

TEST REPORT

Reference No..... : WTX24X10233249W
FCC ID : 2AEPIBLACKCPLUS
Applicant : COLOMBIANA DE COMERCIO S.A.
Address..... : Car. 43E No 8-71, Medellin, Colombia
Manufacturer : Sichuan Koobee Communication Equipment Co., Ltd.
Address..... : 3 Floor, Building 2, 69 Gangyuan Road West Section, Lingang
Development Zone, Yibin City, Sichuan Province, China
Product Name : Smart Phone
Model No..... : Black C Plus
FCC Part 2.1093
Standards : IEEE Std C95.1: 2019
IEEE Std C95.3: 2002 + Rev. 2008
IEC/IEEE 62209-1528 Ed. 1.0 (2020-10)
Date of Receipt sample : 2024-10-10
Date of Test..... : 2024-10-21 to 2024-10-31
Date of Issue : 2024-10-31
Test Report Form No. : WTX_IEEE_1528W
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road,
Block 70 Bao'an District, Shenzhen, Guangdong, China
Tel.: +86-755-33663308 Fax.: +86-755-33663309 Email: sem@waltek.com.cn

Tested by:

Jack Sun

Jack Sun

Approved by:

Jason Su

Jason Su

TABLE OF CONTENTS

1. General Information	4
1.1 Product Description for Equipment Under Test (EUT)	4
1.2 Test Standards	5
1.3 Test Methodology	5
1.4 Test Facility	5
2. Summary of Test Results	6
3. Specific Absorption Rate (SAR)	7
3.1 Introduction	7
3.2 SAR Definition	7
4. SAR Measurement System	8
4.1 The Measurement System	8
4.2 Probe	8
4.3 Probe Calibration Process	10
4.4 Phantom	11
4.5 Device Holder	11
4.6 Test Equipment List	12
5. Tissue Simulating Liquids	13
5.1 Composition of Tissue Simulating Liquid	13
5.2 Tissue Dielectric Parameters for Head and Body Phantoms	14
5.3 Tissue Calibration Result	15
6. SAR Measurement Evaluation	16
6.1 Purpose of System Performance Check	16
6.2 System Setup	16
6.3 Validation Results	17
7. EUT Testing Position	18
7.1 Define Two Imaginary Lines on The Handset	18
7.2 Cheek Position	19
7.3 Tilted Position	19
7.4 Body Position	20
7.5 EUT Antenna Position	20
7.6 EUT Testing Position	21
8. SAR Measurement Procedures	22
8.1 Measurement Procedures	22
8.2 Spatial Peak SAR Evaluation	22
8.3 Area & Zoom Scan Procedures	23
8.4 Volume Scan Procedures	23
8.5 SAR Averaged Methods	23
8.6 Power Drift Monitoring	23
9. SAR Test Result	24
9.1 Conducted RF Output Power	24
9.2 Test Results for Standalone SAR Test	27
10. Measurement Uncertainty	31
10.1 Uncertainty for SAR Test	31
Annex A. Plots of System Performance Check	33
Annex B. Plots of SAR Measurement	41
Annex C. EUT Photos	65
Annex D. Test Setup Photos	67
Annex E. Calibration Certificate	71

Report version

Version No.	Date of issue	Description
Rev.00	2024-10-31	Original
/	/	/

1. General Information

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT:	
Product Name:	Smart Phone
Brand Name:	Kalley
Model No.:	Black C Plus
Adding Model(s):	/
Rated Voltage:	DC 3.87V
Battery Capacity:	4900mAh
Power Adapter	Mode: UT-681A-5200MY Input: 100-240V-50/60Hz, 0.35A Output: 5.0V-2.0A, 10.0W
Software Version:	Kalley_BLACK_C_Plus_V03_20241014
Hardware Version:	KC58NS_01
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT:	
WIFI(5GHz)	
Support Standards:	802.11a, 802.11n-HT20/40, 802.11ac-VHT20/40/80
Frequency Range:	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz
RF Output Power:	16.86dBm (Conducted)
Type of Modulation:	BPSK, QPSK, 16QAM, 64QAM, 256QAM
Type of Antenna:	Integral Antenna
Antenna Gain:	-1.2dBi
Note: 1.The Antenna Gain is provided by the customer and can affect the validity of results. 2.This report only evaluates 5G WIFI SAR.	

1.2 Test Standards

The following report is accordance with IEEE Std C95.1: 2019, IEEE Std C95.3: 2002 + Rev. 2008, IEC/IEEE 62209-1528 Ed. 1.0 (2020-10), KDB 447498 D01 v06, KDB 648474 D04 v01r03, KDB 248227 D01 v02r02, KDB 941225 D01 v03r01, KDB 941225 D05 v02r05 , and KDB 865664 D01 v01r04 and KDB 865664 D02 v01r02.

The objective is to determine compliance with FCC Part 2.1093 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which is result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with KDB 865664 D01 v01r04 and KDB 865664 D02 v01r02. The public notice KDB 447498 D01 v06 for Mobile and Portable Devices RF Exposure Procedure also.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road,Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010. Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A and the CAB identifier is CN0057.

2. Summary of Test Results

The maximum results of Specific Absorption Rate (SAR) have found during testing are as follows:

Frequency Band	Head SAR	Body-worn (10mm Gap)	Hotspot (10mm Gap)	SAR _{1g} Limit (W/kg)
	Maximum SAR _{1g} (W/kg)	Maximum SAR _{1g} (W/kg)	Maximum SAR _{1g} (W/kg)	
WLAN 5GHz	0.598	0.273	0.309	1.6

Remark:

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR Part 2.1093 and IEEE Std C95.1: 2019, and had been tested in accordance with the measurement methods and procedure specified in IEC/IEEE 62209-1528 Ed. 1.0 (2020-10) and KDB 865664 D01 v01r04 and KDB 865664 D02 v01r02.

3. Specific Absorption Rate (SAR)

3.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

3.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$SAR = \frac{d}{dt} \left(\frac{dW}{dm} \right) = \frac{d}{dt} \left(\frac{dW}{\rho dv} \right)$$

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = C \left(\frac{\delta T}{\delta t} \right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

$$SAR = \frac{\sigma |E|^2}{\rho}$$

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

4. SAR Measurement System

4.1 The Measurement System

Comosar is a system that is able to determine the SAR distribution inside a phantom of human being according to different standards. The Comosar system consists of the following items:

- Main computer to control all the system
- 6 axis robot
- Data acquisition system
- Miniature E-field probe
- Phone holder
- Head simulating tissue

The following figure shows the system.

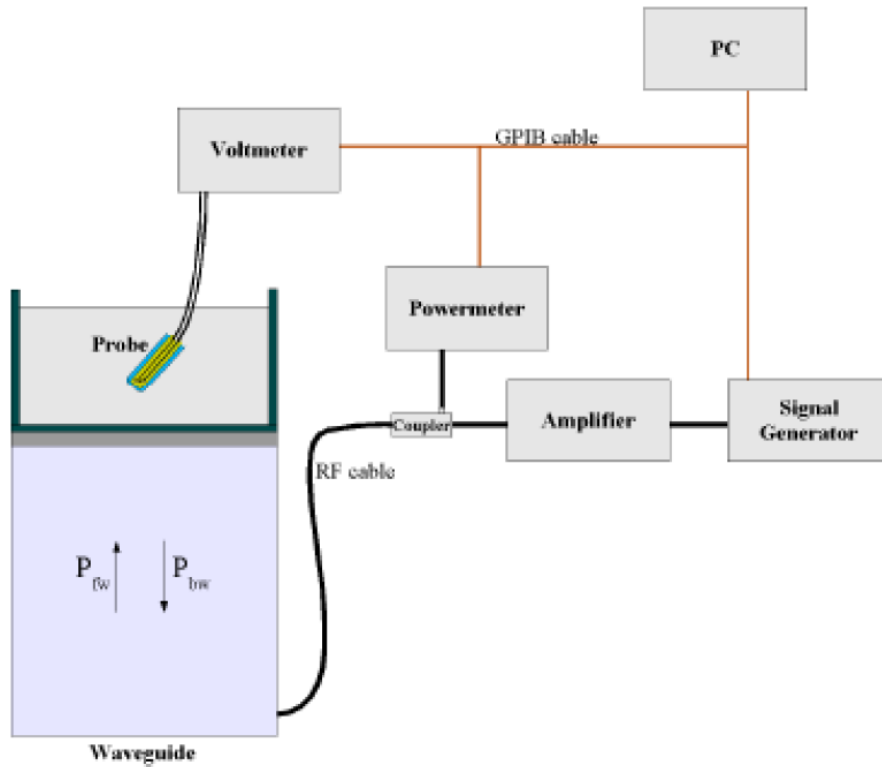


The EUT under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The OpenSAR software computes the results to give a SAR value in a 1g or 10g mass.

4.2 Probe

For the measurements the Specific Dosimetric E-Field Probe SSE2 3823-EPGO-435, and refer to the calibration report for probe parameters.

Probe calibration is realized, in compliance with EN 62209-1 and IEC/IEEE 62209-1528 Ed. 1.0 (2020-10) STD, with CALISAR, Antenna proprietary calibration system. The calibration is performed with the EN 62209-1 annexes technique using reference guide at the five frequencies.



$$SAR = \frac{4(P_{fw} - P_{bw})}{ab\delta} \cos^2\left(\pi \frac{y}{a}\right) e^{-(2z/\delta)}$$

Where :

P_{fw} = Forward Power

P_{bw} = Backward Power

a and b =Waveguide dimensions

δ = Skin depth

Keithley configuration:

Rate = Medium; Filter = ON; RDGS = 10; Filter type = Moving Average; Range auto after each calibration, a SAR measurement is performed on a validation dipole and compared with a NPL calibrated probe, to verify it. The calibration factors, CF(N), for the 3 sensors corresponding to dipole 1, dipole 2 and dipole 3 are:

$$CF(N) = SAR(N)/V_{lin}(N) \quad (N=1,2,3)$$

The linearised output voltage $V_{lin}(N)$ is obtained from the displayed output voltage $V(N)$ using

$$V_{lin}(N) = V(N) * (1 + V(N)/DCP(N)) \quad (N=1,2,3)$$

where DCP is the diode compression point in mV.

4.3 Probe Calibration Process

Dosimetric Assessment Procedure

Each E-Probe/Probe Amplifier combination has unique calibration parameters. SATIMO Probe calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm²) using an with CALISAR, Antenna proprietary calibration system.

Free Space Assessment Procedure

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1mW/cm².

Temperature Assessment Procedure

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated head tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C \frac{\Delta T}{\Delta t}$$

Where:

- Δt = exposure time (30 seconds),
- C = heat capacity of tissue (brain or muscle),
- ΔT = temperature increase due to RF exposure.

SAR is proportional to $\Delta T/\Delta t$, the initial rate of tissue heating, before thermal diffusion takes place. The electric field in the simulated tissue can be used to estimate SAR by equating the thermally derived SAR to that with the E- field component.

$$SAR = \frac{|E|^2 \cdot \sigma}{\rho}$$

Where:

σ = simulated tissue conductivity,

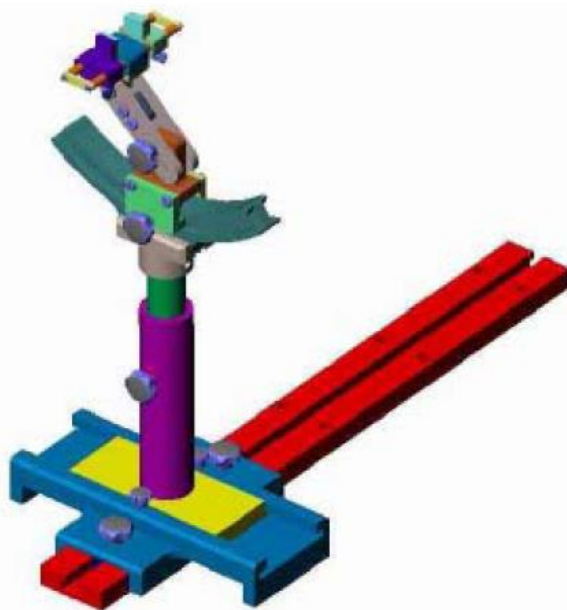
ρ = Tissue density (1.25 g/cm³ for brain tissue)

4.4 Phantom

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.

4.5 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°.



System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

4.6 Test Equipment List

Fixed asset Number	Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
WTXE1105A1002	E-Field Probe	MVG	SSE2	3823-EPGO-435	2024-07-11	2025-07-10
WTXE1035A1009	5 GHz Dipole	MVG	SID5000	SN 02/21 DIP 5G000-543	2024-07-11	2027-07-10
WTXE1053A1001-010	Dielectric Probe	SATIMO	SCLMP	SN 47/12 OCPG49	2024-02-24	2025-02-23
WTXE1075A1003	Power meter	Keithley	3500	1232959	2024-02-24	2025-02-23
WTXE1075A1002	Power meter	Keithley	3500	1162591	2024-02-24	2025-02-23
WTXE1104A1003	EXG Analog Signal Generator	KEYSIGHT	N5173B	MY61252892	2024-02-24	2025-02-23
WTXE1022A1002	GSM Tester	Rohde & Schwarz	CMU200	114403	2024-02-27	2025-02-26
WTXE1041A1002	Communications Tester	Rohde & Schwarz	CMW500	148650	2024-03-19	2025-03-18
WTXE1036A1001	Network Analyzer	Rohde & Schwarz	ZVB 8	101353	2023-10-17	2024-10-16

5. Tissue Simulating Liquids

5.1 Composition of Tissue Simulating Liquid

For the measurement of the field distribution inside the SAM phantom with SMTIMO, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. Please see the following photos for the liquid height.



Liquid Height for Body SAR

The Composition of Tissue Simulating Liquid

Frequency (MHz)	Water (%)	Hexyl Carbitol (%)	Triton X-100 (%)
Head			
5000-6000	65.52	17.24	17.24

5.2 Tissue Dielectric Parameters for Head and Body Phantoms

According to FCC KDBs, IEC/IEEE 62209-1528 Ed. 1.0 (2020-10) and CEI/IEC 62209 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

Target Frequency (MHz)	Head		Body	
	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity (σ)	Permittivity (ϵ_r)
150	0.76	52.3	0.80	61.9
300	0.87	45.3	0.92	58.2
450	0.87	43.5	0.94	56.7
750	0.89	41.9	0.96	55.5
835	0.90	41.5	0.97	55.2
900	0.97	41.5	1.05	55.0
915	0.98	41.5	1.06	55.0
1450	1.20	40.5	1.30	54.0
1610	1.29	40.3	1.40	53.8
1800-2000	1.40	40.0	1.52	53.3
2300	1.67	39.5	1.81	52.9
2450	1.80	39.2	1.95	52.7
2600	1.96	39.0	2.16	52.5
3000	2.40	38.5	2.73	52.0
5200	4.66	36.0	5.30	49.0
5400	4.86	35.8	5.53	48.7
5600	5.07	35.5	5.77	48.5
5800	5.27	35.3	6.00	48.2

5.3 Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using COMOSAR Dielectric Probe Kit and an Agilent Network Analyzer.

Calibration Result for Dielectric Parameters of Tissue Simulating Liquid

Head Tissue Simulating Liquid									
Freq. MHz	Temp. (℃)	Conductivity			Permittivity			Limit (%)	Date
		Reading (σ)	Target (σ)	Delta (%)	Reading (ε r)	Target (ε r)	Delta (%)		
5200	22.5	4.72	4.66	1.29	37.58	36.0	4.39	±5	2024-10-22
5400	22.5	4.95	4.86	1.85	36.69	35.8	2.49	±5	2024-10-22
5600	22.5	5.11	5.07	0.79	35.78	35.5	0.79	±5	2024-10-23
5800	22.5	5.32	5.27	0.95	34.82	35.3	-1.36	±5	2024-10-23

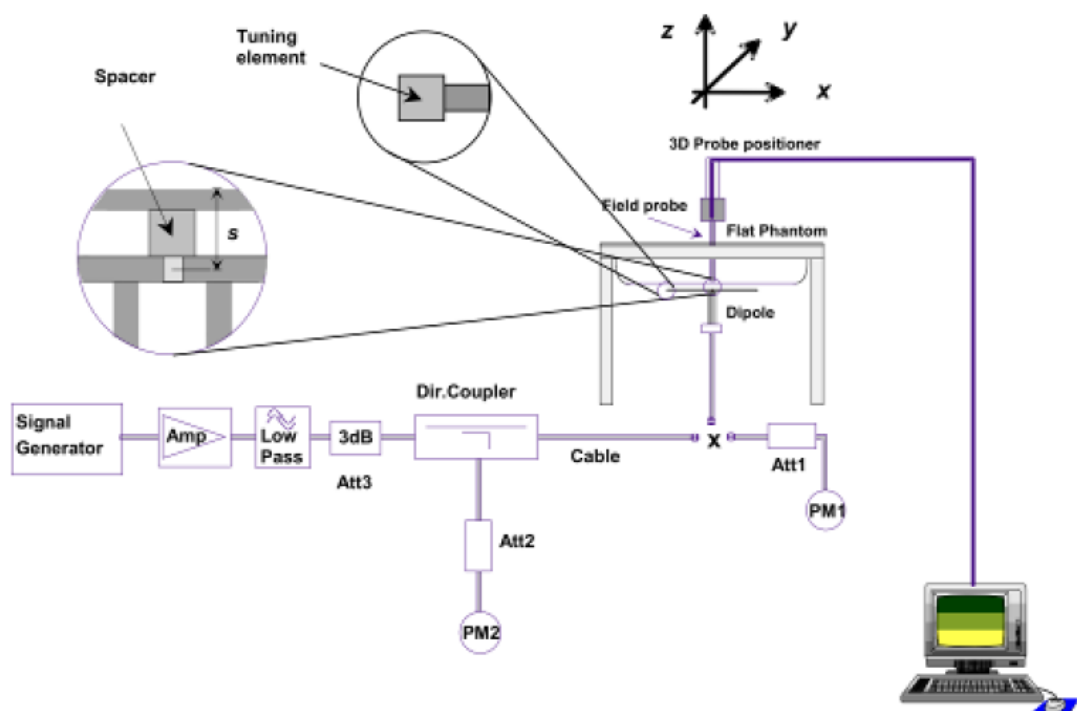
6. SAR Measurement Evaluation

6.1 Purpose of System Performance Check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

6.2 System Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator at frequency 5GHz. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom.



System Verification Setup Block Diagram



Setup Photo of Dipole Antenna

The output power on dipole port must be calibrated to 24 dBm(250 mW) before dipole is connected.

6.3 Validation Results

Comparing to the original SAR value provided by SATIMO, the validation data should be within its specification of 10 %. Table 6.1 shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion.

Frequency	Power	Targeted SAR _{1g}	Measured SAR _{1g}	Normalized SAR _{1g}	Tolerance	Date
MHz	(mw)	(W/kg)	(W/kg)	(W/kg)	(%)	
Head						
5200	250	75.31	18.567	74.268	-1.38	2024-10-22
5400	250	79.56	18.979	75.916	-4.58	2024-10-22
5600	250	78.31	19.008	76.032	-2.91	2024-10-23
5800	250	78.05	18.087	72.348	-7.31	2024-10-23

Remark: Referring to IEC/IEEE 62209-1528 Ed. 1.0 (2020-10), the system check shall be performed at a test frequency that is within ±10% or ±100 MHz of the compliance test mid-band frequency, so the 1750 MHz system verification is made of 1800MHz Dipole.

Targeted and Measurement SAR

Please refer to Annex A for the plots of system performance check.

7. EUT Testing Position

7.1 Define Two Imaginary Lines on The Handset

- (a) The vertical centerline passes through two points on the front side of the handset - the midpoint of the width w_t of the handset at the level of the acoustic output, and the midpoint of the width w_b of the bottom of the handset.
- (b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.
- (c) The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

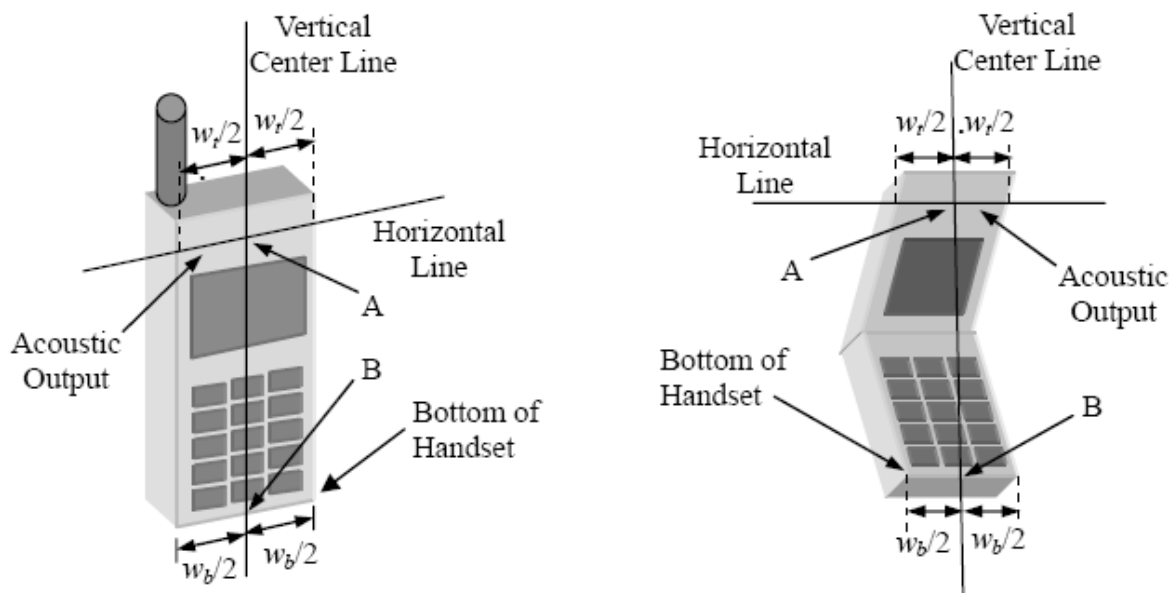


Illustration for Handset Vertical and Horizontal Reference Lines

7.2 Cheek Position

(a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

(b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see Fig. 7.2).

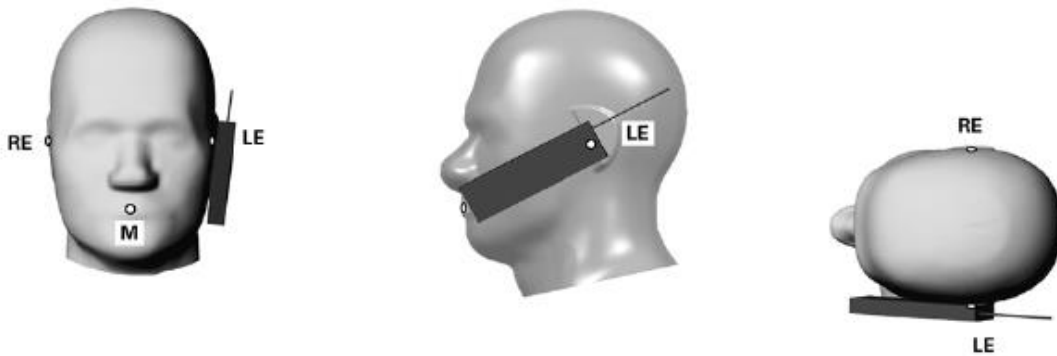


Illustration for Cheek Position

7.3 Tilted Position

(a) To position the device in the “cheek” position described above.

(b) While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see Fig. 7.3).

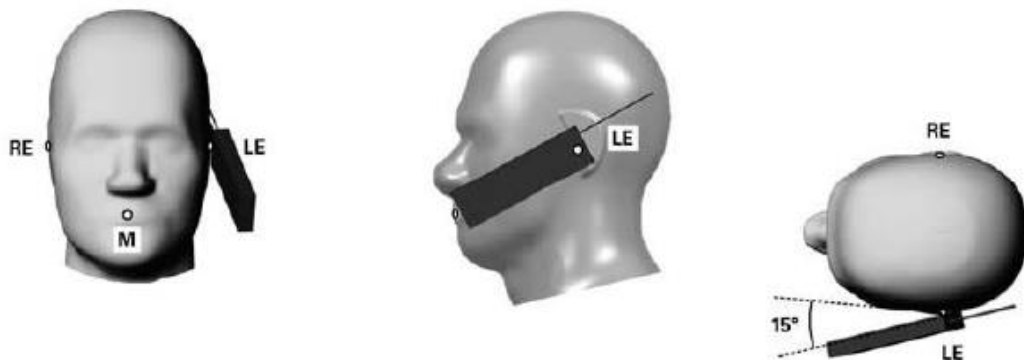


Illustration for Tilted Position

7.4 Body Position

- (a) To position the device parallel to the phantom surface with each side.
- (b) To adjust the device parallel to the flat phantom.
- (c) To adjust the distance between the device surface and the flat phantom to 10mm.

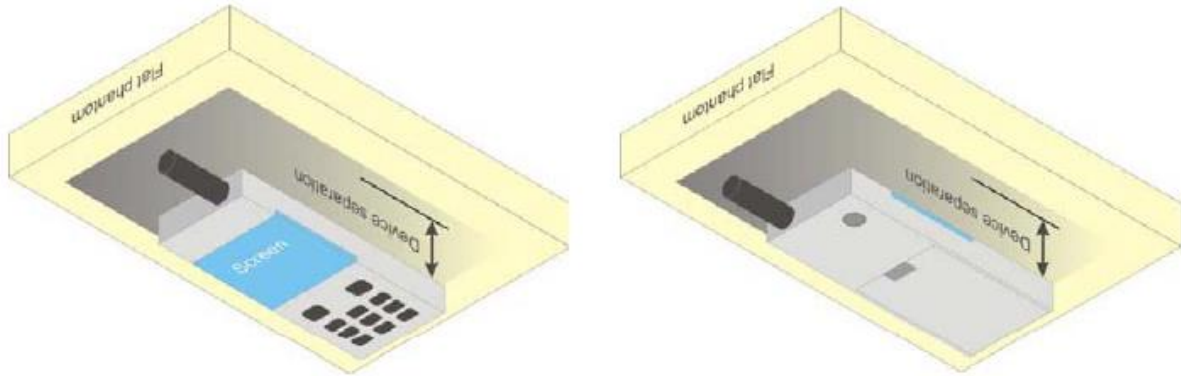
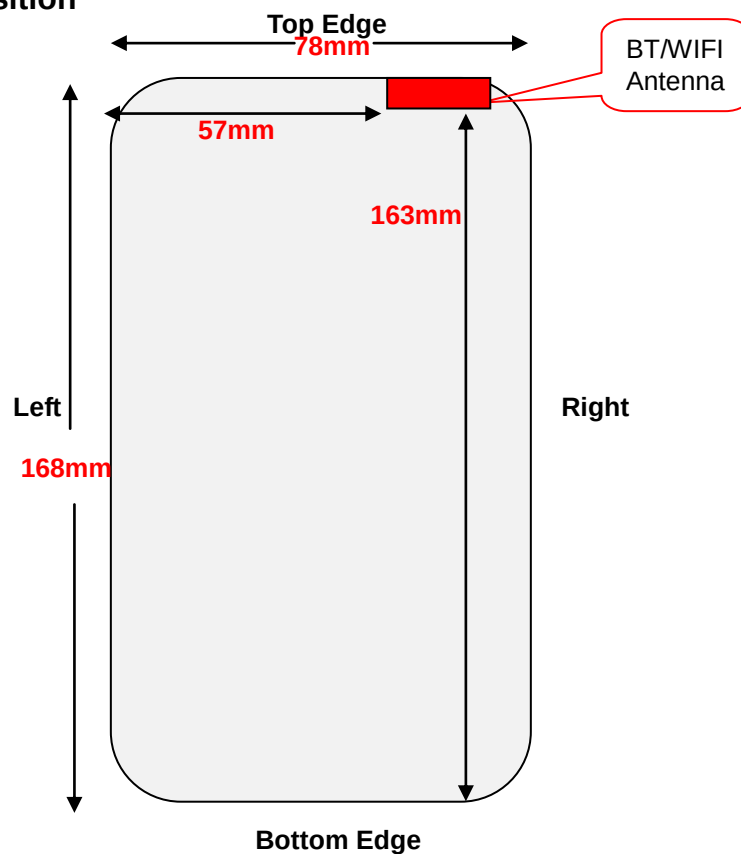


Illustration for Body Position

7.5 EUT Antenna Position



< EUT Front Side View >

Block Diagram for EUT Antenna Position

Distance of EUT antenna-to-edge/surface(mm),						
Antennas	Front	Back	Right Side	Left Side	Top Side	Bottom Side
WLAN	<25	<25	<25	57	<25	163

7.6 EUT Testing Position

Head/Body mode SAR assessments are required for this device. This EUT was tested in different positions for different SAR test modes, more information as below:

Head SAR tests				
Antennas	Right Cheek	Left Cheek	Right Tilted	Left Tilted
WLAN	Yes	Yes	Yes	Yes

Body-worn SAR tests, Test distance: 10mm		
Antennas	Front	Back
WLAN	Yes	Yes

Hotspot SAR tests, Test distance: 10mm						
Antennas	Front	Back	Right Side	Left Side	Top Side	Bottom Side
WLAN	Yes	Yes	Yes	No	Yes	No

Remark:

- Referring to KDB 941225 D06, when the overall device length and width are $\geq 9\text{cm} \times 5\text{cm}$, the test separation distances is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
- Referring to KDB 648474 D04 Handset SAR v01r03, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR $> 1.2 \text{ W/kg}$.

Please refer to Annex D for the EUT test setup photos.

8. SAR Measurement Procedures

8.1 Measurement Procedures

The measurement procedures are as follows:

- (a) Use base station simulator (if applicable) or engineering software to transmit RF power continuously (continuous Tx) in the highest power channel.
- (b) Keep EUT to radiate maximum output power or 100% factor (if applicable)
- (c) Measure output power through RF cable and power meter.
- (d) Place the EUT in the positions as Annex D demonstrates.
- (e) Set scan area, grid size and other setting on the SATIMO software.
- (f) Measure SAR results for the highest power channel on each testing position.
- (g) Find out the largest SAR result on these testing positions of each band
- (h) Measure SAR results for other channels in worst SAR testing position if the 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

8.2 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The SATIMO software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine. The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

8.3 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan measures 5x5x7 points with step size 8, 8 and 5 mm for 300 MHz to 3 GHz, and 8x8x8 points with step size 4, 4 and 2.5 mm for 3 GHz to 6 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

8.4 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing (step-size is 4, 4 and 2.5 mm). When all volume scan were completed, the software can combine and subsequently superpose these measurement data to calculating the multiband SAR.

8.5 SAR Averaged Methods

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 minimize 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 1mm 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 10g and 1 g requires a very fine resolution in the three dimensional scanned data array.

8.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In SATIMO 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 dB. If the power drift more than 5%, the SAR will be retested.

9. SAR Test Result

9.1 Conducted RF Output Power

WLAN(5.2GHz)				
Test Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Tune-up power (dBm)
802.11a	CH 36	5180	15.33	16.5
	CH 40	5200	15.16	16.5
	CH 48	5240	16.43	16.5
802.11n-HT20	CH 36	5180	15.31	16.5
	CH 40	5200	15.17	16.5
	CH 48	5240	15.10	16.5
802.11n-HT40	CH 38	5190	15.23	16.5
	CH 46	5230	15.08	16.5
802.11ac-VHT20	CH 36	5180	15.27	16.5
	CH 40	5200	15.15	16.5
	CH 48	5240	15.11	16.5
802.11ac-VHT40	CH 38	5190	15.35	16.5
	CH 46	5230	15.22	16.5
802.11ac-VHT80	CH 42	5210	15.43	16.5

WLAN(5.3GHz)				
Test Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Tune-up power (dBm)
802.11a	CH 52	5260	14.82	16.0
	CH 56	5280	14.77	16.0
	CH 64	5320	15.36	16.0
802.11n-HT20	CH 52	5260	15.02	16.0
	CH 56	5280	15.23	16.0
	CH 64	5320	15.67	16.0
802.11n-HT40	CH 54	5270	15.34	16.0
	CH 62	5310	15.57	16.0
802.11ac-VHT20	CH 52	5260	14.56	16.0
	CH 56	5280	14.77	16.0
	CH 64	5320	15.22	16.0
802.11ac-VHT40	CH 54	5270	15.36	16.0
	CH 62	5310	15.77	16.0
802.11ac-VHT80	CH 58	5290	15.64	16.0

WLAN(5.6GHz)				
Test Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Tune-up power (dBm)
802.11a	CH 100	5500	16.86	17.0
	CH 116	5580	16.28	17.0
	CH 140	5700	16.04	17.0
802.11n-HT20	CH 100	5500	16.68	17.0
	CH 116	5580	16.36	17.0
	CH 140	5700	16.05	17.0
802.11n-HT40	CH 102	5510	16.39	17.0
	CH 110	5550	16.52	17.0
	CH 134	5670	15.86	17.0
802.11ac-VHT20	CH 100	5500	16.55	17.0
	CH 116	5580	16.20	17.0
	CH 140	5700	15.83	17.0
802.11ac-VHT40	CH 102	5510	16.42	17.0
	CH 110	5550	16.32	17.0
	CH 134	5670	16.01	17.0
802.11ac-VHT80	CH 106	5530	16.62	17.0
	CH 122	5610	16.47	17.0

WLAN(5.8GHz)				
Test Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	Tune-up power (dBm)
802.11a	CH 149	5745	15.32	15.5
	CH 157	5785	14.97	15.5
	CH 165	5825	14.88	15.5
802.11n-HT20	CH 149	5745	15.27	15.5
	CH 157	5785	14.81	15.5
	CH 165	5825	15.11	15.5
802.11n-HT40	CH 151	5755	14.93	15.5
	CH 159	5795	14.33	15.5
802.11ac-VHT20	CH 149	5745	15.16	15.5
	CH 157	5785	14.88	15.5
	CH 165	5825	14.99	15.5
802.11ac-VHT40	CH 151	5755	15.18	15.5
	CH 159	5795	14.75	15.5
802.11ac-VHT80	CH 155	5775	15.03	15.5

Note:

The 5GHz WIFI Output power are provided by Waltek Testing Group Co., Ltd. Dongguan Branch.

Waltek Testing Group (Shenzhen) Co., Ltd.

[Http://www.waltek.com.cn](http://www.waltek.com.cn)

Remark:

1. Per KDB 248227 D01 v02r02, When multiple channel bandwidth configurations in a frequency band have the same specified maximum output power, the initial test configuration is determined by applying the following steps sequentially.

1) The largest channel bandwidth configuration is selected among the multiple configurations in a frequency band with the same specified maximum output power.

2) If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.

3) If multiple configurations have the same specified maximum output power, largest channel bandwidth and lowest order modulation, the lowest data rate configuration among these configurations is selected.

4) When multiple transmission modes (802.11a/g/n/ac) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n.

9.2 Test Results for Standalone SAR Test

Head SAR

WLAN 5.2GHz – Head SAR Test									
Plot No.	Mode	Test Position	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
	802.11a	Right Cheek	48	5240	16.43	16.5	1.016	0.251	0.255
	802.11a	Right Tilted	48	5240	16.43	16.5	1.016	0.224	0.228
1.	802.11a	Left Cheek	48	5240	16.43	16.5	1.016	0.562	0.571
	802.11a	Left Tilted	48	5240	16.43	16.5	1.016	0.530	0.539

WLAN 5.3GHz– Head SAR Test									
Plot No.	Mode	Test Position	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
	802.11ac-VHT40	Right Cheek	62	5310	15.77	16.0	1.054	0.263	0.277
	802.11ac-VHT40	Right Tilted	62	5310	15.77	16.0	1.054	0.241	0.254
2.	802.11ac-VHT40	Left Cheek	62	5310	15.77	16.0	1.054	0.553	0.583
	802.11ac-VHT40	Left Tilted	62	5310	15.77	16.0	1.054	0.525	0.554

WLAN 5.6GHz– Head SAR Test									
Plot No.	Mode	Test Position	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
	802.11a	Right Cheek	100	5500	16.86	17.0	1.033	0.333	0.344
	802.11a	Right Tilted	100	5500	16.86	17.0	1.033	0.312	0.322
3.	802.11a	Left Cheek	100	5500	16.86	17.0	1.033	0.579	0.598
	802.11a	Left Tilted	100	5500	16.86	17.0	1.033	0.547	0.565

WLAN 5.8GHz– Head SAR Test									
Plot No.	Mode	Test Position	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
	802.11a	Right Cheek	149	5745	15.32	15.5	1.042	0.308	0.321
	802.11a	Right Tilted	149	5745	15.32	15.5	1.042	0.289	0.301
4.	802.11a	Left Cheek	149	5745	15.32	15.5	1.042	0.527	0.549
	802.11a	Left Tilted	149	5745	15.32	15.5	1.042	0.501	0.522

Body-worn SAR

WLAN 5.2GHz –Body SAR Test(10mm)									
Plot No.	Mode	Test Position	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
5.	802.11a	Back Side	48	5240	16.43	16.5	1.016	0.234	0.238
	802.11a	Front Side	48	5240	16.43	16.5	1.016	0.205	0.208

WLAN 5.3GHz –Body SAR Test(10mm)									
Plot No.	Mode	Test Position	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
6.	802.11ac-V HT40	Back Side	62	5310	15.77	16.0	1.054	0.227	0.239
	802.11ac-V HT40	Front Side	62	5310	15.77	16.0	1.054	0.199	0.210

WLAN 5.6GHz –Body SAR Test(10mm)									
Plot No.	Mode	Test Position	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
7.	802.11a	Back Side	100	5500	16.86	17.0	1.033	0.264	0.273
	802.11a	Front Side	100	5500	16.86	17.0	1.033	0.229	0.237

WLAN 5.8GHz–Body SAR Test(10mm)									
Plot No.	Mode	Test Position	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
8.	802.11a	Back Side	149	5745	15.32	15.5	1.042	0.239	0.249
	802.11a	Front Side	149	5745	15.32	15.5	1.042	0.208	0.217

Hotspot SAR

WLAN 5.2GHz–Body SAR Test(10mm)									
Plot No.	Mode	Test Position	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
	802.11a	Back Side	48	5240	16.43	16.5	1.016	0.234	0.238
	802.11a	Front Side	48	5240	16.43	16.5	1.016	0.205	0.208
	802.11a	Right side	48	5240	16.43	16.5	1.016	0.151	0.153
9.	802.11a	Top Side	48	5240	16.43	16.5	1.016	0.304	0.309

WLAN 5.3GHz –Body SAR Test(10mm)									
Plot No.	Mode	Test Position	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
	802.11ac-V HT40	Back Side	62	5310	15.77	16.0	1.054	0.227	0.239
	802.11ac-V HT40	Front Side	62	5310	15.77	16.0	1.054	0.199	0.210
	802.11ac-V HT40	Right side	62	5310	15.77	16.0	1.054	0.167	0.176
10.	802.11ac-V HT40	Top Side	62	5310	15.77	16.0	1.054	0.271	0.286

WLAN 5.6GHz–Body SAR Test(10mm)									
Plot No.	Mode	Test Position	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
	802.11a	Back Side	100	5500	16.86	17.0	1.033	0.264	0.273
	802.11a	Front Side	100	5500	16.86	17.0	1.033	0.229	0.237
	802.11a	Right side	100	5500	16.86	17.0	1.033	0.135	0.139
11	802.11a	Top Side	100	5500	16.86	17.0	1.033	0.298	0.308

WLAN 5.8GHz–Body SAR Test(10mm)									
Plot No.	Mode	Test Position	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
	802.11a	Back Side	149	5745	15.32	15.5	1.042	0.239	0.249
	802.11a	Front Side	149	5745	15.32	15.5	1.042	0.208	0.217
	802.11a	Right side	149	5745	15.32	15.5	1.042	0.123	0.128
12	802.11a	Top Side	149	5745	15.32	15.5	1.042	0.241	0.251

Reference No.: WTD23X03064340W

Remark: Per KDB 447498 D01 v06, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

10. Measurement Uncertainty

10.1 Uncertainty for SAR Test

Input quantity X_i (source of uncertainty)	Ref.	Prob. Dist PDF_i	Unc. $a(x_i)$	Div. q_i	$u(x_i) =$ $a(x_i)/q_i$	c_i (1 g; 10 g)	$u(y) = c_i \cdot u(x_i)$	v_i or v_{eff}
Measurement System errors								
Probe calibration	8.4.1.1	N	7.00	2	3.5	1	3.5	∞
Probe calibration drift	8.4.1.2	R	0	$\sqrt{3}$	0	1	0	∞
Probe linearity and detection limit	8.4.1.3	R	5.00	$\sqrt{3}$	2.89	1	2.89	∞
Broadband signal	8.4.1.4	R	0	$\sqrt{3}$	0	1	0	∞
Probe isotropy	8.4.1.5	R	2.50	$\sqrt{3}$	1.44	1	1.44	∞
Other probe and data acquisition errors	8.4.1.6	N	0.02	1	0.02	1	0.02	∞
RF ambient and noise	8.4.1.7	N	0	1	0	1	0	∞
Probe positioning errors	8.4.1.8	N	1.40	1	1.40	$2/TM$	0.70	
Data processing errors	8.4.1.9	N	0.05	1	0.05	1	0.05	∞
Phantom and device (DUT or validation antenna) errors								
Measurement of phantom conductivity(σ)	8.4.2.1	N	4.00	1	4.00	c_{σ}, c_{σ}	4.00	∞
Temperature effects (medium)	8.4.2.2	R	2.50	$\sqrt{3}$	1.44	c_{σ}, c_{σ}	1.44	∞
Shell permittivity	8.4.2.3	R	5.00	$\sqrt{3}$	2.88	See 8.4.2.3	2.88	∞
Distance between the radiating element of the DUT and the phantom medium	8.4.2.4	N	0.03	1	0.03	2	0.02	∞
Repeatability of positioning the DUT or source against the phantom	8.4.2.5	N	0.05	1	0.05	1	0.05	5
Device holder effects	8.4.2.6	N	5.00	1	5.00	1	5.00	
Effect of operating mode on probe sensitivity	8.4.2.7	R	0	$\sqrt{3}$	0	1	0	∞
Time-average SAR	8.4.2.8	R	0	$\sqrt{3}$	0	1	0	∞
Variation in SAR due to drift in output of DUT	8.4.2.9	N	5.00	1	5.00	1	5.00	
Validation antenna uncertainty (validation measurement only)	8.4.2.10	N	0	1	0	1	0	

Uncertainty in accepted power (validation measurement only)	8.4.2.11	N	0	1	0	1	0	
Corrections to the SAR result								
Phantom deviation from target (ϵ', σ)	8.4.3.1	N	0.05	1	0.05	1	0.05	
SAR scaling	8.4.3.2	R	2.00	$\sqrt{3}$	1.15	1	1.15	
Combined Standard Uncertainty		RSS			10.11		10.11	$\nu_{\text{eff}} =$
Expanded uncertainty, U		K=2			20.23		20.23	

Annex A. Plots of System Performance Check

MEASUREMENT 1

Type: Validation measurement (Fast, 75.00 %)
Date of measurement: 2024-10-22
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 1.05; Calibrated: 2024-07-11

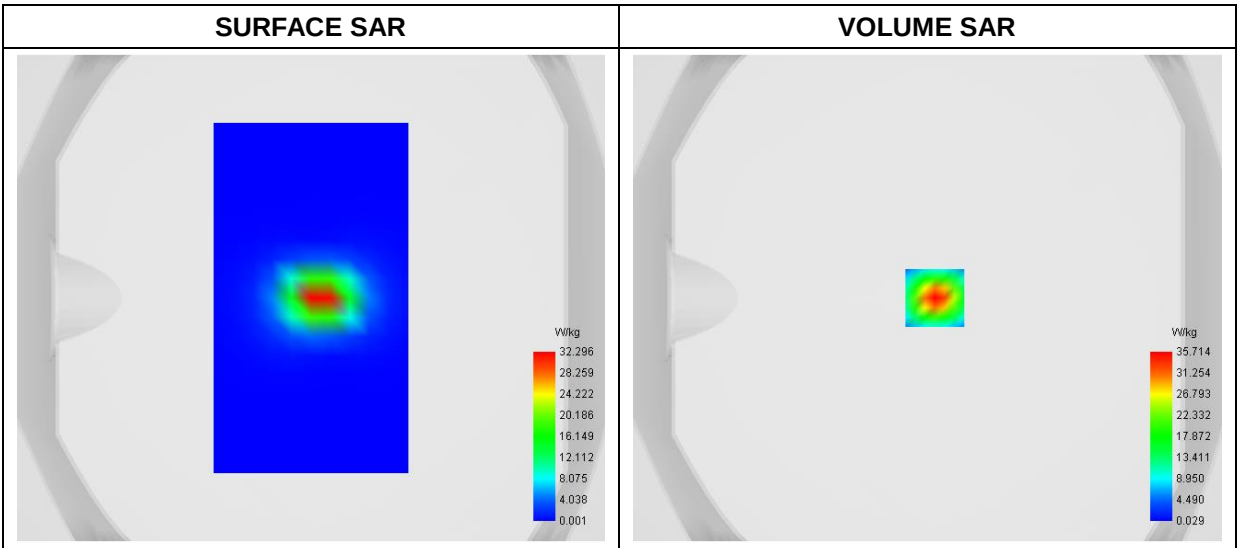
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5200
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	5200.000000
Relative Permittivity (real part)	37.581835
Conductivity (S/m)	4.724561
Power Variation (%)	2.345100
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

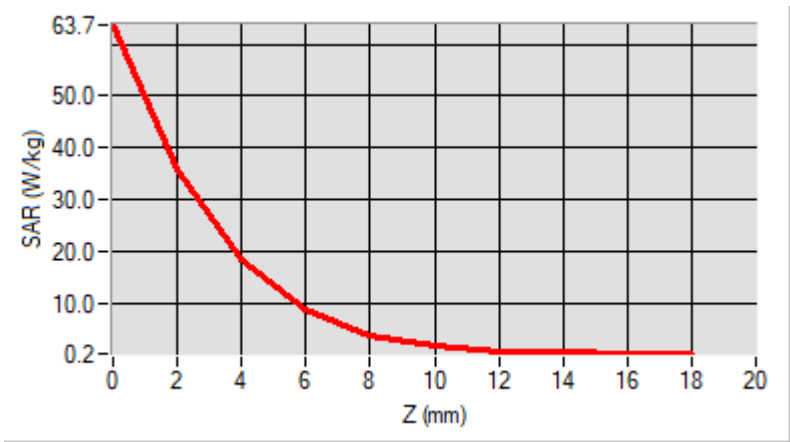


Maximum location: X=3.00, Y=0.00
D. SAR 1g & 10g

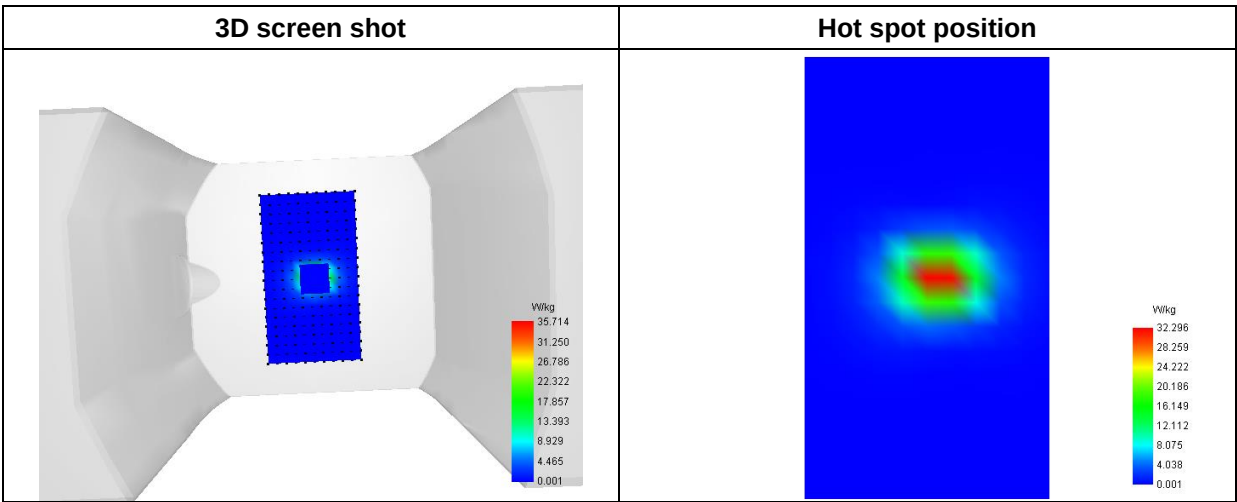
SAR 10g (W/Kg)	5.214336
SAR 1g (W/Kg)	18.566732

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	63.6940	35.7143	18.3619	8.6368	3.8326	1.6405	0.7180	0.3557	0.2183



F. 3D Image



MEASUREMENT 2

Type: Validation measurement (Fast, 75.00 %)
Date of measurement: 2024-10-22
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 0.99; Calibrated: 2024-07-11

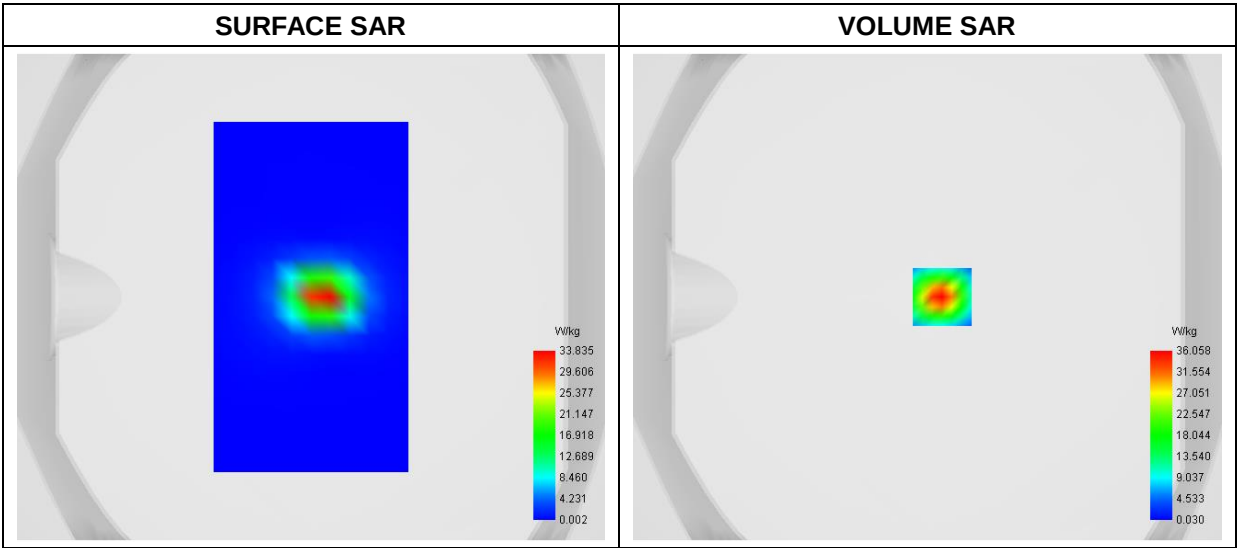
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5400
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	5400.000000
Relative Permittivity (real part)	36.691837
Conductivity (S/m)	4.954247
Power Variation (%)	1.374100
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

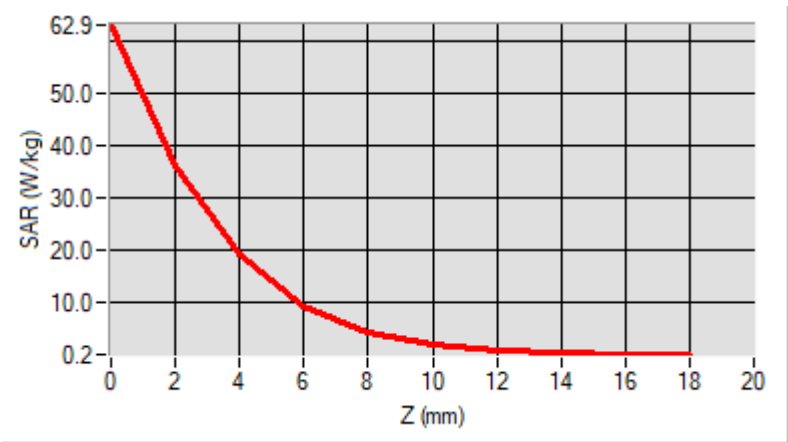


Maximum location: X=6.00, Y=0.00
D. SAR 1g & 10g

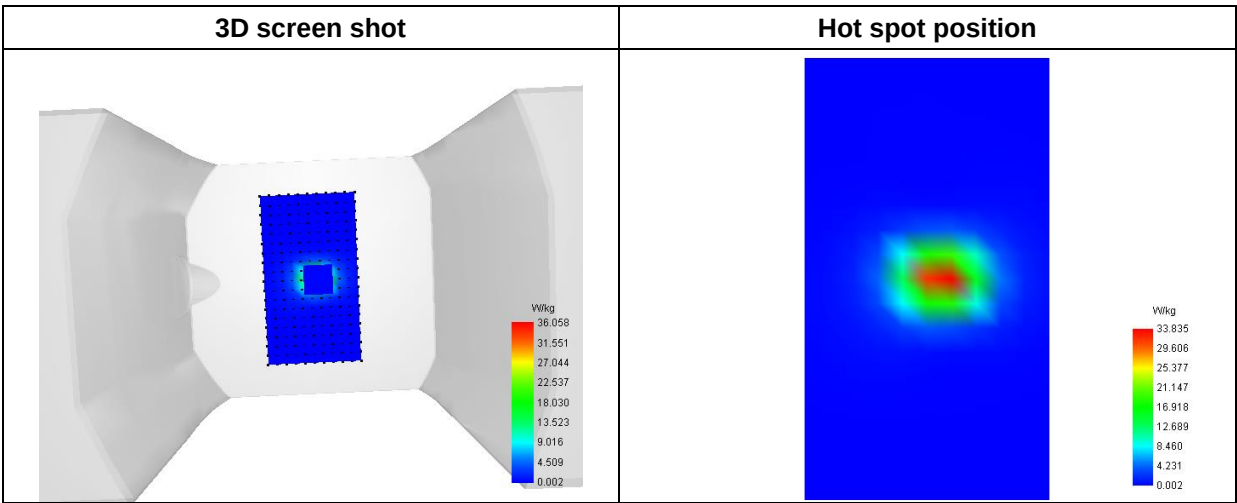
SAR 10g (W/Kg)	5.463589
SAR 1g (W/Kg)	18.979345

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	62.945	36.057	19.161	9.4529	4.4747	2.0809	0.9976	0.5283	0.3243
	6	9	7						



F. 3D Image



MEASUREMENT 3

Type: Validation measurement (Fast, 75.00 %)
Date of measurement: 2024-10-23
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 0.96; Calibrated: 2024-07-11

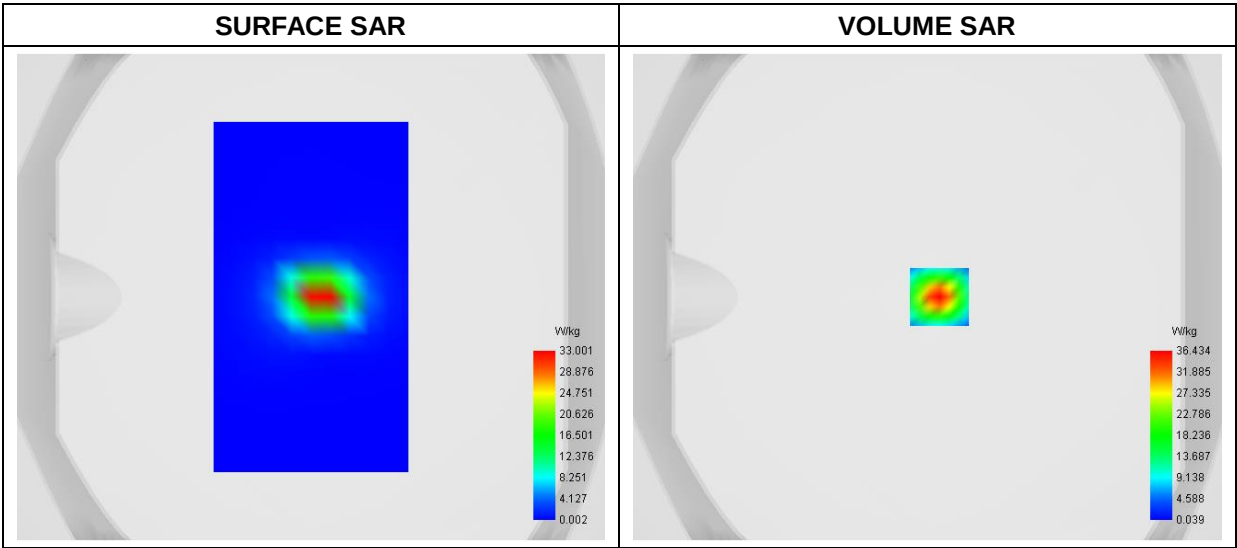
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5600
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	5600.000000
Relative Permittivity (real part)	35.781841
Conductivity (S/m)	5.114258
Power Variation (%)	1.473100
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

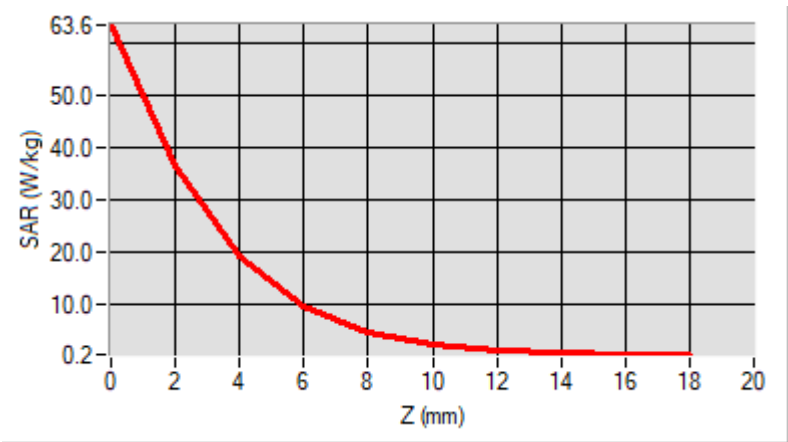


Maximum location: X=5.00, Y=0.00
D. SAR 1g & 10g

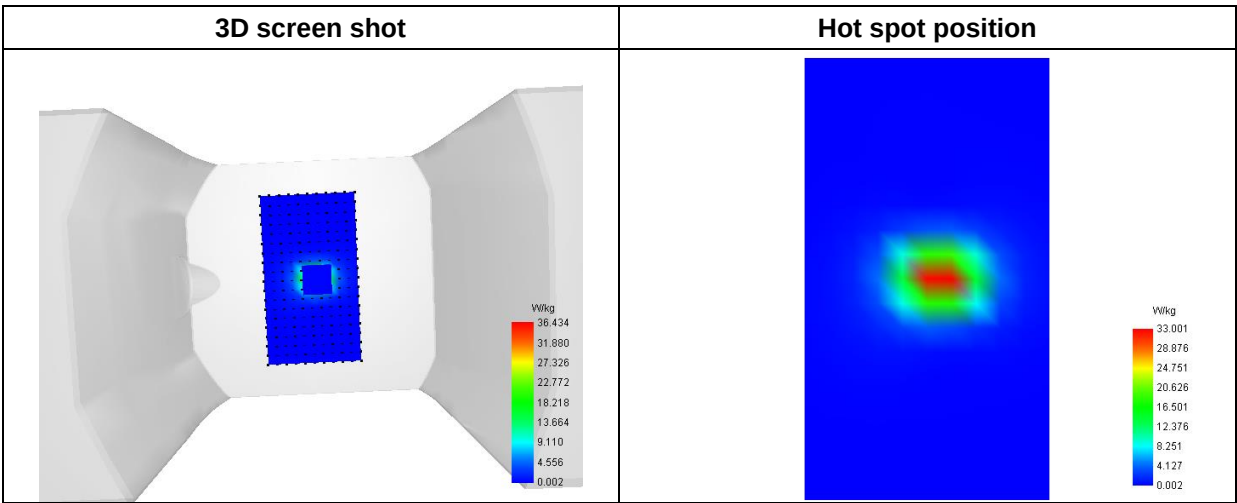
SAR 10g (W/Kg)	5.462480
SAR 1g (W/Kg)	19.007904

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	63.633	36.433	19.347	9.5356	4.5091	2.0948	1.0039	0.5323	0.3279
	5	9	5						



F. 3D Image



MEASUREMENT 4

Type: Validation measurement (Fast, 75.00 %)
Date of measurement: 2024-10-23
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 0.97; Calibrated: 2024-07-11

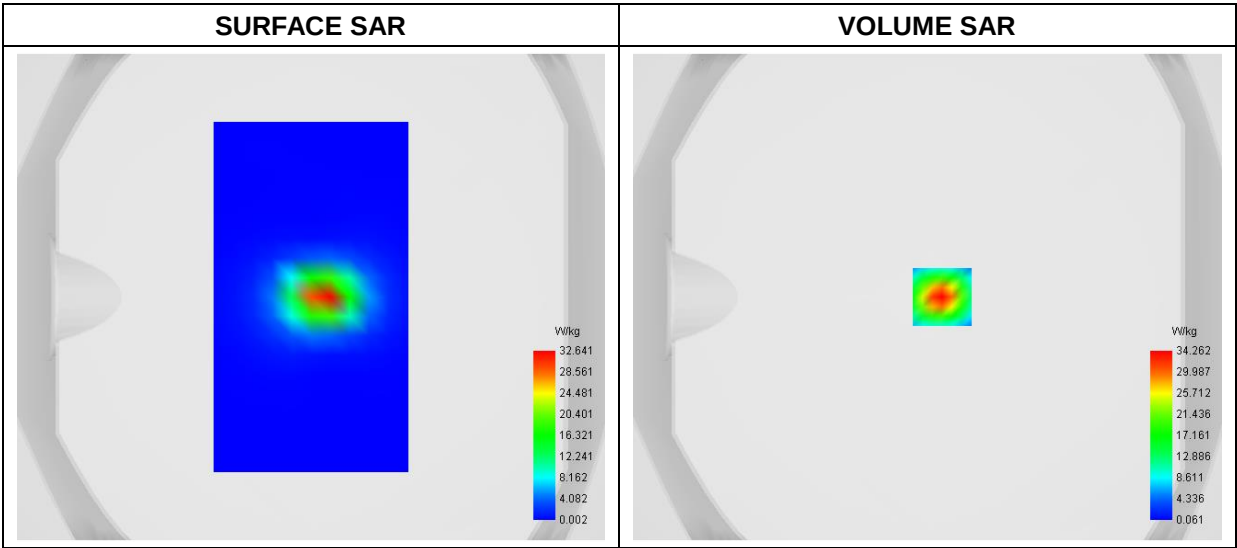
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Dipole
Band	CW5800
Signal	CW (Crest factor: 1.0)

B. SAR Measurement Results

Frequency (MHz)	5800.000000
Relative Permittivity (real part)	34.821853
Conductivity (S/m)	5.324295
Power Variation (%)	-1.437500
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

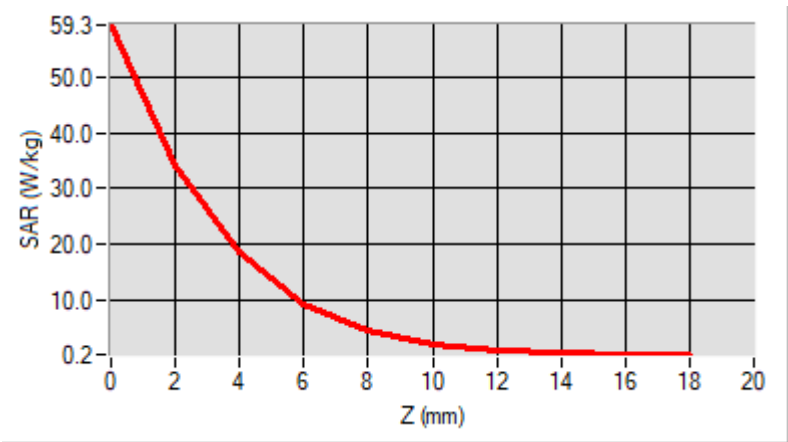


Maximum location: X=6.00, Y=0.00
D. SAR 1g & 10g

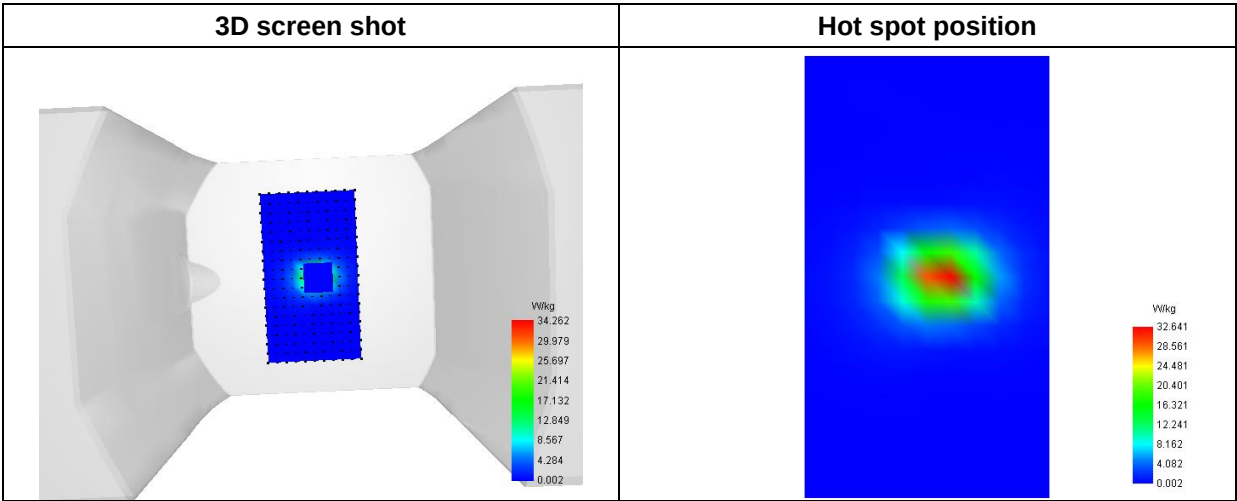
SAR 10g (W/Kg)	5.385932
SAR 1g (W/Kg)	18.087402

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	59.320	34.261	18.434	9.2545	4.4822	2.1439	1.0586	0.5728	0.3524
	3	7	7						



F. 3D Image



Annex B. Plots of SAR Measurement

MEASUREMENT 1

Type: Measurement (Complete)
Date of measurement: 2024-10-22
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 1.05; Calibrated: 2024-07-11

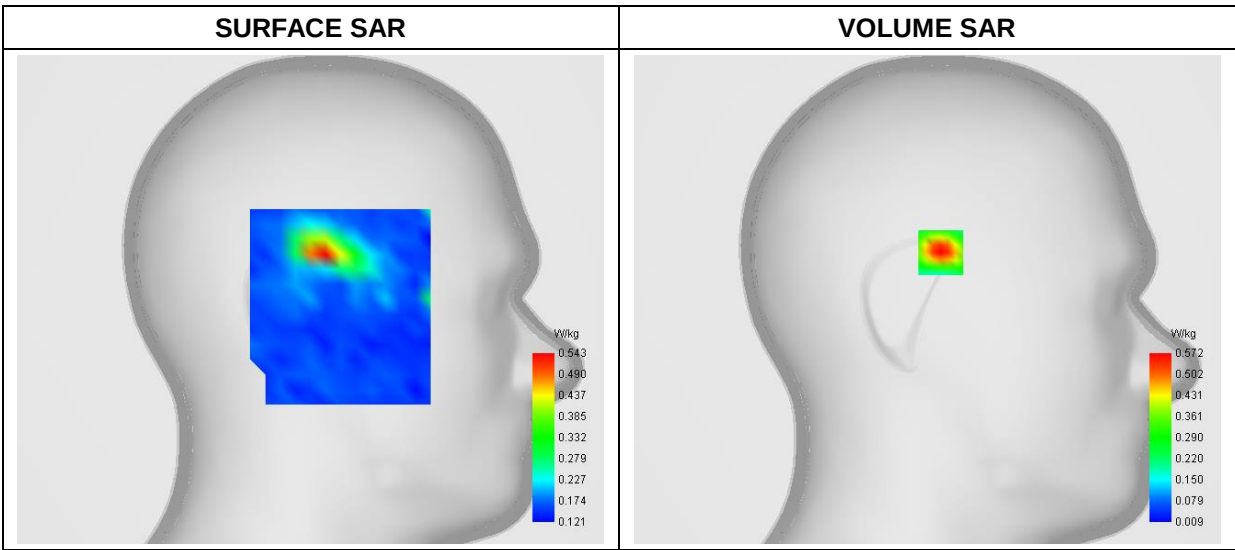
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Left Head
Device Position	Cheek
Band	WiFi(5.2GHz)_802.11a
Channels	High
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5240.000000
Relative Permittivity (real part)	37.581386
Conductivity (S/m)	4.722611
Power Variation (%)	-1.157500
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

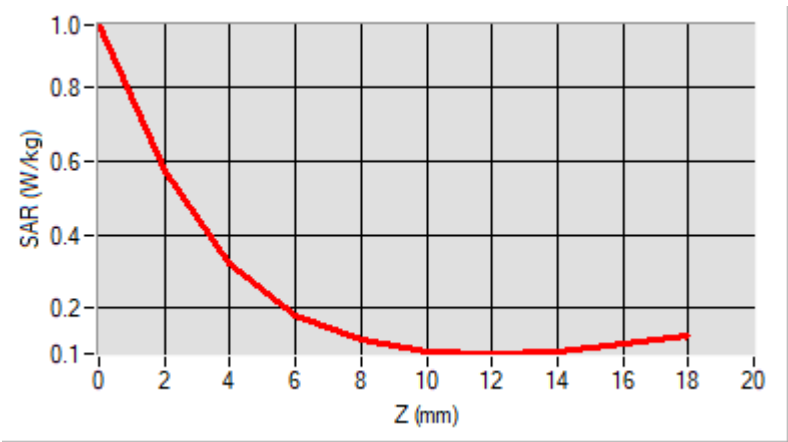


Maximum location: X=-7.00, Y=25.00
D. SAR 1g & 10g

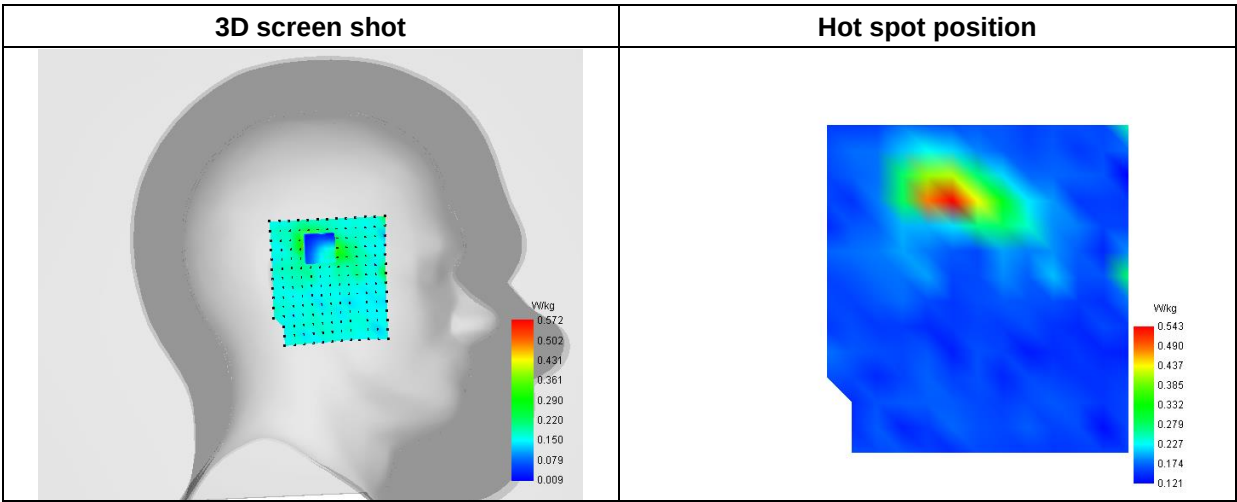
SAR 10g (W/Kg)	0.250699
SAR 1g (W/Kg)	0.562114

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.9713	0.5720	0.3220	0.1821	0.1136	0.0840	0.0765	0.0834	0.1012



F. 3D Image



MEASUREMENT 2

Type: Measurement (Complete)
Date of measurement: 2024-10-22
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 0.99; Calibrated: 2024-07-11

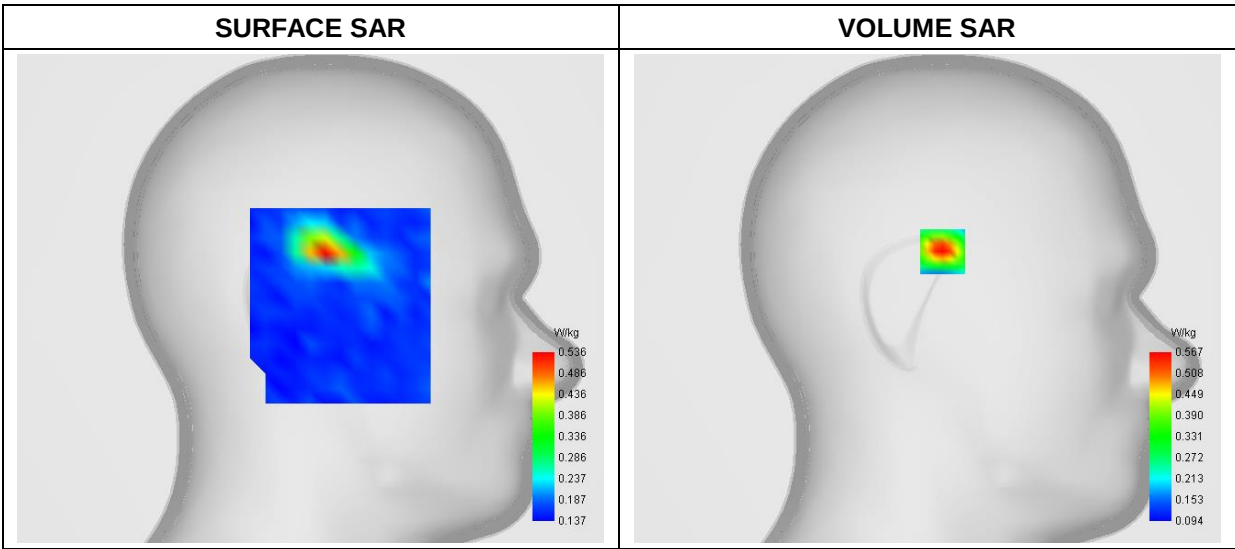
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Left Head
Device Position	Cheek
Band	WiFi(5.3GHz)_802.11ac-VHT40
Channels	High
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5310.000000
Relative Permittivity (real part)	36.692083
Conductivity (S/m)	4.954319
Power Variation (%)	-2.468500
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume



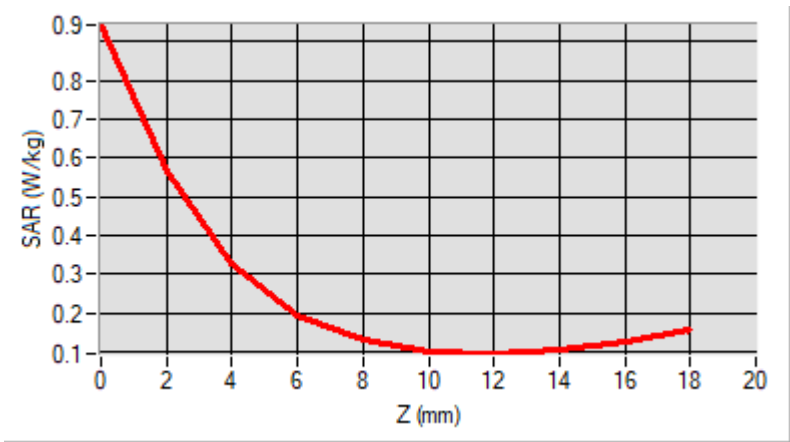
Maximum location: X=-8.00, Y=25.00

D. SAR 1g & 10g

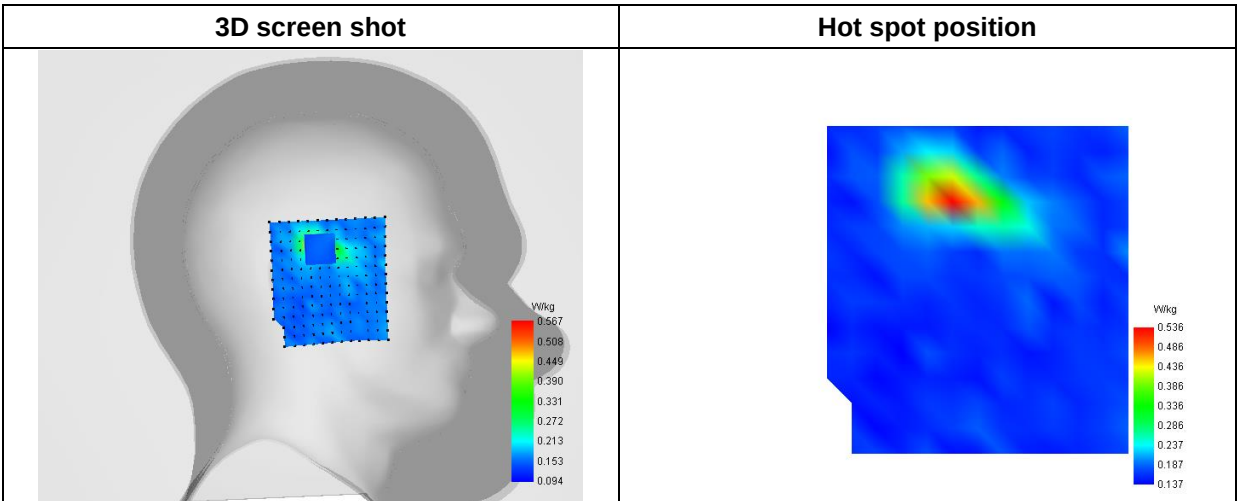
SAR 10g (W/Kg)	0.262632
SAR 1g (W/Kg)	0.552855

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.9437	0.5673	0.3296	0.1950	0.1285	0.1000	0.0943	0.1040	0.1255



F. 3D Image



MEASUREMENT 3

Type: Measurement (Complete)
Date of measurement: 2024-10-23
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 0.96; Calibrated: 2024-07-11

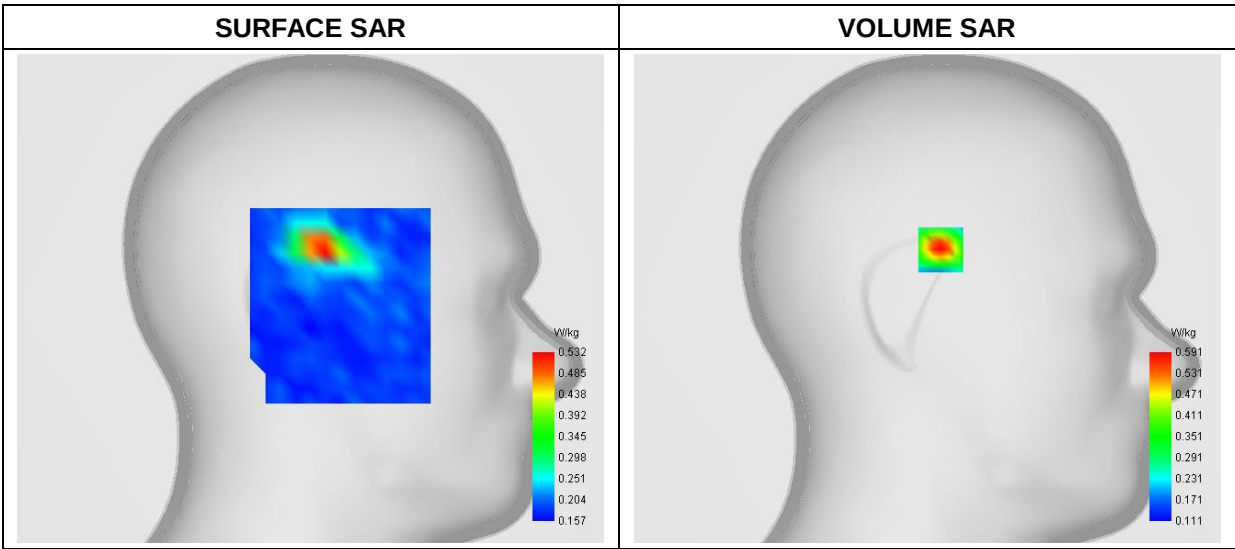
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Left Head
Device Position	Cheek
Band	WiFi(5.6GHz)_802.11a
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5500.000000
Relative Permittivity (real part)	35.784196
Conductivity (S/m)	5.112789
Power Variation (%)	-1.847500
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

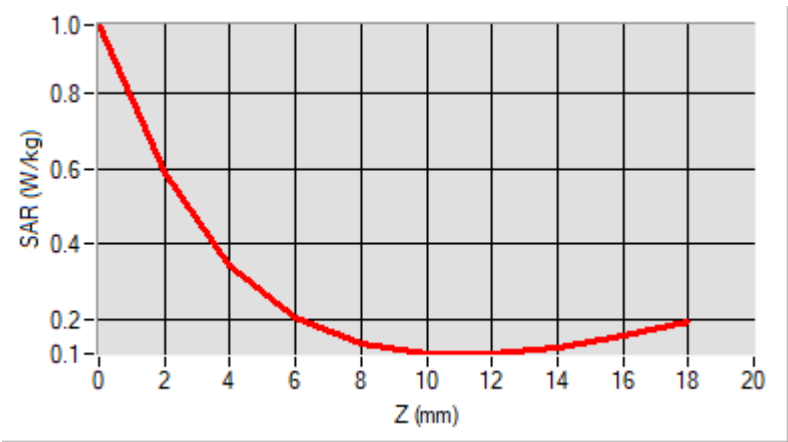


Maximum location: X=-7.00, Y=26.00
D. SAR 1g & 10g

SAR 10g (W/Kg)	0.286346
SAR 1g (W/Kg)	0.578654

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.9806	0.5906	0.3448	0.2067	0.1397	0.1129	0.1107	0.1262	0.1560



F. 3D Image

3D screen shot	Hot spot position
A 3D screen shot of a human head model showing the SAR distribution. A color scale on the right indicates SAR values from 0.111 to 0.581 W/kg.	A hot spot position image showing the SAR distribution. A color scale on the right indicates SAR values from 0.157 to 0.532 W/kg.

MEASUREMENT 4

Type: Measurement (Complete)
Date of measurement: 2024-10-23
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 0.97; Calibrated: 2024-07-11

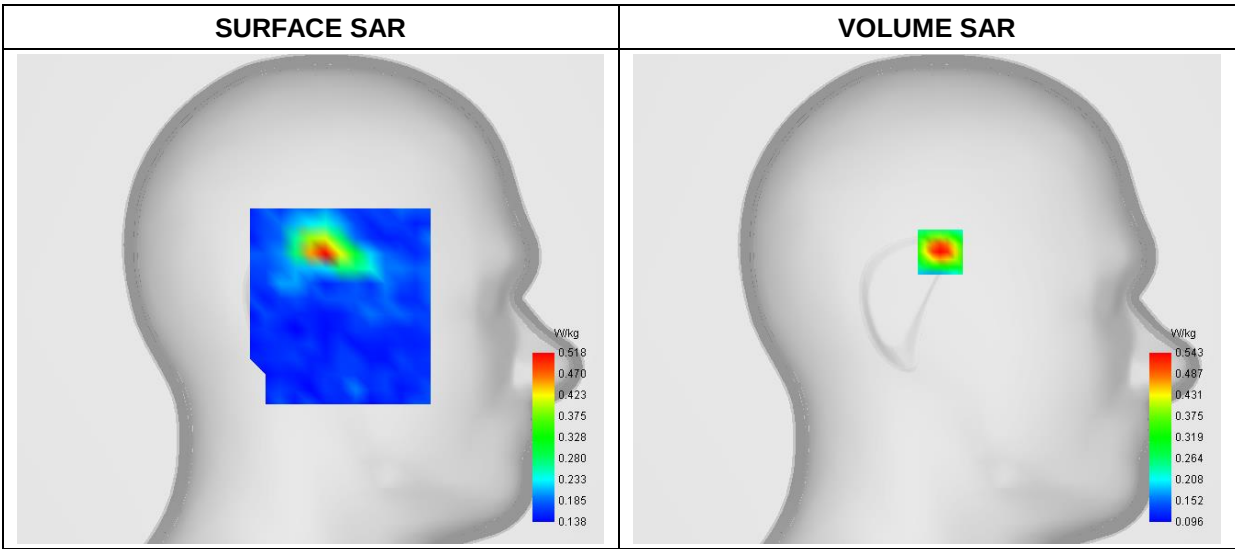
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Left Head
Device Position	Cheek
Band	WiFi(5.8GHz)_802.11a
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5745.000000
Relative Permittivity (real part)	34.822273
Conductivity (S/m)	5.322836
Power Variation (%)	-1.297800
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

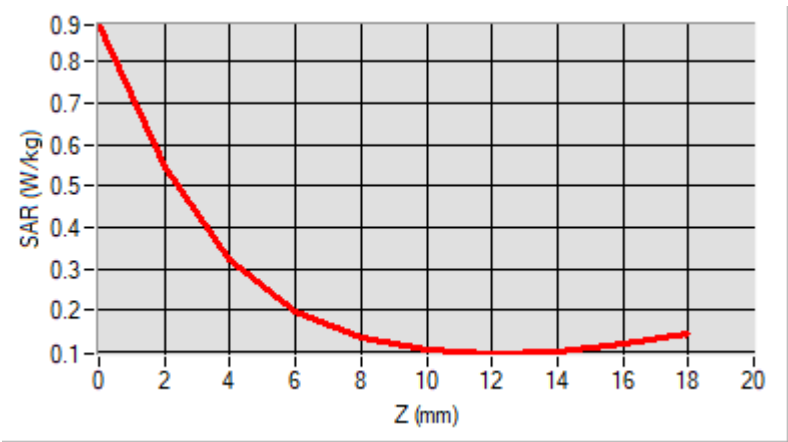


Maximum location: X=-7.00, Y=25.00
D. SAR 1g & 10g

SAR 10g (W/Kg)	0.257583
SAR 1g (W/Kg)	0.526739

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.8870	0.5429	0.3235	0.1968	0.1323	0.1035	0.0960	0.1028	0.1201



F. 3D Image

3D screen shot	Hot spot position
A 3D rendering of a human head model in profile. A blue, semi-transparent rectangular volume is overlaid on the side of the head, indicating the hot spot area. A color scale bar on the right indicates SAR values from 0.096 to 0.543 W/kg.	A 2D color-coded image showing the hot spot position. The color scale ranges from blue (low SAR) to red (high SAR). The highest SAR values are concentrated in a small area on the side of the head.

MEASUREMENT 5

Type: Measurement (Complete)
Date of measurement: 2024-10-22
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 1.05; Calibrated: 2024-07-11

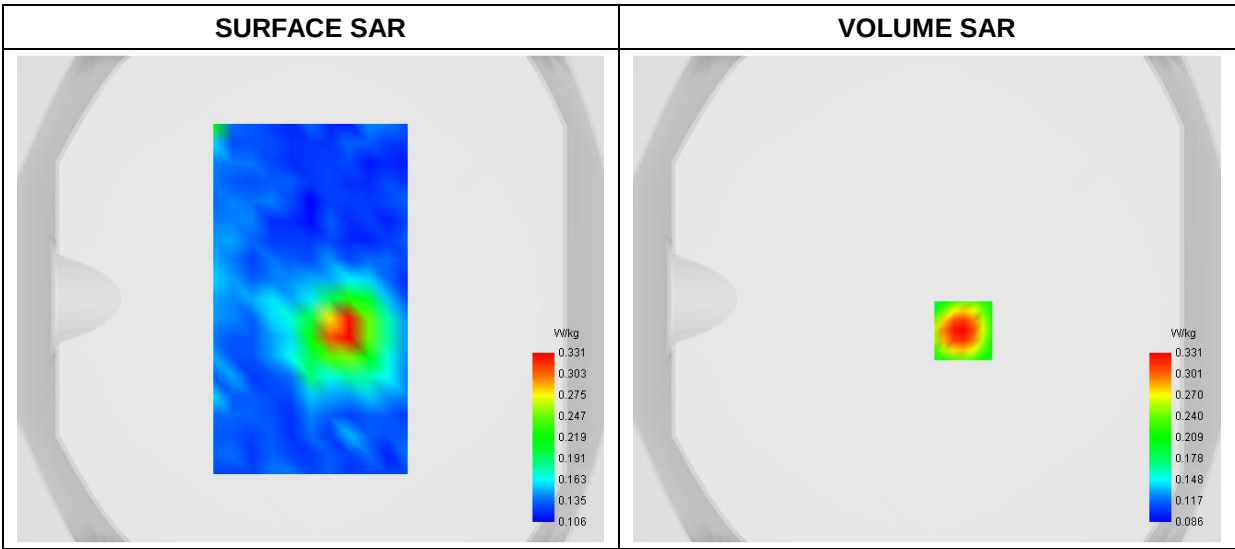
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Back
Band	WiFi(5.2GHz)_802.11a
Channels	High
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5240.000000
Relative Permittivity (real part)	37.581386
Conductivity (S/m)	4.722611
Power Variation (%)	1.951700
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume



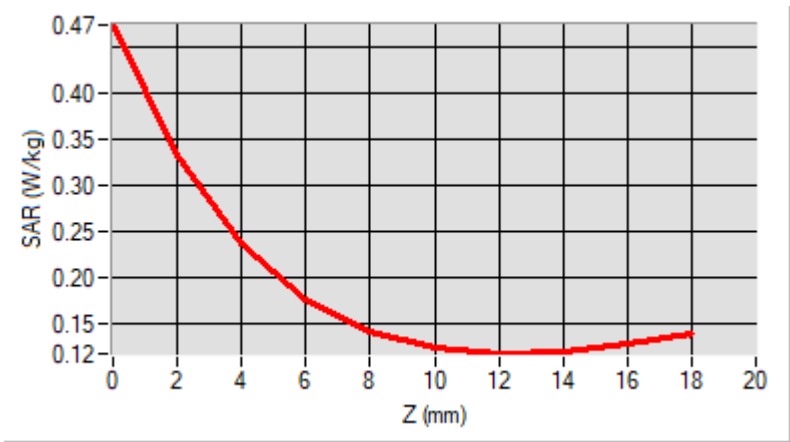
Maximum location: X=15.00, Y=-13.00

D. SAR 1g & 10g

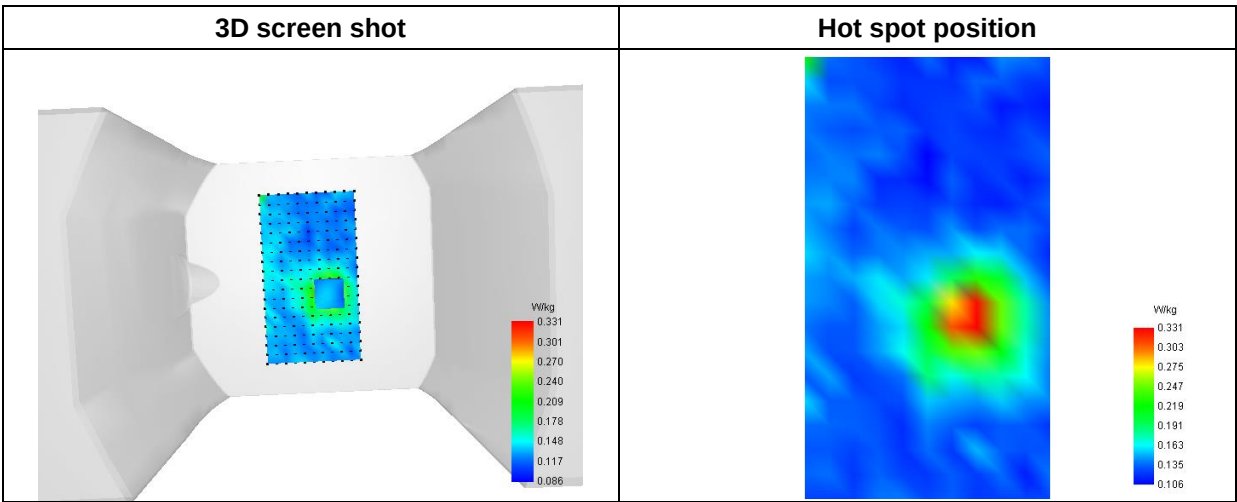
SAR 10g (W/Kg)	0.160566
SAR 1g (W/Kg)	0.234307

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.4729	0.3313	0.2355	0.1743	0.1396	0.1221	0.1164	0.1189	0.1271



F. 3D Image



MEASUREMENT 6

Type: Measurement (Complete)
Date of measurement: 2024-10-22
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 0.99; Calibrated: 2024-07-11

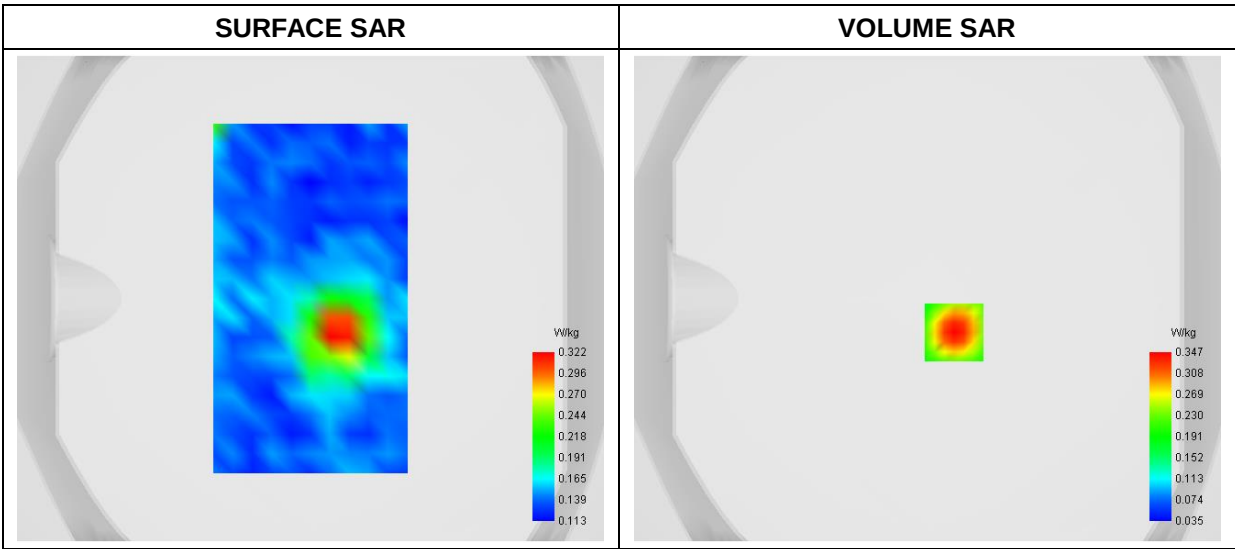
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Back
Band	WiFi(5.3GHz)_802.11ac-VHT40
Channels	High
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5310.000000
Relative Permittivity (real part)	36.692083
Conductivity (S/m)	4.954319
Power Variation (%)	1.114700
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume



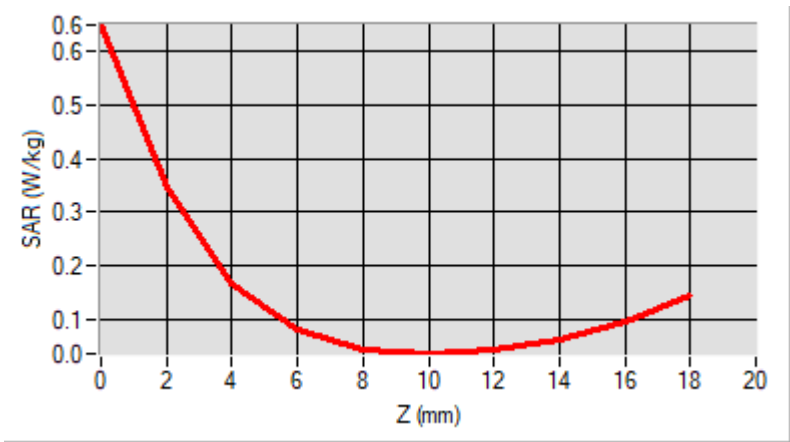
Maximum location: X=11.00, Y=-14.00

D. SAR 1g & 10g

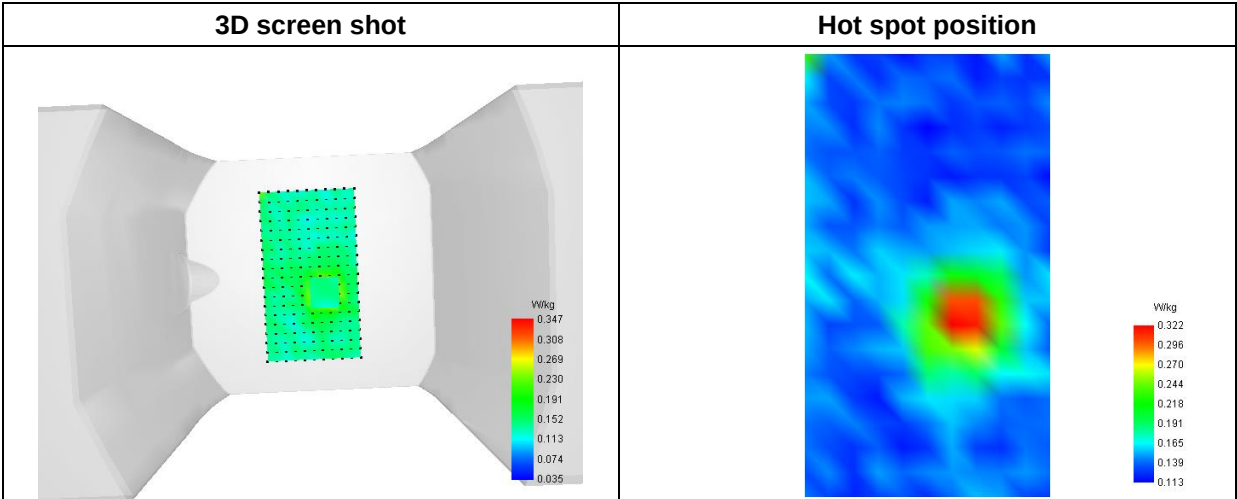
SAR 10g (W/Kg)	0.143670
SAR 1g (W/Kg)	0.227065

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.6492	0.3467	0.1666	0.0791	0.0445	0.0354	0.0412	0.0607	0.0953



F. 3D Image



MEASUREMENT 7

Type: Measurement (Complete)
Date of measurement: 2024-10-23
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 0.96; Calibrated: 2024-07-11

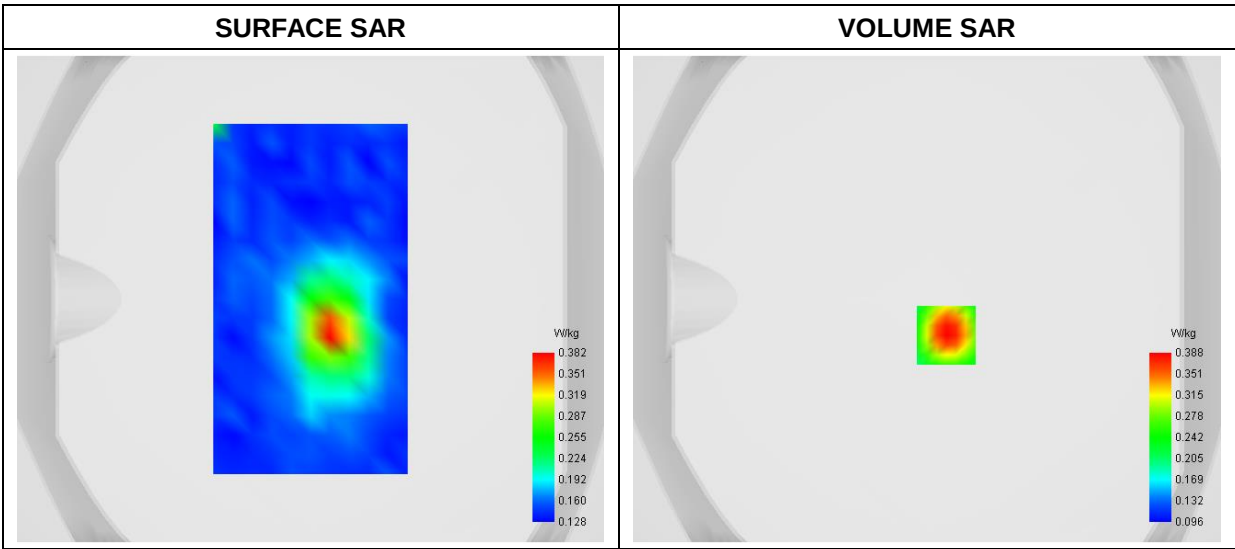
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Back
Band	WiFi(5.6GHz)_802.11a
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5500.000000
Relative Permittivity (real part)	35.784196
Conductivity (S/m)	5.112789
Power Variation (%)	1.757800
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume



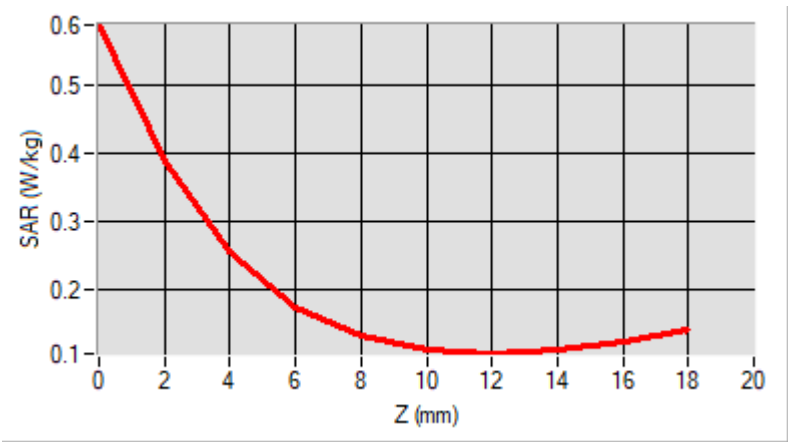
Maximum location: X=8.00, Y=-15.00

D. SAR 1g & 10g

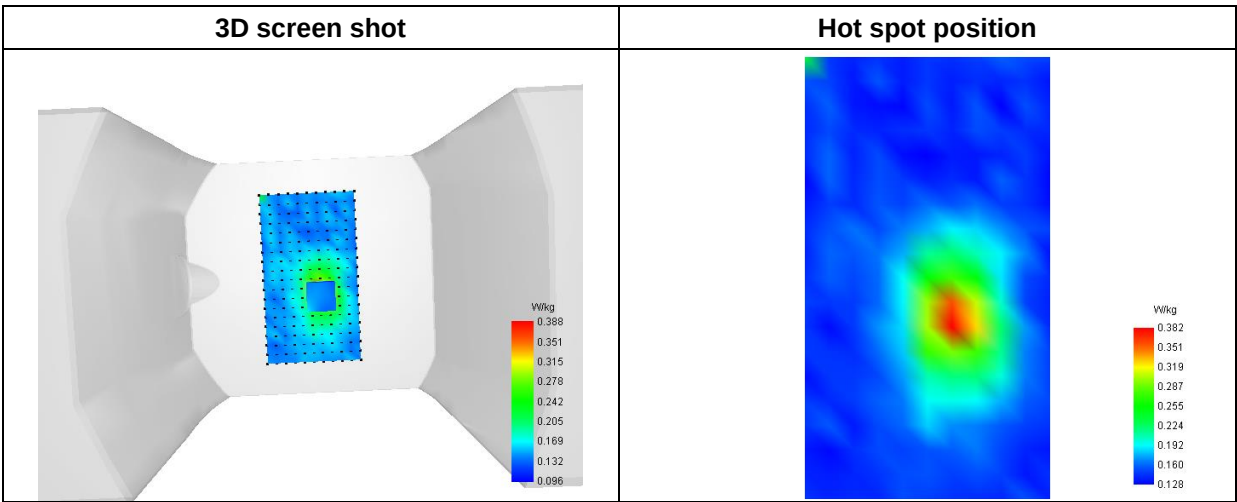
SAR 10g (W/Kg)	0.175341
SAR 1g (W/Kg)	0.263736

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.5885	0.3875	0.2554	0.1749	0.1317	0.1117	0.1067	0.1123	0.1253



F. 3D Image



MEASUREMENT 8

Type: Measurement (Complete)
Date of measurement: 2024-10-23
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 0.97; Calibrated: 2024-07-11

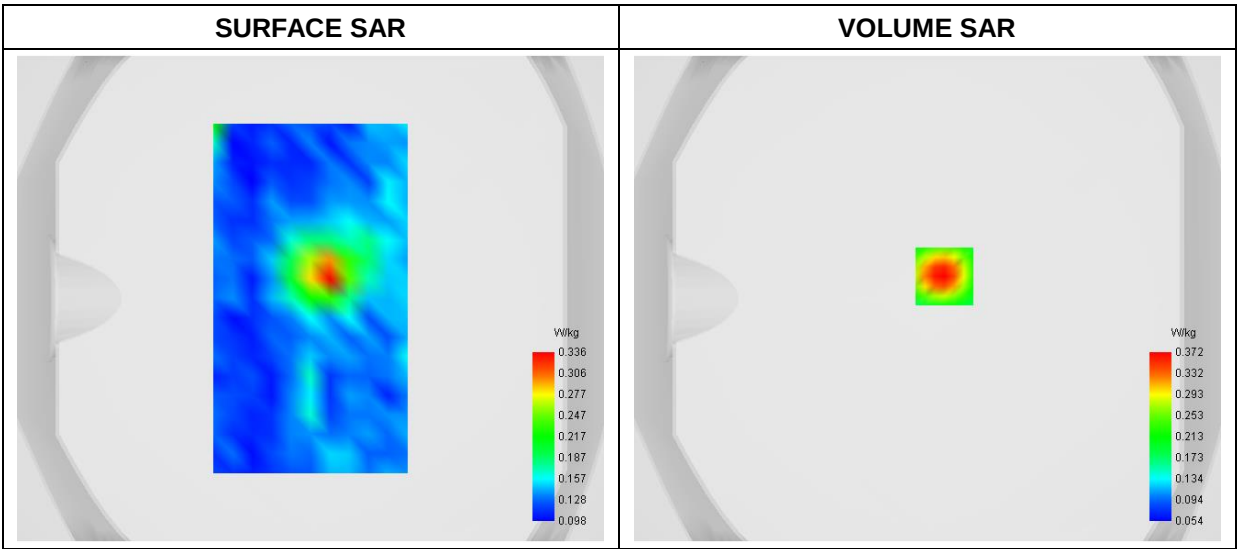
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Front
Band	WiFi(5.8GHz)_802.11a
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5745.000000
Relative Permittivity (real part)	34.822273
Conductivity (S/m)	5.322836
Power Variation (%)	-1.337500
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume



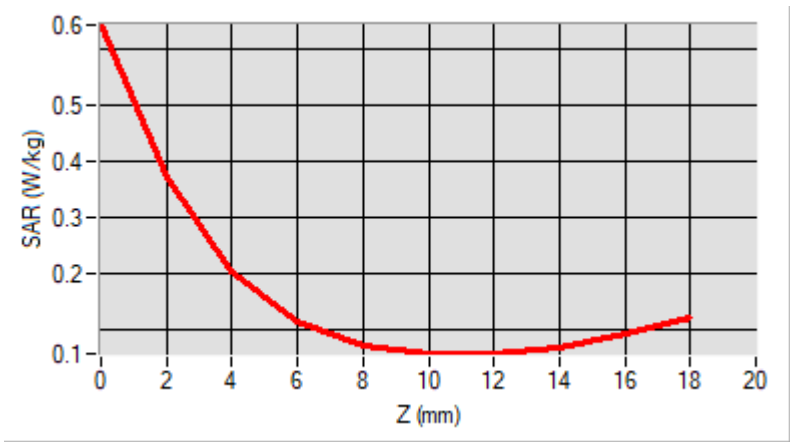
Maximum location: X=7.00, Y=9.00

D. SAR 1g & 10g

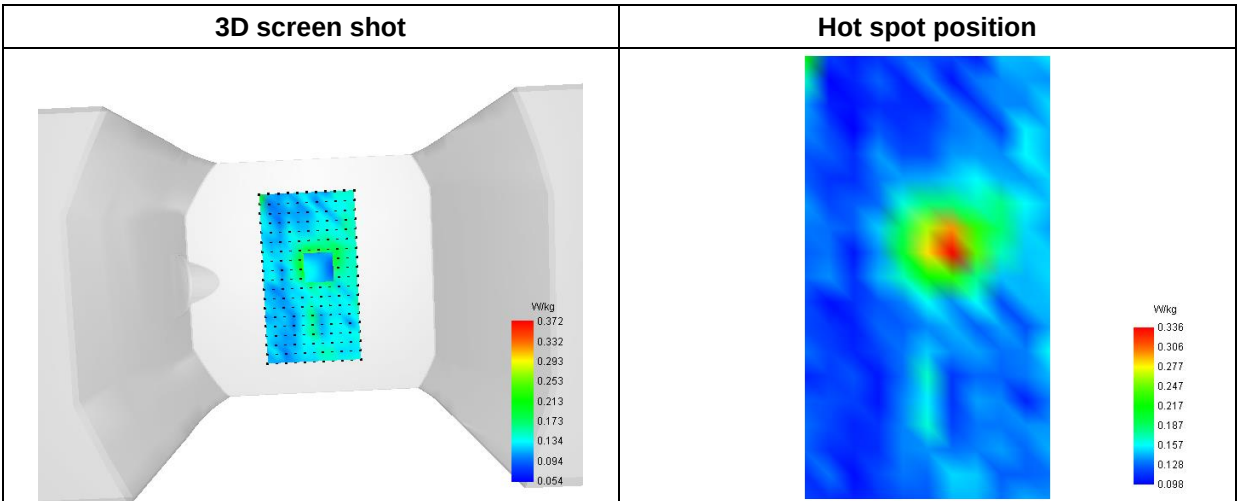
SAR 10g (W/Kg)	0.138960
SAR 1g (W/Kg)	0.238618

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.6428	0.3722	0.2048	0.1145	0.0730	0.0577	0.0580	0.0699	0.0920



F. 3D Image



MEASUREMENT 9

Type: Measurement (Complete)
Date of measurement: 2024-10-22
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 1.05; Calibrated: 2024-07-11

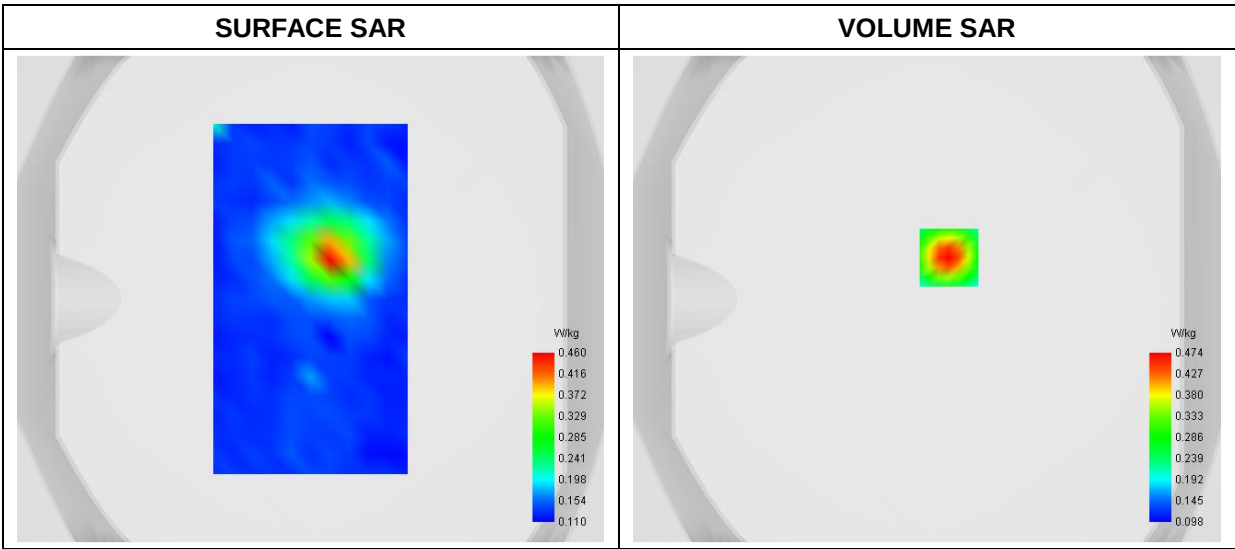
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Top
Band	WiFi(5.2GHz)_802.11a
Channels	High
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5240.000000
Relative Permittivity (real part)	37.581386
Conductivity (S/m)	4.722611
Power Variation (%)	1.137500
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume



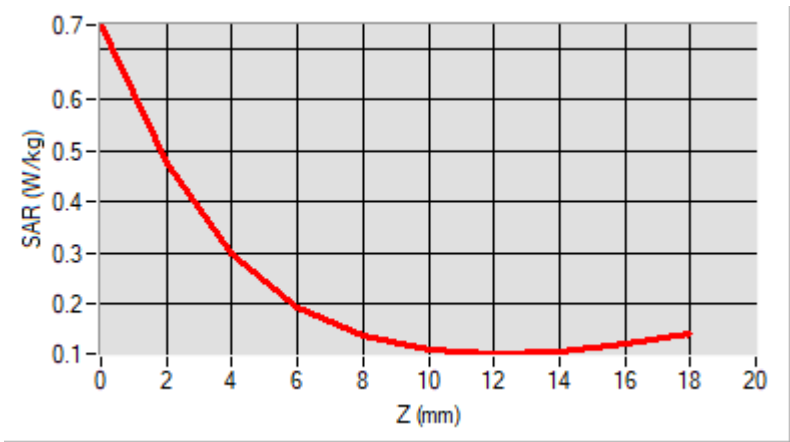
Maximum location: X=9.00, Y=17.00

D. SAR 1g & 10g

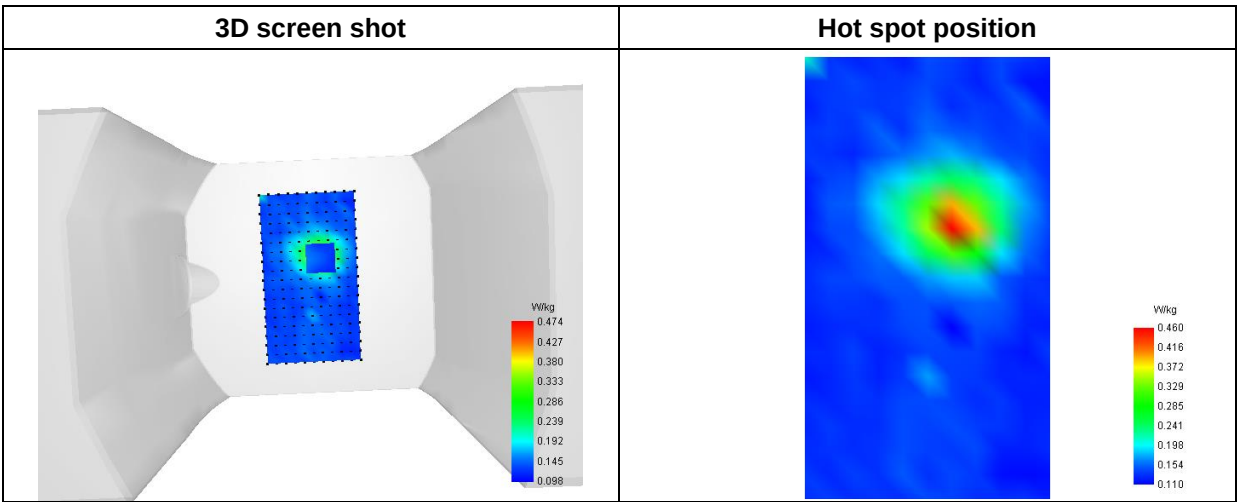
SAR 10g (W/Kg)	0.181907
SAR 1g (W/Kg)	0.304013

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.7469	0.4744	0.2977	0.1923	0.1367	0.1107	0.1032	0.1082	0.1220



F. 3D Image



MEASUREMENT 10

Type: Measurement (Complete)
Date of measurement: 2024-10-22
Measurement duration: 12 minutes 3 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 0.99; Calibrated: 2024-07-11

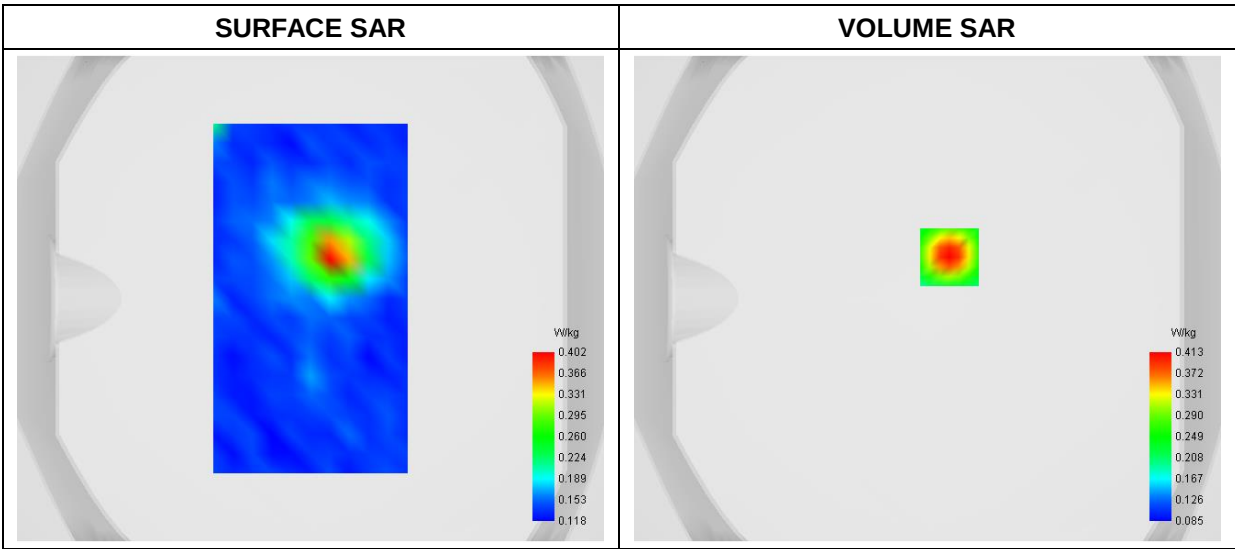
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Top
Band	WiFi(5.3GHz)_802.11ac-VHT40
Channels	High
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5310.000000
Relative Permittivity (real part)	36.692083
Conductivity (S/m)	4.954319
Power Variation (%)	2.204800
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume



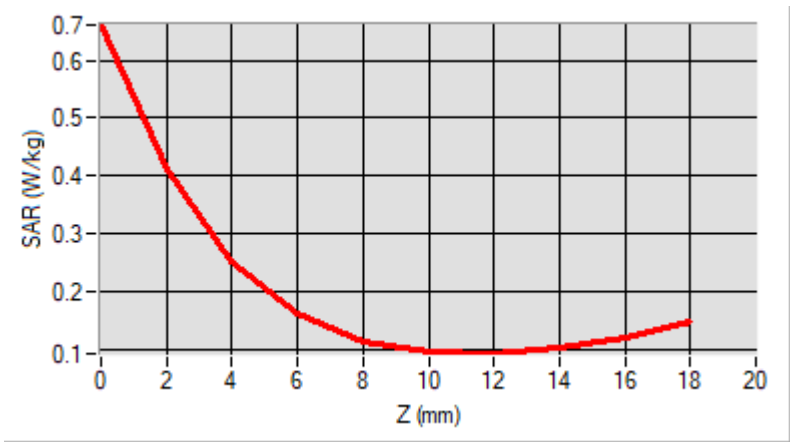
Maximum location: X=9.00, Y=17.00

D. SAR 1g & 10g

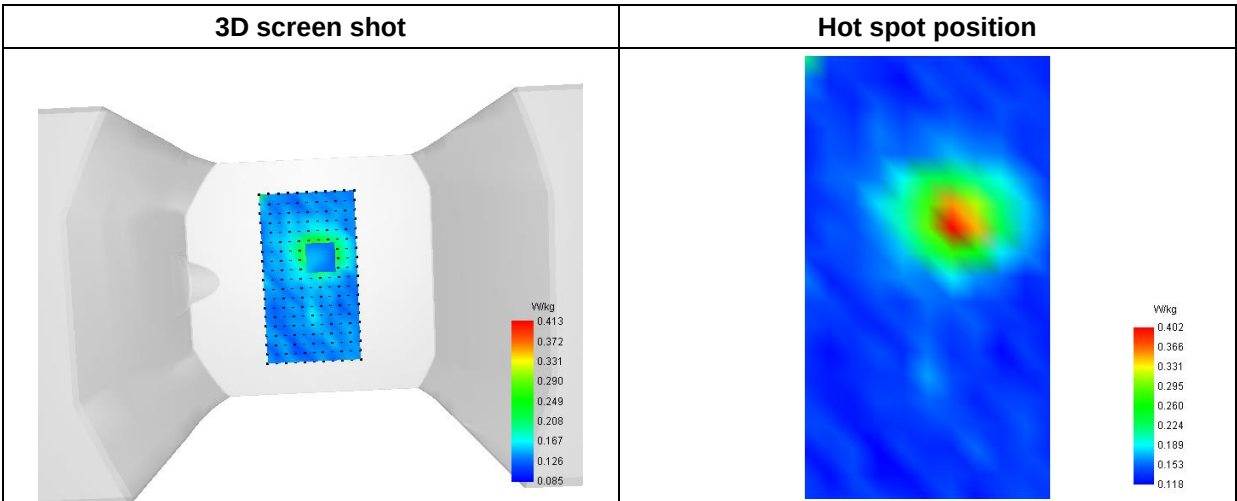
SAR 10g (W/Kg)	0.170206
SAR 1g (W/Kg)	0.270928

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.6615	0.4125	0.2530	0.1607	0.1141	0.0945	0.0919	0.1015	0.1204



F. 3D Image



MEASUREMENT 11

Type: Measurement (Complete)
Date of measurement: 2024-10-23
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 0.96; Calibrated: 2024-07-11

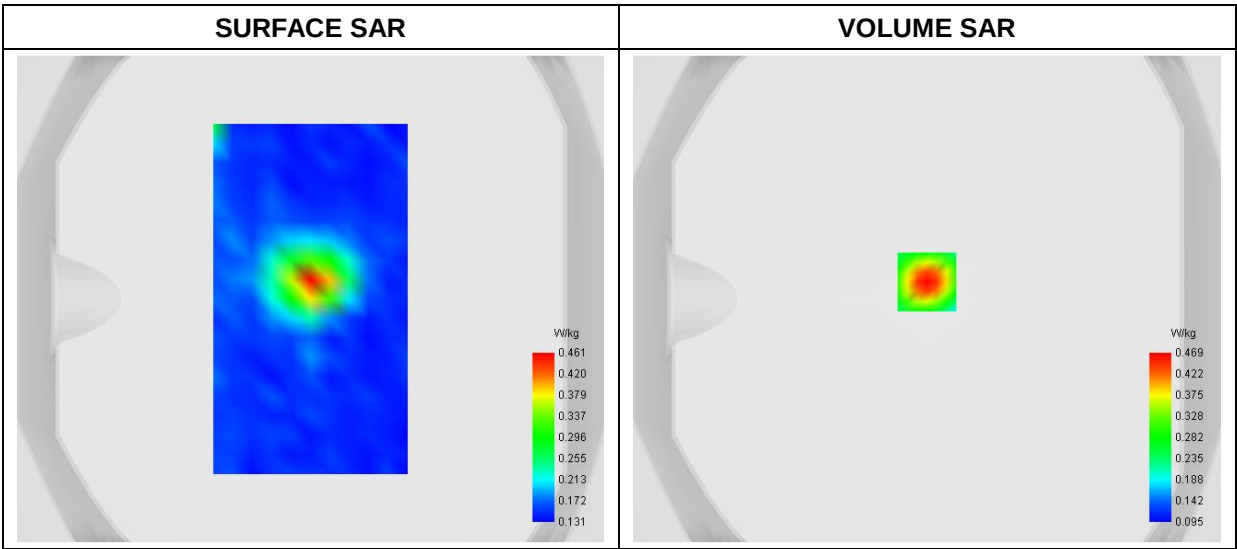
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Top
Band	WiFi(5.6GHz)_802.11a
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5500.000000
Relative Permittivity (real part)	35.784196
Conductivity (S/m)	5.112789
Power Variation (%)	-1.397400
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume



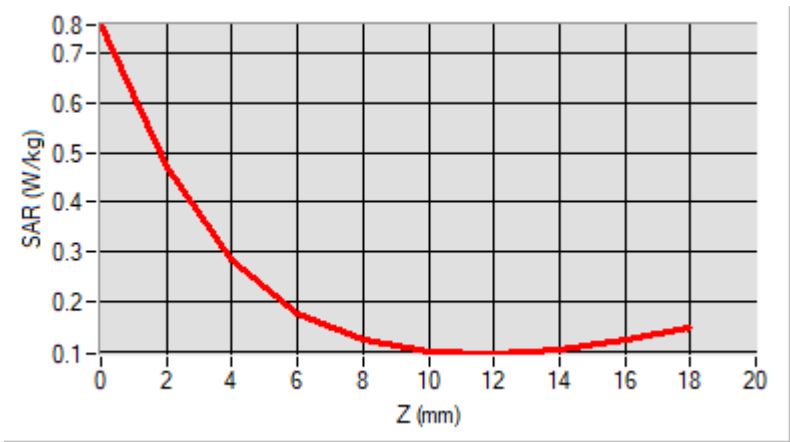
Maximum location: X=0.00, Y=7.00

D. SAR 1g & 10g

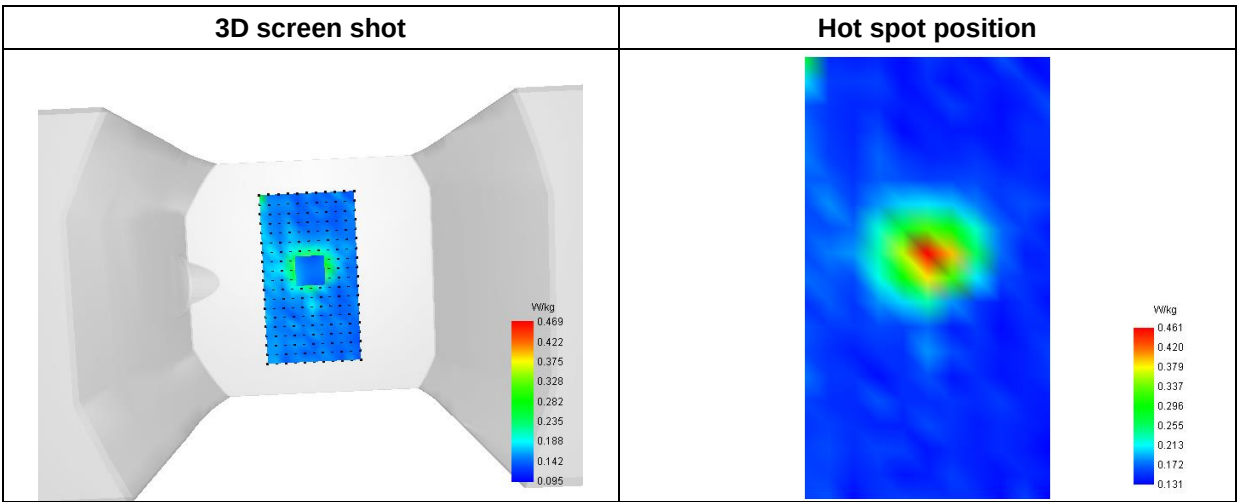
SAR 10g (W/Kg)	0.182009
SAR 1g (W/Kg)	0.298071

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.7565	0.4685	0.2843	0.1776	0.1234	0.0998	0.0951	0.1035	0.1218



F. 3D Image



MEASUREMENT 12

Type: Measurement (Complete)
Date of measurement: 2024-10-23
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - 3823-EPGO-435; ConvF: 0.97; Calibrated: 2024-07-11

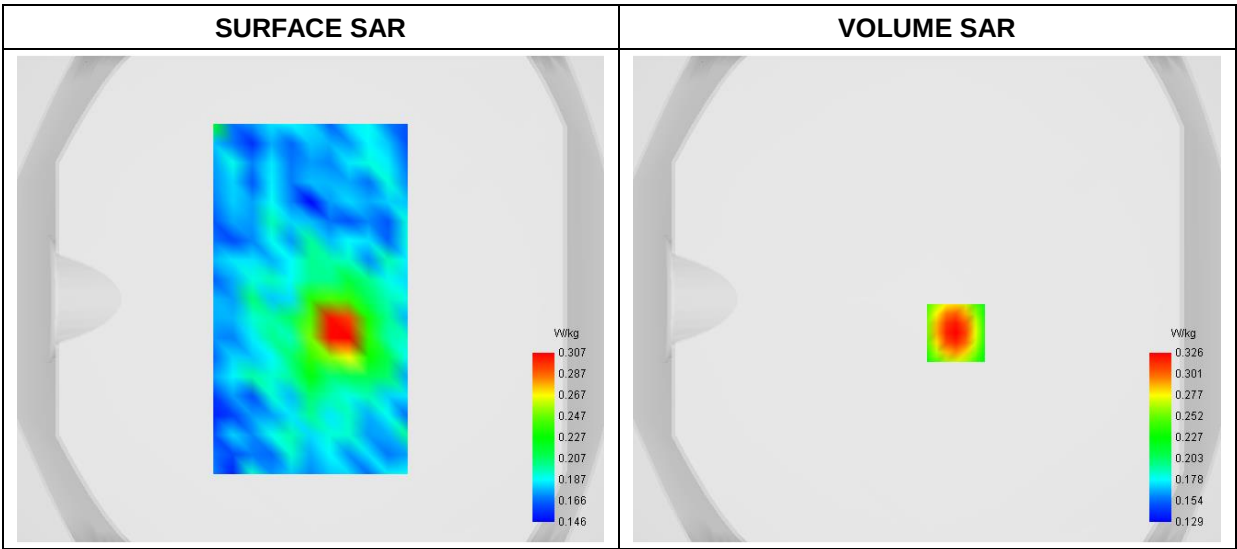
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Top
Band	WiFi(5.8GHz)_802.11a
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5745.000000
Relative Permittivity (real part)	34.822273
Conductivity (S/m)	5.322836
Power Variation (%)	2.171700
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume



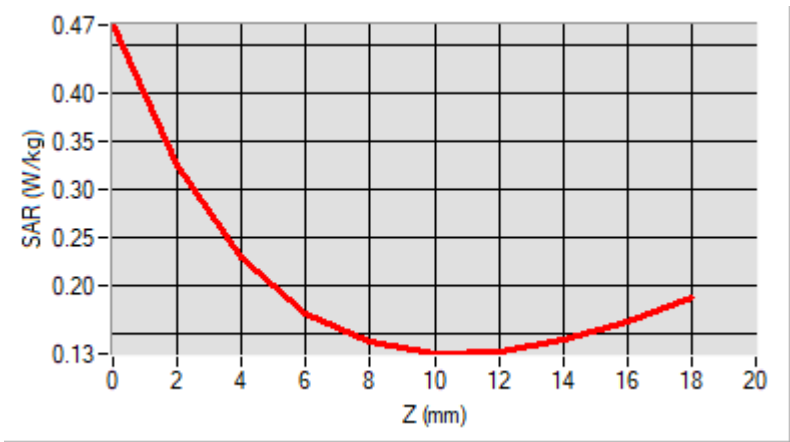
Maximum location: X=12.00, Y=-14.00

D. SAR 1g & 10g

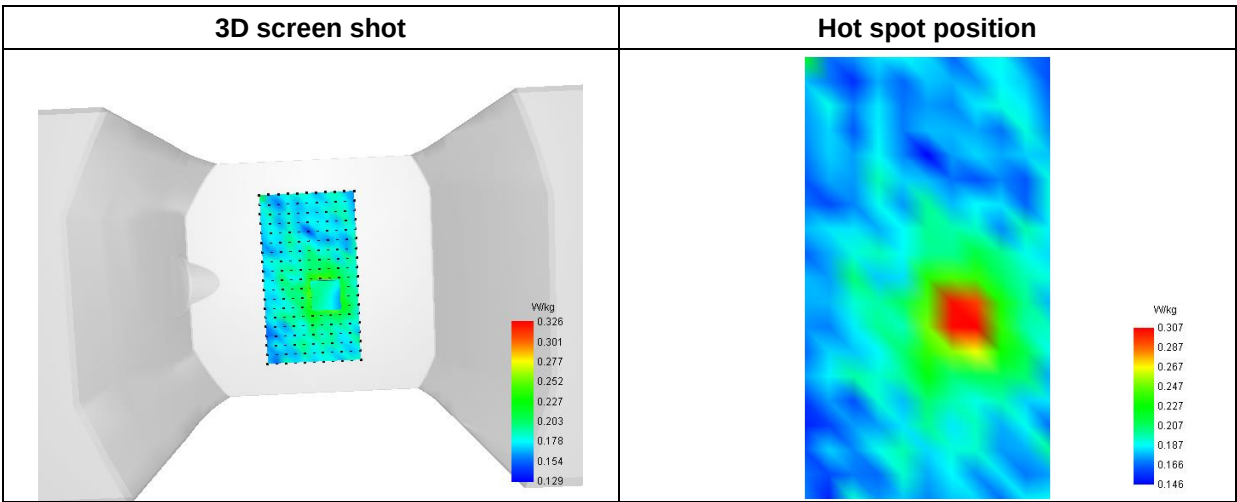
SAR 10g (W/Kg)	0.194299
SAR 1g (W/Kg)	0.240599

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00
SAR (W/Kg)	0.4703	0.3259	0.2301	0.1715	0.1413	0.1298	0.1317	0.1437	0.1634

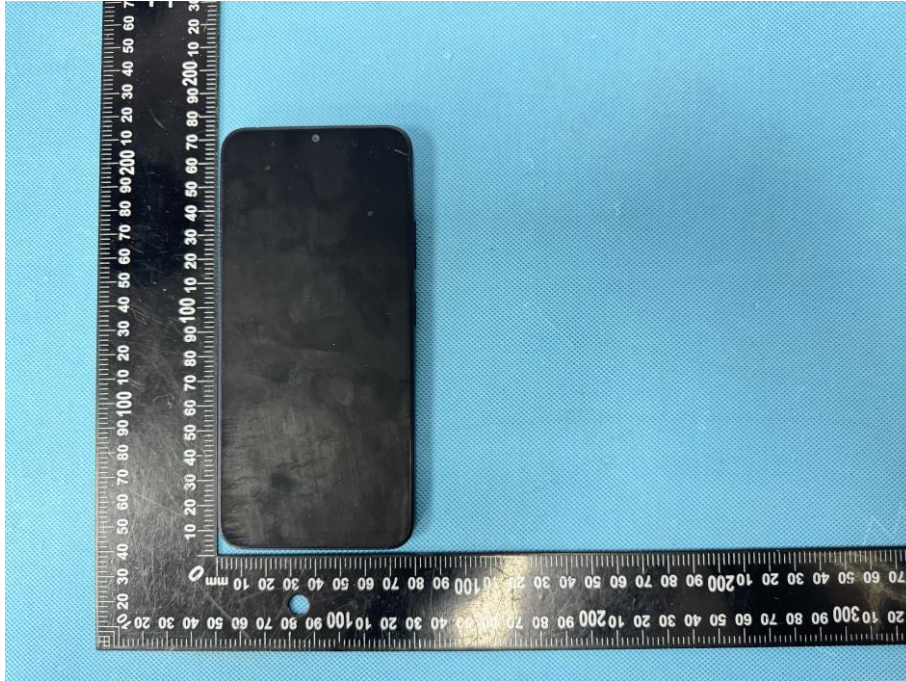


F. 3D Image

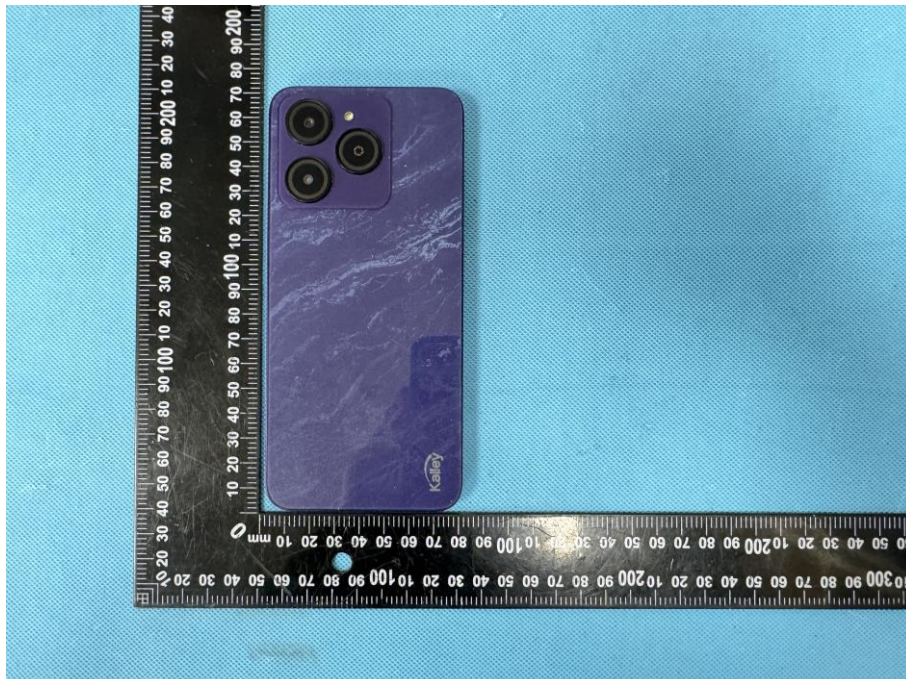


Annex C. EUT Photos

EUT View Front



EUT View Back



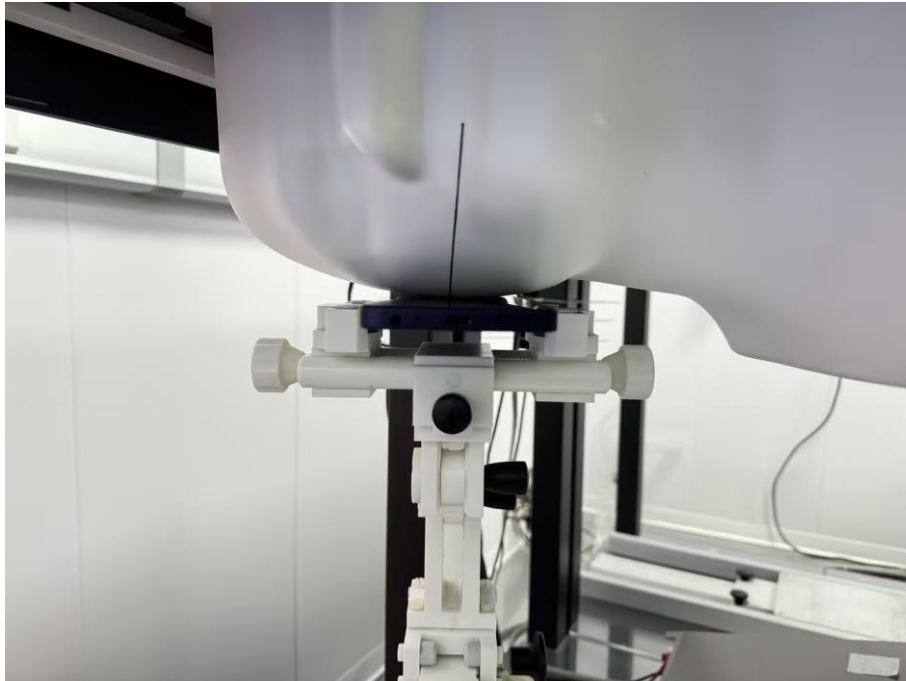
Antenna View



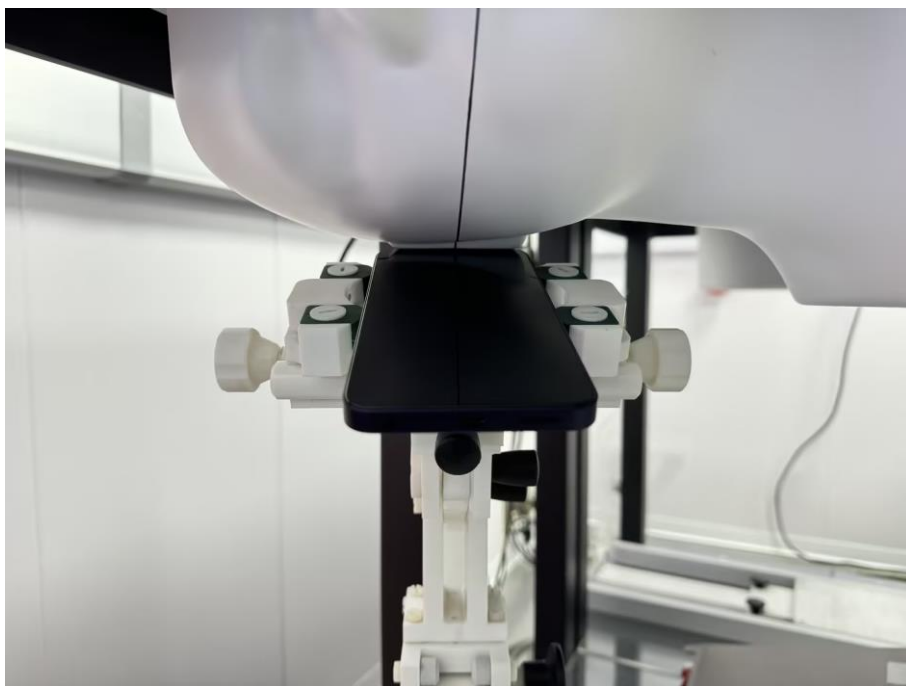
Annex D. Test Setup Photos

Head Exposure Conditions

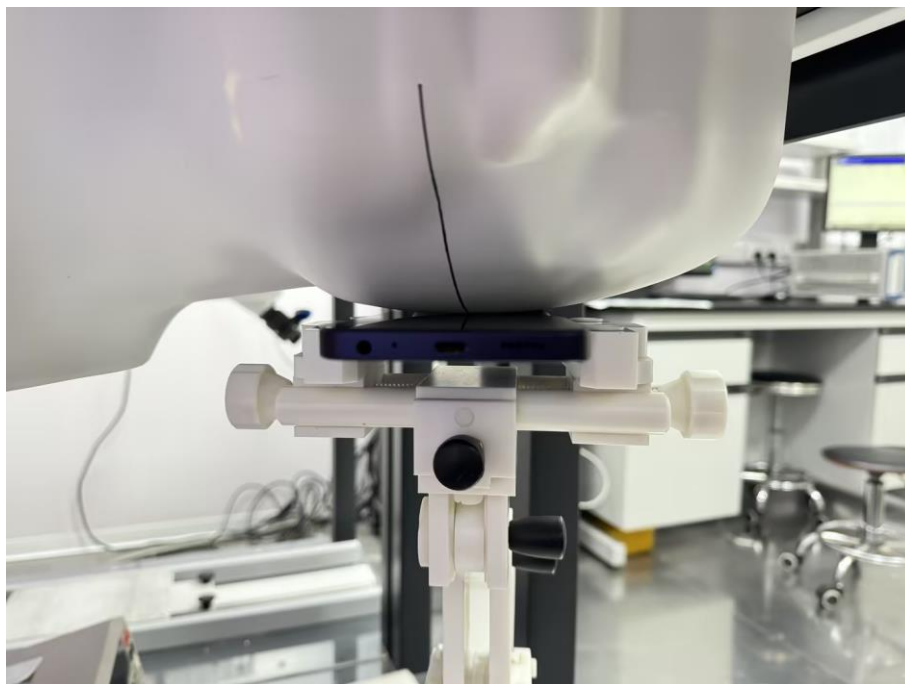
Right Cheek



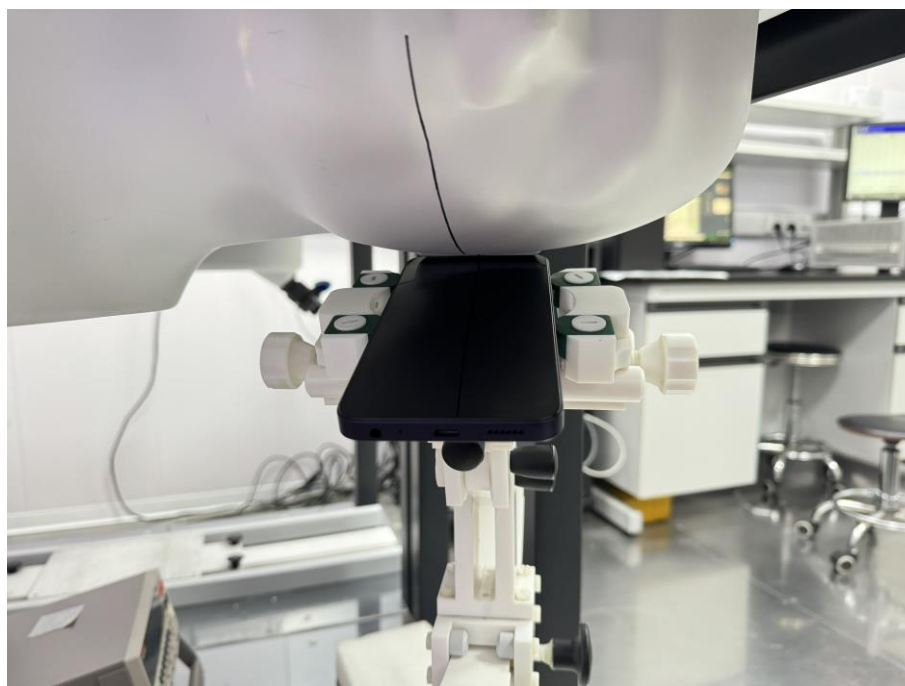
Right Tilt



Left Cheek



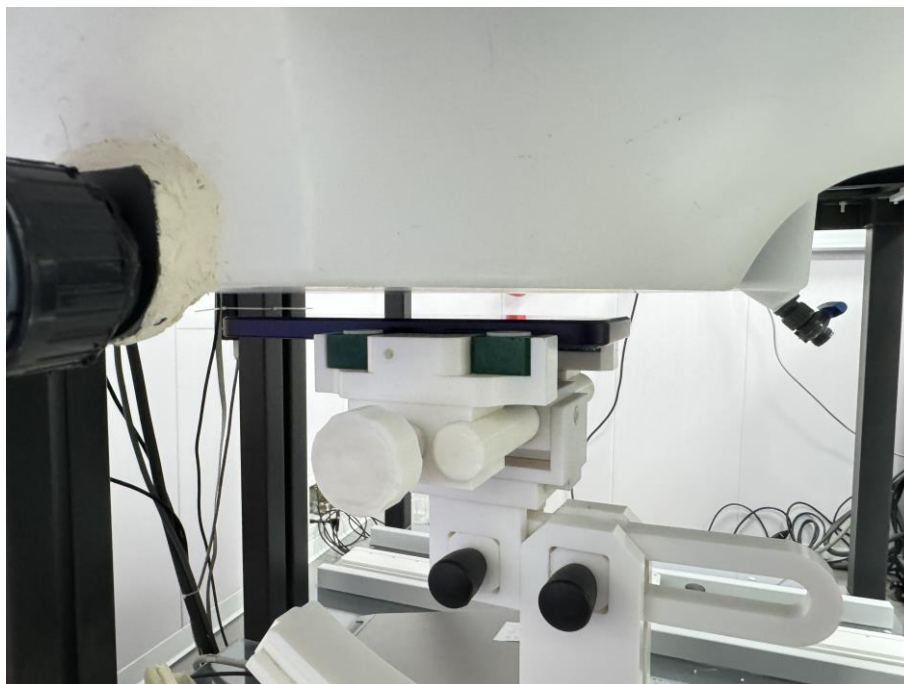
Left Tilt



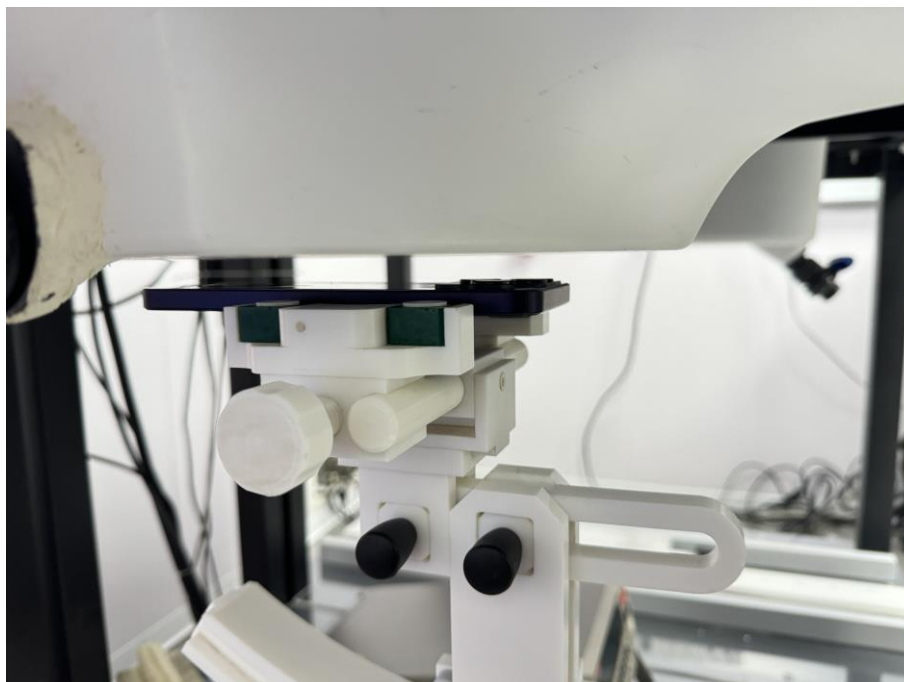
Body mode Exposure Conditions

Test distance: 10mm

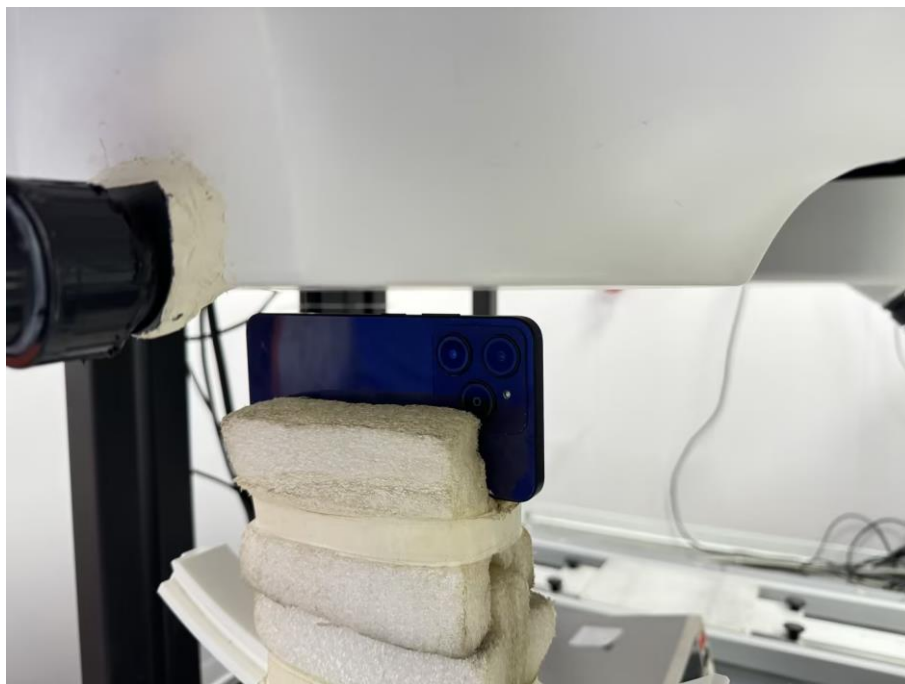
Body Front



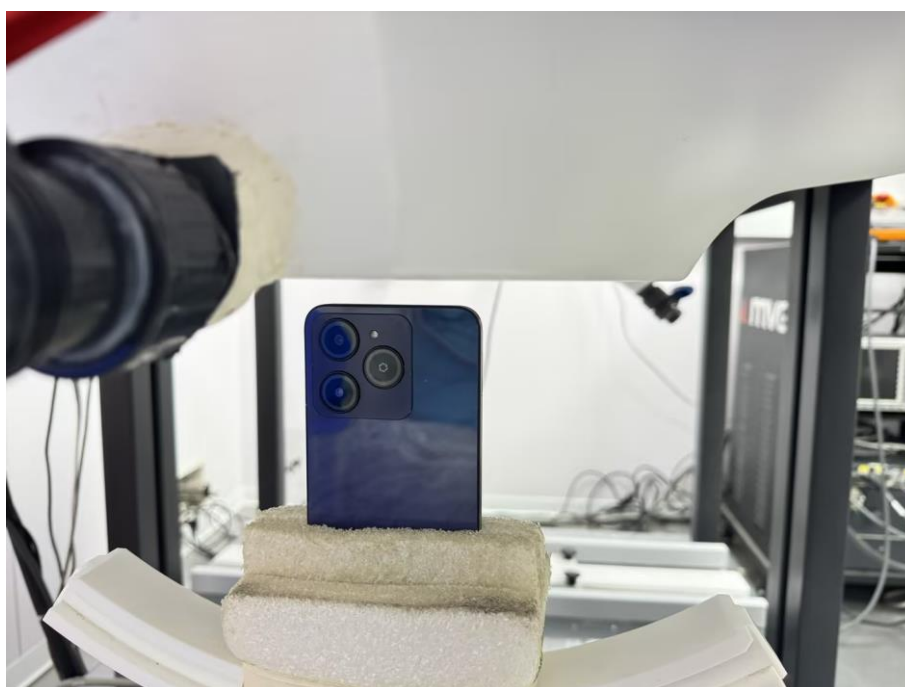
Body Back



Body Right



Body Top



Annex E. Calibration Certificate

Please refer to the exhibit for the calibration certificate

******* END OF REPORT *******