments:

Are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

General Population/Uncontrolled Environments:

Are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

NOTE: This product is used for inlaying inside the cabinet and operating by hand

1.2. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Acer One Z14-55N are as follows.

Band	Max Reported SAR Value(W/kg)
	1-g Body (Separation distance of 0mm)
WLAN 2.4G	0.549
WLAN 5.2G	1.218
WLAN 5.3G	1.168
WLAN 5.6G	1.224
WLAN 5.8G	1.061
Bluetooth EDR	0.042
Bluetooth LE	0.054
Max Simultaneous Tx	1.224

1.3. EUT Description

Device Information			
Product Name	Notebook		
Trade Name	acer		
Model Name	Acer One Z14-55N		
Family Model	N/A		
Model Difference	N/A		
FCC ID	2BGQ7-Z1455N		
Device Phase	Identical Prototype		
Exposure Category	General population / Uncontrolled environment		
Antenna Type	FPC Antenna		
Battery Information	DC 7.6V, 5000mAh, 38Wh		
Hardware version	N/A		
Software version	N/A		
Device Operating Configurations			
Supporting Mode(s)	WLAN 2.4G/5G, Bluetooth		
Test Modulation	WLAN(DSSS/OFDM), Bluetooth(GFSK, $\pi/4$ -DQPSK, 8DPSK)		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	WLAN 2.4G	2412-2462	
	WLAN 5.2G	5180-5240	
	WLAN 5.3G	5260-5320	
	WLAN 5.6G	5500-5700	
	WLAN 5.8G	5745-5825	

	Bluetooth	2402-2480
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1.4. Test specification(s)

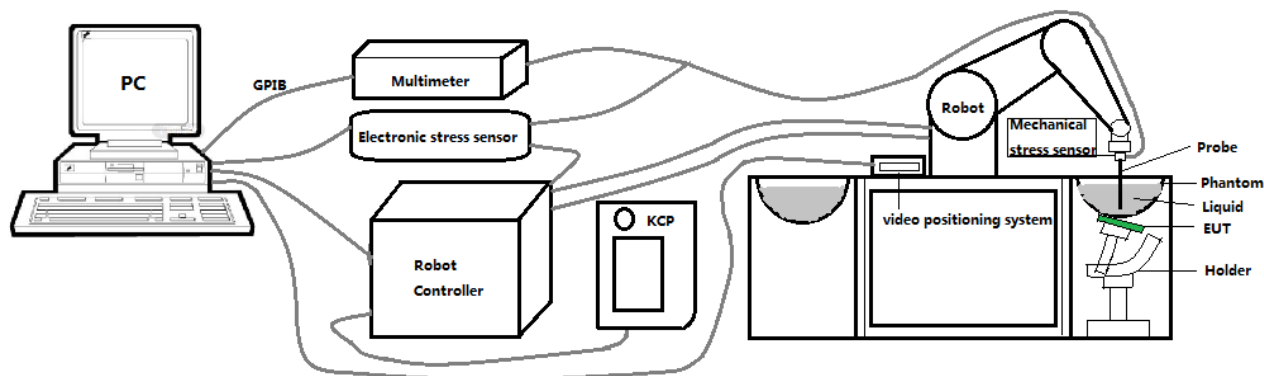
FCC 47 CFR Part 2(2.1093)
IEEE Std 1528-2013
KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02 RF Exposure Reporting v01r02
KDB 447498 D01 General RF Exposure Guidance v06
KDB 248227 D01 802.11 Wi-Fi SAR v02r02
KDB 616217 D04 SAR for laptop and tablets v01r02

1.5. Ambient Condition

Ambient temperature	20°C – 24°C
Relative Humidity	30% – 70%

2. SAR Measurement System

2.1. SATIMO SAR Measurement Set-up Diagram



These measurements were performed with the automated near-field scanning system OPENSAR from SATIMO. The system is based on a high precision robot (working range: 901 mm), which positions the probes with a positional repeatability of better than ± 0.03 mm. The SAR measurements were conducted with dosimetric probe (manufactured by SATIMO), designed in the classical triangular configuration and optimized for dosimetric evaluation.

The first step of the field measurement is the evaluation of the voltages induced on the probe by the device under test. Probe diode detectors are nonlinear. Below the diode compression point, the output voltage is proportional to the square of the applied E-field; above the diode compression point, it is linear to the applied E-field. The compression point depends on the diode, and a calibration procedure is necessary for each sensor of the probe.

The Keithley multimeter reads the voltage of each sensor and send these three values to the PC. The corresponding E field value is calculated using the probe calibration factors, which are stored in the working directory. This evaluation includes linearization of the diode characteristics. The field calculation is done separately for each sensor. Each component of the E field is displayed on the "Dipole Area Scan Interface" and the total E field is displayed on the "3D Interface"

2.2. Robot

The SATIMO SAR system uses the high precision robots from KUKA. For the 6-axis controller system, the robot controller version (KUKA) from KUKA is used. The KUKA robot series have many features that are important for our application:



- High precision (repeatability ± 0.03 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

2.3. E-Field Probe

This E-field detection probe is composed of three orthogonal dipoles linked to special Schottky diodes with low detection thresholds. The probe allows the measurement of electric fields in liquids such as the one defined in the IEEE and CENELEC standards.

For the measurements the Specific Dosimetric E-Field Probe 3423-EPGO-426 with following specifications is used



- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 2.5 mm
- Distance between probe tip and sensor center: 1 mm
- Distance between sensor center and the inner phantom surface: 2 mm (repeatability better than ± 1 mm).
- Probe linearity: ± 0.06 dB
- Axial isotropy: ± 0.01 dB
- Hemispherical Isotropy: ± 0.01 dB
- Calibration range: 650MHz to 5900MHz for head & body simulating liquid.
- Lower detection limit: 8mW/kg

Angle between probe axis (evaluation axis) and surface normal line: less than 30° .

2.3.1. E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than $\pm 10\%$. The spherical isotropy shall be evaluated and within ± 0.25 dB. The sensitivity parameters (Norm X, Norm Y, and Norm Z), the diode compression parameter (DCP) and the conversion factor (Conv F) of the probe are tested. The calibration data can be referred to appendix D of this report.

2.4. SAM phantoms

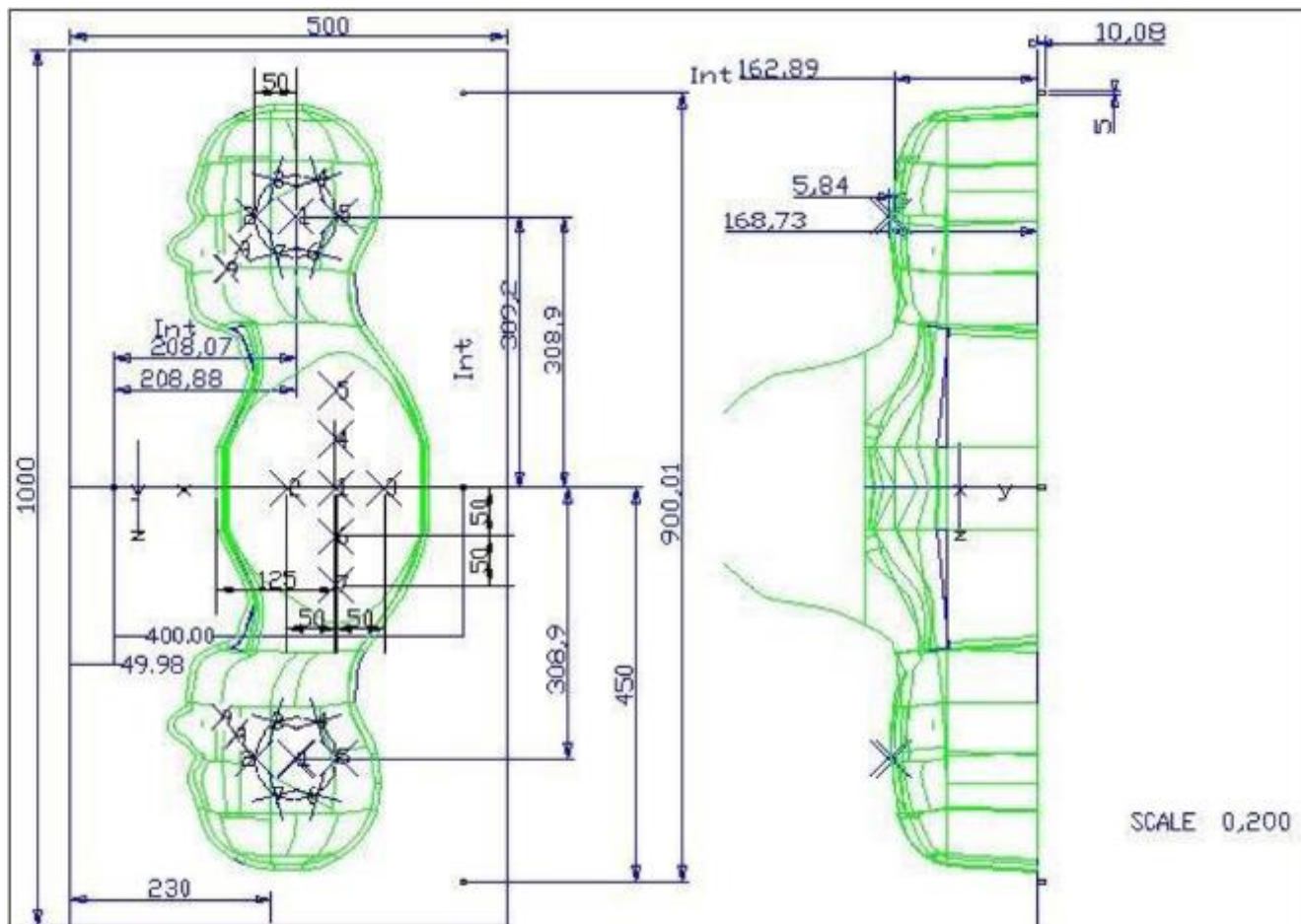
Photo of SAM phantom SN 16/15 SAM119



The SAM phantom is used to measure the SAR relative to people exposed to electro-magnetic field radiated by mobile phones.

2.4.1. Technical Data

Serial Number	Shell thickness	Filling volume	Dimensions	Positionner Material	Permittivity	Loss Tangent
SN 16/15 SAM119	2 mm $\pm$ 0.2 mm	27 liters	Length:1000 mm Width:500 mm Height:200 mm	Gelcoat with fiberglass	3.4	0.02

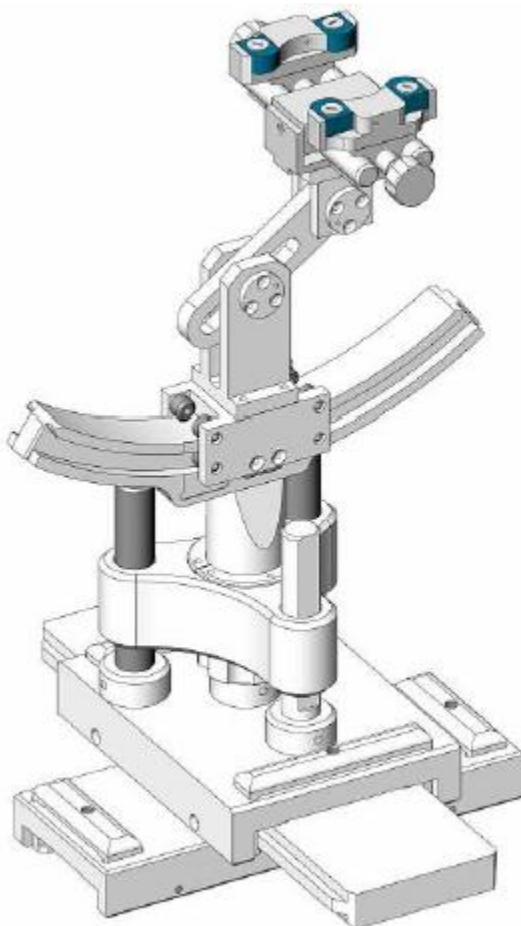


Serial Number	Left Head(mm)		Right Head(mm)		Flat Part(mm)	
SN 16/15 SAM119	2	2.02	2	2.08	1	2.09
	3	2.05	3	2.06	2	2.06
	4	2.07	4	2.07	3	2.08
	5	2.08	5	2.08	4	2.10
	6	2.05	6	2.07	5	2.10
	7	2.05	7	2.05	6	2.07
	8	2.07	8	2.06	7	2.07
	9	2.08	9	2.06	-	-

The test, based on ultrasonic system, allows measuring the thickness with an accuracy of 10 μ m.

2.5. Device Holder

The positioning system allows obtaining cheek and tilting position with a very good accuracy. In compliance with CENELEC, the tilt angle uncertainty is lower than 1 degree.



Serial Number	Holder Material	Permittivity	Loss Tangent
SN 16/15 MSH100	Delrin	3.7	0.005

2.6. Test Equipment List

This table gives a complete overview of the SAR measurement equipment.

Devices used during the test described are marked ☒

	Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
					Last Cal.	Due Date
☒	MVG	E FIELD PROBE	SSE2	4024-EPGO-442	Oct. 04, 2024	Oct. 03, 2025
☐	MVG	750 MHz Dipole	SID750	SN 03/15 DIP 0G750-355	Feb. 21, 2024	Feb. 20, 2027
☐	MVG	835 MHz Dipole	SID835	SN 03/15 DIP 0G835-347	Feb. 21, 2024	Feb. 20, 2027
☐	MVG	900 MHz Dipole	SID900	SN 03/15 DIP 0G900-348	Feb. 21, 2024	Feb. 20, 2027
☐	MVG	1800 MHz Dipole	SID1800	SN 03/15 DIP 1G800-349	Feb. 21, 2024	Feb. 20, 2027
☐	MVG	1900 MHz Dipole	SID1900	SN 03/15 DIP 1G900-350	Feb. 21, 2024	Feb. 20, 2027
☐	MVG	2000 MHz Dipole	SID2000	SN 03/15 DIP 2G000-351	Feb. 21, 2024	Feb. 20, 2027
☒	MVG	2450 MHz Dipole	SID2450	SN 03/15 DIP 2G450-352	Feb. 21, 2024	Feb. 20, 2027
☐	MVG	2600 MHz Dipole	SID2600	SN 03/15 DIP 2G600-356	Feb. 21, 2024	Feb. 20, 2027
☒	MVG	5000 MHz Dipole	SWG5500	SN 13/14 WGA 33	Feb. 21, 2024	Feb. 20, 2027
☒	MVG	Liquid measurement Kit	SCLMP	SN 21/15 OCPG 72	NCR	NCR
☒	MVG	Power Amplifier	N/A	AMPLISAR_28/14_0 03	NCR	NCR
☒	KEITHLEY	Millivoltmeter	2000	4072790	Nov. 29, 2024	Nov. 28, 2025
☐	R&S	Universal radio communication tester	CMU200	117858	Apr. 26, 2024	Apr. 25, 2025
☐	R&S	Wideband radio communication tester	CMW500	103917	Apr. 26, 2024	Apr. 25, 2025
☒	HP	Network Analyzer	8753D	3410J01136	Apr. 26, 2024	Apr. 25, 2025

					2024	2025
☒	Agilent	MXG Vector Signal Generator	N5182A	MY47070317	Apr. 25, 2024	Apr. 24, 2025
☒	Agilent	Power meter	E4419B	MY45102538	Apr. 25, 2024	Apr. 24, 2025
☒	Agilent	Power sensor	E9301A	MY41495644	Apr. 25, 2024	Apr. 24, 2025
☒	Agilent	Power sensor	E9301A	US39212148	Apr. 25, 2024	Apr. 24, 2025
☒	MCLI/USA	Directional Coupler	CB11-20	0D2L51502	Apr. 26, 2024	Apr. 25, 2027
☒	N/A	Thermometer	N/A	LES-085	Mar. 27, 2023	Mar. 26, 2026
☒	MVG	SAM Phantom	SSM2	SN 16/15 SAM119	NCR	NCR
☒	MVG	Device Holder	SMPPD	SN 16/15 MSH100	NCR	NCR
☒	Mini-Circuits	Low Pass	LFCW-6000+	N/A	NCR	NCR
☒	Mini-Circuits	Attenuator	BW-S3W2+	N/A	NCR	NCR
☒	Mini-Circuits	Attenuator	BW-S3W2+	N/A	NCR	NCR
☒	Weinschel	Attenuator	33-10-33	N/A	NCR	NCR

Measurement Software

Manufacturer	Software Name	Software Version
SATIMO	OpenSAR	V5.3.15.11

3. SAR Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

- (a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- (b) Read the WWAN RF power level from the base station simulator.
- (c) For WLAN/Bluetooth power measurement, use engineering software to configure EUT WLAN/Bluetooth continuously transmission, at maximum RF power in each supported wireless interface and frequency band.
- (d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/Bluetooth output power.

<SAR measurement>

- (a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/Bluetooth continuously transmission, at maximum RF power, in the highest power channel.
- (b) Place the EUT in the positions as Appendix A demonstrates.
- (c) Set scan area, grid size and other setting on the OPENSAR software.
- (d) Measure SAR results for the highest power channel on each testing position.
- (e) Find out the largest SAR result on these testing positions of each band.
- (f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg.

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

3.1. Power Reference

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

3.2. Area scan & Zoom scan

The area scan is a 2D scan to find the hot spot location on the DUT. The zoom scan is a 3D scan

above the hot spot to calculate the 1g and 10g SAR value.

Measurement of the SAR distribution with a grid of 8 to 16 mm * 8 to 16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme. Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8 * 4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

From the scanned SAR distribution, identify the position of the maximum SAR value, in addition identify the positions of any local maxima with SAR values within 2 dB of the maximum value that will not be within the zoom scan of other peaks; additional peaks shall be measured only when the primary peak is within 2 dB of the SAR compliance limit (e.g., 1 W/kg for 1,6 W/kg 1 g limit, or 1,26 W/kg for 2 W/kg, 10 g limit).

Area scan & Zoom scan scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5 \text{ mm}$
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	≤ 1.5 · $\Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

3.3. Description of interpolation/extrapolation scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimise measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1 mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.

3.4. Volumetric Scan

The volumetric scan consists to a full 3D scan over a specific area. This 3D scan is useful form multi Tx SAR measurement. Indeed, it is possible with OpenSAR to add, point by point, several volumetric scan to calculate the SAR value of the combined measurement as it is define in the standard IEEE1528 and IEC62209.

3.5. Power Drift

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In OpenSAR measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in V/m. If the power drifts more than $\pm 5\%$, the SAR will be retested.

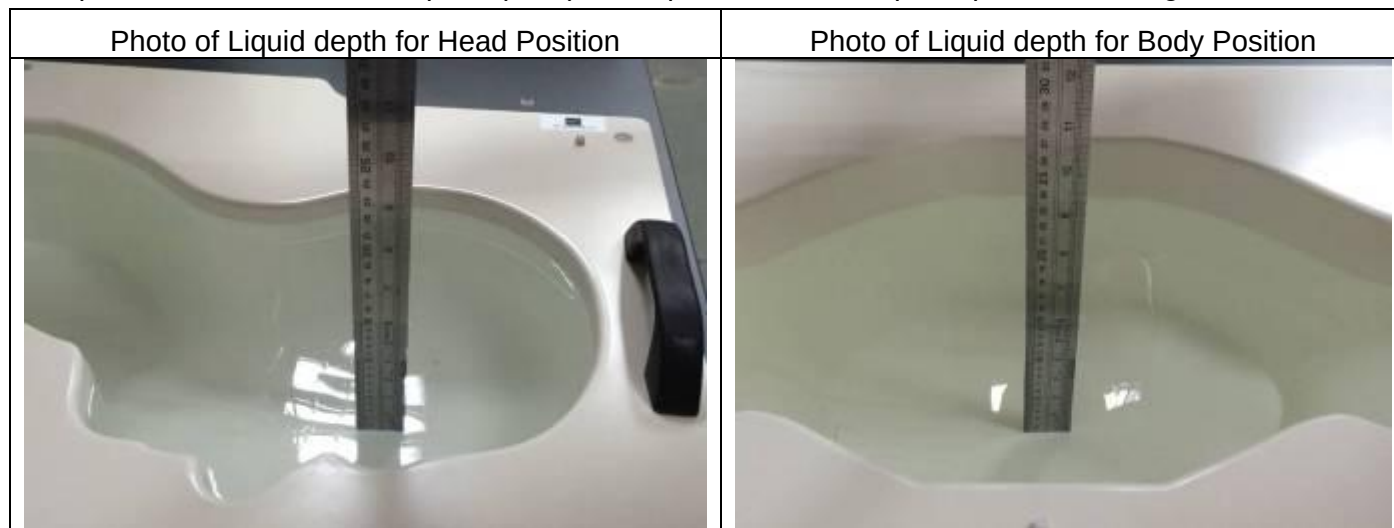
4. System Verification Procedure

4.1. Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% of weight)	Head Tissue									
Frequency Band (MHz)	750	835	900	1800	1900	2000	2450	2600	5200	5800
Water	34.40	34.40	34.40	55.36	55.36	57.87	57.87	57.87	65.53	65.53
NaCl	0.79	0.79	0.79	0.35	0.35	0.16	0.16	0.16	0.00	0.00
1,2-Propanediol	64.81	64.81	64.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Triton X-100	0.00	0.00	0.00	30.45	30.45	19.97	19.97	19.97	24.24	24.24
DGBE	0.00	0.00	0.00	13.84	13.84	22.00	22.00	22.00	10.23	10.23
Ingredients (% of weight)	Body Tissue									
Frequency Band (MHz)	750	835	900	1800	1900	2000	2450	2600	5200	5800
Water	50.30	50.30	50.30	69.91	69.91	71.88	71.88	71.88	79.54	79.54
NaCl	0.60	0.60	0.60	0.13	0.13	0.16	0.16	0.16	0.00	0.00
1,2-Propanediol	49.10	49.10	49.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Triton X-100	0.00	0.00	0.00	9.99	9.99	19.97	19.97	19.97	11.24	11.24
DGBE	0.00	0.00	0.00	19.97	19.97	7.99	7.99	7.99	9.22	9.22

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. For head SAR testing, the liquid depth from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm.



4.1.1. Tissue Dielectric Parameter Check Results

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine if the dielectric parameters are within the tolerances of the specified target values. The measured conductivity and relative permittivity should be within $\pm 5\%$ of the target values.

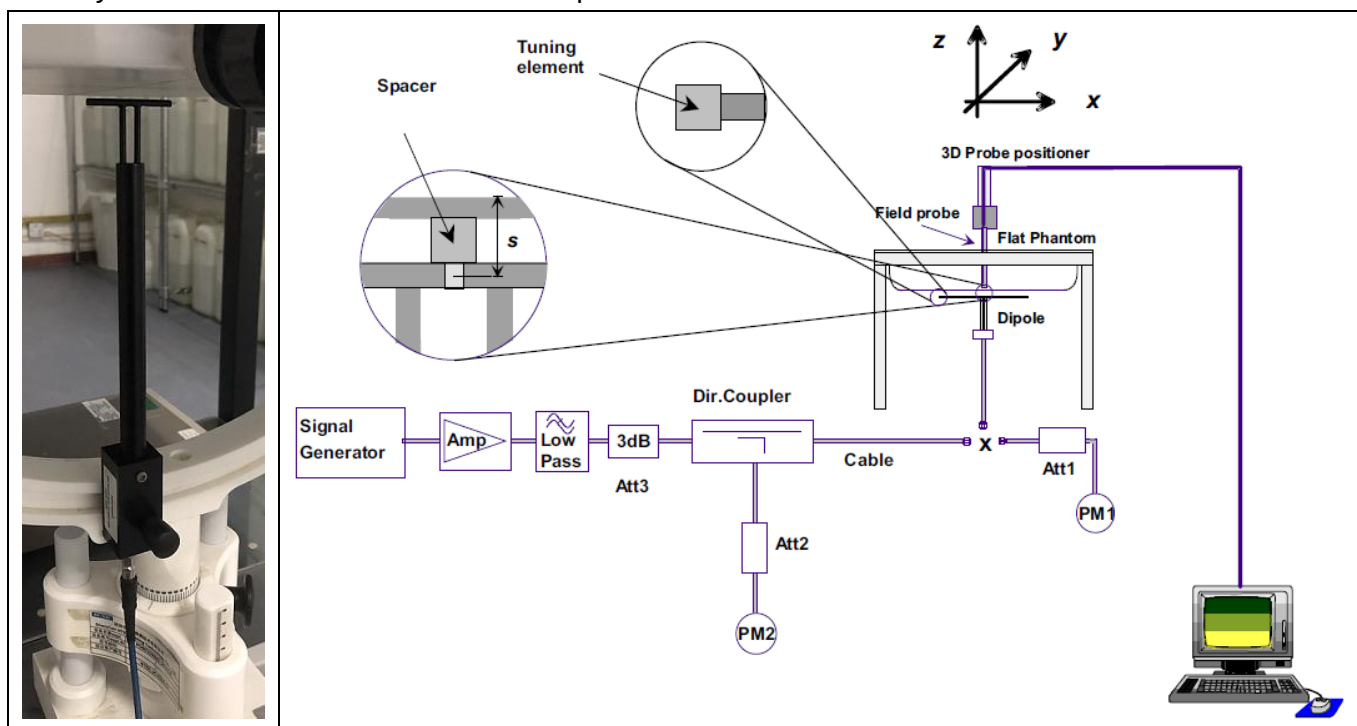
Tissue Type	Measured Frequency (MHz)	Target Tissue		Measured Tissue		Liquid Temp.	Test Date
		ϵ_r	σ (S/m)	ϵ_r	σ (S/m)		
Head 2450	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	38.15	1.77	21.7 °C	Mar. 21, 2025
Head 5200	5200	36.00 (34.20~37.80)	4.66 (4.43~4.89)	36.82	4.49	21.2 °C	Mar. 16, 2025
Head 5400	5400	35.80 (34.01~37.59)	4.86 (4.62~5.10)	36.18	5.04	21.5 °C	Mar. 19, 2025
Head 5600	5600	35.50 (33.73~37.28)	5.07 (4.82~5.32)	36.78	5.03	21.8 °C	Mar. 23, 2025
Head 5800	5800	35.30 (33.54~37.07)	5.27 (5.01~5.53)	35.54	5.25	21.9 °C	Mar. 17, 2025

NOTE: The dielectric parameters of the tissue-equivalent liquid should be measured under similar ambient conditions and within 2 °C of the conditions expected during the SAR evaluation to satisfy protocol requirements.

4.2. System Verification Procedure

The system verification is performed for verifying the accuracy of the complete measurement system and performance of the software. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. To adjust this power a power meter is used. The power sensor is connected to the cable before the system verification to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the system verification to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot).

The system verification is shown as below picture:



4.2.1. System Verification Results

Comparing to the original SAR value provided by SATIMO, the verification data should be within its specification of $\pm 10\%$. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance verification can meet the variation criterion and the plots can be referred to Appendix B of this report.

System Verification	Target SAR (1W)		Measured SAR			Measured SAR		Liquid Temp.	Test Date
	1-g (W/Kg)	10-g (W/Kg)	Input Power (mW)	1-g (W/Kg)	10-g (W/Kg)	(Normalized to 1W)			
						1-g (W/Kg)	10-g (W/Kg)		
2450MHz	50.05 (45.05~55.06)	23.80 (21.42~26.18)	5.160	2.212	51.60	22.12	21.7 °C	Mar. 21, 2025	2450MHz
5200MHz	162.59 (146.33~178.85)	56.21 (50.59~61.83)	1.545	0.517	154.50	51.70	21.2 °C	Mar. 16, 2025	5200MHz
5400MHz	159.81 (143.83~175.79)	55.00 (49.50~60.50)	1.512	0.510	151.20	51.00	21.5 °C	Mar. 19, 2025	5400MHz
5600MHz	179.15 (161.24~197.07)	61.01 (54.91~67.11)	1.718	0.670	171.80	67.00	21.8 °C	Mar. 23, 2025	5600MHz
5800MHz	182.20 (163.98~200.42)	61.32 (55.19~67.45)	1.758	0.584	175.80	58.40	21.9 °C	Mar. 17, 2025	5800MHz

5. SAR Measurement variability and uncertainty

5.1. SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

5.2. SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

6. RF Exposure Positions

6.1. Tablet PC host platform exposure conditions

Refer to KDB616217 D04, when the modular approach is used, transmitters and modules must be initially tested for standalone operations in generic host conditions according to the following minimum test separation distance and antenna installation requirements for incorporation in the tablet platform. The separation distance required for incorporation in qualified hosts is described in KDB 447498; item 5) of section 4.1 and item 1) of section 5.2.2 etc.

- ≤ 5 mm between the antenna and user for both back surface and edge exposure conditions
- the antennas used by the host must have been tested for equipment approval or qualify for SAR test exclusion
- the antenna polarization, physical orientation, rotation and installation configurations used by the host must have been tested for compliance or qualify for test exclusion
- when the *SAR Test Exclusion Threshold* in KDB 447498 applies, a *test separation distance* of 5 mm is required to determine test exclusion for the tablet platform

The antennas embedded in tablets are typically ≤ 5 mm from the outer housing. The required antenna to user test separation distance is a “not to exceed test” distance required to apply the modular approach. Instead of the typical zero gap tablet edge test requirement between the edge of a tablet and the user, when an antenna has been tested at ≤ 5 mm according to the modular approach it can be incorporated into tablets with at least twice the tested distance from the outer housing of the tablet edge; otherwise, the tablet edge zero gap test requirement applies. When the dedicated host approach is applied, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom.

7. RF Output Power

7.1. WLAN & Bluetooth Output Power

7.1.1. Output Power Results Of WLAN

Mode	Channel	Frequency (MHz)	Tune-up (dBm)	Output Power (dBm)	Tune-up (dBm)	Output Power (dBm)	Tune-up (dBm)	Output Power (dBm)
			Ant1		Ant2		MIMO	
802.11b	1	2412	14.50	14.20	14.00	13.69	/	/
	6	2437	14.50	13.99	14.00	13.64	/	/
	11	2462	14.50	13.67	14.00	13.47	/	/
802.11g	1	2412	14.50	14.19	14.00	13.54	/	/
	6	2437	14.50	13.63	14.00	13.19	/	/
	11	2462	14.50	13.79	14.00	13.01	/	/
802.11n HT20	1	2412	14.00	13.82	13.50	13.43	15.00	14.97
	6	2437	14.00	13.47	13.50	13.05	15.00	14.57
	11	2462	14.00	13.74	13.50	12.87	15.00	14.68
802.11n HT40	3	2422	14.50	14.12	14.00	13.59	15.50	15.15
	6	2437	14.50	13.26	14.00	13.22	15.50	14.76
	9	2452	14.50	13.30	14.00	13.15	15.50	14.82

NOTE: Power measurement results of WLAN 2.4G.

Channel	Mode	Frequency (MHz)	Tune-up (dBm)	Output Power (dBm)	Tune-up (dBm)	Output Power (dBm)	Tune-up (dBm)	Output Power (dBm)
			Ant1		Ant2		MIMO	
36	802.11a	5180	13.50	12.94	14.50	13.89	/	/
40		5200	13.50	12.98	14.50	14.06	/	/
48		5240	13.50	13.05	14.50	14.23	/	/
36	802.11n HT20	5180	13.50	12.93	14.50	13.88	16.50	15.98
40		5200	13.50	12.93	14.50	14.01	16.50	16.29
48		5240	13.50	13.14	14.50	14.24	16.50	16.27
38	802.11n HT40	5190	13.00	12.71	14.00	13.69	16.50	15.79
46		5230	13.00	12.76	14.00	13.87	16.50	16.07
36	802.11ac VHT20	5180	13.50	12.83	14.50	13.91	16.50	15.92
40		5200	13.50	12.92	14.50	14.03	16.50	16.05
48		5240	13.50	13.08	14.50	14.22	16.50	16.24
38	802.11ac VHT40	5190	13.00	12.70	14.00	13.73	16.00	15.81
46		5230	13.00	12.70	14.00	13.90	16.00	15.90
42	802.11ac	5210	13.00	12.73	14.00	13.69	16.00	15.92

	VHT80							
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NOTE: Power measurement results of WLAN 5.2G.

Mode	Channel	Frequency (MHz)	Tune-up (dBm)	Output Power (dBm)	Tune-up (dBm)	Output Power (dBm)	Tune-up (dBm)	Output Power (dBm)
			Ant1		Ant2		MIMO	
802.11a	52	5260	12.50	11.50	11.50	11.24	/	/
	56	5280	12.50	11.66	11.50	11.39	/	/
	64	5320	12.50	12.14	11.50	11.17	/	/
802.11n HT20	52	5260	12.00	11.37	12.00	11.75	14.00	13.58
	56	5280	12.00	11.12	12.00	11.96	14.00	13.80
	64	5320	12.00	11.87	12.00	11.95	14.00	13.98
802.11n HT40	54	5270	11.50	10.96	12.00	11.49	14.00	13.72
	62	5310	11.50	11.33	12.00	11.63	14.00	13.66
802.11ac VHT20	52	5260	12.00	11.06	12.00	11.65	14.50	13.60
	56	5280	12.00	11.12	12.00	11.79	14.50	13.58
	64	5320	12.00	11.73	12.00	11.80	14.50	14.38
802.11ac VHT40	54	5270	11.50	10.83	12.00	11.36	14.00	13.38
	62	5310	11.50	11.14	12.00	11.52	14.00	13.52
802.11ac VHT80	58	5290	11.00	10.90	11.50	11.30	13.50	13.34

NOTE: Power measurement results of WLAN 5.3G.

Mode	Channel	Frequency (MHz)	Tune-up (dBm)	Output Power (dBm)	Tune-up (dBm)	Output Power (dBm)	Tune-up (dBm)	Output Power (dBm)
			Ant1		Ant2		MIMO	
802.11a	100	5500	13.50	13.12	15.00	14.63	/	/
	120	5600	13.50	12.79	15.00	13.77	/	/
	140	5700	13.50	11.28	15.00	13.76	/	/
802.11n HT20	100	5500	14.00	13.33	15.00	14.60	17.00	16.56
	120	5600	14.00	12.89	15.00	13.73	17.00	15.92
	140	5700	14.00	13.80	15.00	13.74	17.00	16.27
802.11n HT40	102	5510	14.00	12.97	14.50	14.35	16.50	16.46
	118	5590	14.00	12.83	14.50	14.06	16.50	16.00
	134	5670	14.00	13.60	14.50	13.55	16.50	16.03
802.11ac (VHT20)	100	5500	14.00	13.30	14.50	14.19	17.00	16.50
	120	5600	14.00	12.97	14.50	13.22	17.00	15.85
	140	5700	14.00	13.82	14.50	13.17	17.00	16.19

802.11ac (VHT40)	102	5510	14.00	13.20	14.00	13.99	16.50	16.35
	118	5590	14.00	12.83	14.00	13.60	16.50	16.08
	134	5670	14.00	13.56	14.00	13.11	16.50	16.22
802.11ac (VHT80)	106	5530	13.50	13.11	14.00	13.96	16.50	16.33
	122	5610	13.50	13.07	14.00	13.10	16.50	15.82

NOTE: Power measurement results of WLAN 5.6G.

Mode	Channel	Frequency (MHz)	Tune-up (dBm)	Output Power (dBm)	Tune-up (dBm)	Output Power (dBm)	Tune-up (dBm)	Output Power (dBm)
			Ant1		Ant2		MIMO	
802.11a	149	5745	15.50	14.84	15.00	14.39	/	/
	157	5785	15.50	15.37	15.00	14.75	/	/
	165	5825	15.50	15.21	15.00	14.81	/	/
802.11n HT20	149	5745	15.50	14.78	15.00	14.32	17.50	17.09
	157	5785	15.50	15.39	15.00	14.61	17.50	17.28
	165	5825	15.50	15.32	15.00	14.70	17.50	17.39
802.11n HT40	151	5755	15.50	14.81	14.50	14.12	17.50	16.89
	159	5795	15.50	15.32	14.50	14.40	17.50	17.28
802.11ac VHT20	149	5745	16.00	14.78	15.00	14.20	17.50	16.86
	157	5785	16.00	15.50	15.00	14.56	17.50	17.37
	165	5825	16.00	15.25	15.00	14.67	17.50	17.34
802.11ac VHT40	151	5755	15.50	14.88	14.50	14.17	17.50	16.93
	159	5795	15.50	15.39	14.50	14.40	17.50	17.37
802.11ac VHT80	155	5775	15.50	15.13	14.50	14.12	17.50	17.25

NOTE: Power measurement results of WLAN 5.8G.

7.1.2. Output Power Results Of Bluetooth

BLE	Output Power (dBm)				
	Data Rates	Tune-up (dBm)	Channe		
			0CH	19CH	39CH
	1M	12.50	11.05	12.27	11.69
	2M	12.00	11.04	11.91	11.25

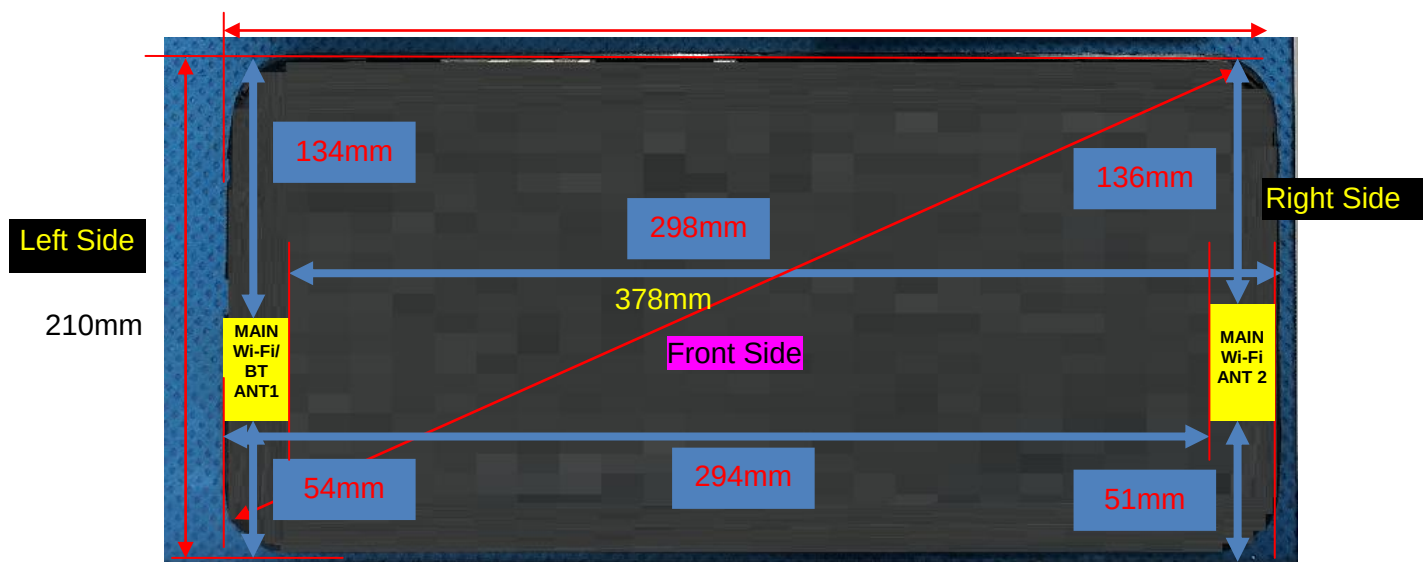
BLE	Output Power (dBm)				
	Data Rates	Tune-up (dBm)	Channe		
			0CH	19CH	39CH
	1M	11.00	9.56	10.57	9.79
	2M	10.00	8.76	9.78	8.95
	3M	11.00	9.18	10.29	9.50

NOTE: Power measurement results of Bluetooth.

8. Antenna Location

Top Side

322mm



Bottom Side

Front View

Note: Since the confidentiality request of EUT, the antenna location example diagram see as above.

Distance of the Antenna to the EUT surface/edge					
Antennas	Back Side	Left Side	Right Side	Top Side	Bottom Side
2.4G&5G/BT Ant 1	5	5	298	134	54
2.4G&5G Ant 2	5	294	5	136	51

Note: When the minimum separation distance is < 5 mm, a distance of 5 mm is applied to determine

SAR test exclusion.

Ant 1

Positions for SAR tests		
Test separation distances ≤ 50 mm		
Exposure Positions	Tune-up Maximum power of WLAN 2.4G	
	14.50 dBm	28.18 mW
Back Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Left Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Exposure Positions	Tune-up Maximum power of WLAN 5.2G	
	13.50 dBm	22.39 mW
Back Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Left Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Exposure Positions	Tune-up Maximum power of WLAN 5.3G	
	12.50 dBm	17.18 mW
Back Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Left Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Exposure Positions	Tune-up Maximum power of WLAN 5.6G	
	14.00 dBm	25.12 mW
Back Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Left Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Exposure Positions	Tune-up Maximum power of WLAN 5.8G	
	16.00 dBm	39.81 mW
Back Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88

	SAR testing required?	YES
Left Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES

Ant1

Positions for SAR tests		
Test separation distances > 50 mm		
Exposure Positions	Tune-up Maximum power of WLAN 2.4G	
	14.50 dBm	28.18 mW
Right Side	Antenna to user(mm)	298
	SAR exclusion threshold(mW)	2576
	SAR testing required?	NO
Top Side	Antenna to user(mm)	134
	SAR exclusion threshold(mW)	936
	SAR testing required?	NO
Bottom Side	Antenna to user(mm)	54
	SAR exclusion threshold(mW)	136
	SAR testing required?	NO
Exposure Positions	Tune-up Maximum power of WLAN 5.2G	
	13.50 dBm	22.39 mW
Right Side	Antenna to user(mm)	298
	SAR exclusion threshold(mW)	2546
	SAR testing required?	NO
Top Side	Antenna to user(mm)	134
	SAR exclusion threshold(mW)	906
	SAR testing required?	NO
Bottom Side	Antenna to user(mm)	54
	SAR exclusion threshold(mW)	106
	SAR testing required?	NO
Exposure Positions	Tune-up Maximum power of WLAN 5.3G	
	12.50 dBm	17.78 mW
Right Side	Antenna to user(mm)	298
	SAR exclusion threshold(mW)	2545
	SAR testing required?	NO
Top Side	Antenna to user(mm)	134
	SAR exclusion threshold(mW)	905
	SAR testing required?	NO
Bottom Side	Antenna to user(mm)	54
	SAR exclusion threshold(mW)	105
	SAR testing required?	NO

Exposure Positions	Tune-up Maximum power of WLAN 5.6G	
	14.00 dBm	25.12 mW
Right Side	Antenna to user(mm)	298
	SAR exclusion threshold(mW)	2545
	SAR testing required?	NO
Top Side	Antenna to user(mm)	134
	SAR exclusion threshold(mW)	905
	SAR testing required?	NO
Bottom Side	Antenna to user(mm)	54
	SAR exclusion threshold(mW)	105
	SAR testing required?	NO
Exposure Positions	Tune-up Maximum power of WLAN 5.8G	
	16.00 dBm	39.81 mW
Right Side	Antenna to user(mm)	298
	SAR exclusion threshold(mW)	2542
	SAR testing required?	NO
Top Side	Antenna to user(mm)	134
	SAR exclusion threshold(mW)	602
	SAR testing required?	NO
Bottom Side	Antenna to user(mm)	54
	SAR exclusion threshold(mW)	102
	SAR testing required?	NO

Ant 2

Positions for SAR tests		
Test separation distances ≤ 50 mm		
Exposure Positions	Tune-up Maximum power of WLAN 2.4G	
	14.50 dBm	28.18 mW
Back Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Right Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Exposure Positions	Tune-up Maximum power of WLAN 5.2G	
	13.50 dBm	22.39 mW
Back Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Right Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Exposure Positions	Tune-up Maximum power of WLAN 5.3G	
	12.50 dBm	17.18 mW
Back Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Right Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Exposure Positions	Tune-up Maximum power of WLAN 5.6G	
	14.00 dBm	25.12 mW
Back Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Right Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Exposure Positions	Tune-up Maximum power of WLAN 5.8G	
	16.00 dBm	39.81 mW
Back Side	Antenna to user(mm)	5
	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES
Right Side	Antenna to user(mm)	5

	SAR exclusion threshold(mW)	8.88
	SAR testing required?	YES

Ant2

Positions for SAR tests		
Test separation distances > 50 mm		
Exposure Positions	Tune-up Maximum power of WLAN 2.4G	
	14.50 dBm	28.18 mW
Left Side	Antenna to user(mm)	294
	SAR exclusion threshold(mW)	2536
	SAR testing required?	NO
Top Side	Antenna to user(mm)	136
	SAR exclusion threshold(mW)	956
	SAR testing required?	NO
Bottom Side	Antenna to user(mm)	51
	SAR exclusion threshold(mW)	106
	SAR testing required?	NO
Exposure Positions	Tune-up Maximum power of WLAN 5.2G	
	13.50 dBm	22.39 mW
Left Side	Antenna to user(mm)	294
	SAR exclusion threshold(mW)	2506
	SAR testing required?	NO
Top Side	Antenna to user(mm)	136
	SAR exclusion threshold(mW)	926
	SAR testing required?	NO
Bottom Side	Antenna to user(mm)	51
	SAR exclusion threshold(mW)	76
	SAR testing required?	NO
Exposure Positions	Tune-up Maximum power of WLAN 5.3G	
	12.50 dBm	17.18 mW
Left Side	Antenna to user(mm)	294
	SAR exclusion threshold(mW)	2505
	SAR testing required?	NO
Top Side	Antenna to user(mm)	136
	SAR exclusion threshold(mW)	925
	SAR testing required?	NO
Bottom Side	Antenna to user(mm)	51
	SAR exclusion threshold(mW)	75
	SAR testing required?	NO
Exposure Positions	Tune-up Maximum power of WLAN 5.6G	
	14.00 dBm	25.12 mW

Left Side	Antenna to user(mm)	294
	SAR exclusion threshold(mW)	2505
	SAR testing required?	NO
Top Side	Antenna to user(mm)	136
	SAR exclusion threshold(mW)	925
	SAR testing required?	NO
Bottom Side	Antenna to user(mm)	51
	SAR exclusion threshold(mW)	75
	SAR testing required?	NO
Exposure Positions	Tune-up Maximum power of WLAN 5.8G	
	16.00 dBm	39.81 mW
Left Side	Antenna to user(mm)	294
	SAR exclusion threshold(mW)	2502
	SAR testing required?	NO
Top Side	Antenna to user(mm)	136
	SAR exclusion threshold(mW)	912
	SAR testing required?	NO
Bottom Side	Antenna to user(mm)	51
	SAR exclusion threshold(mW)	72
	SAR testing required?	NO

9. SAR Results

9.1. SAR measurement results

9.1.1. SAR measurement Result of WLAN 2.4G Ant1

Test Position of Body with 0mm	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						
Back Side	6/2437	802.11b	0.488	0.214	0.11	13.99	14.50	0.549	2025/3/21	16#
Left Side	6/2437	802.11b	0.255	0.110	-2.06	13.99	14.50	0.287	2025/3/21	

NOTE: Body SAR test results of WLAN 2.4G

Ant2

Test Position of Body with 0mm	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						
Back Side	6/2437	802.11b	0.200	0.091	-2.38	13.64	14.00	0.217	2025/3/21	15#
Right Side	6/2437	802.11b	0.179	0.080	2.86	13.64	14.00	0.194	2025/3/21	

NOTE: Body SAR test results of WLAN 2.4G

MIMO

Test Position of Body with 0mm	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						
Back Side	6/2437	802.11n HT40	0.238	0.106	0.16	14.76	15.50	0.282	2025/3/21	17#
Left Side	6/2437	802.11n HT40	0.117	0.050	1.00	14.76	15.50	0.139	2025/3/21	

NOTE: Body SAR test results of WLAN 2.4G

9.1.2. SAR measurement Result of WLAN 5.2G

Ant1

Test Position of Body with 0mm	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						
Back Side	40/5200	802.11n HT20	0.682	0.245	-4.22	12.93	13.50	0.778	2025/3/16	
Left Side	40/5200	802.11n HT20	1.005	0.208	3.93	12.93	13.50	1.146	2025/3/16	4#
Left Side	36/5180	802.11n HT20	0.968	0.177	2.68	12.93	13.50	1.104	2025/3/16	
Left Side	48/5240	802.11n HT20	0.995	0.201	2.87	13.14	13.50	1.081	2025/3/16	
Left Side Repeated	40/5200	802.11n HT20	0.998	0.204	3.14	12.93	13.50	1.138	2025/3/16	

NOTE: Body SAR test results of WLAN 5.2G

Ant2

Test Position of Body with 0mm	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						
Back Side	40/5200	802.11n HT20	0.884	0.235	-2.74	14.01	14.50	0.990	2025/3/16	
Back Side	36/5180	802.11n HT20	0.699	0.183	-1.74	13.88	14.50	0.806	2025/3/16	
Back Side	48/5240	802.11n HT20	0.895	0.209	-2.33	14.24	14.50	0.950	2025/3/16	
Right Side	40/5200	802.11n HT20	1.088	0.331	-1.71	14.01	14.50	1.218	2025/3/16	#3
Right Side	36/5180	802.11n HT20	0.957	0.258	-1.28	13.88	14.50	1.104	2025/3/16	
Right Side	48/5240	802.11n HT20	1.025	0.289	-2.64	14.24	14.50	1.088	2025/3/16	
Right Side Repeated	40/5200	802.11n HT20	1.063	0.324	-1.52	14.01	14.50	1.190	2025/3/16	

NOTE: Body SAR test results of WLAN 5.2G

MIMO

Test Position of Body with 0mm	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						
Back Side	46/5230	802.11n HT40	0.846	0.306	1.12	16.07	16.50	0.934	2025/3/16	
Back Side	38/5190	802.11n HT40	0.807	0.276	0.65	15.79	16.50	0.950	2025/3/16	
Right Side	46/5230	802.11n HT40	0.882	0.234	-3.52	16.07	16.50	0.974	2025/3/16	5#
Right Side	38/5190	802.11n HT40	0.816	0.212	-2.63	15.79	16.50	0.961	2025/3/16	
Right Side Repeated	40/5200	802.11n HT40	0.874	0.228	-1.74	16.07	16.50	0.965	2025/3/16	

NOTE: Body SAR test results of WLAN 5.2G

9.1.3. SAR measurement Result of WLAN 5.3G

Ant1

Test Position of Body with 0mm	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						
Back Side	56/5280	802.11a	0.694	0.251	3.91	11.66	12.50	0.842	2025/3/19	
Back Side	52/5260	802.11a	0.634	0.218	-1.85	11.50	12.50	0.798	2025/3/19	
Back Side	64/5320	802.11a	0.724	0.278	-2.14	12.14	12.50	0.787	2025/3/19	
Left Side	56/5280	802.11a	0.952	0.201	-2.42	11.66	12.50	1.155	2025/3/19	8#
Left Side	52/5260	802.11a	0.916	0.184	-1.47	11.50	12.50	1.153	2025/3/19	
Left Side	64/5320	802.11a	0.942	0.194	-2.63	12.14	12.50	1.023	2025/3/19	
Left Side Repeated	56/5280	802.11a	0.943	1.730	-1.68	11.66	12.50	1.144	2025/3/19	

NOTE: Body SAR test results of WLAN 5.3G

Ant2

Test Position	Test channel	Mode	SAR Value (W/kg)	Power Drift(%)	Conducted Power	Tune-up Power	Scaled SAR	Date	Plot
---------------	--------------	------	------------------	----------------	-----------------	---------------	------------	------	------

of Body with 0mm	/Freq.		1-g	10-g		(dBm)	(dBm)	1-g (W/Kg)		
Back Side	62/5310	802.11n HT40	0.930	0.258	-1.64	11.63	12.00	1.013	2025/3/19	
Back Side	54/5270	802.11n HT40	0.875	0.234	-1.53	11.49	12.00	0.984	2025/3/19	
Right Side	62/5310	802.11n HT40	1.073	0.279	-2.96	11.63	12.00	1.168	2025/3/19	6#
Right Side	54/5270	802.11n HT40	1.021	0.228	-2.96	11.49	12.00	1.148	2025/3/19	
Right Side Repeated	62/5310	802.11n HT40	1.054	0.247	-2.96	11.63	12.00	1.148	2025/3/19	

NOTE: Body SAR test results of WLAN 5.3G

MIMO

Test Position of Body with 0mm	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						
Back Side	64/5230	802.11ac VHT20	0.843	0.277	4.10	14.38	14.50	0.867	2025/3/19	
Back Side	52/5260	802.11ac VHT20	0.687	0.205	-1.63	13.60	14.50	0.845	2025/3/19	
Back Side	56/5280	802.11ac VHT20	0.672	0.277	-2.54	13.58	14.50	0.831	2025/3/19	
Right Side	64/5230	802.11ac VHT20	0.868	0.225	2.23	14.38	14.50	0.892	2025/3/19	7#
Right Side	52/5260	802.11ac VHT20	0.704	0.213	-1.25	13.60	14.50	0.866	2025/3/19	
Right Side	56/5280	802.11ac VHT20	0.695	0.204	-2.47	13.58	14.50	0.859	2025/3/19	
Right Side Repeated	64/5230	802.11ac VHT20	0.861	0.217	-1.58	14.38	14.50	0.885	2025/3/19	

NOTE: Body SAR test results of WLAN 5.3G

9.1.4. SAR measurement Result of WLAN 5.6G

Ant1

Test Position	Test channel	Mode	SAR Value (W/kg)	Power Drift(%)	Conducted Power	Tune-up Power	Scaled SAR	Date	Plot
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of Body with 0mm	/Freq.		1-g	10-g		(dBm)	(dBm)	1-g (W/Kg)		
Back Side	134/5670	802.11n HT40	0.788	0.249	-3.38	13.60	14.00	0.864	2025/3/23	
Back Side	102/5510	802.11n HT40	0.657	0.186	-2.51	12.97	14.00	0.833	2025/3/23	
Back Side	118/5590	802.11n HT40	0.641	0.178	-1.85	12.89	14.00	0.828	2025/3/23	
Left Side	134/5670	802.11n HT40	0.805	0.251	-1.14	13.60	14.00	0.883	2025/3/23	9#
Left Side	102/5510	802.11n HT40	0.684	0.195	-1.84	12.97	14.00	0.867	2025/3/23	
Left Side	118/5590	802.11n HT40	0.672	0.189	-2.81	12.89	14.00	0.868	2025/3/23	
Left Side Repeated	134/5670	802.11n HT40	0.793	0.246	-1.07	13.60	14.00	0.870	2025/3/23	

NOTE: Body SAR test results of WLAN 5.6G

Ant2

Test Position of Body with 0mm	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						
Back Side	100/5500	802.11n HT20	1.116	0.354	-0.43	14.60	15.00	1.224	2025/3/23	11#
Back Side	120/5600	802.11n HT20	0.904	0.248	-2.54	13.73	15.00	1.211	2025/3/23	
Back Side	140/5700	802.11n HT20	0.912	0.253	-0.85	13.74	15.00	1.219	2025/3/23	
BackSide Repeated	100/5500	802.11n HT20	1.108	0.347	-1.77	14.60	15.00	1.215	2025/3/23	
Right Side	100/5500	802.11n HT20	0.678	0.213	-1.62	14.60	15.00	0.743	2025/3/23	

NOTE: Body SAR test results of WLAN 5.6G

MIMO

Test Position of Body with 0mm	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						
Back	100/5500	802.11n	0.905	0.286	-4.23	16.56	17.00	1.001	2025/3/23	10#

Side		HT20								
Back Side	120/5600	802.11n HT20	0.776	0.217	-3.51	15.92	17.00	0.995	2025/3/23	
Back Side	140/5700	802.11n HT20	0.785	0.223	-2.95	16.27	17.00	0.929	2025/3/23	
BackSide Repeated	100/5500	802.11n HT20	0.897	0.276	-1.76	16.56	17.00	0.993	2025/3/23	
Right Side	100/5500	802.11n HT20	0.564	0.171	1.75	16.56	17.00	0.624	2025/3/23	

NOTE: Body SAR test results of WLAN 5.6G

9.1.5. SAR measurement Result of WLAN 5.8G

Ant1

Test Position of Body with 0mm	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						
Back Side	157/5785	802.11ac VHT20	0.668	0.232	4.04	15.50	16.00	0.750	2025/3/17	
Left Side	157/5785	802.11ac VHT20	0.946	0.267	3.45	15.50	16.00	1.061	2025/3/17	14#
Left Side	149/5745	802.11ac VHT20	0.785	0.184	2.14	14.78	16.00	1.040	2025/3/17	
Left Side	165/5825	802.11ac VHT20	0.824	0.279	-2.47	15.25	16.00	0.979	2025/3/17	
Left Side Repeated	157/5785	802.11ac VHT20	0.938	0.257	-1.68	15.50	16.00	1.052	2025/3/17	

NOTE: Body SAR test results of WLAN 5.8G

Ant2

Test Position of Body with 0mm	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						
Back Side	157/5785	802.11n HT20	0.896	0.305	4.77	14.61	15.00	0.980	2025/3/17	13#
Back Side	149/5745	802.11n HT20	0.831	0.272	2.65	14.32	15.00	0.972	2025/3/17	
Back Side	165/5825	802.11n HT20	0.884	0.287	-1.89	14.70	15.00	0.947	2025/3/17	
BackSide	157/5785	802.11n	0.884	0.297	3.55	14.61	15.00	0.967	2025/3/17	

Repeated		HT20								
Right Side	157/5785	802.11n HT20	0.783	0.220	-2.54	14.61	15.00	0.857	2025/3/17	
Right Side	149/5745	802.11n HT20	0.712	0.198	-3.38	14.32	15.00	0.833	2025/3/17	
Right Side	165/5825	802.11n HT20	0.814	0.235	-1.37	14.70	15.00	0.872	2025/3/17	

NOTE: Body SAR test results of WLAN 5.8G

MIMO

Test Position of Body with 0mm	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						
Back Side	155/5775	802.11ac VHT80	0.828	0.278	-0.86	17.25	17.50	0.877	2025/3/17	12#
Back Side Repeated	155/5775	802.11ac VHT80	0.815	0.261	-0.38	17.25	17.50	0.863	2025/3/17	
Right Side	155/5775	802.11ac VHT80	0.623	0.177	-0.56	17.25	17.50	0.660	2025/3/17	

NOTE: Body SAR test results of WLAN 5.8G

9.1.6. SAR measurement Result of Bluetooth EDR

Test Position of Body with 0mm	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						
Back Side	39/2441	GFSK	0.038	0.014	1.92	10.57	11.00	0.042	2025/3/21	2#
Left Side	39/2441	GFSK	0.017	0.008	1.52	10.57	11.00	0.019	2025/3/21	

NOTE: Body SAR test results of BT RED

9.1.7. SAR measurement Result of Bluetooth LE

Test Position of Body with 0mm	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						
Back	19/2440	GFSK	0.051	0.021	1.92	12.27	12.50	0.054	2025/3/21	1#

Side										
Left Side	19/2440	GFSK	0.026	0.013	-1.52	12.27	12.50	0.027	2025/3/21	

NOTE: Body SAR test results of BT LE

9.2. Simultaneous Transmission Analysis

NO simultaneous transmissions are possible for this device of Bluetooth and 2.4G Wi-Fi.

Ant 1

Test Position		Scaled SAR _{MAX}		Σ 1-g SAR (W/Kg)	SPLSR	Remark
		BT EDR	WLAN 5G			
Body	Back Side	0.042	0.864	0.906	N/A	N/A
	Left Side	0.019	1.115	1.134	N/A	N/A

note: Only Ant 1 2.4G and 5G are on the same antenna

Ant 2

Test Position		Scaled SAR _{MAX}		Σ 1-g SAR (W/Kg)	SPLSR	Remark
		BT EDR	WLAN 5G			
Body	Back Side	N/A	1.224	1.224	N/A	N/A
	Right Side	N/A	1.128	1.128	N/A	N/A

Ant 1

Test Position		Scaled SAR _{MAX}		Σ 1-g SAR (W/Kg)	SPLSR	Remark
		BT LE	WLAN 5G			
Body	Back Side	0.054	0.864	0.918	N/A	N/A
	Left Side	0.027	1.115	1.142	N/A	N/A

note: Only Ant 1 2.4G and 5G are on the same antenna.

Ant 2

Test Position		Scaled SAR _{MAX}		Σ 1-g SAR (W/Kg)	SPLSR	Remark
		BT EDR	WLAN 5G			
Body	Back Side	N/A	1.224	1.224	N/A	N/A
	Right Side	N/A	1.128	1.128	N/A	N/A

10. Appendix A. Photo documentation

Refer to appendix Test Setup photo---SAR

11. Appendix B. System Check Plots

Table of contents
MEASUREMENT 1 System Performance Check - 2450MHz
MEASUREMENT 2 System Performance Check - 5200MHz
MEASUREMENT 3 System Performance Check - 5800MHz

1# System check at 2450 MHz
Date of measurement: 21/3/2025

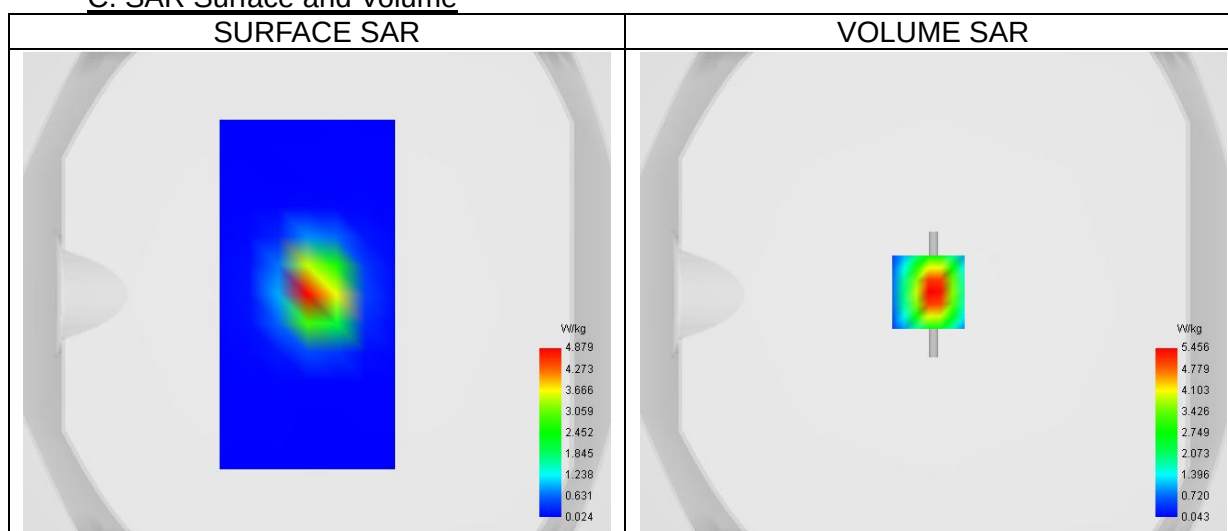
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.74
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
Channels/Frequency	Middle
Signal	CW

B. Permittivity

Middle TX Frequency (MHz)	2450.000
Relative permittivity (real part)	38.15
Relative permittivity (imaginary part)	12.98
Conductivity (S/m)	1.77

C. SAR Surface and Volume



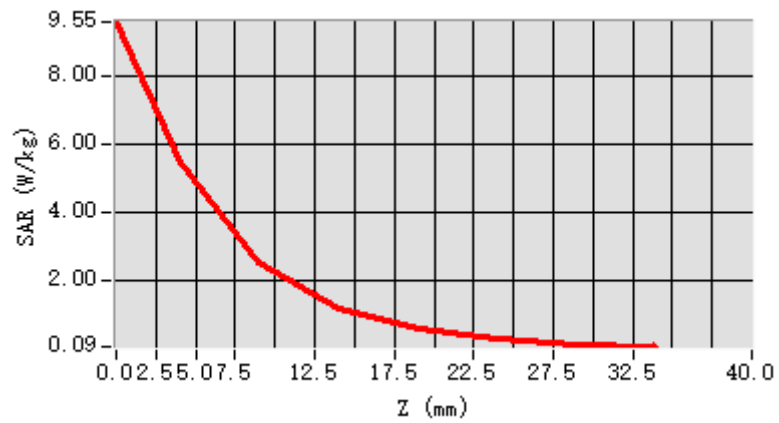
Maximum location: X=-2.00, Y=1.00 ; SAR Peak: 9.82 W/kg

D. SAR 1g & 10g

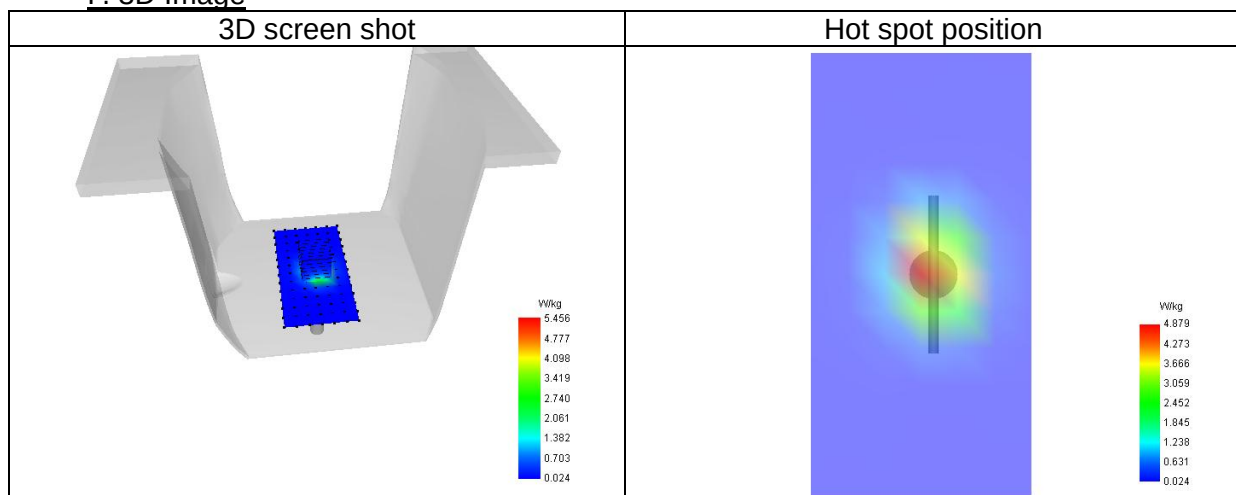
SAR 10g (W/Kg)	2.212
SAR 1g (W/Kg)	5.160
Variation (%)	-0.15
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	46.31

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	9.550	5.456	2.527	1.215	0.599	0.306	0.163



F. 3D Image



2# System check at 5200 MHz
Date of measurement: 16/3/2025

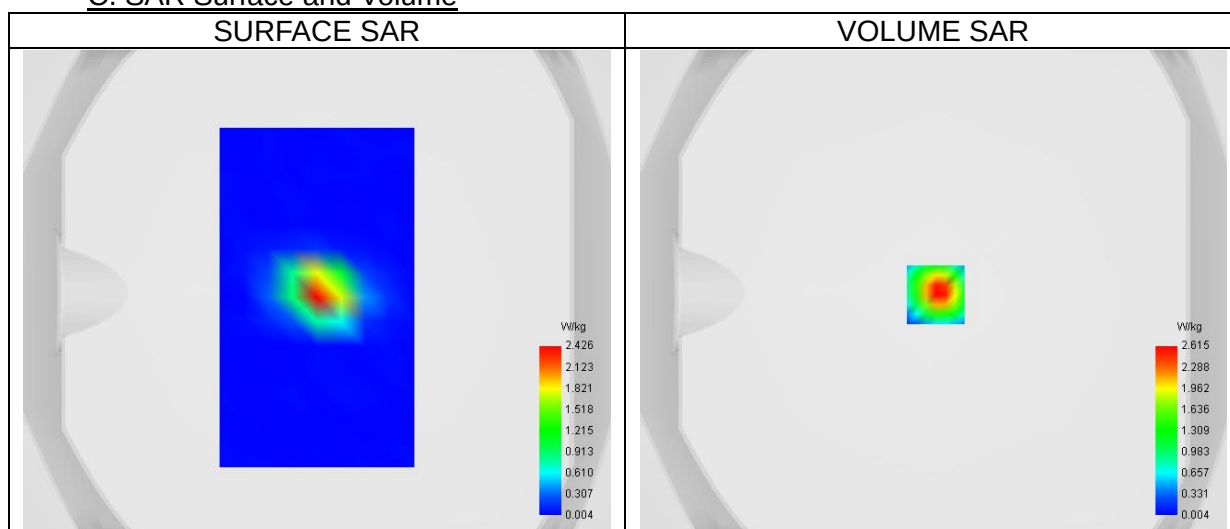
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.89
Area Scan	dx=10mm dy=10mm, Complete
Zoom Scan	7x7x12,dx=4mm dy=4mm dz=2.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW5200
Signal	CW
Channels/Frequency	Middle

B. Permittivity

Middle TX Frequency (MHz)	5200.00
Relative permittivity (real part)	36.82
Relative permittivity (imaginary part)	15.53
Conductivity (S/m)	4.49

C. SAR Surface and Volume



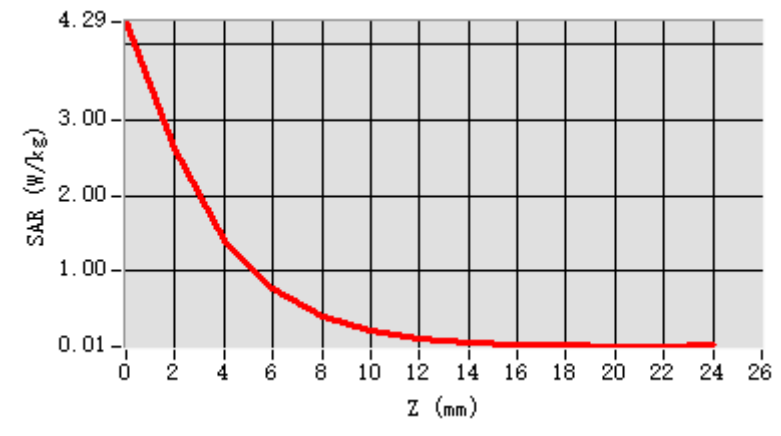
Maximum location: X=1.00, Y=-1.00 ; SAR Peak: 4.67 W/kg

D. SAR 1g & 10g

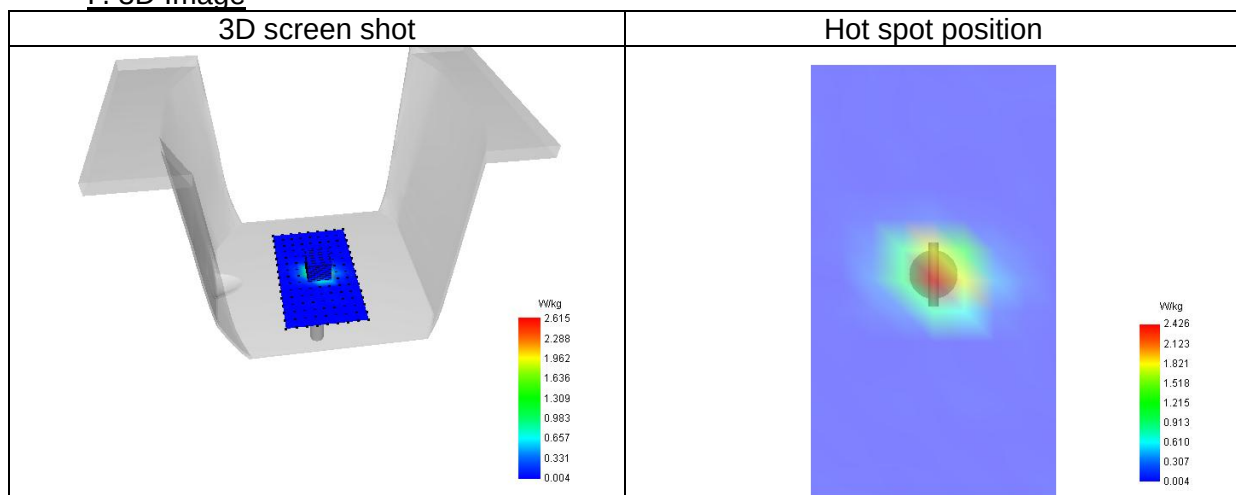
SAR 10g (W/Kg)	0.517
SAR 1g (W/Kg)	1.545
Variation (%)	0.22
Horizontal validation criteria: minimum distance (mm)	8.94
Vertical validation criteria: SAR ratio M2/M1 (%)	53.51

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
						0	0	0	0	0	0	0
SAR (W/Kg)	4.28	2.61	1.39	0.76	0.41	0.22	0.10	0.05	0.03	0.04	0.00	0.01
	8	5	9	8	3	2	7	3	4	5	7	2



F. 3D Image



3# System check at 5400 MHz
Date of measurement: 19/3/2025

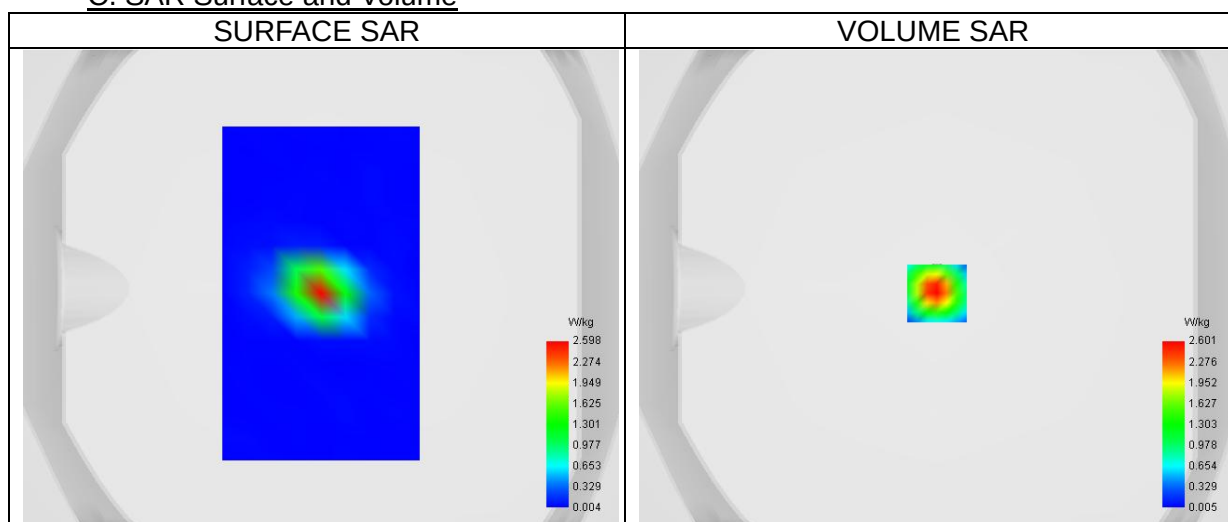
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.97
Area Scan	dx=10mm dy=10mm, Complete
Zoom Scan	7x7x12,dx=4mm dy=4mm dz=2.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW5400
Signal	CW
Channels/Frequency	Middle

B. Permittivity

Middle TX Frequency (MHz)	5400.00
Relative permittivity (real part)	36.18
Relative permittivity (imaginary part)	16.78
Conductivity (S/m)	5.04

C. SAR Surface and Volume



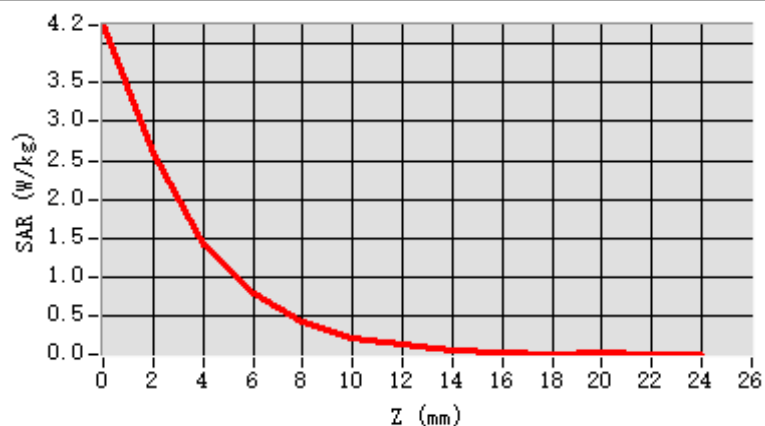
Maximum location: X=0.00, Y=-2.00 ; SAR Peak: 4.47 W/kg

D. SAR 1g & 10g

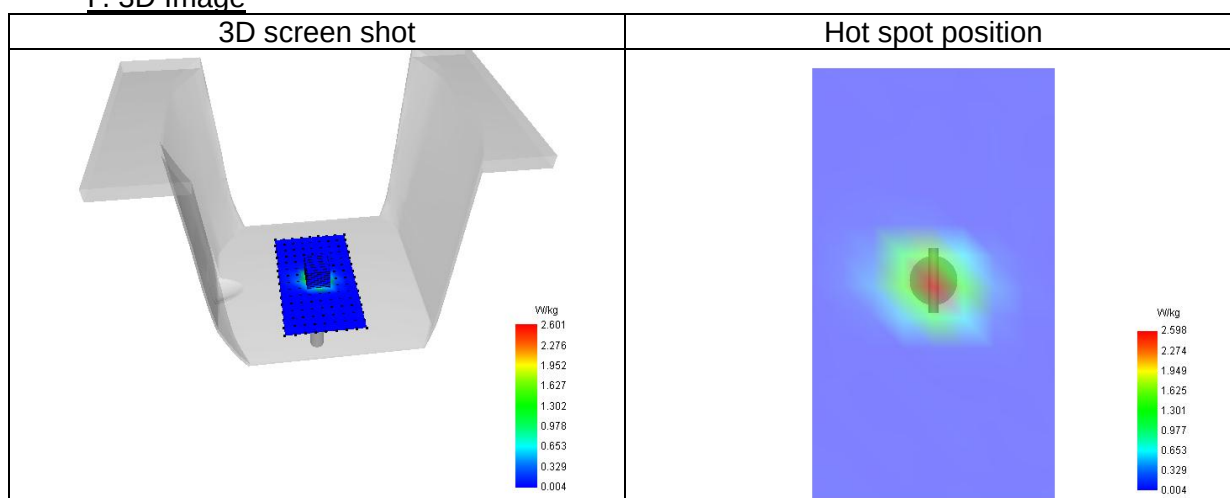
SAR 10g (W/Kg)	0.510
SAR 1g (W/Kg)	1.512
Variation (%)	1.77
Horizontal validation criteria: minimum distance (mm)	11.31
Vertical validation criteria: SAR ratio M2/M1 (%)	54.62

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
						0	0	0	0	0	0	0
SAR (W/Kg)	4.23	2.60	1.42	0.79	0.42	0.22	0.13	0.07	0.04	0.01	0.03	0.01
	7	1	0	0	2	3	4	4	0	8	0	8



F. 3D Image



4# System check at 5600 MHz
Date of measurement: 23/3/2025

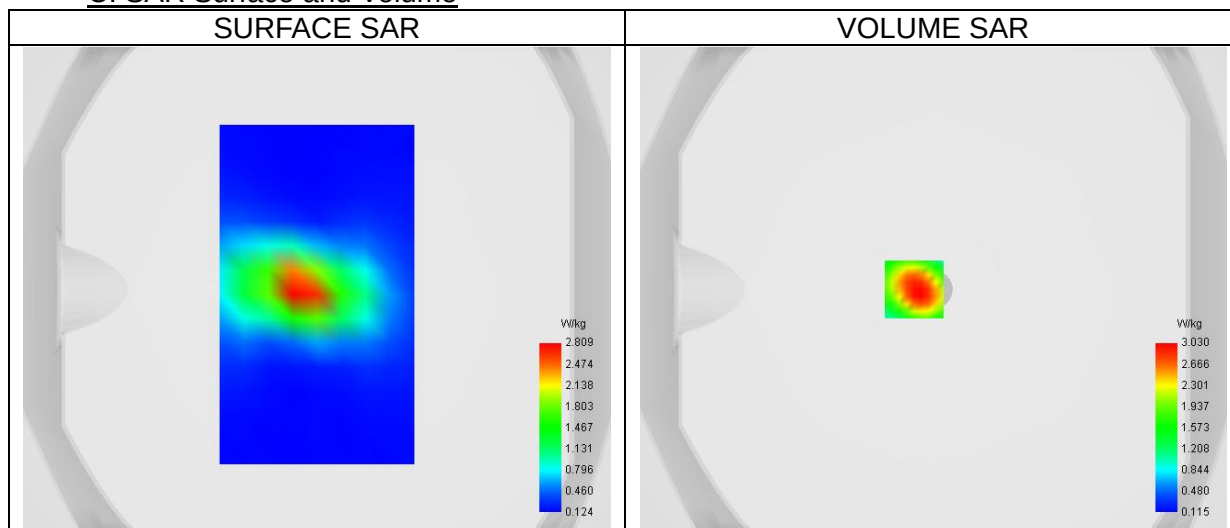
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.88
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	CW5600
Channels/Frequency	Middle
Signal	CW

B. Permittivity

Middle TX Frequency (MHz)	5600.000
Relative permittivity (real part)	36.78
Relative permittivity (imaginary part)	16.16
Conductivity (S/m)	5.03

C. SAR Surface and Volume



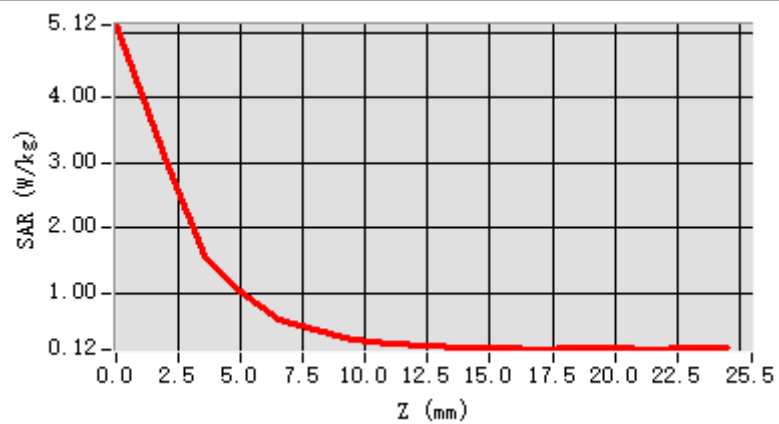
Maximum location: X=-8.00, Y=0.00 ; SAR Peak: 5.70 W/kg

D. SAR 1g & 10g

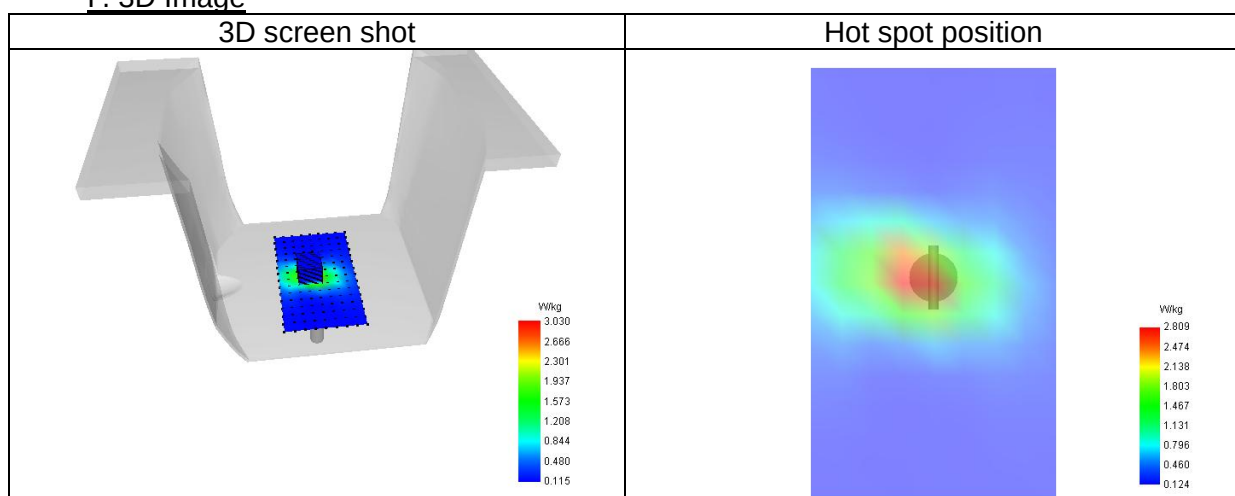
SAR 10g (W/Kg)	0.670
SAR 1g (W/Kg)	1.718
Variation (%)	0.34
Horizontal validation criteria: minimum distance (mm)	12.37
Vertical validation criteria: SAR ratio M2/M1 (%)	55.67

E. Z Axis Scan

Z (mm)	0.0 0	2.0 0	3.5 0	5.0 0	6.5 0	8.0 0	9.5 0	11. 00	12. 50	14. 00	15. 50	17. 00	18. 50	20. 00	21. 50	23. 00
SAR (W/Kg)	5.1 25	3.0 30	1.5 58	1.0 07	0.5 86	0.4 19	0.2 73	0.2 03	0.1 79	0.1 54	0.1 49	0.1 34	0.1 38	0.1 37	0.1 21	0.1 51



F. 3D Image



5# System check at 5800 MHz

Date of measurement: 17/3/2025

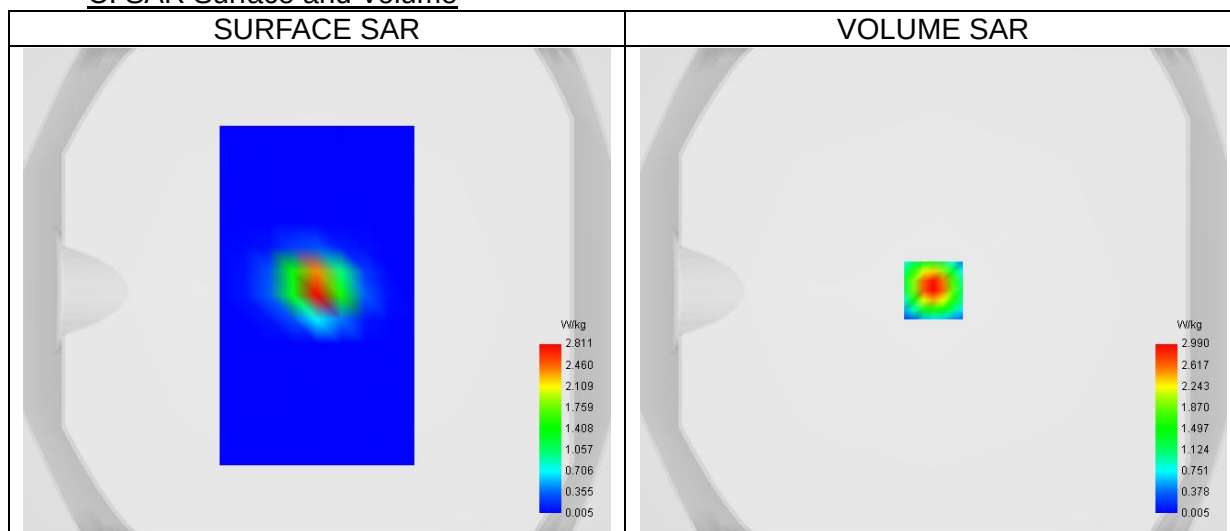
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.90
Area Scan	dx=10mm dy=10mm, Complete
Zoom Scan	7x7x12,dx=4mm dy=4mm dz=2.0mm,Complete
Phantom	Validation plane
Device Position	Dipole
Band	CW5800
Signal	CW
Channels/Frequency	Middle

B. Permittivity

Middle TX Frequency (MHz)	5800.00
Relative permittivity (real part)	35.54
Relative permittivity (imaginary part)	16.30
Conductivity (S/m)	5.25

C. SAR Surface and Volume



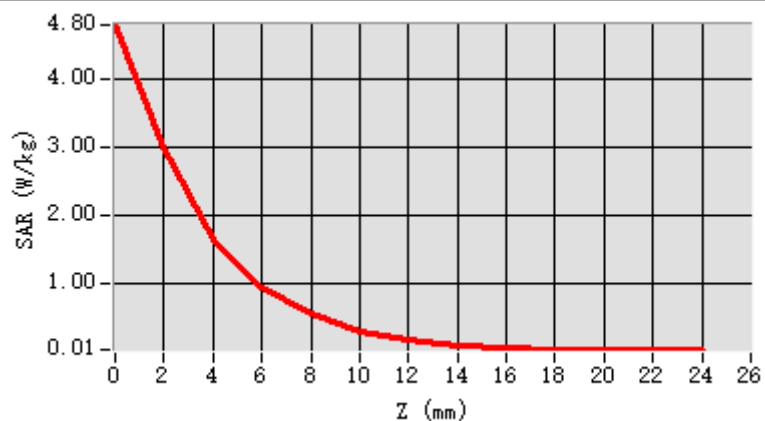
Maximum location: X=0.00, Y=0.00 ; SAR Peak: 5.22 W/kg

D. SAR 1g & 10g

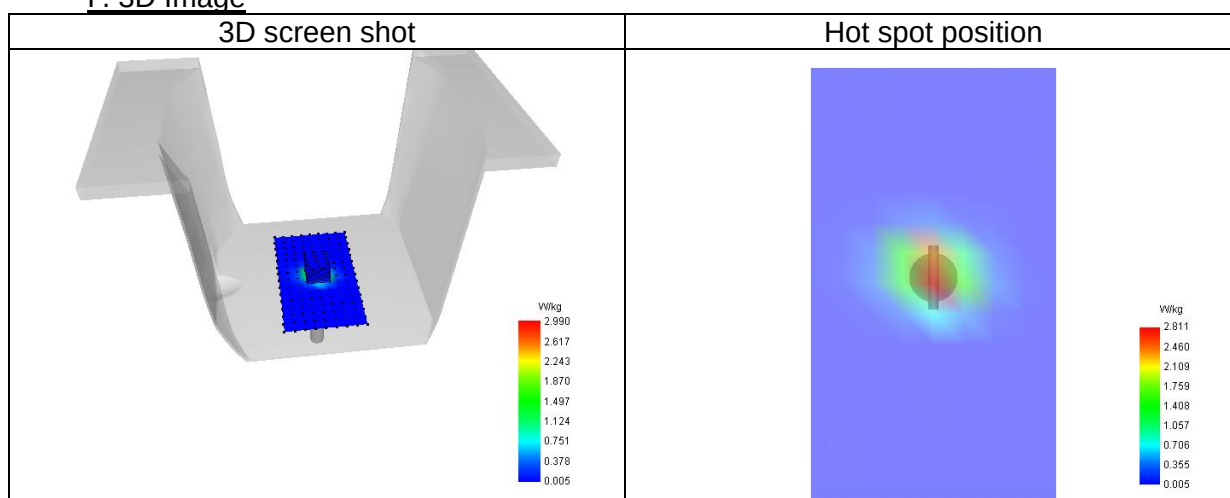
SAR 10g (W/Kg)	0.584
SAR 1g (W/Kg)	1.758
Variation (%)	-2.47
Horizontal validation criteria: minimum distance (mm)	8.94
Vertical validation criteria: SAR ratio M2/M1 (%)	54.88

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)	4.80 0	2.99 0	1.64 1	0.93 7	0.53 9	0.26 4	0.15 0	0.06 9	0.03 1	0.01 9	0.01 9	0.01 2



F. 3D Image



12. Appendix C. SAR Measurement Plots

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

Date of measurement: 21/3/2025

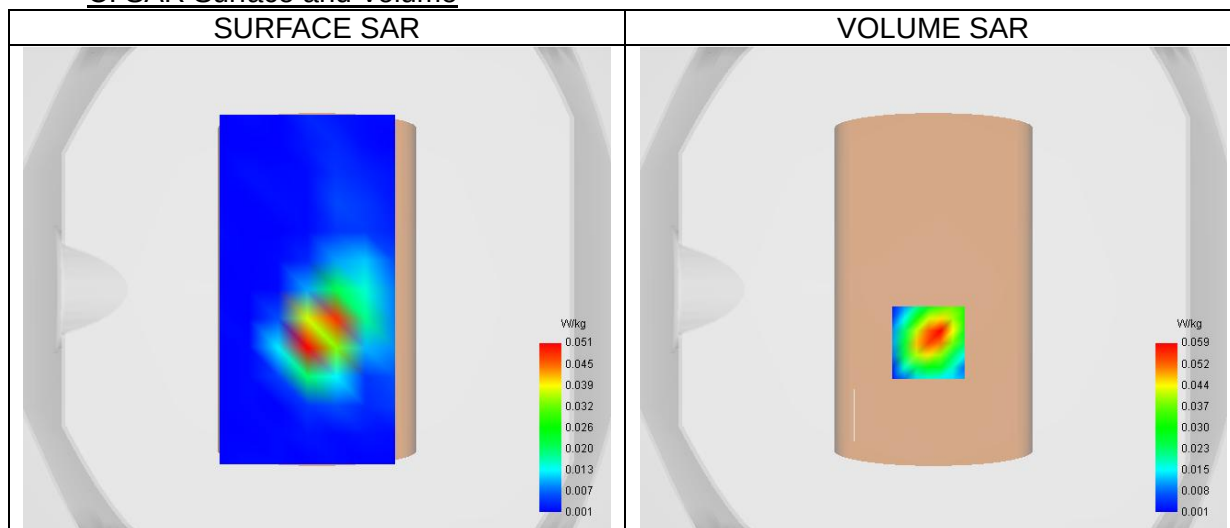
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.74
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 (19)/ frequency 2440.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	2440.00
Relative permittivity (real part)	38.18
Relative permittivity (imaginary part)	12.91
Conductivity (S/m)	1.75

C. SAR Surface and Volume



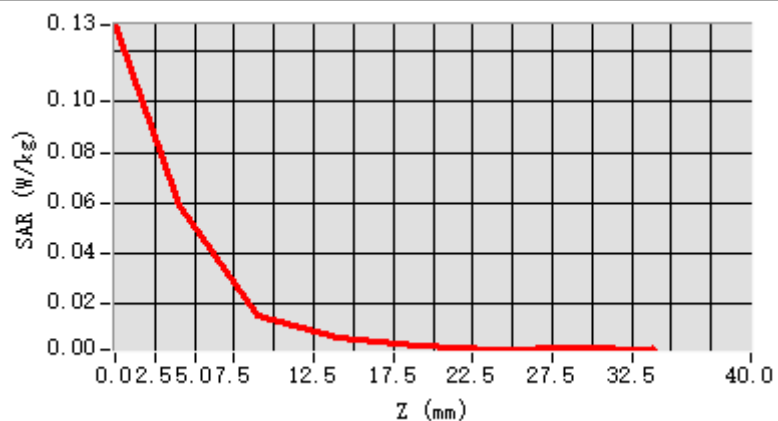
Maximum location: X=-2.00, Y=-22.00 ; SAR Peak: 0.11 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.021
SAR 1g (W/Kg)	0.051
Variation (%)	1.92
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	39.46

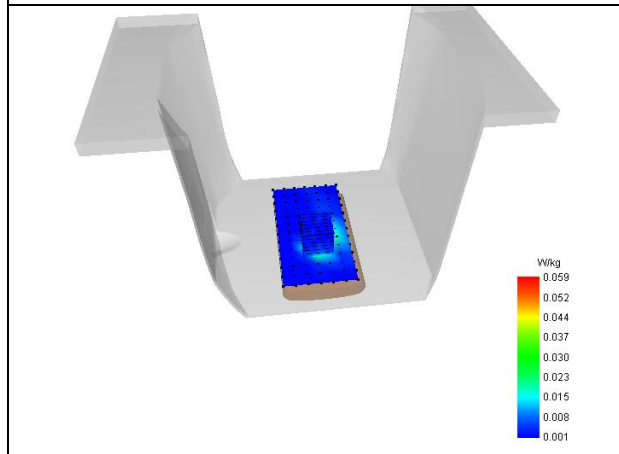
E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.130	0.059	0.016	0.007	0.003	0.002	0.002

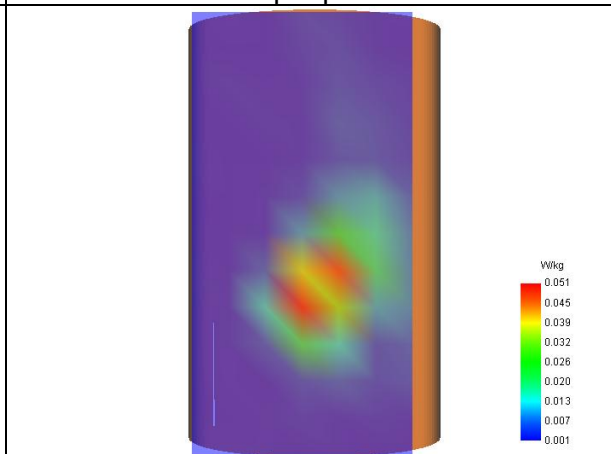


F. 3D Image

3D screen shot



Hot spot position



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

Date of measurement: 21/3/2025

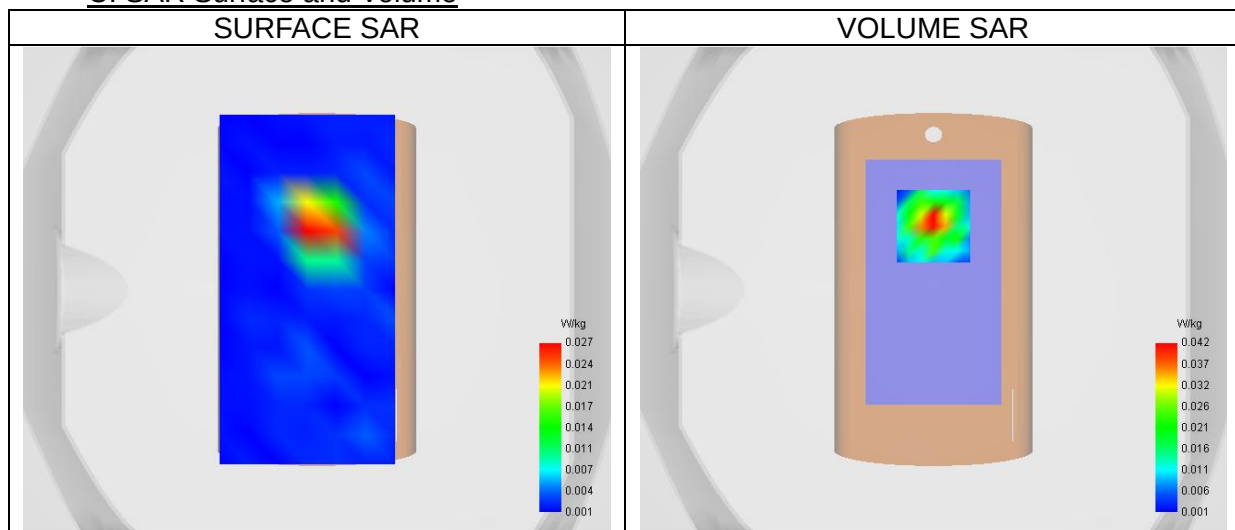
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.74
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 2441.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	2441.00
Relative permittivity (real part)	38.23
Relative permittivity (imaginary part)	12.93
Conductivity (S/m)	1.75

C. SAR Surface and Volume



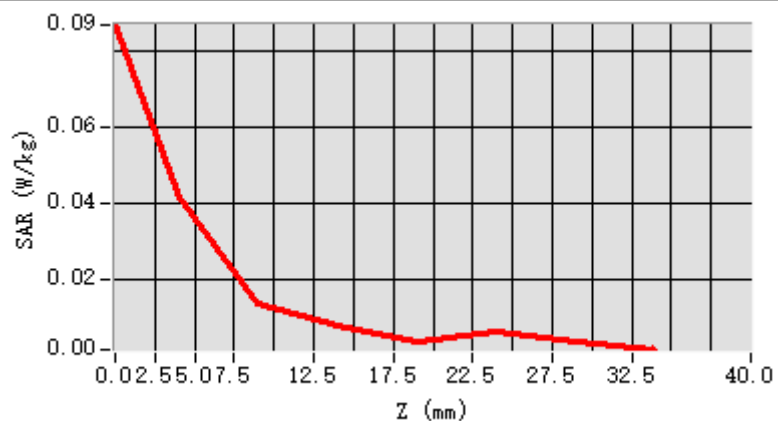
Maximum location: X=0.00, Y=26.00 ; SAR Peak: 0.10 W/kg

D. SAR 1g & 10g

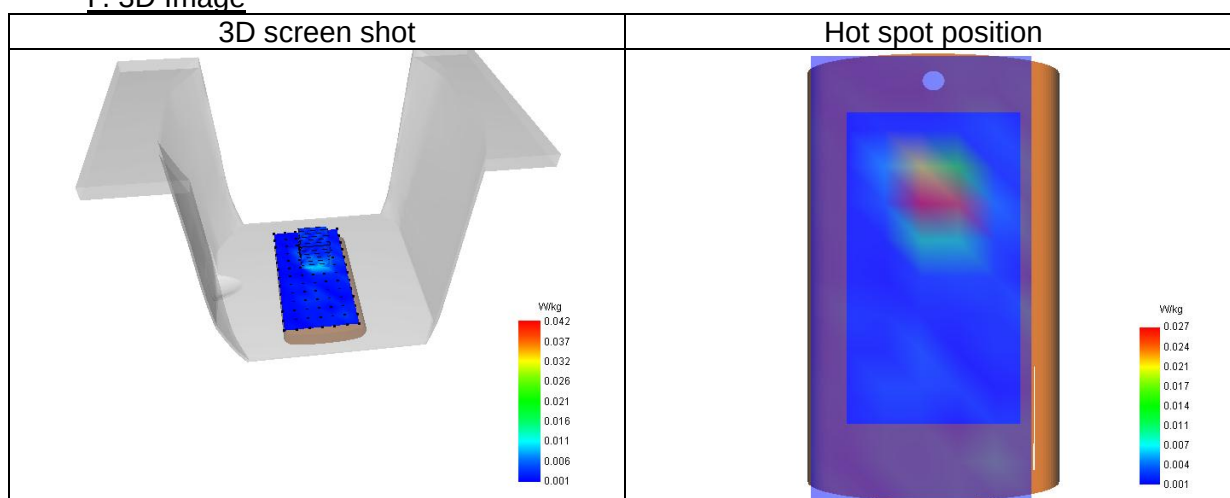
SAR 10g (W/Kg)	0.014
SAR 1g (W/Kg)	0.038
Variation (%)	-2.96
Horizontal validation criteria: minimum distance (mm)	7.07
Vertical validation criteria: SAR ratio M2/M1 (%)	46.52

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.087	0.042	0.014	0.008	0.004	0.007	0.004



F. 3D Image



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

Date of measurement: 16/3/2025

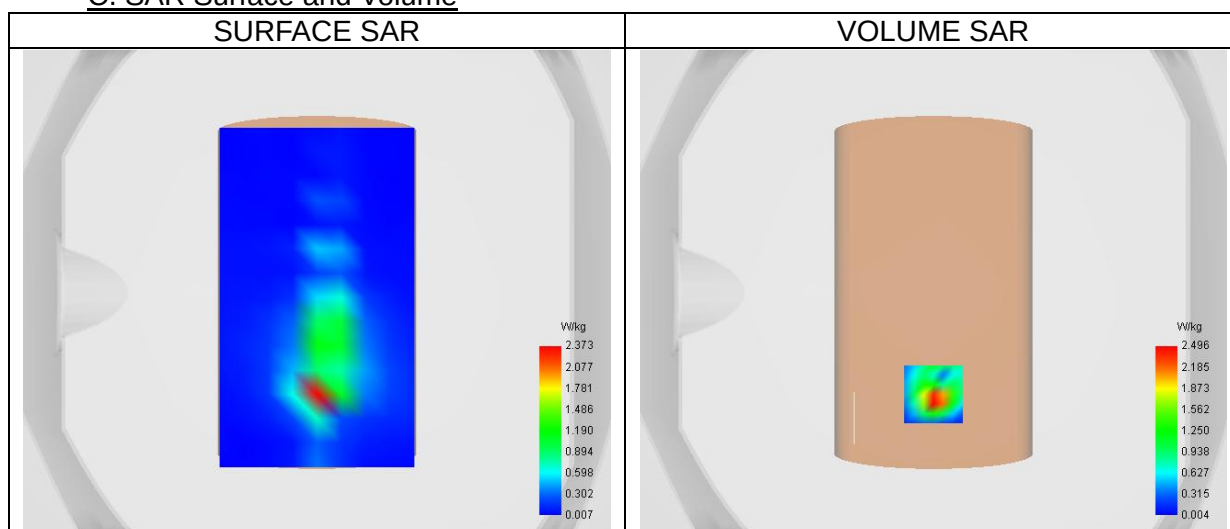
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.89
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 n
Channels/Frequency	Middle (40)/ frequency 5200.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5200.00
Relative permittivity (real part)	36.82
Relative permittivity (imaginary part)	15.53
Conductivity (S/m)	4.49

C. SAR Surface and Volume



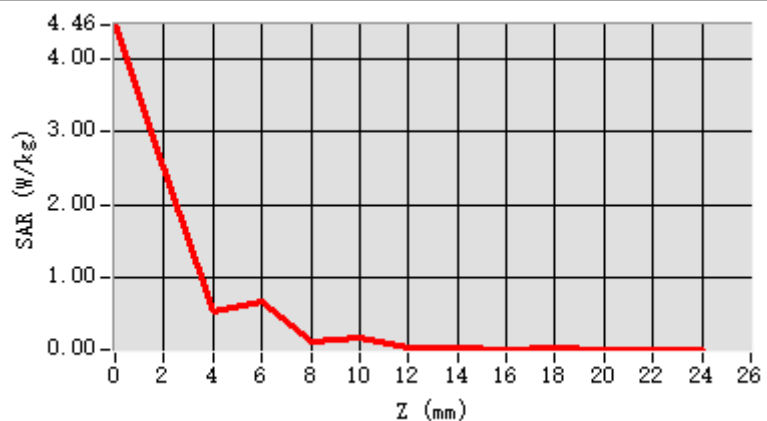
Maximum location: X=0.00, Y=-42.00 ; SAR Peak: 4.90 W/kg

D. SAR 1g & 10g

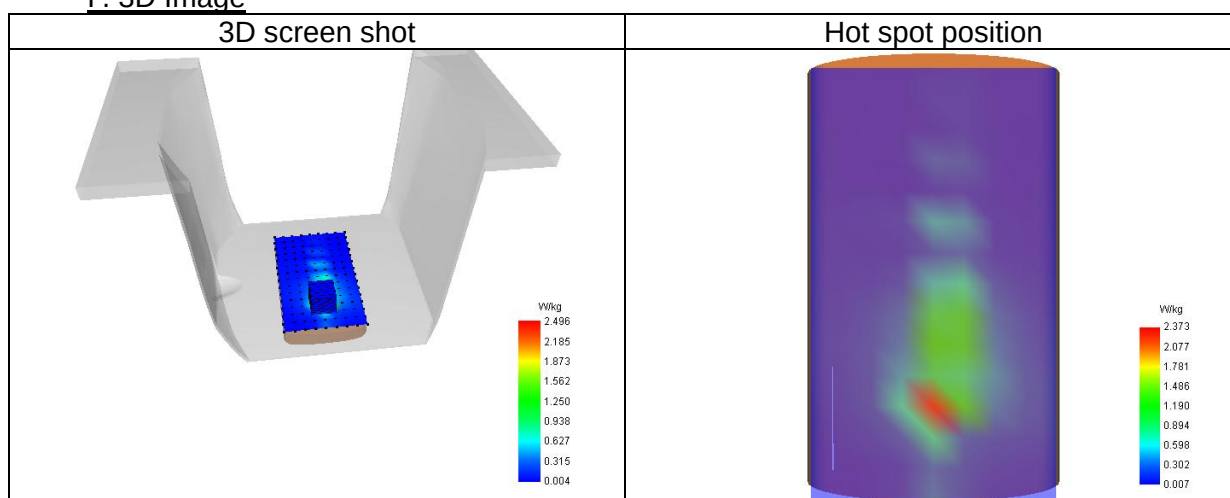
SAR 10g (W/Kg)	0.331
SAR 1g (W/Kg)	1.088
Variation (%)	-2.32
Horizontal validation criteria: minimum distance (mm)	5.66
Vertical validation criteria: SAR ratio M2/M1 (%)	49.96

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
						0	0	0	0	0	0	0
SAR (W/Kg)	4.46	2.49	0.53	0.65	0.11	0.16	0.02	0.03	0.01	0.02	0.00	0.00
	4	6	2	3	3	0	1	8	0	3	8	4



F. 3D Image



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

Date of measurement: 16/3/2025

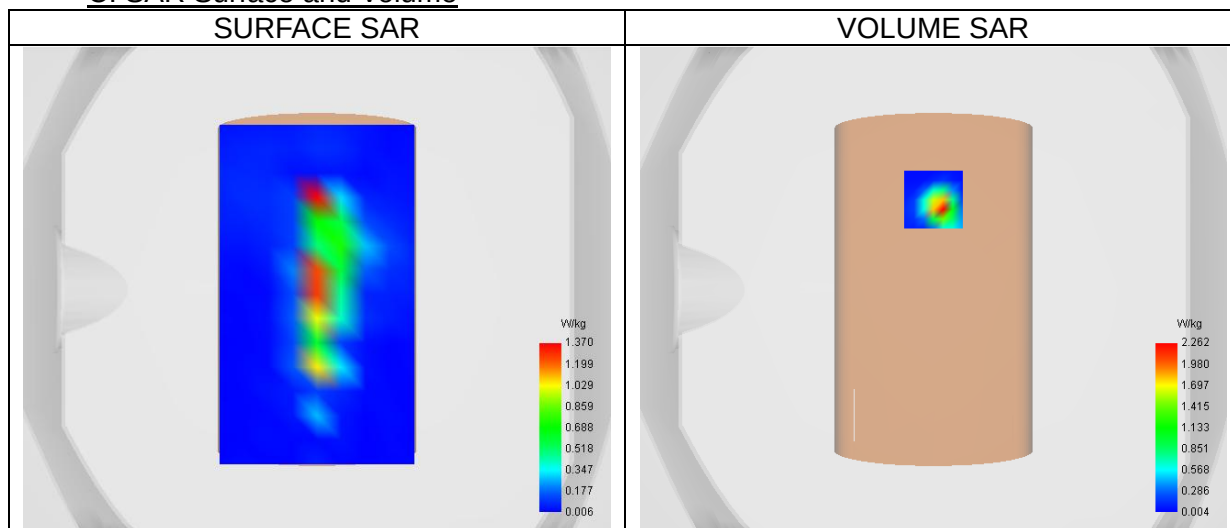
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.89
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 n
Channels/Frequency	Middle (40)/ frequency 5200.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5200.00
Relative permittivity (real part)	36.82
Relative permittivity (imaginary part)	15.53
Conductivity (S/m)	4.49

C. SAR Surface and Volume



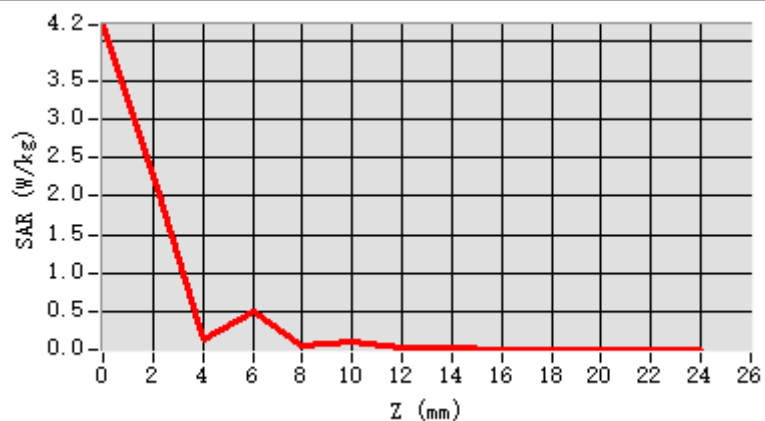
Maximum location: X=0.00, Y=37.00 ; SAR Peak: 4.41 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.208
SAR 1g (W/Kg)	1.005
Variation (%)	3.93
Horizontal validation criteria: minimum distance (mm)	4.00
Vertical validation criteria: SAR ratio M2/M1 (%)	45.81

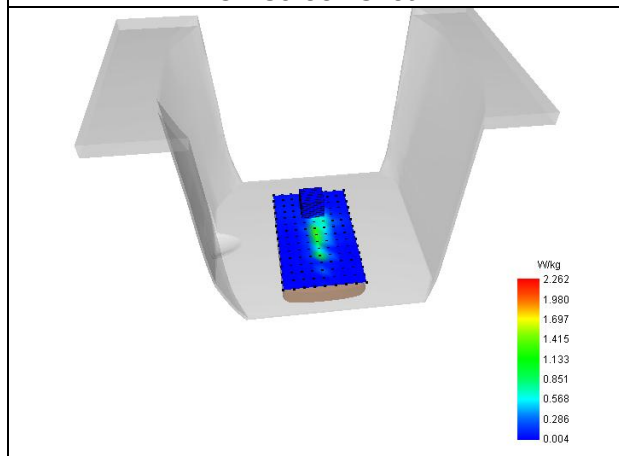
E. Z Axis Scan

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
						0	0	0	0	0	0	0
SAR (W/Kg)	4.21	2.26	0.15	0.50	0.05	0.10	0.02	0.03	0.01	0.01	0.01	0.02
	5	2	1	5	5	8	9	2	5	8	1	2

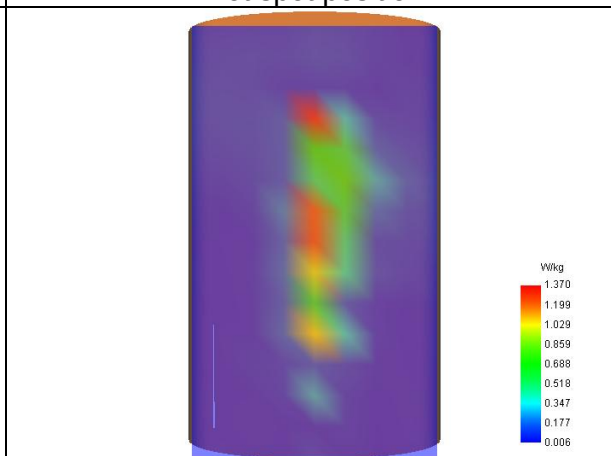


F. 3D Image

3D screen shot



Hot spot position



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

Date of measurement: 16/3/2025

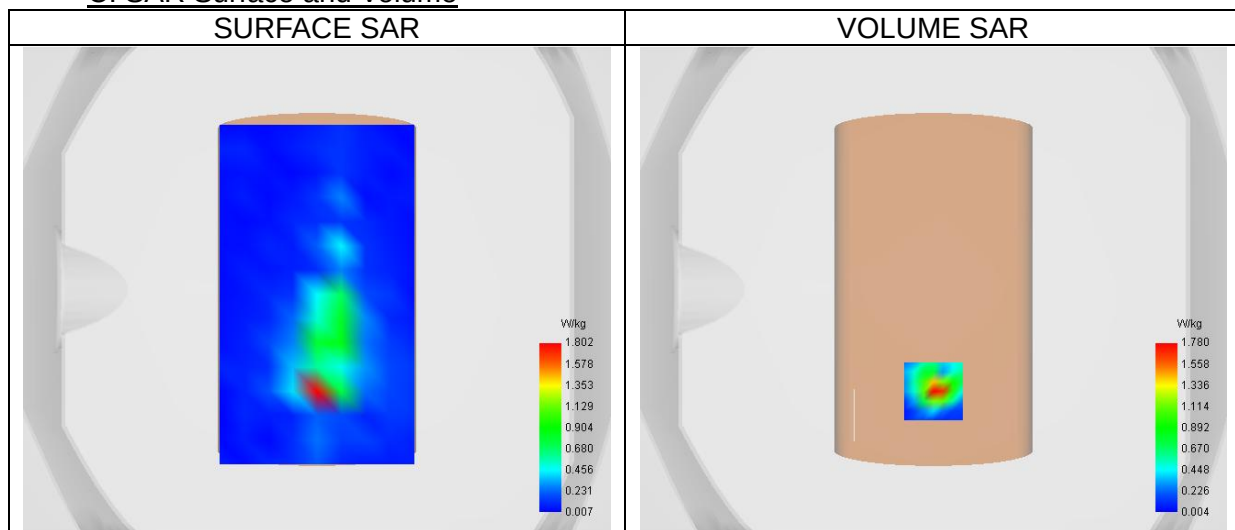
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.89
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 n
Channels/Frequency	Middle (40)/ frequency 5200.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5200.00
Relative permittivity (real part)	36.82
Relative permittivity (imaginary part)	15.53
Conductivity (S/m)	4.49

C. SAR Surface and Volume



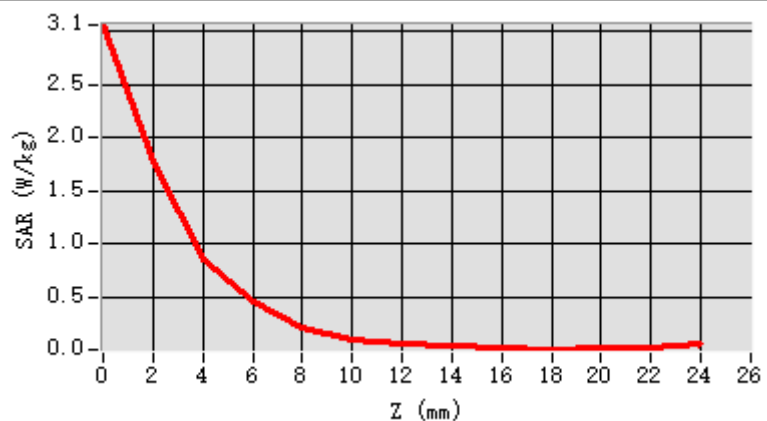
Maximum location: X=0.00, Y=-42.00 ; SAR Peak: 3.44 W/kg

D. SAR 1g & 10g

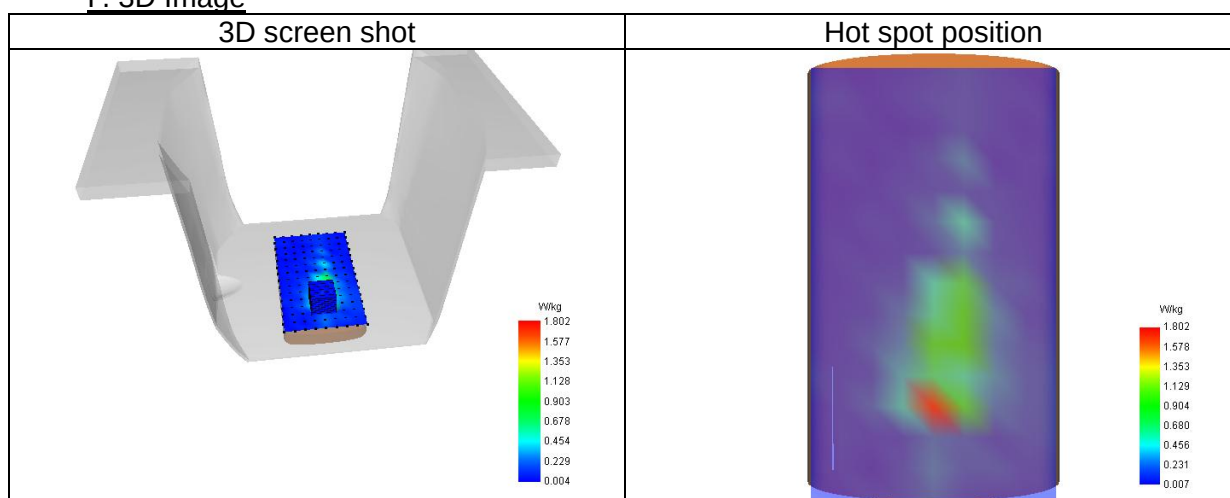
SAR 10g (W/Kg)	0.234
SAR 1g (W/Kg)	0.882
Variation (%)	-3.52
Horizontal validation criteria: minimum distance (mm)	5.66
Vertical validation criteria: SAR ratio M2/M1 (%)	47.90

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
						0	0	0	0	0	0	0
SAR (W/Kg)	3.05	1.78	0.85	0.46	0.21	0.11	0.07	0.05	0.03	0.01	0.02	0.02
	7	0	3	3	4	2	2	7	0	1	7	6



F. 3D Image



6# SAR Measurement at U-NII-2a (Body, Validation Plane)

Date of measurement: 19/3/2025

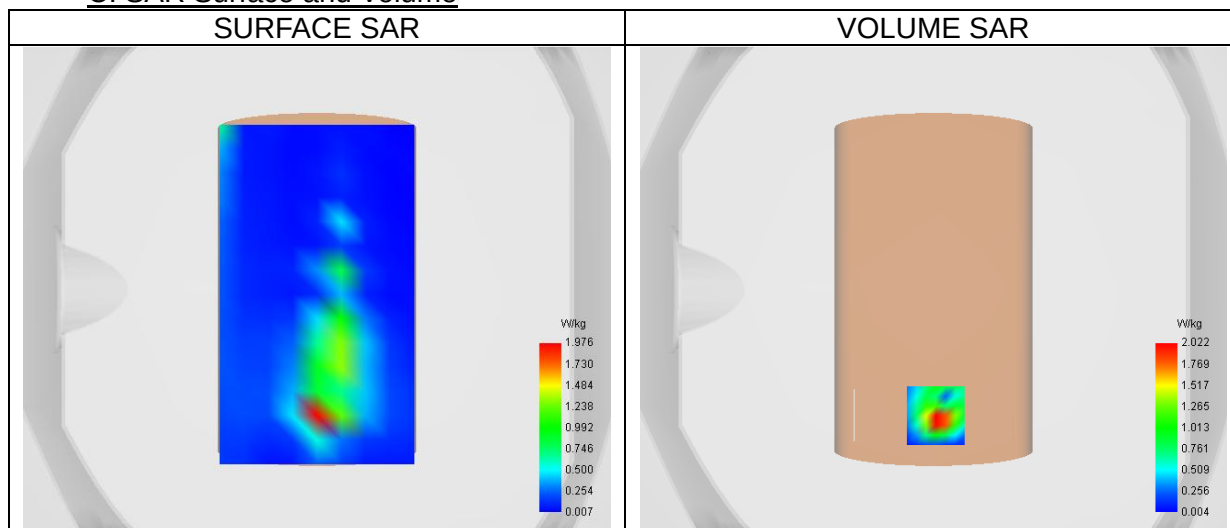
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.89
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-2a
Signal	IEEE 802.11 a
Channels/Frequency	Middle (56)/ frequency 5280.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5280.00
Relative permittivity (real part)	36.54
Relative permittivity (imaginary part)	16.54
Conductivity (S/m)	4.85

C. SAR Surface and Volume



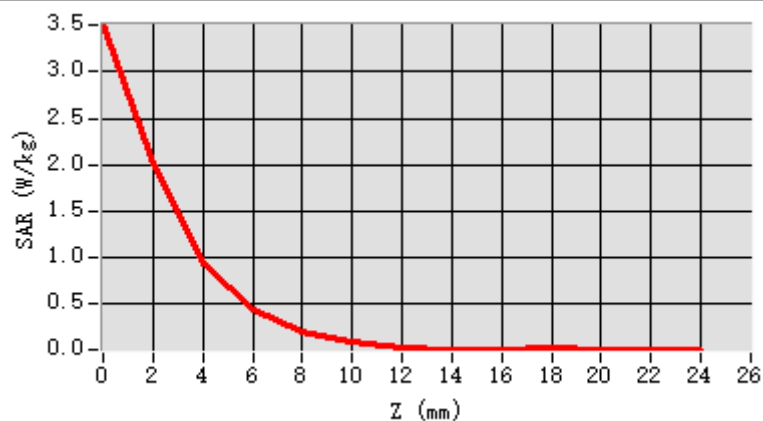
Maximum location: X=1.00, Y=-52.00 ; SAR Peak: 4.08 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.279
SAR 1g (W/Kg)	1.073
Variation (%)	-2.96
Horizontal validation criteria: minimum distance (mm)	5.66
Vertical validation criteria: SAR ratio M2/M1 (%)	48.47

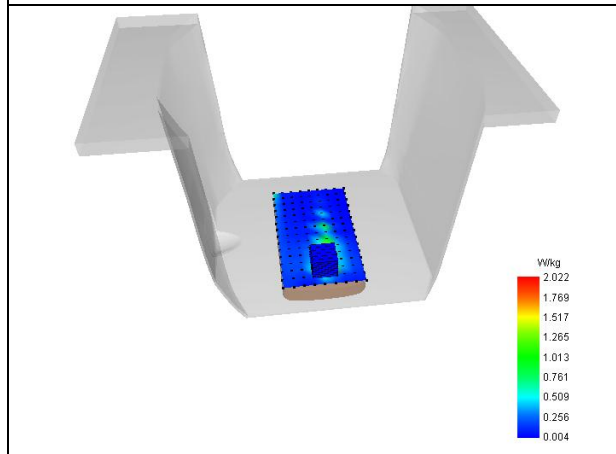
E. Z Axis Scan

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
						0	0	0	0	0	0	0
SAR (W/Kg)	3.50	2.02	0.94	0.45	0.21	0.09	0.04	0.01	0.01	0.02	0.01	0.01
	5	2	5	1	0	3	1	3	6	5	6	5

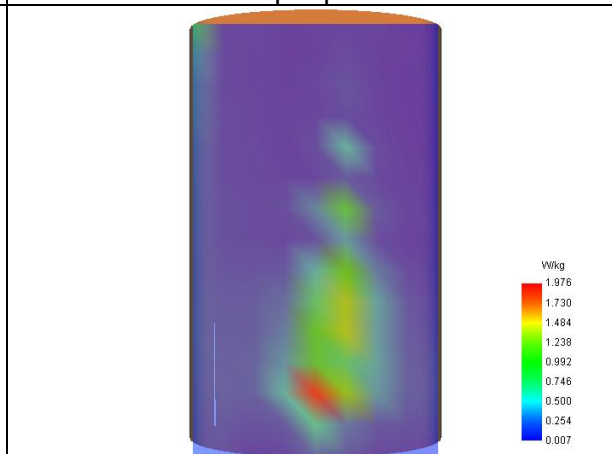


F. 3D Image

3D screen shot



Hot spot position



7# SAR Measurement at U-NII-2a (Body, Validation Plane)

Date of measurement: 19/3/2025

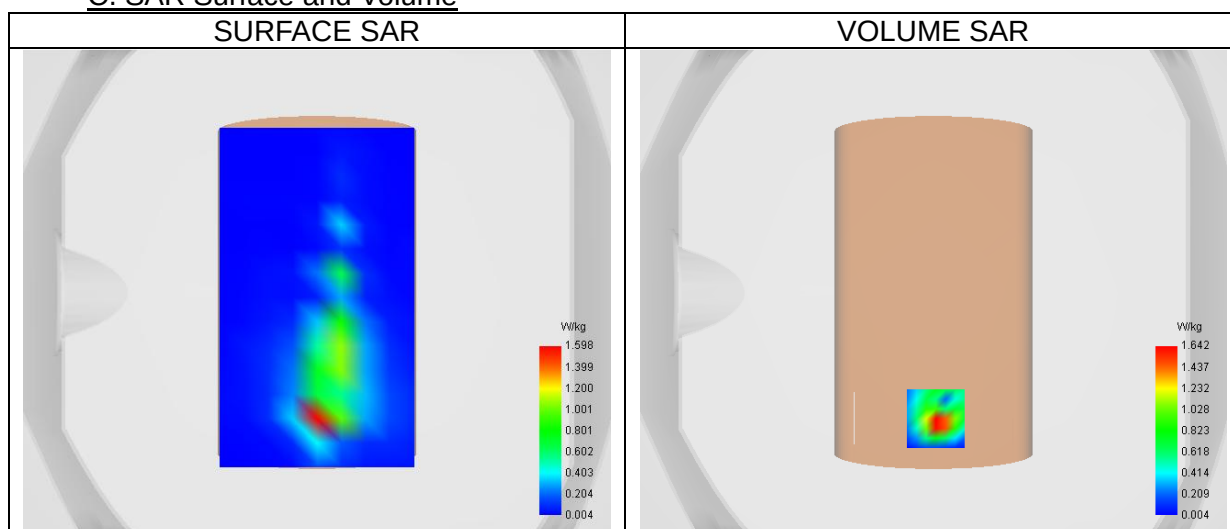
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.89
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-2a
Signal	IEEE 802.11 a
Channels/Frequency	Middle (56)/ frequency 5280.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5280.00
Relative permittivity (real part)	36.54
Relative permittivity (imaginary part)	16.54
Conductivity (S/m)	4.85

C. SAR Surface and Volume



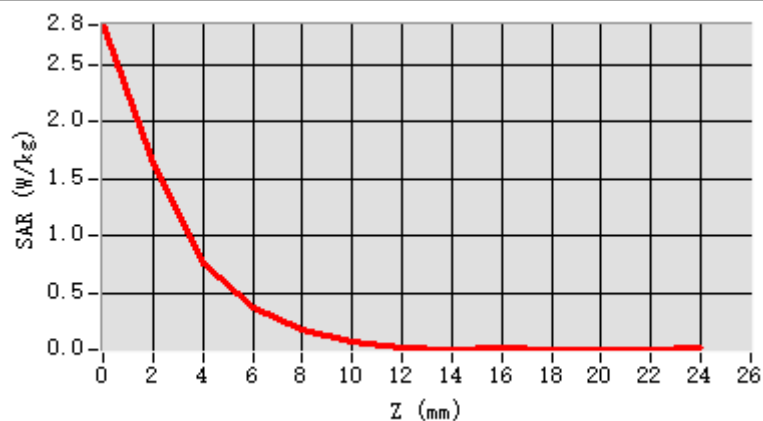
Maximum location: X=1.00, Y=-52.00 ; SAR Peak: 3.35 W/kg

D. SAR 1g & 10g

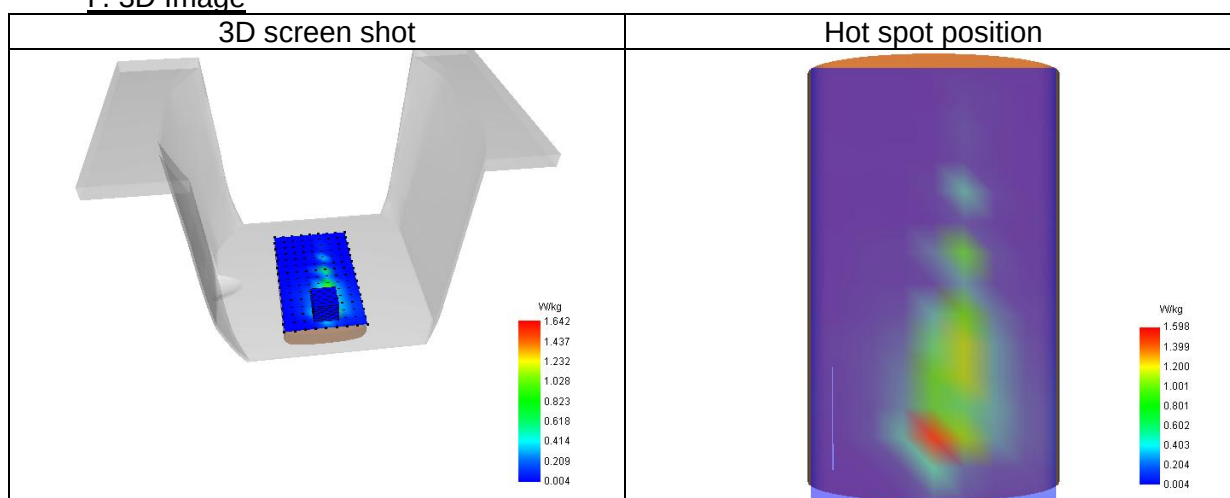
SAR 10g (W/Kg)	0.225
SAR 1g (W/Kg)	0.868
Variation (%)	2.23
Horizontal validation criteria: minimum distance (mm)	5.66
Vertical validation criteria: SAR ratio M2/M1 (%)	47.36

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
						0	0	0	0	0	0	0
SAR (W/Kg)	2.84	1.64	0.76	0.37	0.17	0.07	0.02	0.01	0.01	0.01	0.00	0.00
	7	2	5	2	7	3	7	2	5	2	8	5



F. 3D Image



8# SAR Measurement at U-NII-2a (Body, Validation Plane)

Date of measurement: 19/3/2025

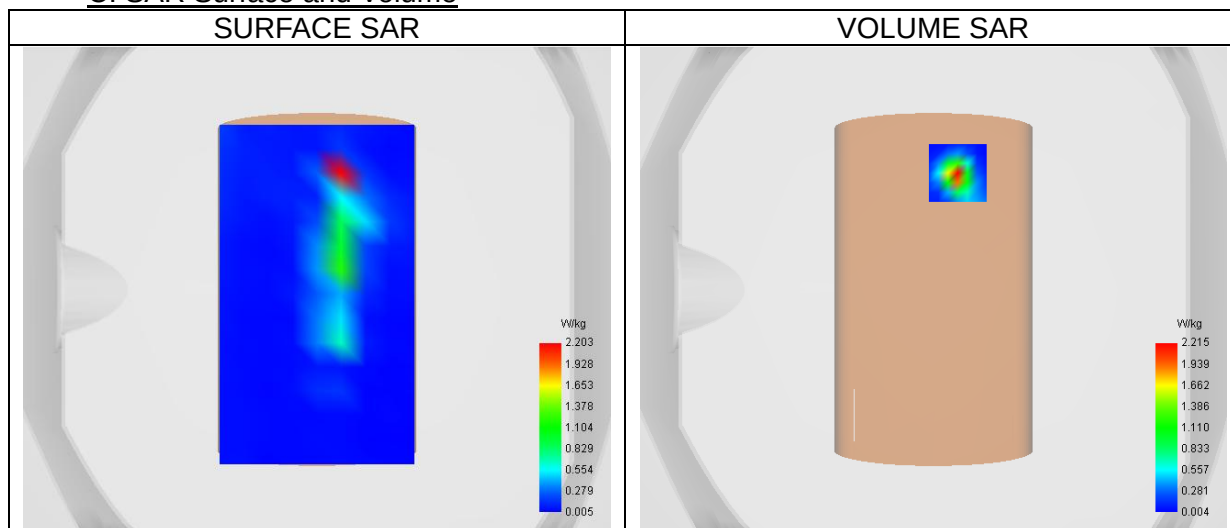
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.89
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-2a
Signal	IEEE 802.11 a
Channels/Frequency	Middle (56)/ frequency 5280.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5280.00
Relative permittivity (real part)	36.54
Relative permittivity (imaginary part)	16.54
Conductivity (S/m)	4.85

C. SAR Surface and Volume



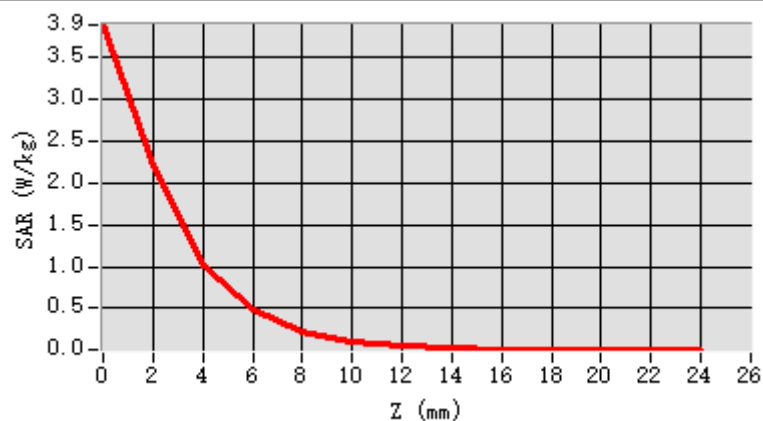
Maximum location: X=10.00, Y=48.00 ; SAR Peak: 4.36 W/kg

D. SAR 1g & 10g

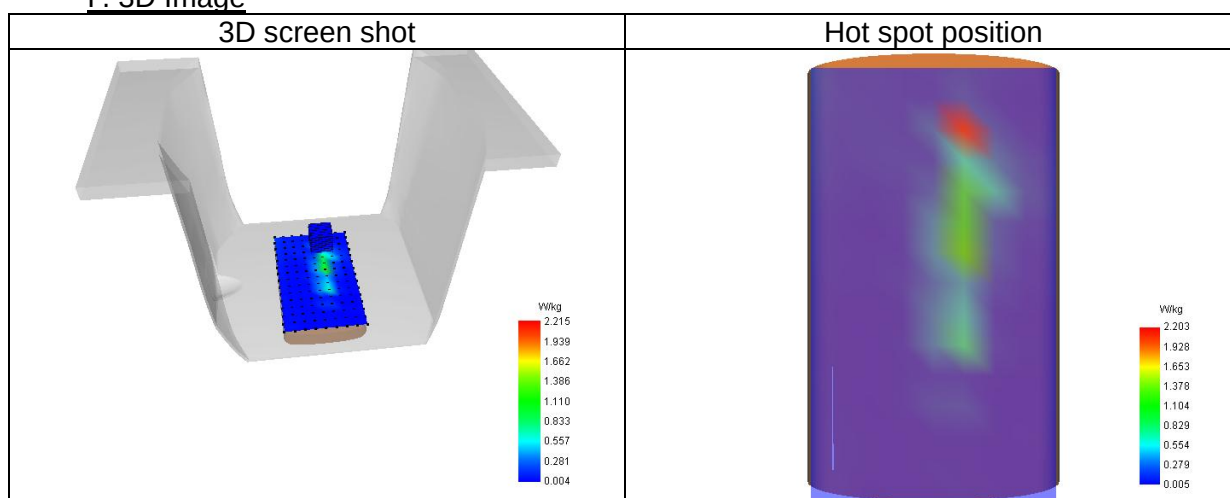
SAR 10g (W/Kg)	0.201
SAR 1g (W/Kg)	0.952
Variation (%)	-2.42
Horizontal validation criteria: minimum distance (mm)	4.00
Vertical validation criteria: SAR ratio M2/M1 (%)	46.11

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
						0	0	0	0	0	0	0
SAR (W/Kg)	3.88	2.21	1.02	0.47	0.22	0.10	0.05	0.03	0.01	0.01	0.01	0.00
	0	5	1	8	3	4	6	2	2	8	1	9



F. 3D Image



9# SAR Measurement at U-NII-2c (Body, Validation Plane)

Date of measurement: 23/3/2025

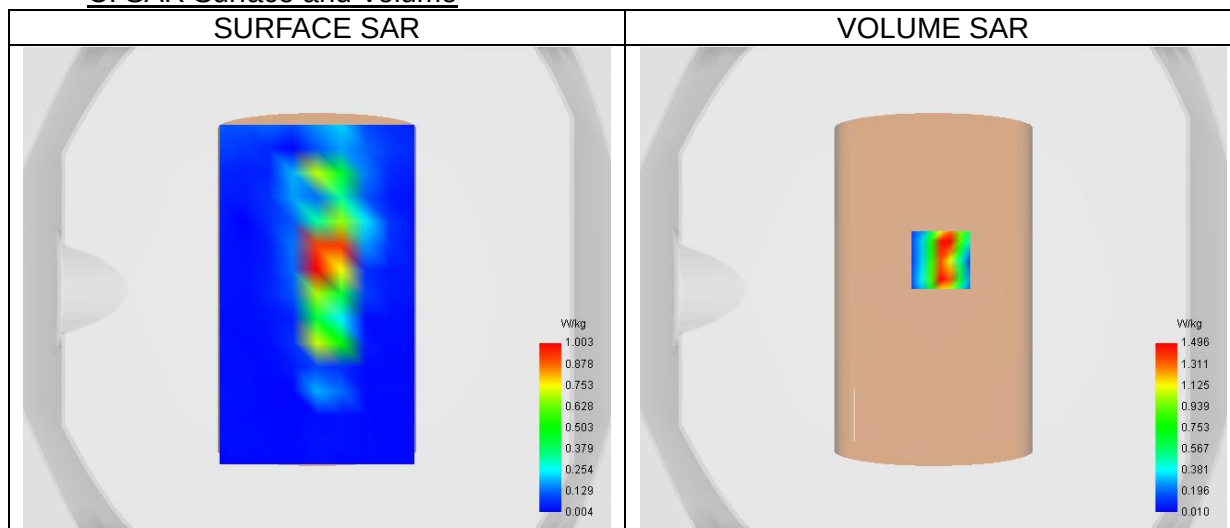
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.88
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-2c
Signal	IEEE 802.11 a
Channels/Frequency	Middle (120)/ frequency 5600.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5600.00
Relative permittivity (real part)	36.78
Relative permittivity (imaginary part)	16.16
Conductivity (S/m)	5.03

C. SAR Surface and Volume



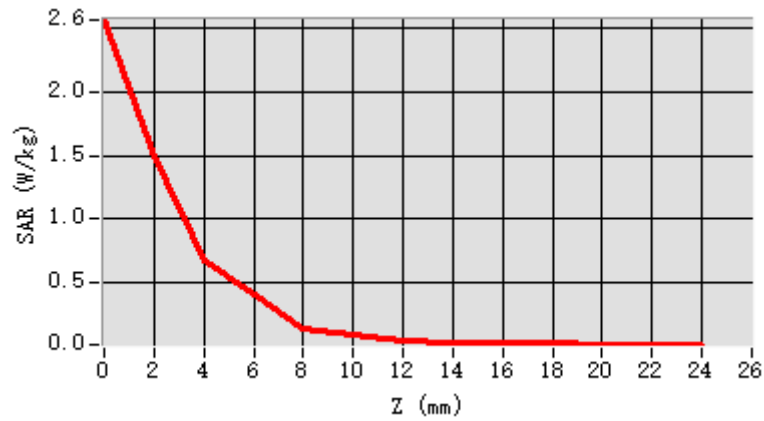
Maximum location: X=3.00, Y=12.00 ; SAR Peak: 2.94 W/kg

D. SAR 1g & 10g

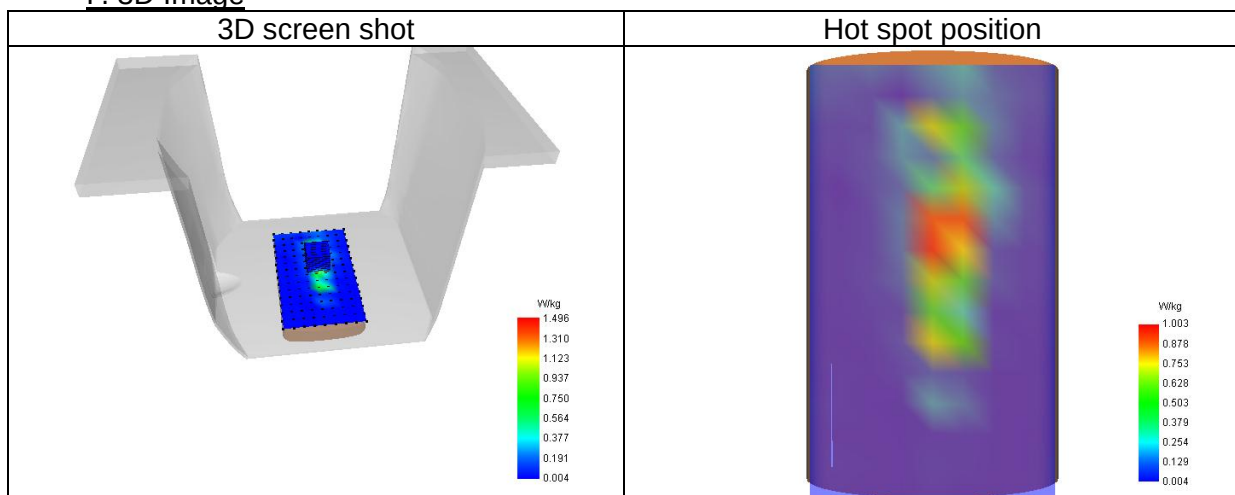
SAR 10g (W/Kg)	0.201
SAR 1g (W/Kg)	0.805
Variation (%)	-1.14
Horizontal validation criteria: minimum distance (mm)	5.66
Vertical validation criteria: SAR ratio M2/M1 (%)	48.32

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
						0	0	0	0	0	0	0
SAR (W/Kg)	2.56	1.49	0.67	0.39	0.14	0.09	0.04	0.03	0.02	0.02	0.01	0.01
	9	6	2	8	2	1	0	0	4	2	1	5



F. 3D Image



10# SAR Measurement at U-NII-2c (Body, Validation Plane)

Date of measurement: 23/3/2025

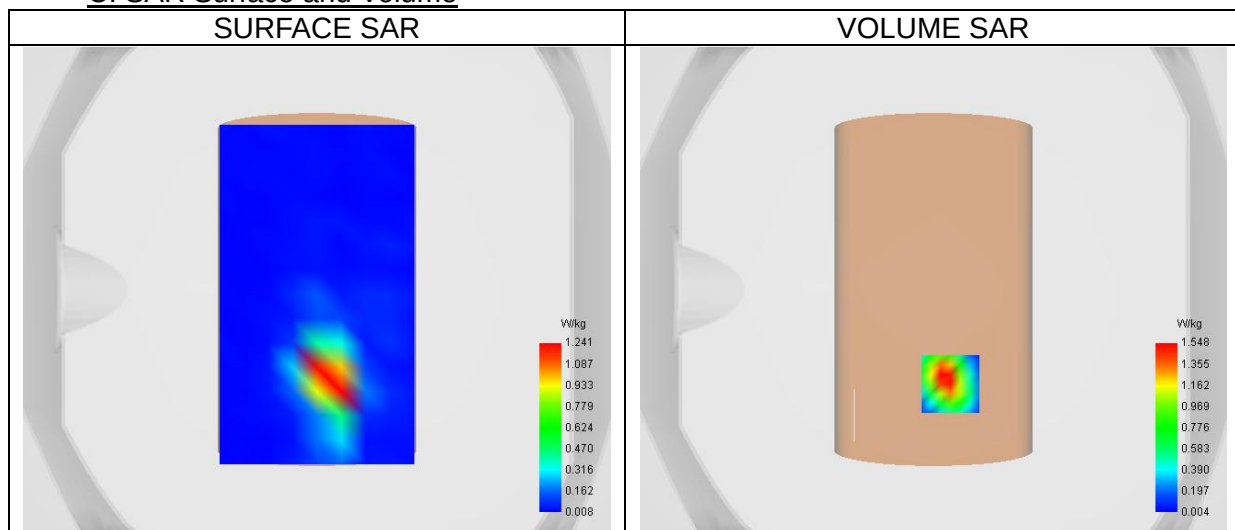
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.88
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-2c
Signal	IEEE 802.11 a
Channels/Frequency	Middle (120)/ frequency 5600.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5600.00
Relative permittivity (real part)	36.78
Relative permittivity (imaginary part)	16.16
Conductivity (S/m)	5.03

C. SAR Surface and Volume



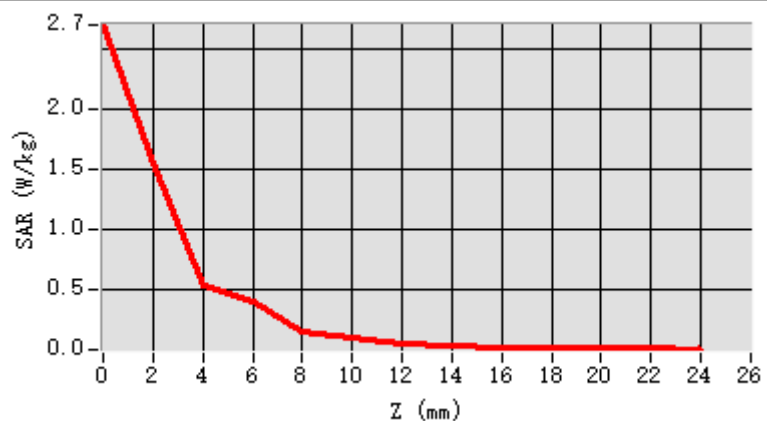
Maximum location: X=7.00, Y=-39.00 ; SAR Peak: 2.94 W/kg

D. SAR 1g & 10g

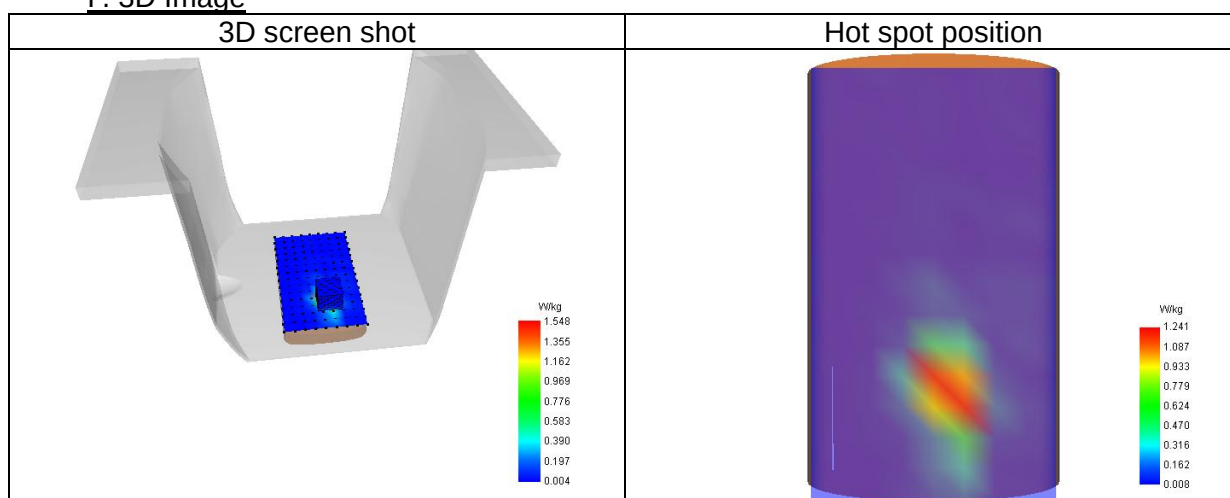
SAR 10g (W/Kg)	0.286
SAR 1g (W/Kg)	0.905
Variation (%)	-4.23
Horizontal validation criteria: minimum distance (mm)	8.00
Vertical validation criteria: SAR ratio M2/M1 (%)	49.22

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
						0	0	0	0	0	0	0
SAR (W/Kg)	2.69	1.54	0.53	0.39	0.15	0.11	0.05	0.04	0.02	0.02	0.02	0.01
	7	8	6	9	5	4	5	5	8	1	4	7



F. 3D Image



11# SAR Measurement at U-NII-2c (Body, Validation Plane)

Date of measurement: 23/3/2025

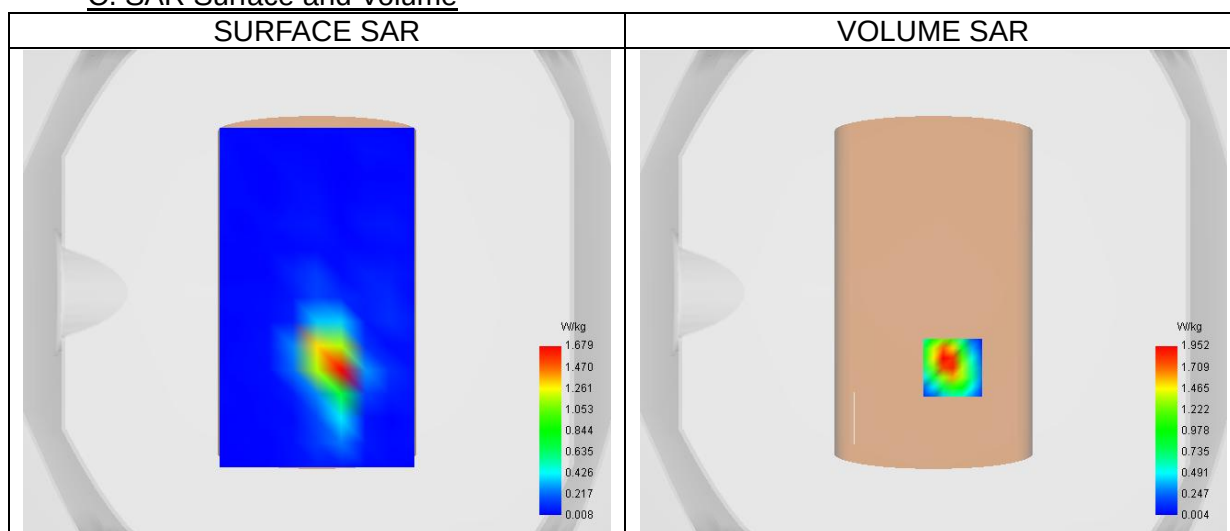
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.88
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-2c
Signal	IEEE 802.11 n
Channels/Frequency	Middle (100)/ frequency 5500.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5500.00
Relative permittivity (real part)	37.08
Relative permittivity (imaginary part)	16.08
Conductivity (S/m)	5.03

C. SAR Surface and Volume



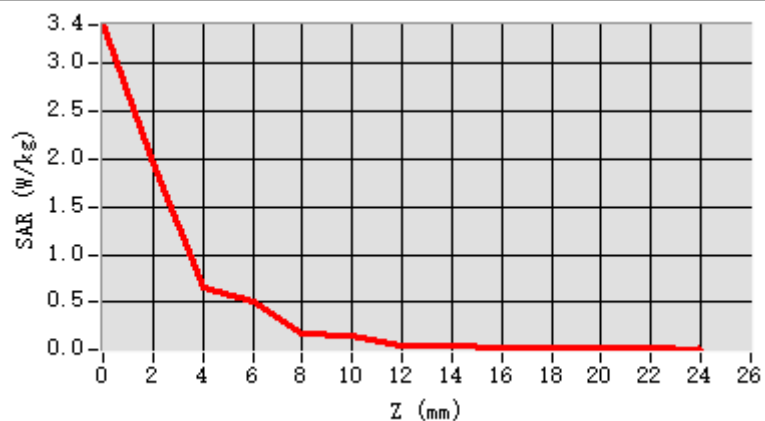
Maximum location: X=8.00, Y=-31.00 ; SAR Peak: 3.61 W/kg

D. SAR 1g & 10g

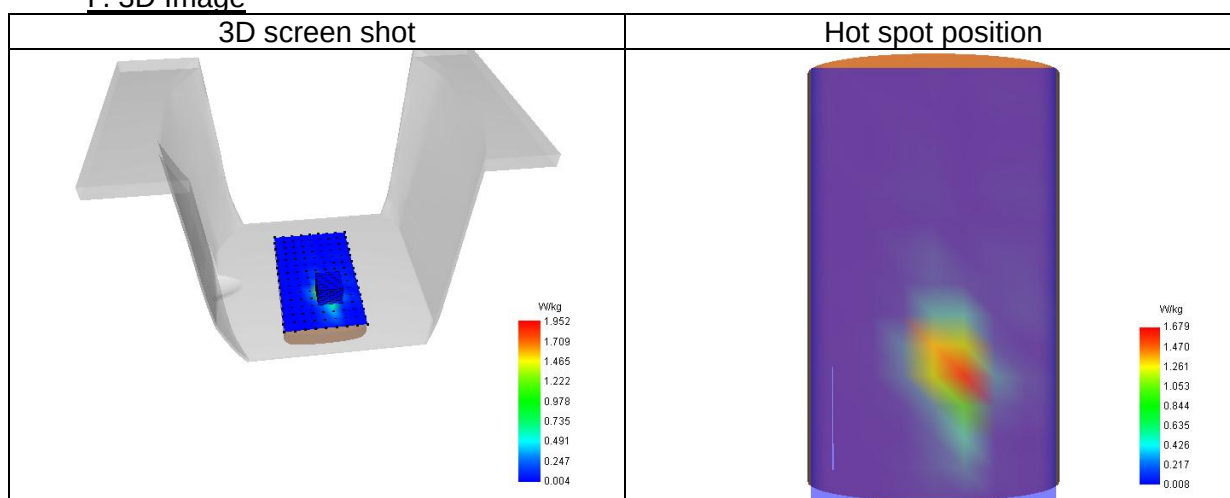
SAR 10g (W/Kg)	0.354
SAR 1g (W/Kg)	1.116
Variation (%)	-0.43
Horizontal validation criteria: minimum distance (mm)	8.00
Vertical validation criteria: SAR ratio M2/M1 (%)	49.97

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
						0	0	0	0	0	0	0
SAR (W/Kg)	3.40	1.95	0.65	0.50	0.17	0.14	0.05	0.05	0.02	0.02	0.02	0.02
	2	2	9	7	8	8	4	1	4	0	2	2



F. 3D Image



12# SAR Measurement at U-NII-3 (Body, Validation Plane)

Date of measurement: 17/3/2025

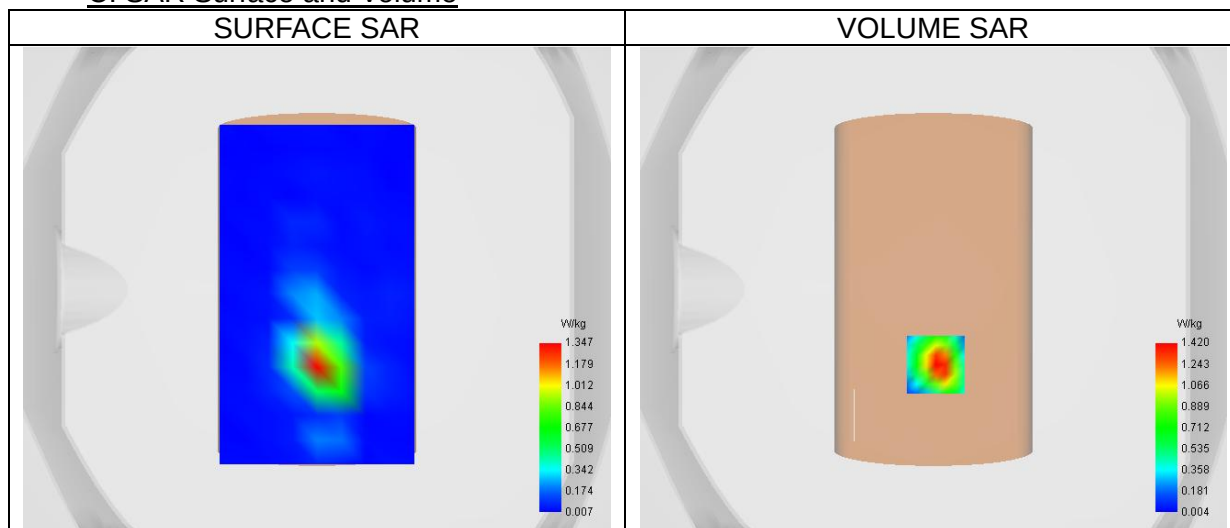
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.90
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-3
Signal	IEEE 802.11 a
Channels/Frequency	Middle (157)/ frequency 5785.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5785.00
Relative permittivity (real part)	35.62
Relative permittivity (imaginary part)	16.17
Conductivity (S/m)	5.20

C. SAR Surface and Volume



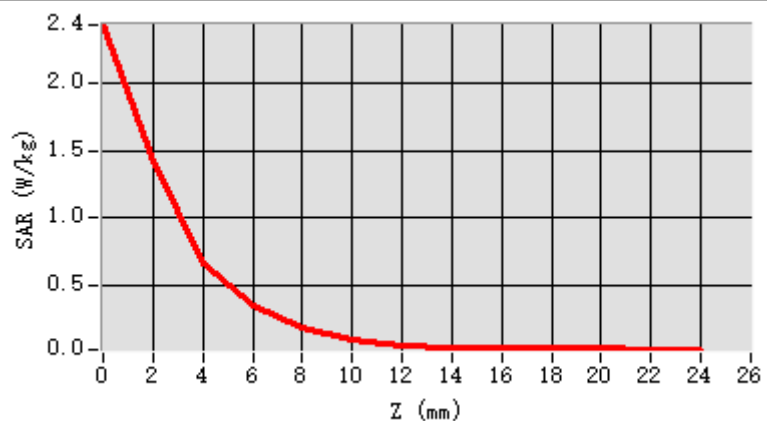
Maximum location: X=1.00, Y=-31.00 ; SAR Peak: 2.78 W/kg

D. SAR 1g & 10g

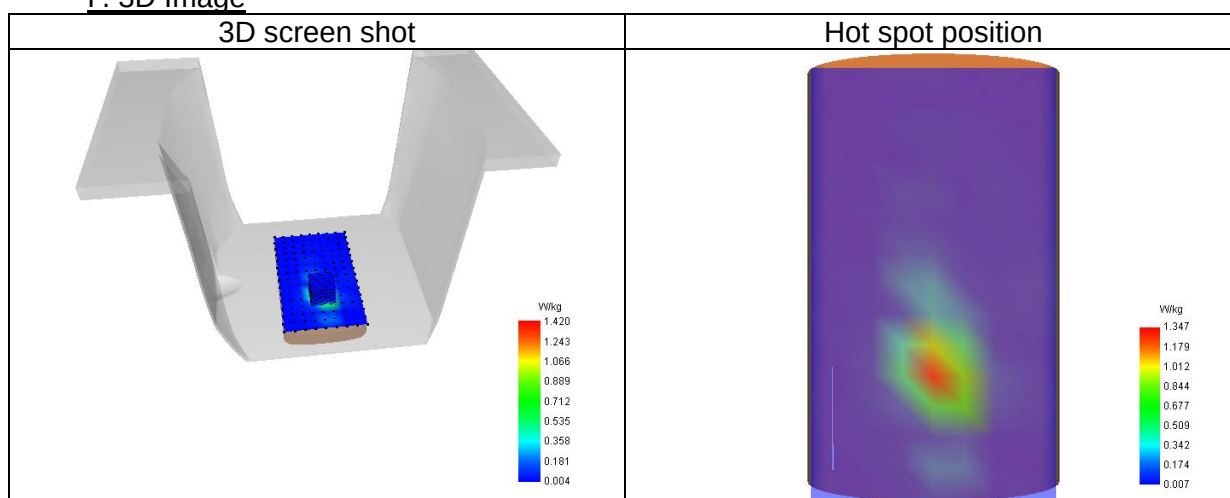
SAR 10g (W/Kg)	0.278
SAR 1g (W/Kg)	0.828
Variation (%)	-0.86
Horizontal validation criteria: minimum distance (mm)	8.00
Vertical validation criteria: SAR ratio M2/M1 (%)	46.69

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
						0	0	0	0	0	0	0
SAR (W/Kg)	2.43	1.42	0.66	0.34	0.17	0.09	0.05	0.03	0.02	0.03	0.03	0.01
	6	0	3	2	7	2	0	1	6	0	0	6



F. 3D Image



13# SAR Measurement at U-NII-3 (Body, Validation Plane)

Date of measurement: 17/3/2025

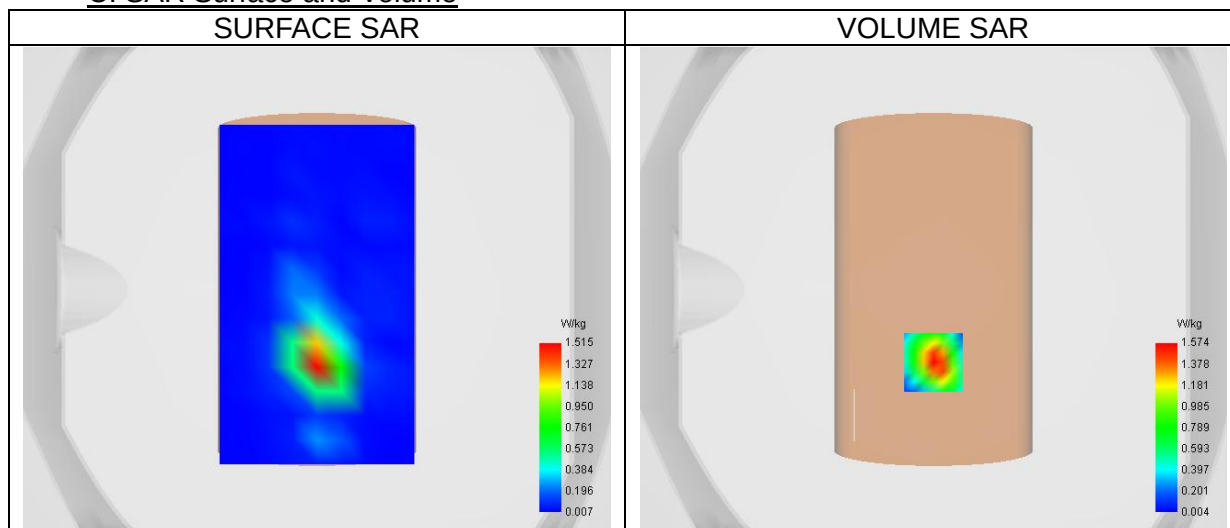
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.90
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-3
Signal	IEEE 802.11 n
Channels/Frequency	Middle (157)/ frequency 5785.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5785.00
Relative permittivity (real part)	35.62
Relative permittivity (imaginary part)	16.17
Conductivity (S/m)	5.20

C. SAR Surface and Volume



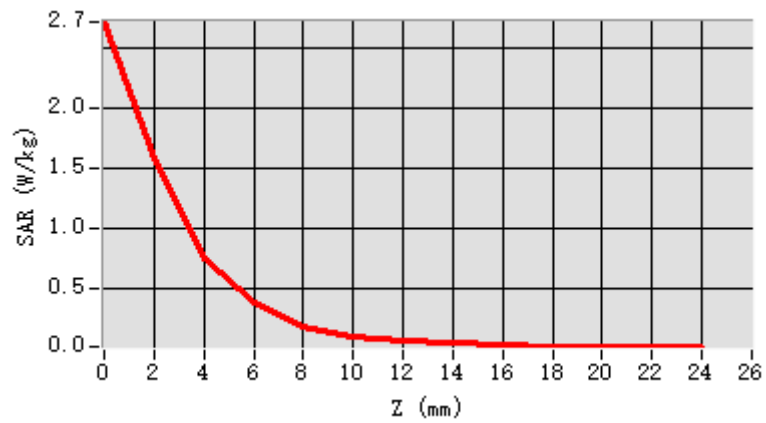
Maximum location: X=0.00, Y=-30.00 ; SAR Peak: 2.93 W/kg

D. SAR 1g & 10g

SAR 10g (W/Kg)	0.305
SAR 1g (W/Kg)	0.896
Variation (%)	4.77
Horizontal validation criteria: minimum distance (mm)	8.94
Vertical validation criteria: SAR ratio M2/M1 (%)	47.49

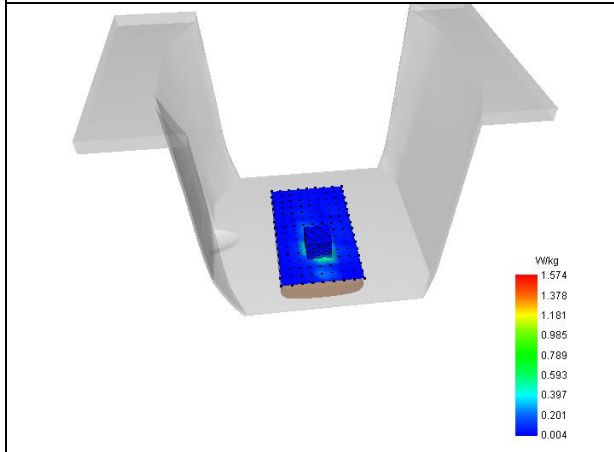
E. Z Axis Scan

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
						0	0	0	0	0	0	0
SAR (W/Kg)	2.71	1.57	0.74	0.37	0.18	0.10	0.05	0.04	0.02	0.01	0.01	0.01
	8	4	7	9	3	0	5	1	6	1	6	2

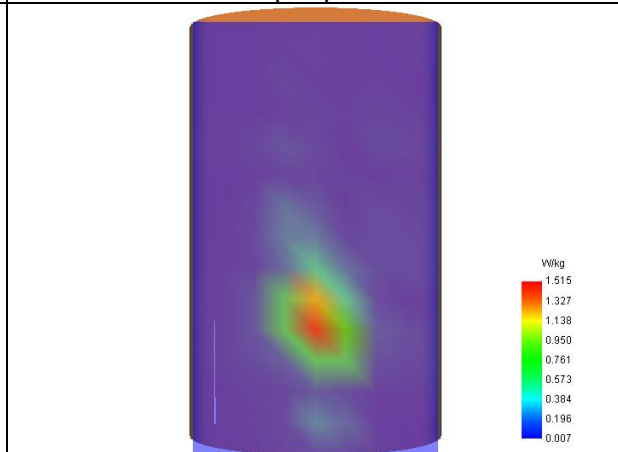


F. 3D Image

3D screen shot



Hot spot position



14# SAR Measurement at U-NII-3 (Body, Validation Plane)

Date of measurement: 17/3/2025

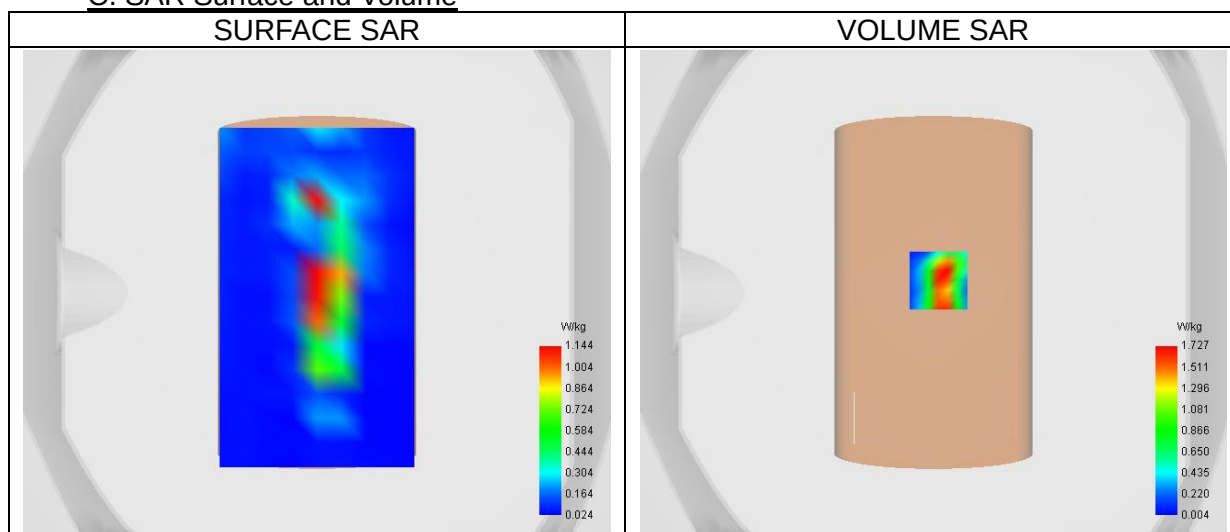
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	1.90
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-3
Signal	IEEE 802.11 a
Channels/Frequency	Middle (157)/ frequency 5785.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	5785.00
Relative permittivity (real part)	35.62
Relative permittivity (imaginary part)	16.17
Conductivity (S/m)	5.20

C. SAR Surface and Volume



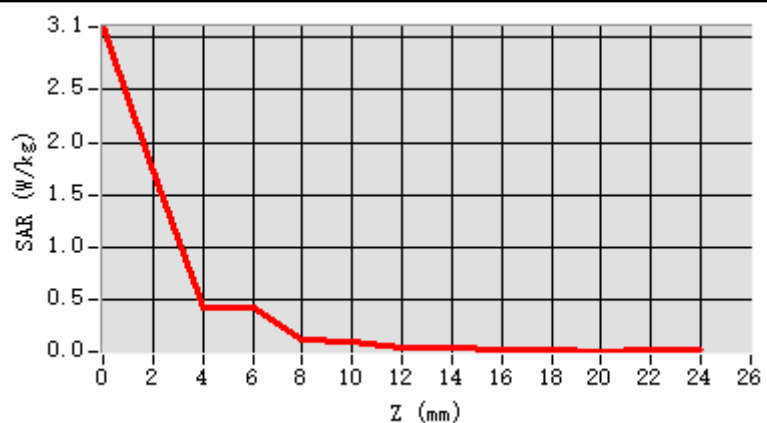
Maximum location: X=2.00, Y=5.00 ; SAR Peak: 3.38 W/kg

D. SAR 1g & 10g

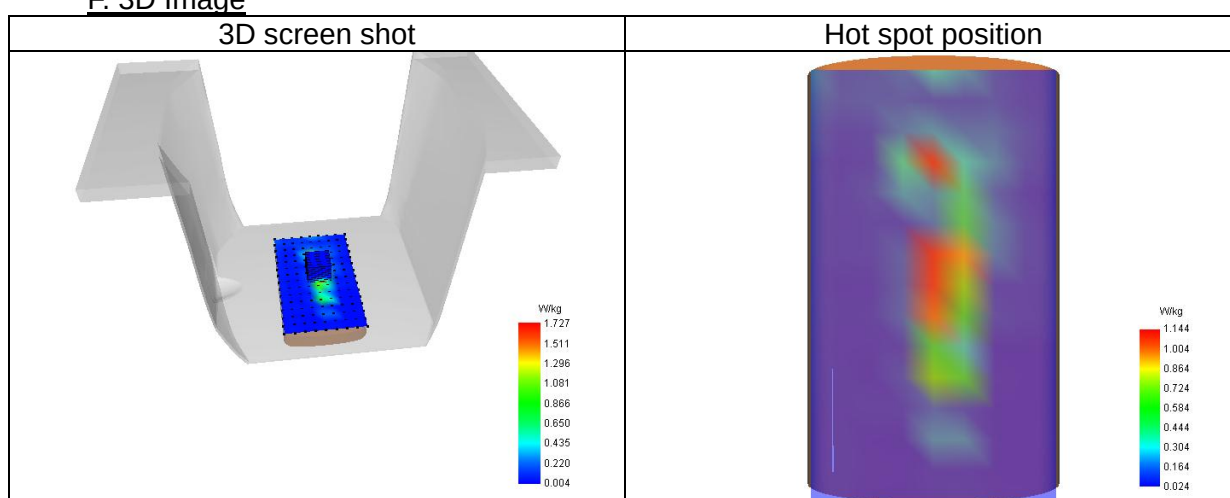
SAR 10g (W/Kg)	0.267
SAR 1g (W/Kg)	0.946
Variation (%)	3.45
Horizontal validation criteria: minimum distance (mm)	5.66
Vertical validation criteria: SAR ratio M2/M1 (%)	49.58

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)	3.10 0	1.72 7	0.42 8	0.42 2	0.11 9	0.09 7	0.04 3	0.04 0	0.03 0	0.02 7	0.00 9	0.02 4



F. 3D Image



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

Date of measurement: 21/3/2025

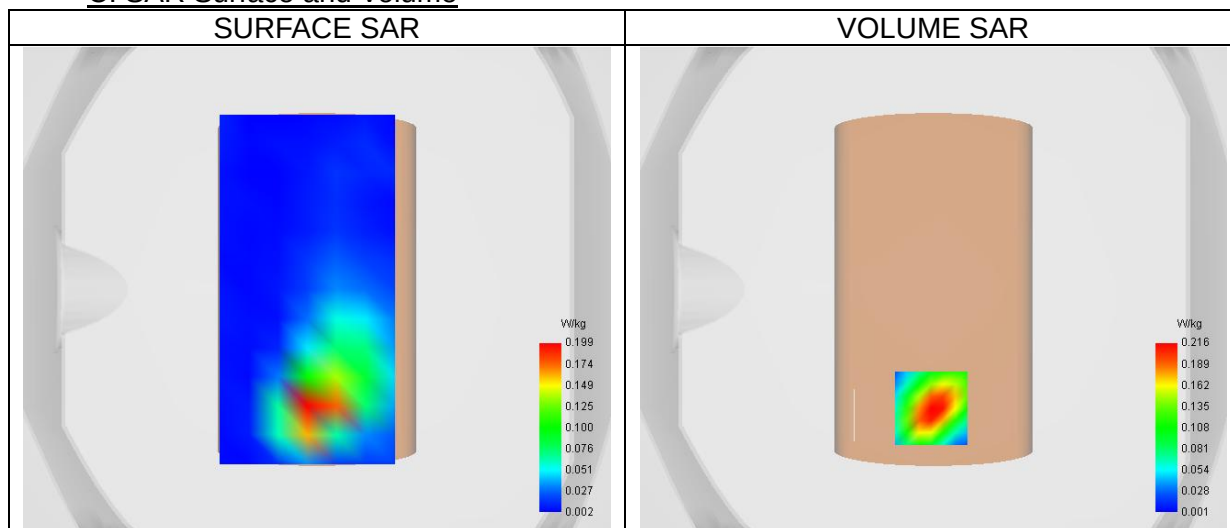
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.74
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)	38.20
Relative permittivity (imaginary part)	12.90
Conductivity (S/m)	1.75

C. SAR Surface and Volume



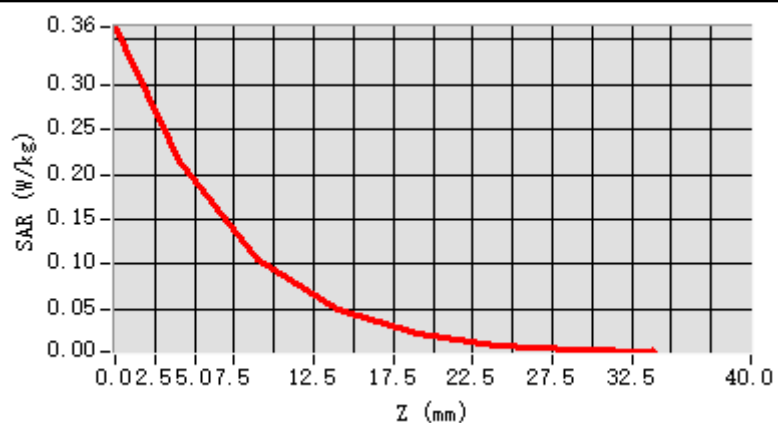
Maximum location: X=-1.00, Y=-49.00 ; SAR Peak: 0.37 W/kg

D. SAR 1g & 10g

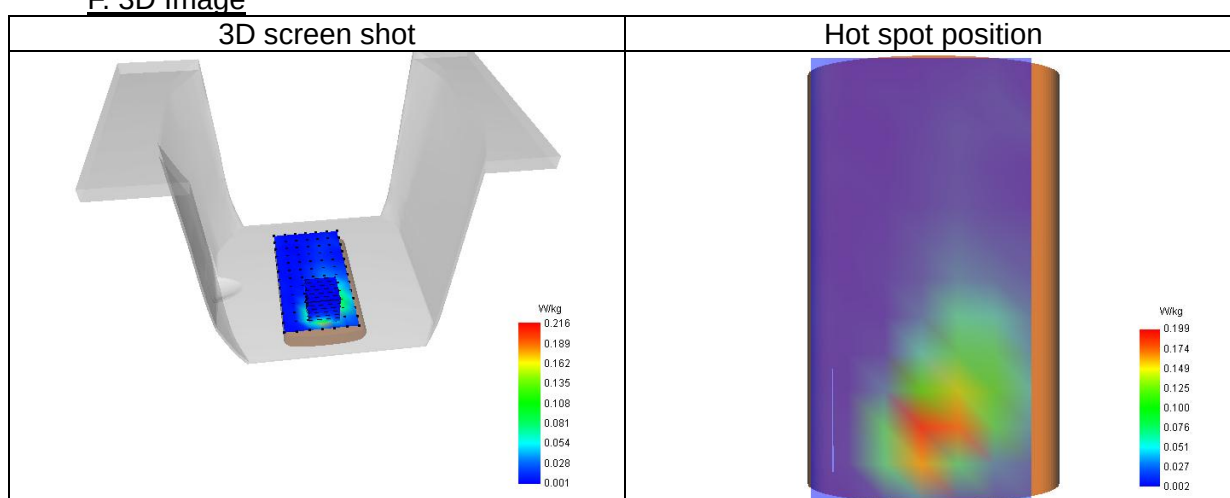
SAR 10g (W/Kg)	0.091
SAR 1g (W/Kg)	0.200
Variation (%)	-2.38
Horizontal validation criteria: minimum distance (mm)	11.18
Vertical validation criteria: SAR ratio M2/M1 (%)	48.44

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.364	0.216	0.104	0.050	0.023	0.010	0.005



F. 3D Image



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

Date of measurement: 21/3/2025

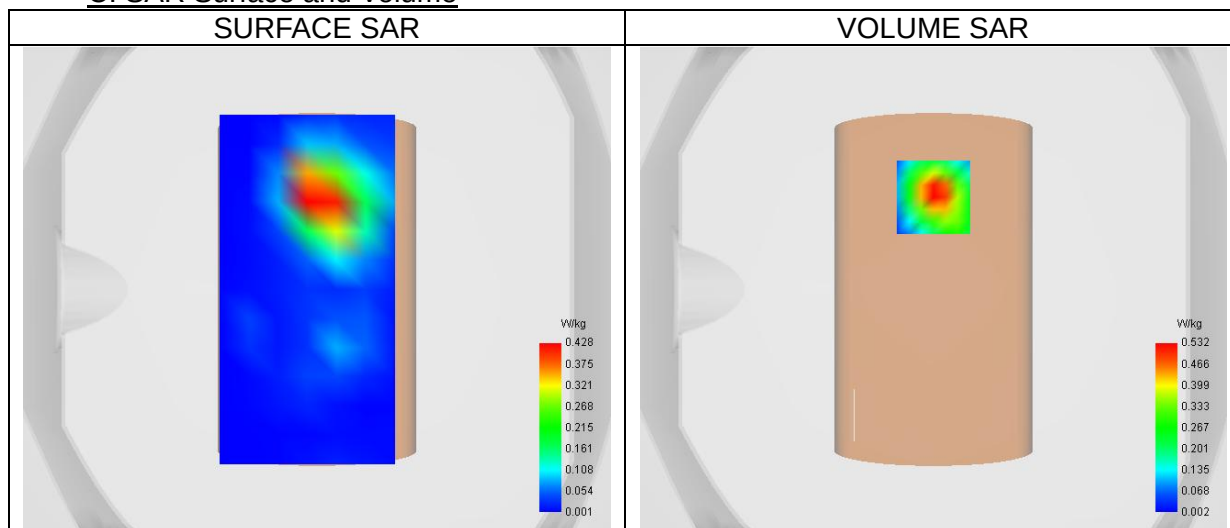
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.74
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)	38.20
Relative permittivity (imaginary part)	12.90
Conductivity (S/m)	1.75

C. SAR Surface and Volume



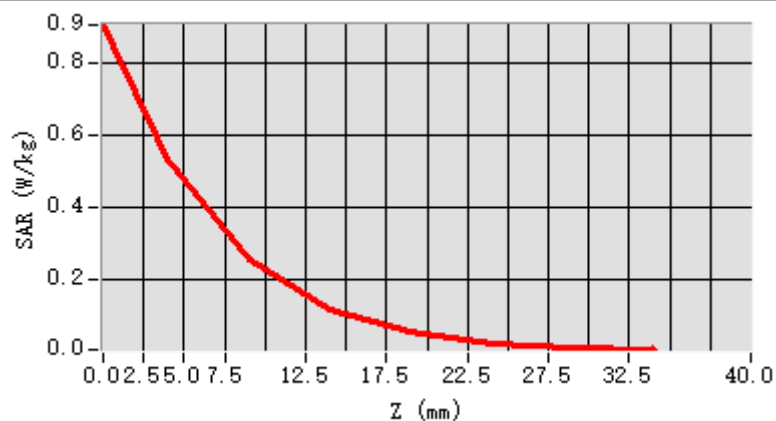
Maximum location: X=0.00, Y=38.00 ; SAR Peak: 0.92 W/kg

D. SAR 1g & 10g

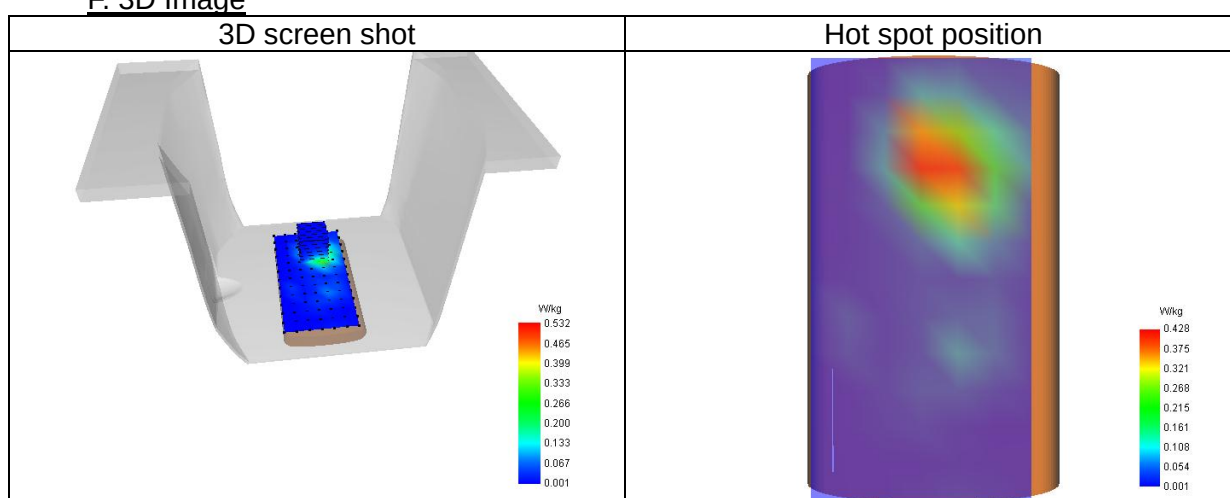
SAR 10g (W/Kg)	0.214
SAR 1g (W/Kg)	0.488
Variation (%)	0.11
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	48.10

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.905	0.532	0.256	0.119	0.058	0.024	0.014



F. 3D Image



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

Date of measurement: 21/3/2025

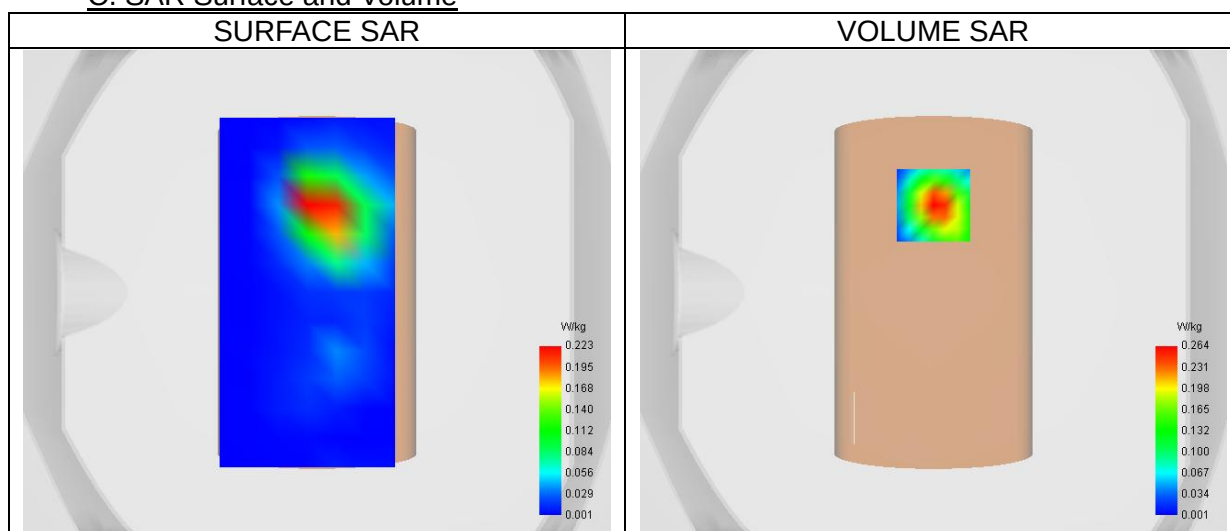
A. Experimental conditions.

Probe	4024-EPGO-442
ConvF	2.74
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 n
Channels/Frequency	Middle (6)/ frequency 2437.00 Mhz

B. Permittivity

Middle TX Frequency (MHz)	2437.00
Relative permittivity (real part)	38.20
Relative permittivity (imaginary part)	12.90
Conductivity (S/m)	1.75

C. SAR Surface and Volume



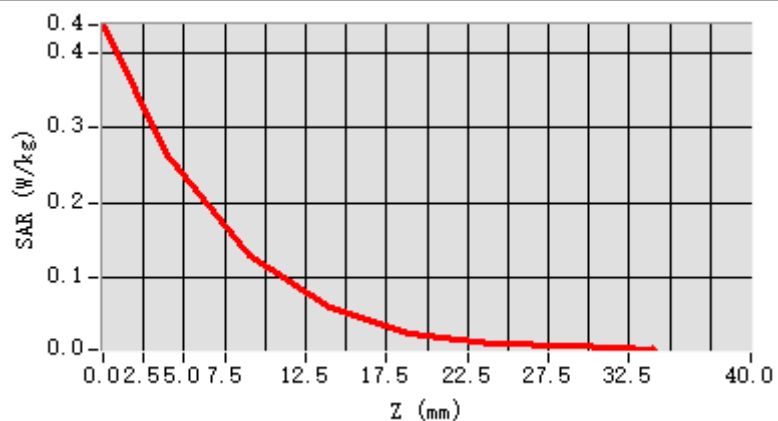
Maximum location: X=0.00, Y=36.00 ; SAR Peak: 0.44 W/kg

D. SAR 1g & 10g

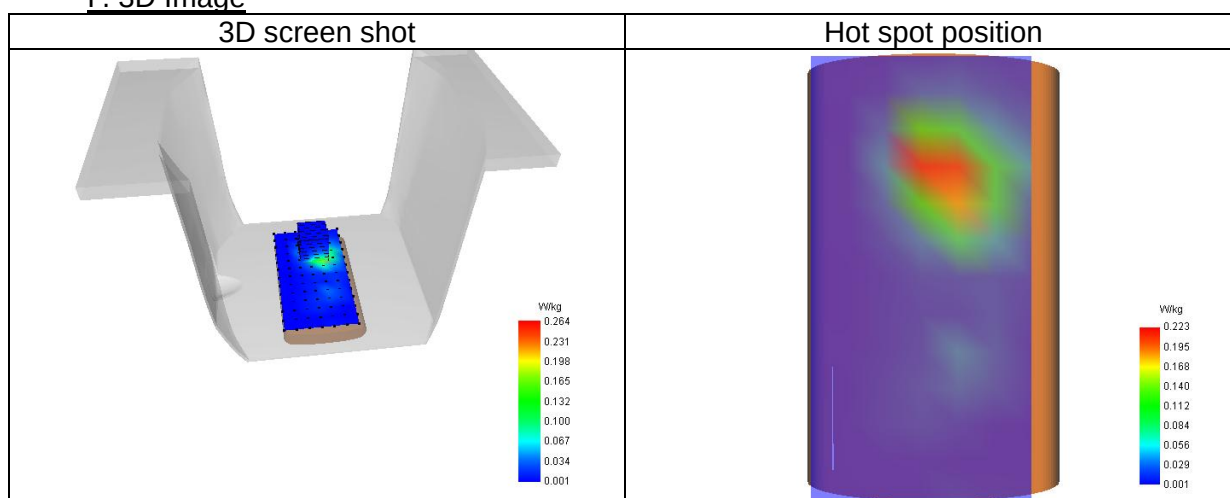
SAR 10g (W/Kg)	0.106
SAR 1g (W/Kg)	0.238
Variation (%)	0.16
Horizontal validation criteria: minimum distance (mm)	10.00
Vertical validation criteria: SAR ratio M2/M1 (%)	48.80

E. Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.438	0.264	0.129	0.060	0.026	0.012	0.008



F. 3D Image



13. Appendix D. Calibration Certificate

Table of contents
E Field Probe - 4024-EPGO-442
2450 MHz Dipole - SN 03/15 DIP 2G450-352
5000-6000 MHz Dipole - SN 13/14 WGA 33

Docusign Envelope ID: 223C1A7C-4751-4B95-8502-1618DC0951E3



COMOSAR E-Field Probe Calibration Report

Ref : ACR.278.12.24.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.: 4024-EPGO-442**

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon

29280 PLOUZANE - FRANCE

Calibration date: 10/04/2024



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).

Docusign Envelope ID: 223C1A7C-4751-4B95-8502-1618DC0951E3



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.278.12.24.BES.A

	<i>Name</i>	<i>Function</i>	<i>Date</i>	<i>Signature</i>
<i>Prepared by :</i>	Cyrille ONNEE	Measurement Responsible	10/4/2024	
<i>Checked & approved by:</i>	Pedro Ruiz	Technical Manager	10/4/2024	
<i>Authorized by:</i>	Pedro Ruiz	Laboratory Director	10/4/2024	

Assinado por:
Pedro RUIZ
29093B31C46F428...

	<i>Customer Name</i>
<i>Distribution :</i>	SHENZHEN NTEK TESTING TECHNOLOGY CO., LTD.

<i>Issue</i>	<i>Name</i>	<i>Date</i>	<i>Modifications</i>
A	Cyrille ONNEE	10/4/2024	Initial release

Docusign Envelope ID: 223C1A7C-4751-4B95-8502-1618DC0951E3



COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.278.12.24.BES.A

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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.278.12.24.BES.A

1 DEVICE UNDER TEST

Device Under Test	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	4024-EPGO-442
Product Condition (new / used)	New
Frequency Range of Probe	0.15 GHz-7.5GHz
Resistance of Three Dipoles at Connector	Dipole 1: $R1=0.206\text{ M}\Omega$ Dipole 2: $R2=0.223\text{ M}\Omega$ Dipole 3: $R3=0.235\text{ M}\Omega$

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 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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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.278.12.24.BES.A

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:

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

where

$SAR_{uncertainty}$ is the uncertainty in percent of the probe boundary effect

d_{be} is the distance between the surface and the closest *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., $\delta \approx 14 \text{ mm}$ 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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COMOSAR E-FIELD PROBE CALIBRATION REPORT

Ref: ACR.278.12.24.BES.A

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.

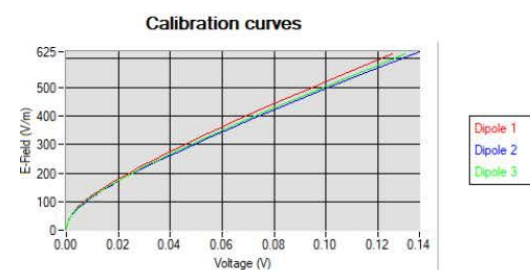
The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-14% for the frequency range 600-7500MHz.

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 ($\mu\text{V}/(\text{V}/\text{m})^2$)
0.73	0.79	0.78

DCP dipole 1 (mV)	DCP dipole 2 (mV)	DCP dipole 3 (mV)
105	109	103

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:

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

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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

P_w =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	2.42
HL850	835	2.34
HL900	900	2.24
HL1800	1800	2.51
HL1900	1900	2.57
HL2000	2000	2.64
HL2300	2300	2.73
HL2450	2450	2.74
HL2600	2600	2.51
HL3300	3300	2.11
HL3500	3500	2.15
HL3700	3700	2.08
HL3900	3900	2.27
HL4200	4200	2.39
HL4600	4600	2.30
HL4900	4900	2.13
HL5200	5200	1.89
HL5400	5400	1.97
HL5600	5600	1.88
HL5800	5800	1.90

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

