
SAR Test Report

Report No.: AGC16626250709FH01

FCC ID : 2AW3IF520

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION : TPMS Diagnostic Tool

BRAND NAME : XTOOL, AutoProPAD

MODEL NAME : F520, XTireProbe, X400S, TP300, TP380, TP500, TP580

APPLICANT : Shenzhen Xtooltech Intelligent Co., Ltd.

DATE OF ISSUE : Nov. 11 2025

STANDARD(S) : IEEE Std. 1528:2013
FCC 47 CFR Part 2§2.1093
IEEE Std C95.1™-2019

REPORT VERSION : V1.0

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Nov. 11 2025	Valid	Initial Release

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Test Report

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Manufacturer Name	Shenzhen Xtooltech Intelligent Co., Ltd.
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Product Designation	TPMS Diagnostic Tool
Brand Name	XTOOL, AutoProPAD
Model Name	F520
Series Model names	XTireProbe, X400S, TP300, TP380, TP500, TP580
Different Description	Only the model name is different, Software features, colors different.
EUT Voltage	DC 3.6V by battery
Applicable Standard	IEEE Std. 1528:2013 FCC 47 CFR Part 2§2.1093 IEEE Std C95.1™-2019
Date of receipt of test item	Jul. 25, 2025
Test Date	Oct. 21, 2025 to Oct. 24, 2025
Report Template	AGCRT-US-5G/SAR (2021-04-20)

Note: The results of testing in this report apply to the product/system which was tested only.



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Nov. 11 2025



Reviewed By

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Nov. 11 2025



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Nov. 11 2025

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1. SUMMARY OF MAXIMUM SAR VALUE

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

Frequency Band	Highest Reported 1g-SAR(W/kg)	SAR Test Limit (W/kg)
	Body-worn(with 5mm separation)	
2.4 GHz WIFI- Module ESP32-S3	0.155	1.6
2.4 GHz WIFI -Module RTL8821CS	0.313	
5.3 GHz WIFI	1.099	
5.6 GHz WIFI	1.240	
5.8 GHz WIFI	1.159	
SAR Test Result	PASS	

This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6W/kg) specified in IEEE Std. 1528:2013; FCC 47CFR § 2.1093; IEEE Std C95.1™-2019 and the following specific FCC Test Procedures:

- KDB 447498 D01 General RF Exposure Guidance v06
- KDB 865664 D01 SAR Measurement 100MHz to 6GHz v01r04
- KDB 248227 D01 802 11 Wi-Fi SAR v02r02
- KDB 941225 D07 UMPC Mini Tablet v01r02

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2. GENERAL INFORMATION

2.1. EUT Description

General Information	
Product Designation	TPMS Diagnostic Tool
Test Model	F520
Hardware Version	F520_V1.2
Software Version	N/A
Device Category	Portable
RF Exposure Environment	Uncontrolled
Antenna Type	PIFA Antenna
2.4GHz WIFI	
WIFI Specification	☒ 802.11b ☒ 802.11g ☒ 802.11n(20) ☒ 802.11n(40)
Operation Frequency	2412~2462MHz
Avg. Burst Power(dBm)	Module ESP32-S3: 11b:9.75dBm, 11g:9.55dBm, 11n(20):9.47dBm, 11n(40):9.60dBm Module RTL8821CS: 11b:13.47dBm, 11g:11.91dBm, 11n(20):11.64dBm, 11n(40):11.42dBm
Antenna Gain	Module ESP32-S3:2.57dBi, Module RTL8821CS: 2.80dBi;
5GHz WIFI	
WIFI Specification	☒ 802.11a ☒ 802.11n20 ☒ 802.11ac20 ☒ 802.11n40 ☒ 802.11ac40 ☒ 802.11ac80
Operation Frequency	U-NII-1: 5180MHz~5240MHz; U-NII-2A: 5260MHz~5320MHz; U-NII-2C: 5500MHz~5700MHz; U-NII-3: 5745MHz~5825MHz
Type of modulation	802.11a/n:(64-QAM, 16-QAM, QPSK, BPSK) OFDM 802.11ac :(256-QAM, 64-QAM, 16-QAM, QPSK, BPSK) OFDM
Avg. Burst Power(dBm)	U-NII-1:13.62dBm; U-NII-2A: 13.75dBm; U-NII-2C: 13.55dBm; U-NII-3: 11.56dBm
Antenna Gain	3.77dBi
Battery 1#	Brand name: Thanksun Model No. : XBL21700-4500 Voltage and Capacitance: DC 3.6 V & 4500mAh
Battery 2#	Brand name: LARGE Model No. : 01DQ0180-04 Voltage and Capacitance: DC 3.6 V & 4700mAh

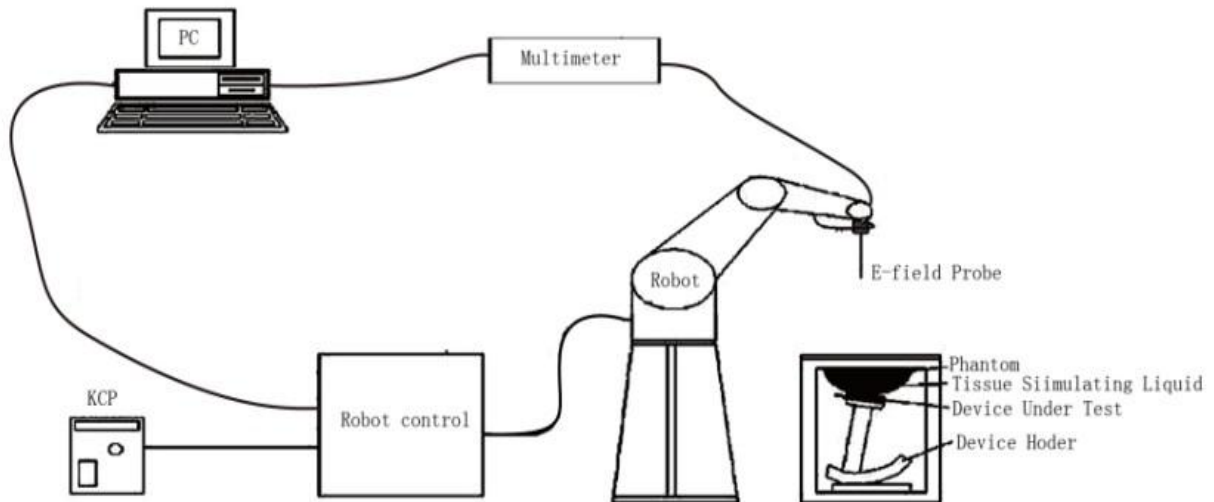
Note: 1.The sample used for testing is end product.

2. The test sample has no any deviation to the test method of standard mentioned in page 1.

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3. SAR MEASUREMENT SYSTEM

3.1. The SATIMO system used for performing compliance tests consists of following items



The COMOSAR system for performing compliance tests consists of the following items:

- The PC. It controls most of the bench devices and stores measurement data. A computer running WinXP and the Opensar software.
- The E-Field probe. The probe is a 3-axis system made of 3 distinct dipoles. Each dipole returns a voltage in function of the ambient electric field.
- The Keithley multimeter measures each probe dipole voltages.
- The SAM phantom simulates a human head. The measurement of the electric field is made inside the phantom.
- The liquids simulate the dielectric properties of the human head tissues.
- The network emulator controls the mobile phone under test.
- The validation dipoles are used to measure a reference SAR. They are used to periodically check the bench to make sure that there is no drift of the system characteristics over time.
- The phantom, the device holder and other accessories according to the targeted measurement.

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3.2. COMOSAR E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SATIMO. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. SATIMO conducts the probe calibration in compliance with international and national standards (e.g. IEEE1528 etc.) Under ISO17025. The calibration data are in Appendix D.

Isotropic E-Field Probe Specification

Model	SSE2		
Manufacture	MVG		
Identification No.	2023-EPGO-414		
Frequency	0.15GHz-7.5GHz Linearity:±0.10dB(0.15GHz-7.5GHz)		
Dynamic Range	0.01W/kg-100W/kg Linearity:±0.10dB		
Dimensions	Overall length:330mm Length of individual dipoles:2mm Maximum external diameter:8mm Probe Tip external diameter:2.5mm Distance between dipoles/ probe extremity:1mm		
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precisin of better 30%.		

3.3. Robot

The COMOSAR system uses the KUKA robot from SATIMO SA (France). For the 6-axis controller COMOSAR system, the KUKA robot controller version from SATIMO is used.

The XL robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller

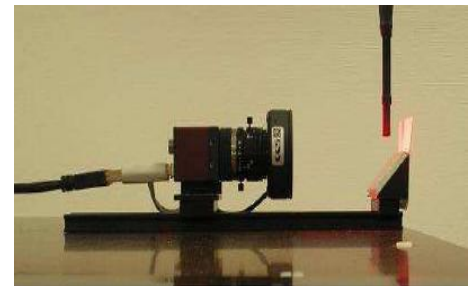


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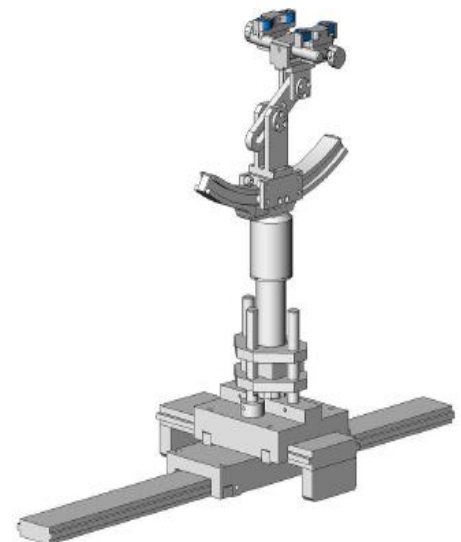
3.4. Video Positioning System

The video positioning system is used in OpenSAR to check the probe. Which is composed of a camera, LED, mirror and mechanical parts. The camera is piloted by the main computer with firewire link. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip. The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.



3.5. Device Holder

The COMOSAR device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR). Thus the device needs no repositioning when changing the angles. The COMOSAR device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon_r = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



3.6. SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas:

- Left head
- Right head
- Flat phantom



The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

ELLI39 Phantom

The Flat phantom is a fiberglass shell phantom with 2mm+/- 0.2 mm shell thickness. It has only one measurement area for Flat phantom



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4. SAR MEASUREMENT PROCEDURE

4.1. Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in 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 occupational/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.

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 given mass 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 can be obtained using either of the following equations:

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

$$SAR = c_h \left. \frac{dT}{dt} \right|_{t=0}$$

Where

SAR	is the specific absorption rate in watts per kilogram;
E	is the r.m.s. value of the electric field strength in the tissue in volts per meter;
σ	is the conductivity of the tissue in siemens per metre;
ρ	is the density of the tissue in kilograms per cubic metre;
c _h	is the heat capacity of the tissue in joules per kilogram and Kelvin;

$\left. \frac{dT}{dt} \right|_{t=0}$ is the initial time derivative of temperature in the tissue in kelvins per second

4.2. SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface is 2.7mm This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties,

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in SATIMO software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in db) is specified in the standards for compliance testing. For example, a 2db range is required in IEEE Standard 1528 standards, whereby 3db is a requirement when compliance is assessed in accordance with the ARIB standard (Japan) If one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximum are detected, the number of Zoom Scan has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100MHz to 6GHz

	$\leq 3 \text{ GHz}$	$> 3 \text{ GHz}$
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	$5 \pm 1 \text{ mm}$	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5 \text{ mm}$
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	$\leq 2 \text{ GHz}: \leq 15 \text{ mm}$ $2 - 3 \text{ GHz}: \leq 12 \text{ mm}$	$3 - 4 \text{ GHz}: \leq 12 \text{ mm}$ $4 - 6 \text{ GHz}: \leq 10 \text{ mm}$
	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 $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

Zoom Scan are used to assess the peak spatial SAR value within a cubic average volume containing 1g and 10g of simulated tissue. The Zoom Scan measures points(refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1g and 10g and displays these values next to the job's label.

Zoom Scan Parameters extracted from KDB865664 d01 SAR Measurement 100MHz to 6GHz

Maximum zoom scan spatial resolution: Δx_{Zoom} , Δy_{Zoom}			$\leq 2 \text{ GHz}: \leq 8 \text{ mm}$ $2 - 3 \text{ GHz}: \leq 5 \text{ mm}^*$	$3 - 4 \text{ GHz}: \leq 5 \text{ mm}^*$ $4 - 6 \text{ GHz}: \leq 4 \text{ mm}^*$
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		$\leq 5 \text{ mm}$	$3 - 4 \text{ GHz}: \leq 4 \text{ mm}$ $4 - 5 \text{ GHz}: \leq 3 \text{ mm}$ $5 - 6 \text{ GHz}: \leq 2 \text{ mm}$
	graded grid	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	$\leq 4 \text{ mm}$	$3 - 4 \text{ GHz}: \leq 3 \text{ mm}$ $4 - 5 \text{ GHz}: \leq 2.5 \text{ mm}$ $5 - 6 \text{ GHz}: \leq 2 \text{ mm}$
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		$\geq 30 \text{ mm}$	$3 - 4 \text{ GHz}: \geq 28 \text{ mm}$ $4 - 5 \text{ GHz}: \geq 25 \text{ mm}$ $5 - 6 \text{ GHz}: \geq 22 \text{ mm}$
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 <u>reported</u> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is $\leq 1.4 \text{ W/kg}$, $\leq 8 \text{ mm}$, $\leq 7 \text{ mm}$ and $\leq 5 \text{ mm}$ zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

Step 4: Power Drift Measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the same settings. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

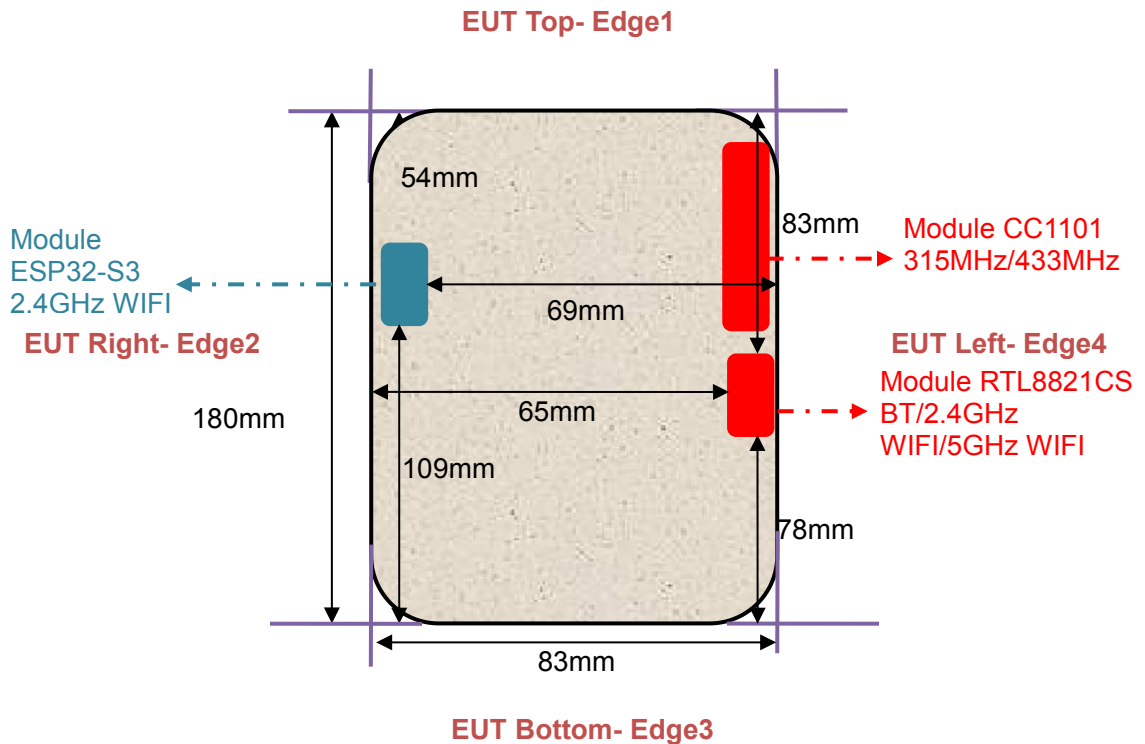
4.3. RF Exposure Conditions

Test Configuration and setting:

The device is a smart diagnostic system that supports 315MHz, 433MHz, 2.4GHz and 5GHz WIFI;

For SAR testing, the EUT is configured with the WLAN continuous TX tool through qualcomm software.

Antenna Location: (the back view)



Test Configurations	Antenna to edges/surface	SAR required
Module ESP32-S3		
Back	<25mm	Yes
Front	<25mm	Yes
Edge 1 (Top)	54mm>25mm	No
Edge 2 (Right)	5mm<25mm	Yes
Edge 3 (Bottom)	109mm>25mm	No
Edge 4 (Left)	69mm>25mm	No
Module RTL8821CS		
Back	<25mm	Yes
Front	<25mm	Yes
Edge 1 (Top)	83mm>25mm	No
Edge 2 (Right)	65mm<25mm	No
Edge 3 (Bottom)	78mm>25mm	No
Edge 4 (Left)	5mm<25mm	Yes

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5. TISSUE SIMULATING LIQUID

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 15cm. For head SAR testing the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in 5.2

5.1. The composition of the tissue simulating liquid

Frequency (MHz) \ Ingredient (% Weight)	Water	NaCl	Polysorbate 20	DGBE	1,2- Propanediol	Triton X-100	Diethylen glycol monohex ylether
2450 Head	71.88	0.16	0.0	7.99	0.0	19.97	0.0
5000 Head	65.52	0.0	0.0	0.0	0.0	17.24	17.24

5.2. Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in IEEE 1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in IEEE 1528.

Target Frequency (MHz)	head		body	
	ϵ_r	σ (S/m)	ϵ_r	σ (S/m)
300	45.3	0.87	45.3	0.87
450	43.5	0.87	43.5	0.87
835	41.5	0.90	41.5	0.90
900	41.5	0.97	41.5	0.97
1450	40.5	1.20	40.5	1.20
1800 – 2000	40.0	1.40	40.0	1.40
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	38.5	2.40
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5600	35.5	5.07	48.5	5.77
5800	35.3	5.27	48.2	6.00

(ϵ_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m³)

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5.3. Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using SATIMO Dielectric Probe Kit and R&S Network Analyzer ZVL6.

Tissue Stimulant Measurement for 2450MHz							
Head	Fr. (MHz)	Dielectric Parameters ($\pm 5\%$)		Ambient Temp [°C]	Relative Humidity (%)	Tissue Temp [°C]	Test time
		ϵ_r 39.2 (37.24-41.16)	δ [s/m]1.80 (1.71-1.89)				
	2412	41.03	1.82	21.1	50.7	20.8	Oct. 24, 2025
	2437	40.62	1.85				
	2450	40.23	1.87				
	2462	39.70	1.88				

Tissue Stimulant Measurement for 5300MHz							
Head	Fr. (MHz)	Dielectric Parameters ($\pm 5\%$)		Ambient Temp [°C]	Relative Humidity (%)	Tissue Temp [°C]	Test time
		ϵ_r 35.9 (34.105-37.695)	δ [s/m]4.76 (4.522-4.998)				
	5260	35.18	4.72	22.3	54.4	21.9	Oct. 21, 2025
	5300	34.80	4.75				
	5320	34.36	4.78				

Tissue Stimulant Measurement for 5600MHz							
Head	Fr. (MHz)	Dielectric Parameters ($\pm 5\%$)		Ambient Temp [°C]	Relative Humidity (%)	Tissue Temp [°C]	Test time
		ϵ_r 35.5 (33.725-37.275)	δ [s/m]5.07 (4.8165-5.3235)				
	5500	36.08	5.08	20.6	57.6	20.4	Oct. 22, 2025
	5580	35.16	5.10				
	5600	34.75	5.13				
	5700	33.92	5.15				

Tissue Stimulant Measurement for 5800MHz							
Head	Fr. (MHz)	Dielectric Parameters ($\pm 5\%$)		Ambient Temp [°C]	Relative Humidity (%)	Tissue Temp [°C]	Test time
		ϵ_r 35.3 (33.535-37.065)	δ [s/m] 5.27 (5.0065-5.5335)				
	5745	37.01	5.38	20.7	59.2	20.4	Oct. 23, 2025
	5785	36.91	5.41				
	5800	36.41	5.43				
	5825	35.69	5.47				

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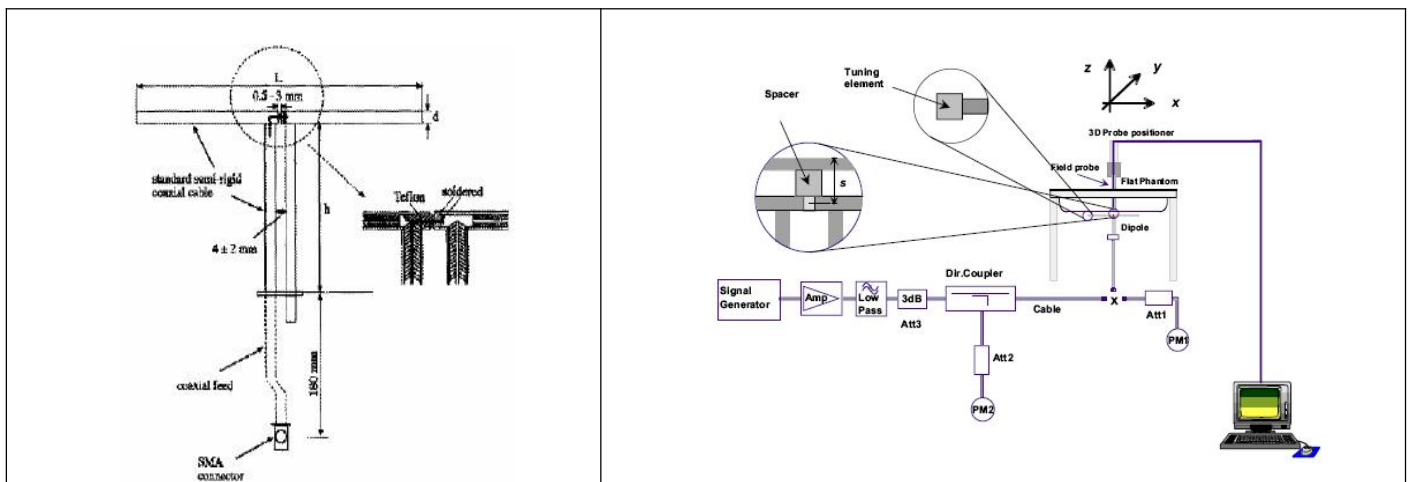
6. SAR SYSTEM CHECK PROCEDURE

6.1. SAR System Check Procedures

SAR system check is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

Each SATIMO system is equipped with one or more system check kits. These units, together with the predefined measurement procedures within the SATIMO software, enable the user to conduct the system check and system validation. System kit includes a dipole, and dipole device holder.

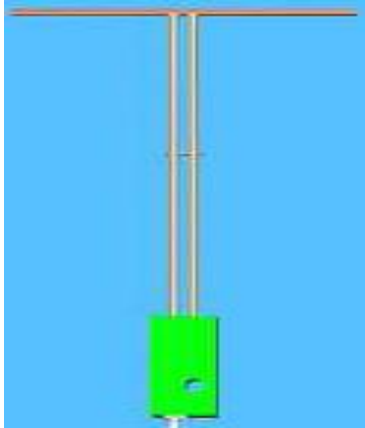
The system check verifies that the system operates within its specifications. It's performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system check setup is shown as below.



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6.2. SAR System Check

6.2.1. Dipoles

	The dipoles are based on the IEEE-1528 standard, and are complied with mechanical and electrical specifications in line with the requirements of IEEE. the table below provides details for the mechanical and electrical Specifications for the dipoles.
	The dipole is based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of IEEE. The table below provides details for the mechanical and electrical specifications for the wave guide.

Frequency	L (mm)	h (mm)	d (mm)
2450MHz	51.5	30.4	3.6
5000MHz	20.6	40.3	3.6

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6.2.2. System Check Result

System Performance Check at 2450MHz & 5200-5800MHz for Head							
Validation Kit: SN 2915 DIP 2G450-393 & SN 1722 DIP 5G000-671							
Frequency [MHz]	Target Value(W/kg)		Reference Result ($\pm 10\%$)		Normalized to 1W(W/kg)		Test time
	1g	10g	1g	10g	1g	10g	
2450	52.85	24.53	47.57-58.14	22.08-26.98	52.27	24.19	Oct. 24, 2025
5200	77.74	22.60	69.97-85.51	20.34-24.86	74.30	23.70	Oct. 21, 2025
5600	80.69	23.28	72.62-88.76	20.95-25.61	73.20	24.10	Oct. 22, 2025
5800	75.01	21.84	67.51-82.51	19.66-24.02	74.50	23.80	Oct. 23, 2025

Note:

(1) We use a CW signal of 15dBm/10dBm for system check, and then all SAR values are normalized to 1W forward power. The result must be within $\pm 10\%$ of target value.

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7. EUT TEST POSITION

This EUT was tested in **body back, body front, edge2 and edge4.**

7.1. Body Worn Position

- (1) To position the EUT parallel to the phantom surface.
- (2) To adjust the EUT parallel to the flat phantom.
- (3) To adjust the distance between the EUT surface and the flat phantom to **5mm.**

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8. SAR EXPOSURE LIMITS

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

Type Exposure	Uncontrolled Environment Limit (W/kg)
Spatial Peak SAR (1 g cube tissue for brain or body)	1.60
Spatial Average SAR (Whole body)	0.08
Spatial Peak SAR (Limbs)	4.0

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9. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

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10. TEST EQUIPMENT LIST

No.	Equipment description	Manufacturer/ Model	Identification No.	Software version	Current calibration date	Next calibration date
AGC-HE-A103	SAR Probe	MVG	2023-EPGO-414	N/A	2025-05-06	2026-05-05
AGC-HE-A071	Phantom	SATIMO	SN_2316_ELLI39	N/A	Validated. No cal required.	Validated. No cal required.
AGC-HE-A073	Multimeter	Keithley 2000	4114939	N/A	2025-05-16	2026-05-15
AGC-HE-S003	SAR Software	MVG-OpenSAR	N/A	V5.3.15.8	N/A	N/A
AGC-HE-A061	Dipole	SATIMO SID2450	SN 2915 DIP 2G450-393	N/A	2025-05-16	2028-05-15
AGC-HE-A101	Dipole	SID5000	SN 1722 DIP 5G000-671	N/A	2025-05-16	2028-05-15
AGC-HE-E021	Signal Generator	Agilent-E4438C	US41461365	V5.03	2025-05-21	2026-05-20
AGC-EM-E061	EXA Signal Analyzer	Agilent / N9010A	MY53470504	N/A	2025-05-08	2026-05-07
AGC-HE-E004	Network Analyzer	Rhode & Schwarz ZVL6	101443	3.2	2025-07-18	2026-07-17
AGC-ER-A001	Attenuator	SMA-JK	N/A	N/A	2025-09-05	2027-09-04
AGC-EM-E019	Amplifier	AS0104-55_55	1004793	N/A	N/A	N/A
AGC-EM-E040	Directional Couple	Werlatone/ C5571-10	SN99463	N/A	2024-02-01	2026-01-31
AGC-EM-E041	Directional Couple	Werlatone/ C6026-10	SN99482	N/A	2024-02-01	2026-01-31
AGC-BQ-E016	Power Sensor	NRP-Z21	104604	N/A	2025-05-16	2026-05-15
AGC-HE-E023	Power Sensor	NRP-Z23	100323	N/A	2025-01-14	2026.01-13
AGC-HE-S004	Power Viewer	R&S	V2.3.1.0		N/A	N/A
AGC-HE-A001	Calibration standard parts for network sub - port	R&S/ ZV-Z132	100707	V2.3.1.0	2024-11-08	2025-11-07
AGC-HE-A002	Thermometer	DigiMate/TP677	3811930452	N/A	2025-05-24	2027-05-23

Note: IEC/IEEE 62209-1528 Dipole SAR Validation, AGC Lab has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;
3. Return-loss is within 20% of calibrated measurement;
4. Impedance is within 5Ω of calibrated measurement.

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11. MEASUREMENT UNCERTAINTY

SATIMO Uncertainty- 2023-EPGO-414 Measurement uncertainty for DUT averaged over 1 gram / 10 gram.									
Uncertainty Component	Sec.	Tol (+-%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	vi
Measurement System									
Probe calibration	E.2.1	7.000	N	1	1	1	7.000	7.000	∞
Axial Isotropy	E.2.2	0.105	R	1.732	0.707	0.707	0.043	0.043	∞
Hemispherical Isotropy	E.2.2	0.105	R	1.732	0.707	0.707	0.043	0.043	∞
Boundary effect	E.2.3	1.000	R	1.732	1	1	0.577	0.577	∞
Linearity	E.2.4	1.105	R	1.732	1	1	0.638	0.638	∞
System detection limits	E.2.4	1.000	R	1.732	1	1	0.577	0.577	∞
Modulation response	E.2.5	3.000	R	1.732	1	1	1.732	1.732	∞
Readout Electronics	E.2.6	0.021	N	1	1	1	0.021	0.021	∞
Response Time	E.2.7	0.000	R	1.732	1	1	0.000	0.000	∞
Integration Time	E.2.8	1.400	R	1.732	1	1	0.808	0.808	∞
RF ambient conditions-Noise	E.6.1	3.000	R	1.732	1	1	1.732	1.732	∞
RF ambient conditions-reflections	E.6.1	3.000	R	1.732	1	1	1.732	1.732	∞
Probe positioner mechanical tolerance	E.6.2	1.400	R	1.732	1	1	0.808	0.808	∞
Probe positioning with respect to phantom shell	E.6.3	1.400	R	1.732	1	1	0.808	0.808	∞
Extrapolation, interpolation, and integrations algorithms for max. SAR evaluation	E.5	2.300	R	1.732	1	1	1.328	1.328	∞
Test sample Related									
Test sample positioning	E.4.2	2.6	N	1	1	1	2.60	2.60	∞
Device holder uncertainty	E.4.1	3	N	1	1	1	3.00	3.00	∞
Output power variation—SAR drift measurement	E.2.9	5	R	1.732	1	1	2.89	2.89	∞
SAR scaling	E.6.5	5	R	1.732	1	1	2.89	2.89	∞
Phantom and tissue parameters									
Phantom shell uncertainty—shape, thickness, and permittivity	E.3.1	4	R	1.732	1	1	2.309	2.309	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E.3.2	1.9	N	1	1	0.84	1.900	1.596	∞
Liquid conductivity measurement	E.3.3	4	N	1	0.78	0.71	3.120	2.840	M
Liquid permittivity measurement	E.3.3	5	N	1	0.23	0.26	1.150	1.300	M
Liquid conductivity—temperature uncertainty	E.3.4	2.5	R	1.732	0.78	0.71	1.126	1.025	∞
Liquid permittivity—temperature uncertainty	E.3.4	2.5	R	1.732	0.23	0.26	0.332	0.375	∞
Combined Standard Uncertainty			RSS				10.533	10.348	
Expanded Uncertainty (95% Confidence interval)			K=2				21.065	20.695	

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SATIMO Uncertainty- 2023-EPGO-414									
System Validation uncertainty for DUT averaged over 1 gram / 10 gram.									
Uncertainty Component	Sec.	Tol (+-%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	vi
Measurement System									
Probe calibration	E.2.1	7.000	N	1	1	1	7.000	7.000	∞
Axial Isotropy	E.2.2	0.105	R	1.732	1.000	1.000	0.061	0.061	∞
Hemispherical Isotropy	E.2.2	0.105	R	1.732	0.000	0.000	0.000	0.000	∞
Boundary effect	E.2.3	1.000	R	1.732	1.000	1.000	0.577	0.577	∞
Linearity	E.2.4	1.105	R	1.732	1.000	1.000	0.638	0.638	∞
System detection limits	E.2.4	1.000	R	1.732	1.000	1.000	0.577	0.577	∞
Modulation response	E.2.5	3.000	R	1.732	0.000	0.000	0.000	0.000	∞
Readout Electronics	E.2.6	0.021	N	1.000	1.000	1.000	0.021	0.021	∞
Response Time	E.2.7	0.000	R	1.732	0.000	0.000	0.000	0.000	∞
Integration Time	E.2.8	1.400	R	1.732	0.000	0.000	0.000	0.000	∞
RF ambient conditions-Noise	E.6.1	3.000	R	1.732	1.000	1.000	1.732	1.732	∞
RF ambient conditions-reflections	E.6.1	3.000	R	1.732	1.000	1.000	1.732	1.732	∞
Probe positioner mechanical tolerance	E.6.2	1.400	R	1.732	1.000	1.000	0.808	0.808	∞
Probe positioning with respect to phantom shell	E.6.3	1.400	R	1.732	1.000	1.000	0.808	0.808	∞
Extrapolation, interpolation, and integrations algorithms for max. SAR evaluation	E.5	2.300	R	1.732	1.000	1.000	1.328	1.328	∞
System validation source									
Deviation of experimental dipole from numerical dipole	E.6.4	5	N	1	1	1	5	5	∞
Input power and SAR drift measurement	8,6.6.4	5	R	1.732	1	1	2.887	2.887	∞
Dipole axis to liquid distance	8,E.6.6	2	R	1.732	1	1	1.155	1.155	∞
Phantom and set-up									
Phantom shell uncertainty—shape, thickness, and permittivity	E.3.1	4	R	1.732	1	1	2.309	2.309	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E.3.2	1.9	N	1	1	0.84	1.9	1.596	∞
Liquid conductivity (temperature uncertainty)	E.3.3	4	N	1	0.78	0.71	3.12	2.84	∞
Liquid conductivity (measured)	E.3.3	5	N	1	0.23	0.26	1.15	1.3	M
Liquid permittivity (temperature uncertainty)	E.3.4	2.5	R	1.732	0.78	0.71	1.126	1.025	∞
Liquid permittivity (measured)	E.3.4	2.5	R	1.732	0.23	0.26	0.332	0.375	M
Combined Standard Uncertainty			RSS				10.466	10.279	
Expanded Uncertainty (95% Confidence interval)			K=2				20.931	20.559	

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SATIMO Uncertainty- 2023-EPGO-414									
System Check uncertainty for DUT averaged over 1 gram / 10 gram.									
Uncertainty Component	Sec.	Tol (+-%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	vi
Measurement System									
Probe calibration drift	E.2.1.3	0.500	N	1	1	1	0.5	0.5	∞
Axial Isotropy	E.2.2	0.105	R	1.732	0	0	0	0	∞
Hemispherical Isotropy	E.2.2	0.105	R	1.732	0	0	0	0	∞
Boundary effect	E.2.3	1.000	R	1.732	0	0	0	0	∞
Linearity	E.2.4	1.105	R	1.732	0	0	0	0	∞
System detection limits	E.2.4	1	R	1.732	0	0	0	0	∞
Modulation response	E.2.5	3	R	1.732	0	0	0	0	∞
Readout Electronics	E.2.6	0.021	N	1	0	0	0	0	∞
Response Time	E.2.7	0	R	1.732	0	0	0	0	∞
Integration Time	E.2.8	1.4	R	1.732	0	0	0	0	∞
RF ambient conditions-Noise	E.6.1	3	R	1.732	0	0	0	0	∞
RF ambient conditions-reflections	E.6.1	3	R	1.732	0	0	0	0	∞
Probe positioner mechanical tolerance	E.6.2	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to phantom shell	E.6.3	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation, and integrations algorithms for max. SAR evaluation	E.5	2.3	R	$\sqrt{3}$	0	0	0	0.00	∞
System check source (dipole)									
Deviation of experimental dipoles	E.6.4	2	N	1	1	1	2	2	∞
Input power and SAR drift measurement	8,6.6.4	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Dipole axis to liquid distance	8,E.6.6	2	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Phantom and tissue parameters									
Phantom shell uncertainty—shape, thickness, and permittivity	E.3.1	4	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E.3.2	1.9	N	1.000	1	0.84	1.90	1.60	∞
Liquid conductivity measurement	E.3.3	4	N	1.000	0.78	0.71	3.12	2.84	∞
Liquid permittivity measurement	E.3.3	5	N	1.000	0.23	0.26	1.15	1.30	M
Liquid conductivity—temperature uncertainty	E.3.4	2.5	R	$\sqrt{3}$	0.78	0.71	1.13	1.02	∞
Liquid permittivity—temperature uncertainty	E.3.4	2.5	R	$\sqrt{3}$	0.23	0.26	0.33	0.38	M
Combined Standard Uncertainty			RSS				5.562	5.203	
Expanded Uncertainty (95% Confidence interval)			K=2				11.124	10.406	

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12. CONDUCTED POWER MEASUREMENT

2.4GHz WIFI

Mode	Data Rate (Mbps)	Channel	Frequency(MHz)	Avg. Burst Power (dBm)
Module ESP32-S3				
802.11b	1	01	2412	9.75
		06	2437	9.28
		11	2462	8.28
802.11g	6	01	2412	9.55
		06	2437	9.10
		11	2462	8.18
802.11n HT20	6.5	01	2412	9.47
		06	2437	9.01
		11	2462	8.00
802.11n HT40	13.5	03	2422	9.60
		06	2437	9.40
		09	2452	8.76
Module RTL8821CS				
802.11b	1	01	2412	13.47
		06	2437	12.33
		11	2462	11.72
802.11g	6	01	2412	11.91
		06	2437	10.96
		11	2462	10.22
802.11n HT20	6.5	01	2412	11.64
		06	2437	10.53
		11	2462	9.95
802.11n HT40	13.5	03	2422	11.42
		06	2437	10.85
		09	2452	10.33

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5GHz WIFI- Module RTL8821CS

Mode	channel	Frequency	Average Power (dBm)							
			Data Rate(bps)							
			6M	9M	12M	18M	24M	36M	48M	54M
802.11a	36	5180	12.13	12.00	11.83	11.70	11.68	11.61	11.59	11.52
	40	5200	12.52	12.51	12.39	12.27	12.16	12.09	11.93	11.80
	48	5240	13.62	13.49	13.37	13.35	13.17	13.16	12.97	12.84
	52	5260	13.30	13.19	13.07	12.97	12.93	12.92	12.84	12.70
	60	5300	13.75	13.74	13.61	13.49	13.46	13.30	13.20	13.07
	64	5320	13.35	13.24	13.05	13.03	12.97	12.87	12.86	12.76
	100	5500	11.04	10.91	10.85	10.79	10.76	10.59	10.48	10.30
	116	5580	13.55	13.38	13.21	13.11	12.99	12.85	12.74	12.70
	140	5700	8.29	8.24	8.21	8.13	8.10	7.96	7.81	7.67
	149	5745	10.08	9.90	9.84	9.69	9.52	9.41	9.37	9.22
	157	5785	10.24	10.24	10.15	10.01	9.87	9.76	9.60	9.42
	165	5825	11.56	11.54	11.36	11.35	11.16	10.98	10.93	10.90
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (20)	36	5180	11.27	11.08	11.06	10.93	10.92	10.88	10.81	10.61
	40	5200	11.43	11.33	11.23	11.20	11.18	11.07	10.98	10.88
	48	5240	12.31	12.15	12.00	11.85	11.80	11.61	11.56	11.50
	52	5260	12.44	12.26	12.08	11.89	11.72	11.59	11.44	11.33
	60	5300	12.87	12.70	12.56	12.37	12.29	12.13	11.94	11.91
	64	5320	12.64	12.53	12.39	12.31	12.26	12.21	12.13	12.01
	100	5500	9.64	9.49	9.29	9.21	9.15	9.01	8.86	8.70
	116	5580	12.05	11.98	11.80	11.75	11.56	11.37	11.33	11.32
	140	5700	7.50	7.32	7.25	7.19	7.16	7.00	6.92	6.83
	149	5745	9.87	9.76	9.65	9.55	9.50	9.34	9.28	9.11
	157	5785	10.02	9.88	9.80	9.71	9.65	9.54	9.51	9.41
	165	5825	11.34	11.19	11.14	11.08	11.06	10.97	10.78	10.77
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (40)	38	5190	9.36	9.32	9.26	9.15	9.09	9.00	9.00	8.85
	46	5230	10.03	9.97	9.77	9.63	9.60	9.58	9.43	9.26
	54	5270	10.37	10.24	10.16	10.04	9.91	9.83	9.75	9.72
	62	5310	10.65	10.58	10.53	10.47	10.43	10.32	10.29	10.28
	102	5510	8.10	8.02	7.99	7.87	7.78	7.60	7.59	7.51
	110	5550	9.39	9.30	9.27	9.24	9.08	9.04	8.99	8.90
	134	5670	6.12	5.93	5.88	5.77	5.58	5.40	5.23	5.14
	151	5755	9.71	9.61	9.56	9.44	9.29	9.18	9.01	8.97
	159	5795	10.06	9.95	9.90	9.89	9.88	9.69	9.68	9.53

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Mode	channel	Frequency	Average Power (dBm)							
			Data Rate(bps)							
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11ac (20)	36	5180	11.64	11.53	11.38	11.33	11.24	11.21	11.16	11.12
	40	5200	11.76	11.73	11.58	11.47	11.45	11.30	11.22	11.15
	48	5240	12.49	12.47	12.39	12.27	12.08	12.06	12.00	11.85
	52	5260	12.57	12.45	12.27	12.16	12.14	12.11	12.10	12.08
	60	5300	13.06	12.97	12.88	12.80	12.71	12.63	12.61	12.47
	64	5320	12.47	12.28	12.13	11.96	11.79	11.64	11.51	11.48
	100	5500	9.91	9.90	9.87	9.67	9.58	9.56	9.49	9.34
	116	5580	12.02	11.89	11.86	11.71	11.68	11.61	11.59	11.56
	140	5700	7.42	7.24	7.07	6.93	6.81	6.61	6.47	6.40
	149	5745	9.79	9.67	9.65	9.52	9.52	9.40	9.29	9.23
	157	5785	10.07	9.88	9.70	9.53	9.33	9.16	9.08	8.92
	165	5825	11.17	11.03	11.01	10.92	10.88	10.84	10.66	10.50
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11ac (40)	38	5190	9.27	9.22	9.13	9.08	8.97	8.81	8.78	8.77
	46	5230	10.03	9.99	9.97	9.86	9.82	9.64	9.63	9.55
	54	5270	10.33	10.23	10.11	9.97	9.82	9.73	9.57	9.47
	62	5310	10.55	10.39	10.21	10.17	10.05	9.92	9.87	9.74
	102	5510	8.00	7.81	7.79	7.76	7.63	7.52	7.52	7.46
	110	5550	9.47	9.40	9.33	9.17	9.03	9.01	8.92	8.84
	134	5670	6.02	5.86	5.70	5.65	5.61	5.56	5.45	5.44
	151	5755	9.64	9.63	9.54	9.35	9.31	9.11	9.06	8.94
	159	5795	10.15	9.96	9.81	9.69	9.54	9.54	9.35	9.15
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11ac (80)	42	5210	8.66	8.56	8.42	8.30	8.30	8.27	8.18	8.08
	58	5290	9.55	9.42	9.29	9.25	9.17	9.12	9.08	9.06
	106	5530	7.02	6.90	6.79	6.72	6.56	6.50	6.43	6.37
	138	5690	7.48	7.44	7.30	7.14	6.97	6.92	6.91	6.84
	155	5775	10.06	9.94	9.79	9.62	9.57	9.54	9.47	9.37

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According to FCC KDB 447498 D01 "General SAR test exclusion guidance" The corresponding SAR Exclusion Threshold condition, listed below:

- ◆ The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
 - $[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR, where
 - $f(\text{GHz})$ is the RF channel transmit frequency in GHz.
 - Power and distance are rounded to the nearest mW and mm before calculation.
 - The result is rounded to one decimal place for comparison. The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.
- ◆ At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:
 - [Threshold at 50 mm in step 1) + (test separation distance - 50mm) ($f(\text{MHz})/150$)] mW, at 100MHz to 1500 MHz;
 - [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)-10] mW at > 1500 MHz and ≤ 6 GHz;
- ◆ At frequencies below 100 MHz, the following may be considered for SAR test exclusion.
 - The threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by $[1 + \log(100/f(\text{MHz}))]$ for test separation distances > 50 mm and < 200 mm.
 - The threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by 1/2 for test separation distances ≤ 50 mm.
 - SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable.

Test Mode	Field Strength (dBuV/m@3m)	Max Output power (dBm)	Max Output power (mW)	Threshold Value (mW)
433MHz	82.86	-17.07	0.01963	172.43
315MHz	79.68	-20.25	0.00944	237.97

Note:

1. Max Output Power (dBm) = Field Strength of Fundamental (dBuV/m@3m)-95.23-4.7.
2. Max Output Power (mW) = $10^{(\text{Max power (dBm)}/10)}$

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13. TEST RESULTS

13.1. SAR Test Results Summary

13.1.1. Test position and configuration

1. The EUT is a smart diagnostic system that supports 315MHz, 433MHz, 2.4GHz and 5GHz WIFI.
2. Per KDB 447498 D01, Lab use the head liquid with a separation of 0mm at flat phantom to test back, front edge2 and edge4.
3. For SAR testing, the device was controlled by software to test at reference fixed frequency points.

13.1.2. Operation Mode

1. Per KDB 447498 D01 v06 ,for each exposure position, if the highest 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional.
2. Per KDB 865664 D01 v01r04,for each frequency band, if the measured SAR is ≥ 0.8 W/kg, testing for repeated SAR measurement is required , that the highest measured SAR is only to be tested. When the SAR results are near the limit, the following procedures are required for each device to verify these types of SAR measurement related variation concerns by repeating the highest measured SAR configuration in each frequency band.
 - (1) When the original highest measured SAR is ≥ 0.8 W/kg, repeat that measurement once.
 - (2) 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.
 - (3) Perform a third repeated measurement only if the original, first and second repeated measurement is ≥ 1.5 W/kg and ratio of largest to smallest SAR for the original, first and second measurement is ≥ 1.20 .
3. Per KDB 941225 D07 UMPC Mini Tablet v01r02,UMPC mini-tablet devices must be tested for 1-g SAR on all surfaces and side edges with a transmitting antenna located at ≤ 25 mm from that surface or edge, at 5 mm separation from a flat phantom, for the data modes, wireless technologies and frequency bands supported by the device to determine SAR compliance
4. Per KDB 248227 D01 v02r02 Chapter 5.2.2,when SAR measurement is required for 2.4GHz 802.11g/n OFDM configurations, the measurement and test reducing procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.
 - (1) When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.
 - (2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg,
5. Per KDB 248227 D01 v02r02 Chapter 5.3.4, SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. The initial test position procedure is applied to next to the ear, UMPC mini-tablet and hotspot mode configurations. When the same maximum output power is specified for multiple transmission modes, the procedures in 5.3.2 are applied to determine the test configuration. Additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. The subsequent test configuration and SAR measurement procedures are described in the following.
 - (1) When SAR test exclusion provisions of KDB Publication 447498 D01 are applicable and SAR measurement is not required for the initial test configuration, SAR is also not required for the next

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highest maximum output power transmission mode subsequent test configuration(s) in that frequency band or aggregated band and exposure configuration.

- (2) When the highest reported SAR for the initial test configuration (when applicable, include subsequent highest output channels), according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.
 - (3) When the specified maximum output power is same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the report SAR for UNII 2A is < 1.2 W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.
 - (4) When the specified maximum output power different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is ≤ 1.2 W/kg, testing for the band with the lower specified output power is not required; otherwise test is remaining separately for SAR;
6. Maximum Scaling SAR in order to calculate the Maximum SAR values to test under the standard Peak Power, Calculation method is as follows:
Maximum Scaling SAR = tested SAR (Max.) $\times$ [maximum turn-up power (mW)/ maximum measurement output power(mW)]

13.1.3. SAR Test Results Summary

SAR MEASUREMENT										
Depth of Liquid (cm):>15										
Product: Smart Diagnostic System										
Test Mode: 2.4GHz 802.11b										
Position	Mode	Ch.	Fr. (MHz)	Power Drift (<±5%)	SAR (1g) (W/kg)	Max. Tune-up Power (dBm)	Meas. Output Power (dBm)	Tune-up Scaling factor	Scaled SAR (W/kg)	Limit W/kg
Module ESP32-S3-Battery 1#										
Body back	DTS	1	2412	-4.810	0.106	9.80	9.75	1.012	0.107	1.6
Body back	DTS	6	2437	-1.020	0.109	9.80	9.28	1.127	0.123	1.6
Body back	DTS	11	2462	-1.290	0.109	9.80	8.28	1.419	0.155	1.6
Body front	DTS	6	2437	-1.100	0.031	9.80	9.28	1.127	0.035	1.6
Edge 2 (Right)	DTS	6	2437	2.360	0.079	9.80	9.28	1.127	0.089	1.6
Module ESP32-S3-Battery 2#										
Body back	DTS	11	2462	-3.610	0.110	9.80	9.28	1.127	0.124	1.6
Module RTL8821CS-Battery 1#										
Body back	DTS	1	2412	-1.910	0.203	13.50	13.47	1.007	0.204	1.6
Body back	DTS	6	2437	-2.710	0.204	13.50	12.33	1.309	0.267	1.6
Body back	DTS	11	2462	-1.510	0.208	13.50	11.72	1.507	0.313	1.6
Body front	DTS	6	2437	-0.430	0.053	13.50	12.33	1.309	0.069	1.6
Edge 4 (Left)	DTS	6	2437	4.350	0.113	13.50	12.33	1.309	0.148	1.6
Module RTL8821CS-Battery 2#										
Body back	DTS	11	2462	-2.020	0.204	13.50	11.72	1.507	0.307	1.6

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SAR MEASUREMENT									
Depth of Liquid (cm):>15									
Product: Smart Diagnostic System									
Test Mode: 5.3GHz 802.11a									
Position	Ch.	Fr. (MHz)	Power Drift (<±5%)	SAR (1g) (W/kg)	Max. Tune-up Power (dBm)	Meas. Output Power (dBm)	Tune-up Scaling factor	Scaled SAR (W/kg)	Limit (W/kg)
Module RTL8821CS-Battery 1#									
Body back	52	5260	-4.100	0.779	13.80	13.30	1.122	0.874	1.6
Body back	60	5300	-1.260	0.758	13.80	13.75	1.012	0.767	1.6
Body back	64	5320	-1.640	0.991	13.80	13.35	1.109	1.099	1.6
Body front	60	5300	-4.370	0.083	13.80	13.75	1.012	0.084	1.6
Edge 4 (Left)	60	5300	-4.930	0.566	13.80	13.75	1.012	0.573	1.6
Module RTL8821CS-Battery 2#									
Body back	64	5320	-3.780	0.956	13.80	13.35	1.109	1.060	1.6

According to KDB 248227 D01 802 11 Wi-Fi SAR v02r02 Section 5.3.1

b) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

U-NII-1 Band(dBm)	U-NII-1 Band(mW)	NII-2A Band(dBm)	NII-2A Band(mW)	The highest reported SAR for U-NII-2A Band (W/kg)	The adjusted SAR(W/kg)	Limit(W/kg)
13.75	23.71	13.62	23.01	1.099	1.067	1.2

$$1.099 \times 23.01 / 23.71 = 1.067$$

Conclusion: SAR is not required for U-NII-1 Band.

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SAR MEASUREMENT									
Depth of Liquid (cm):>15									
Product: Smart Diagnostic System									
Test Mode: 5.6GHz 802.11a									
Position	Ch.	Fr. (MHz)	Power Drift (<±5%)	SAR (1g) (W/kg)	Max. Tune-up Power (dBm)	Meas. Output Power (dBm)	Tune-up Scaling factor	Scaled SAR (W/kg)	Limit (W/kg)
Module RTL8821CS-Battery 1#									
Body back	100	5500	-2.710	1.172	11.10	11.04	1.014	1.188	1.6
Body back	116	5580	-2.340	1.226	13.60	13.55	1.012	1.240	1.6
Body back	140	5700	-3.740	1.165	8.30	8.29	1.002	1.168	1.6
Body front	116	5580	-1.400	0.129	13.60	13.55	1.012	0.130	1.6
Edge 4 (Left)	116	5580	-3.820	0.735	13.60	13.55	1.012	0.744	1.6
Module RTL8821CS-Battery 2#									
Body back	116	5580	-2.330	1.098	13.60	13.55	1.012	1.111	1.6

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SAR MEASUREMENT									
Depth of Liquid (cm):>15									
Product: Smart Diagnostic System									
Test Mode: 5.8GHz 802.11a									
Position	Ch.	Fr. (MHz)	Power Drift (<±5%)	SAR (1g) (W/kg)	Max. Tune-up Power (dBm)	Meas. Output Power (dBm)	Tune-up Scaling factor	Scaled SAR (W/kg)	Limit (W/kg)
Module RTL8821CS-Battery 1#									
Body back	149	5745	-4.110	1.099	10.30	10.08	1.052	1.156	1.6
Body back	157	5785	-1.270	1.143	10.30	10.24	1.014	1.159	1.6
Body back	165	5825	-1.970	1.127	11.60	11.56	1.009	1.137	1.6
Body front	149	5745	-9.180	0.167	11.60	11.56	1.009	0.169	1.6
Edge 4 (Left)	149	5745	-3.820	0.834	10.30	10.08	1.052	0.877	1.6
Edge 4 (Left)	157	5785	1.250	0.759	10.30	10.24	1.014	0.770	1.6
Edge 4 (Left)	165	5825	-1.550	0.839	11.60	11.56	1.009	0.847	1.6
Module RTL8821CS-Battery 2#									
Body back	157	5785	-0.370	1.131	10.30	10.24	1.014	1.147	1.6

Note:

- When the 1-g SAR is $\leq 0.8\text{W/kg}$, testing for low and high channel is optional.
- The test separation of all above table is 5mm.
- Plots are only shown for the bold marked worst case SAR results

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Repeated SAR									
Product: TPMS Diagnostic Tool									
Test Mode: 5.3GHz & 5.6GHz&5.8GHz									
Position	Ch.	Fr. (MHz)	Power Drift (<±5%)	Once SAR (1g) (W/kg)	Power Drift (<±5%)	Twice SAR (1g) (W/kg)	Power Drift (<±5%)	Third SAR (1g) (W/kg)	Limit W/kg
Body back	64	5320	-1.730	0.969	--	--	--	--	1.6
Body back	116	5580	-1.150	1.093	--	--	--	--	1.6
Body back	157	5785	-4.230	1.121	--	--	--	--	1.6

The second repeated SAR judge reference							
Product: TPMS Diagnostic Tool							
Band	Position	Ch.	Fr. (MHz)	Orignal SAR (1g) (W/kg)	First SAR (1g) (W/kg)	Ratio	Limit
5.3GHz	Body back	64	5320	0.991	0.969	1.023	<1.2
5.6GHz	Body back	116	5580	1.226	1.093	1.122	<1.2
5.8GHz	Body back	157	5785	1.143	1.121	1.020	<1.2

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APPENDIX A. SAR SYSTEM CHECK DATA

Test Laboratory: AGC Lab

Date: Oct. 24, 2025

System Check Head 2450 MHz

DUT: Dipole 2450 MHz Type: SID 2450

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Duty Cycle: 1:1; Conv.F=2.29

Frequency: 2450 MHz; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.87$ mho/m; $\epsilon_r = 40.23$; $\rho = 1000$ kg/m³ ;

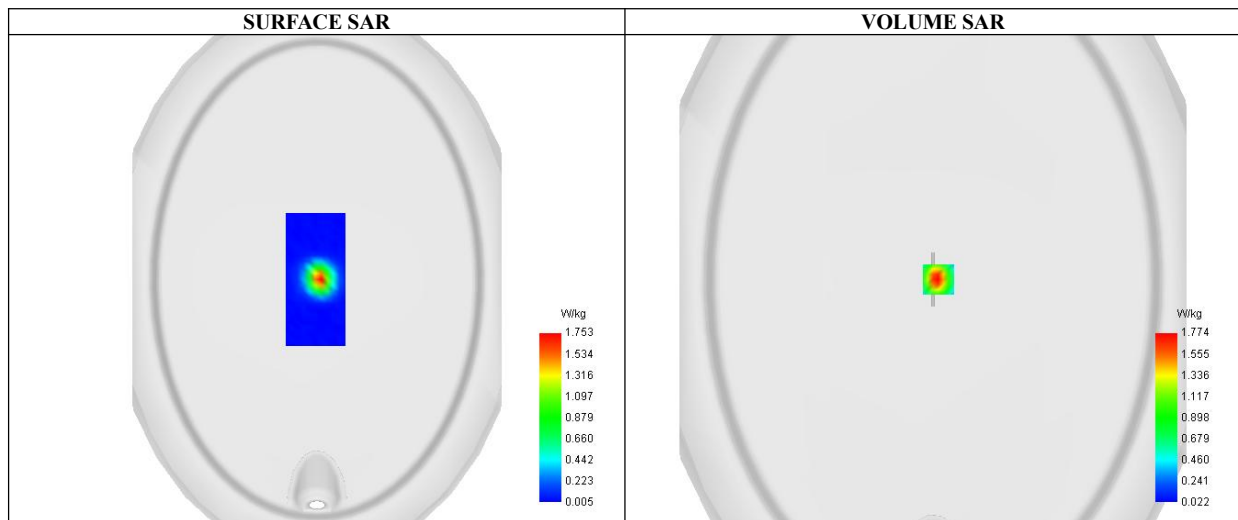
Phantom section: Flat Section; Input Power=15dBm

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/System Check 2450 MHz Head/Area Scan: Measurement grid: dx=8mm, dy=8mm

Configuration/System Check 2450 MHz Head/Zoom Scan: Measurement grid: dx=5mm, dy=5mm, dz=5mm



Maximum location: X=5.00, Y=0.00 ; SAR Peak: 3.14 W/kg

SAR 10g (W/Kg)	0.765
SAR 1g (W/Kg)	1.653
Variation (%)	-2.670
Horizontal validation criteria: minimum distance (mm)	14.142136
Vertical validation criteria: SAR ratio M2/M1 (%)	45.793839

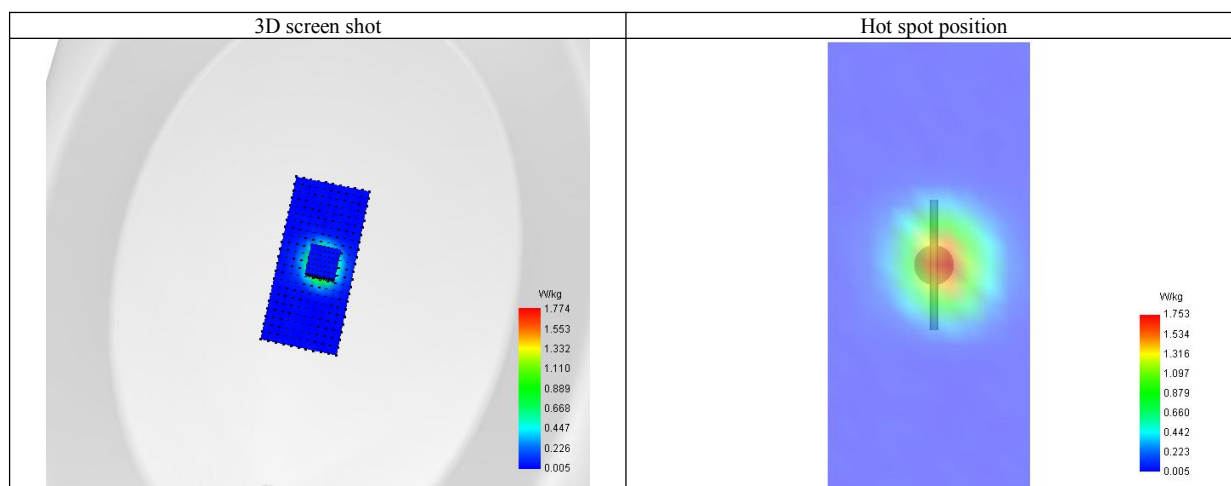
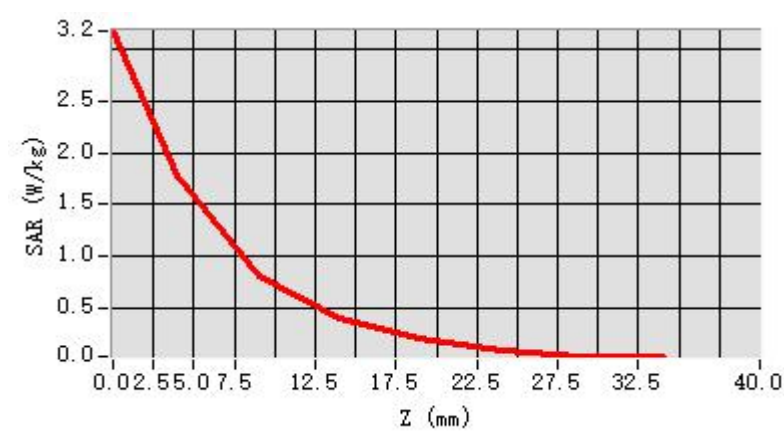
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Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	3.169	1.774	0.812	0.401	0.217	0.103	0.051



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Test Laboratory: AGC Lab
System Check Head 5300 MHz
DUT: Dipole 5000MHz Type: SID5000

Date: Oct. 21, 2025

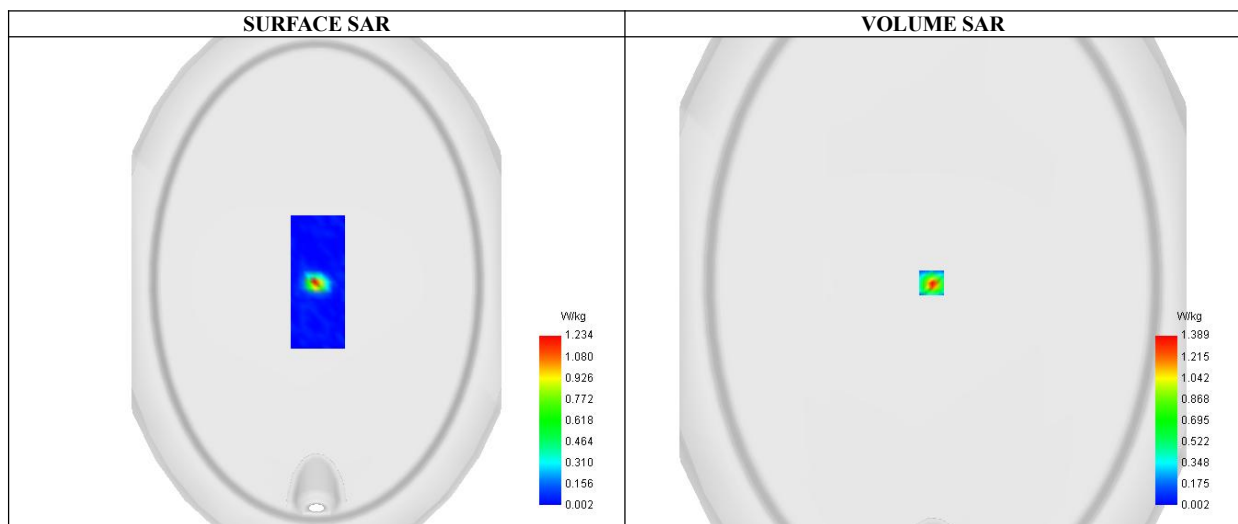
Communication System: CW; Communication System Band: D5000 (5000.0 MHz); Duty Cycle: 1:1; Conv.F=1.54
Frequency: 5300 MHz; Medium parameters used: $f = 5250$ MHz; $\sigma = 4.75$ mho/m; $\epsilon_r = 34.80$; $\rho = 1000$ kg/m³ ;
Phantom section: Flat Section; Input Power=10dBm

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/System Check 5300 MHz Head/Area Scan: Measurement grid: dx=8mm, dy=8mm

Configuration/System Check 5300 MHz Head/Zoom Scan: Measurement grid: dx=4mm,dy=4mm, dz=2mm



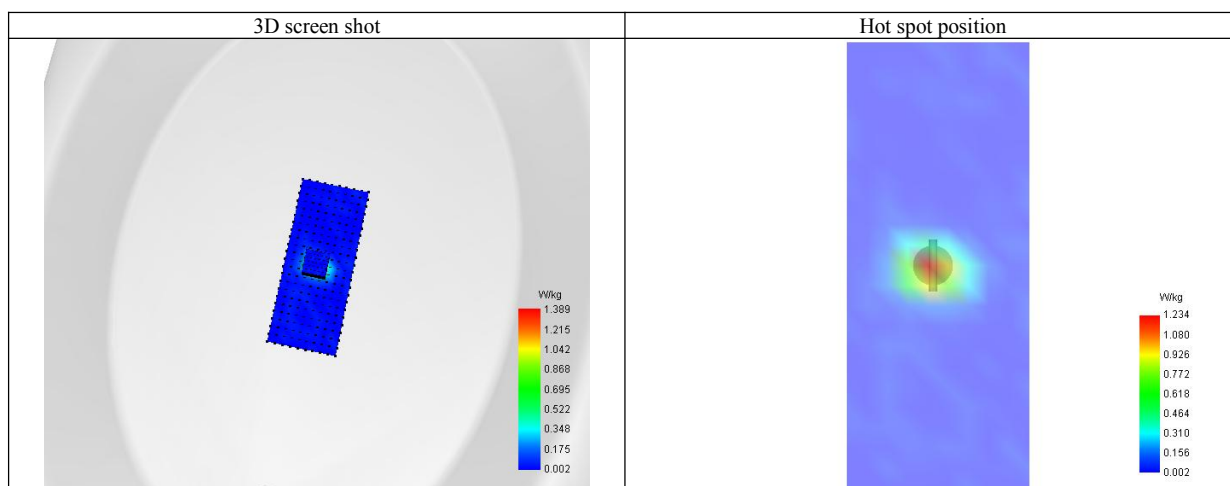
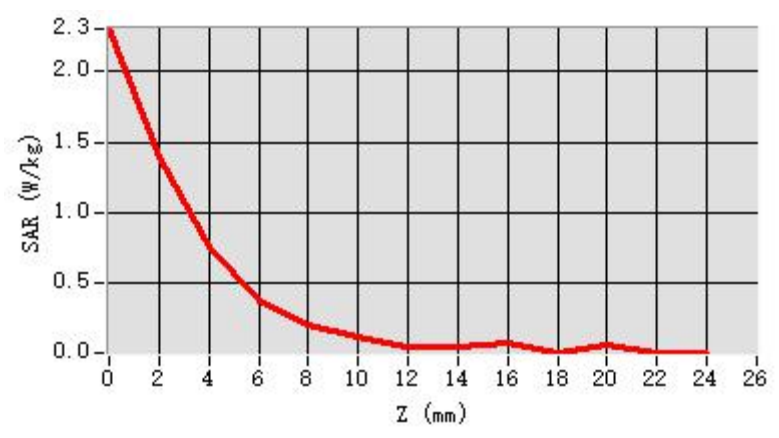
Maximum location: X=-1.00, Y=-1.00 ; SAR Peak: 2.43 W/kg

SAR 10g (W/Kg)	0.237
SAR 1g (W/Kg)	0.743
Variation (%)	2.970
Horizontal validation criteria: minimum distance (mm)	8.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	54.089849

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Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	2.305	1.389	0.751	0.378	0.207	0.123	0.046	0.045	0.067	0.009	0.066	0.004



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Test Laboratory: AGC Lab
System Check Head 5600 MHz
DUT: Dipole 5000MHz Type: SID5000

Date: Oct. 22, 2025

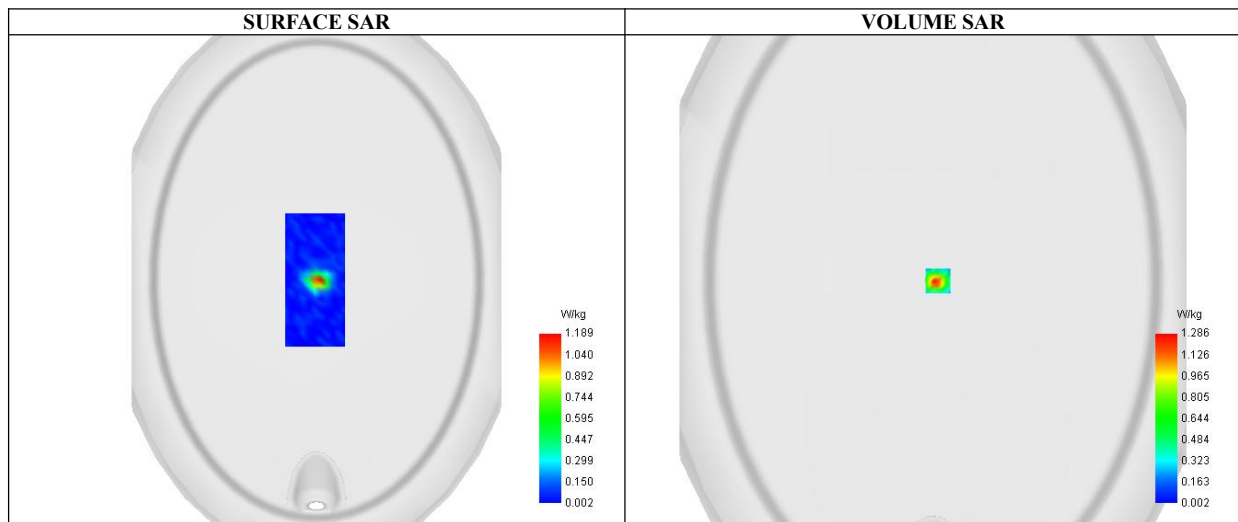
Communication System: CW; Communication System Band: D5000 (5000.0 MHz); Duty Cycle: 1:1; Conv.F=1.44
Frequency: 5600 MHz; Medium parameters used: $f = 5600$ MHz; $\sigma = 5.13$ mho/m; $\epsilon_r = 34.75$; $\rho = 1000$ kg/m³ ;
Phantom section: Flat Section; Input Power=10dBm

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/System Check 5600 MHz Head/Area Scan: Measurement grid: dx=8mm, dy=8mm

Configuration/System Check 5600 MHz Head/Zoom Scan: Measurement grid: dx=4mm,dy=4mm, dz=2mm



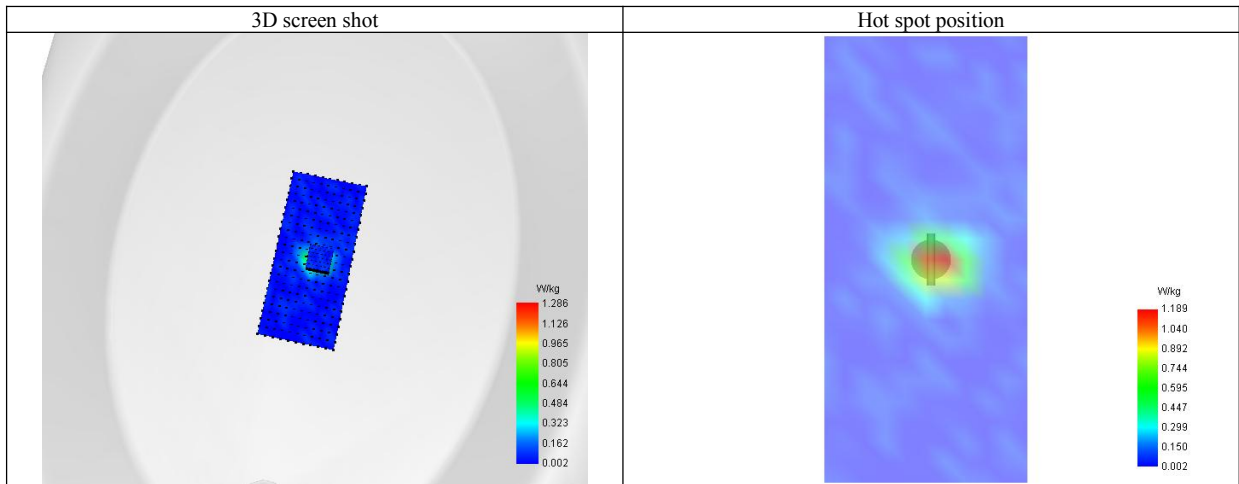
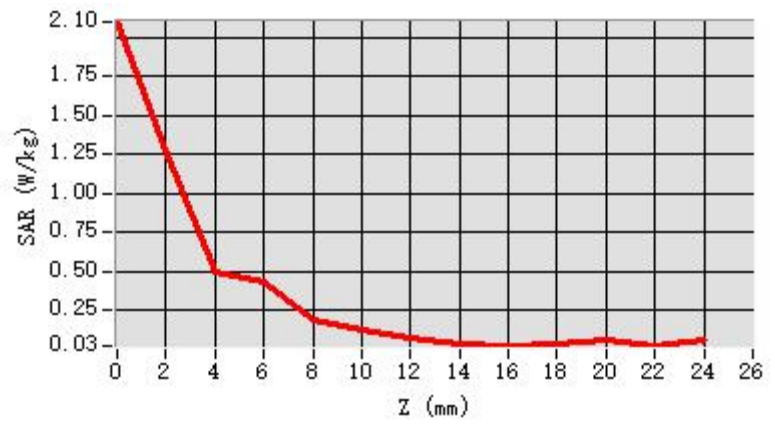
Maximum location: X=5.00, Y=-1.00 ; SAR Peak: 2.51 W/kg

SAR 10g (W/Kg)	0.241
SAR 1g (W/Kg)	0.732
Variation (%)	-4.820
Horizontal validation criteria: minimum distance (mm)	8.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	50.576712

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Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	2.102	1.286	0.503	0.431	0.197	0.123	0.070	0.042	0.026	0.044	0.069	0.027



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Test Laboratory: AGC Lab
System Check Head 5800 MHz
DUT: Dipole 5000MHz Type: SID5000

Date: Oct. 23, 2025

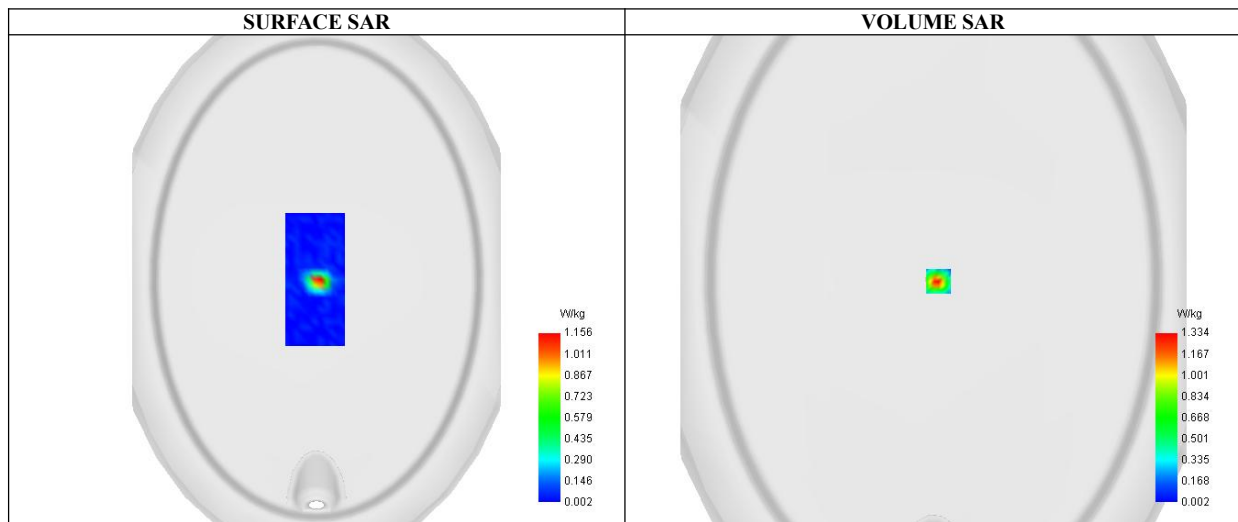
Communication System: CW; Communication System Band: D5000 (5000.0 MHz); Duty Cycle: 1:1; Conv.F=1.41
Frequency: 5800 MHz; Medium parameters used: $f = 5800$ MHz; $\sigma = 5.43$ mho/m; $\epsilon_r = 36.41$; $\rho = 1000$ kg/m³ ;
Phantom section: Flat Section; Input Power=10dBm

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/System Check 5800 MHz Head/Area Scan: Measurement grid: dx=8mm, dy=8mm

Configuration/System Check 5800 MHz Head/Zoom Scan: Measurement grid: dx=4mm,dy=4mm, dz=2mm



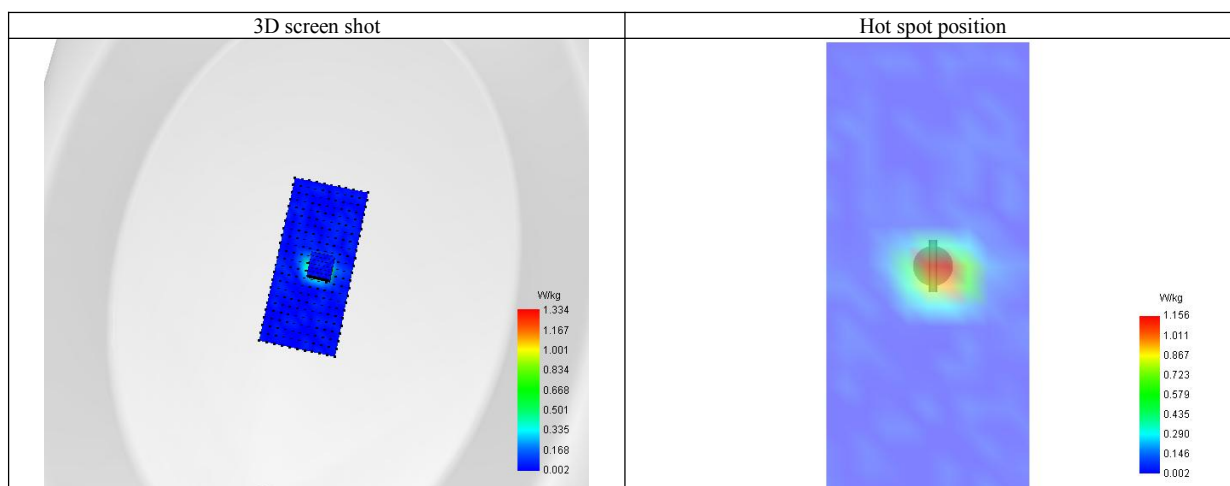
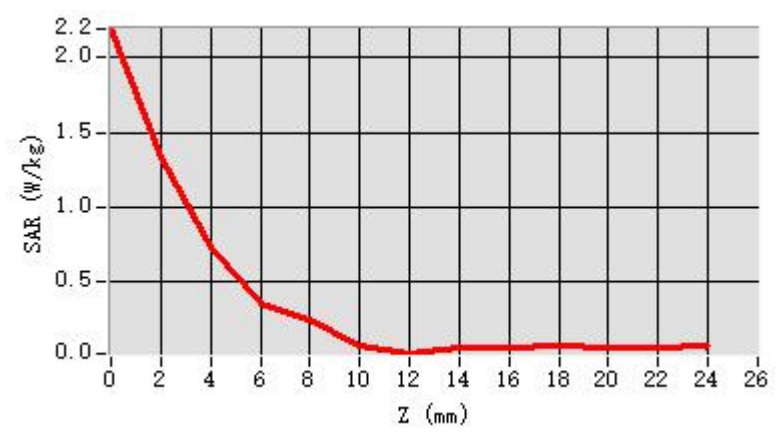
Maximum location: X=5.00, Y=-2.00 ; SAR Peak: 2.46 W/kg

SAR 10g (W/Kg)	0.238
SAR 1g (W/Kg)	0.745
Variation (%)	4.470
Horizontal validation criteria: minimum distance (mm)	8.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	55.182815

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Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	2.190	1.334	0.736	0.354	0.255	0.076	0.023	0.064	0.066	0.074	0.067	0.066



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APPENDIX B. SAR MEASUREMENT DATA

Module ESP32-S3-Battery 1#

Test Laboratory: AGC Lab

802.11b High- Body back

DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 24, 2025

Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1; Conv.F=2.29;
Frequency: 2462 MHz; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.88$ mho/m; $\epsilon_r = 39.70$; $\rho = 1000$ kg/m³ ;
Phantom section: Flat Section

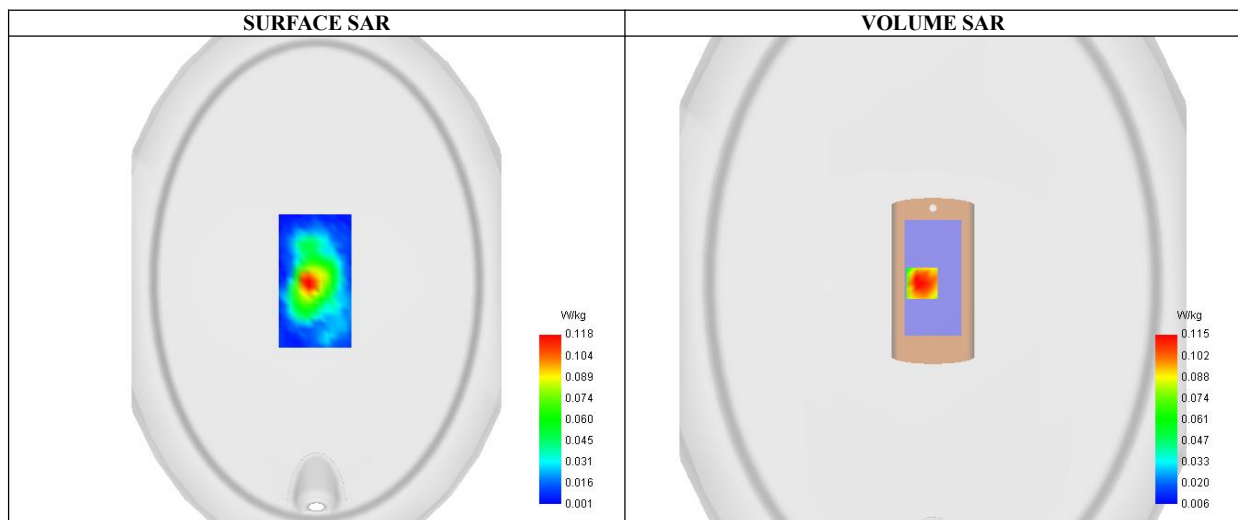
SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/802.11b High- Body back /Area Scan: Measurement grid: dx=8mm, dy=8mm

Configuration/802.11b High- Body back /Zoom Scan: Measurement grid: dx=5mm, dy=5mm, dz=5mm;

Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	7x7x7, dx=5mm dy=5mm dz=5mm
Phantom	ELLI
Device Position	Body back
Band	2450MHz
Channels	High
Signal	Crest factor: 1.0



Maximum location: X=-11.00, Y=-2.00 ; SAR Peak: 0.20 W/kg

SAR 10g (W/Kg)	0.057
SAR 1g (W/Kg)	0.109
Variation (%)	-1.290
Horizontal validation criteria: minimum distance (mm)	21.213203
Vertical validation criteria: SAR ratio M2/M1 (%)	50.506985

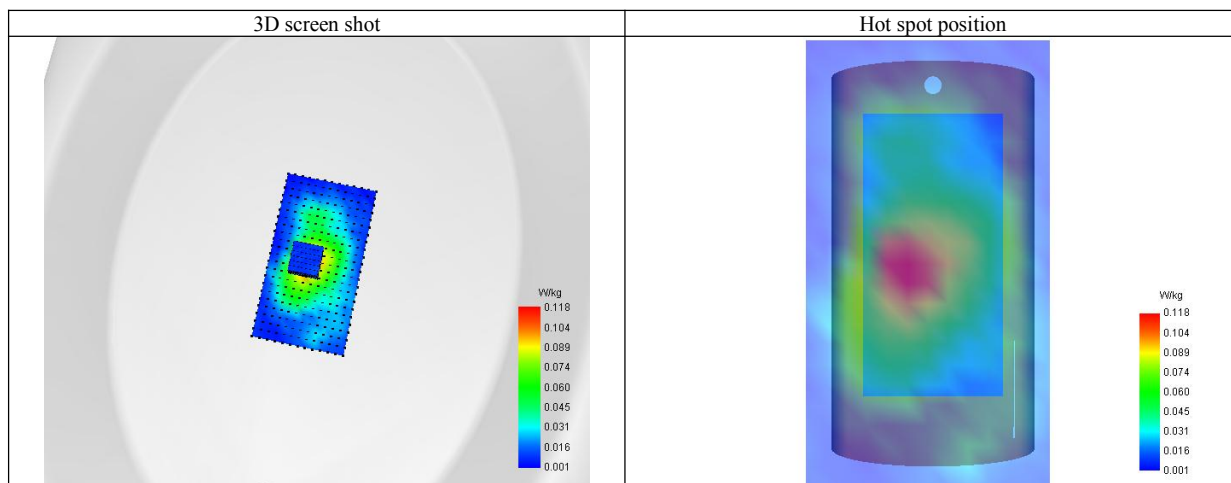
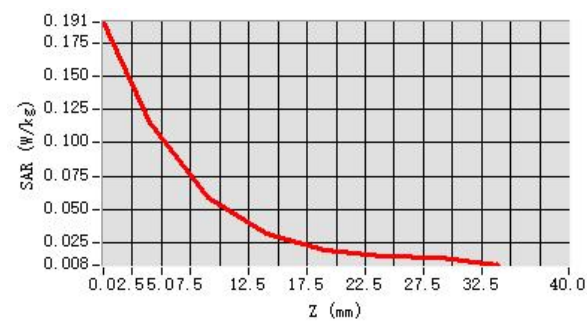
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Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.191	0.115	0.058	0.031	0.019	0.015	0.013



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Module ESP32-S3-Battery 2#
Test Laboratory: AGC Lab
802.11b High- Body back
DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 24, 2025

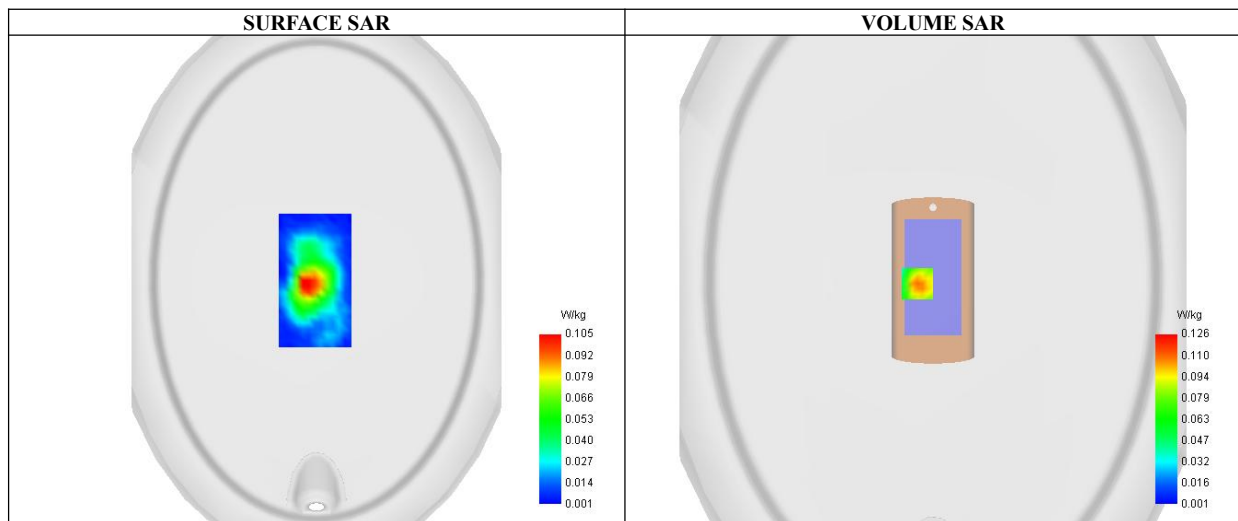
Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1; Conv.F=2.29;
Frequency: 2462 MHz; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.88$ mho/m; $\epsilon_r = 39.70$; $\rho = 1000$ kg/m³ ;
Phantom section: Flat Section

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/802.11b High- Body back /Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/802.11b High- Body back /Zoom Scan: Measurement grid: dx=5mm,dy=5mm, dz=5mm;

Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	ELLI
Device Position	Body back
Band	2450MHz
Channels	High
Signal	Crest factor: 1.0



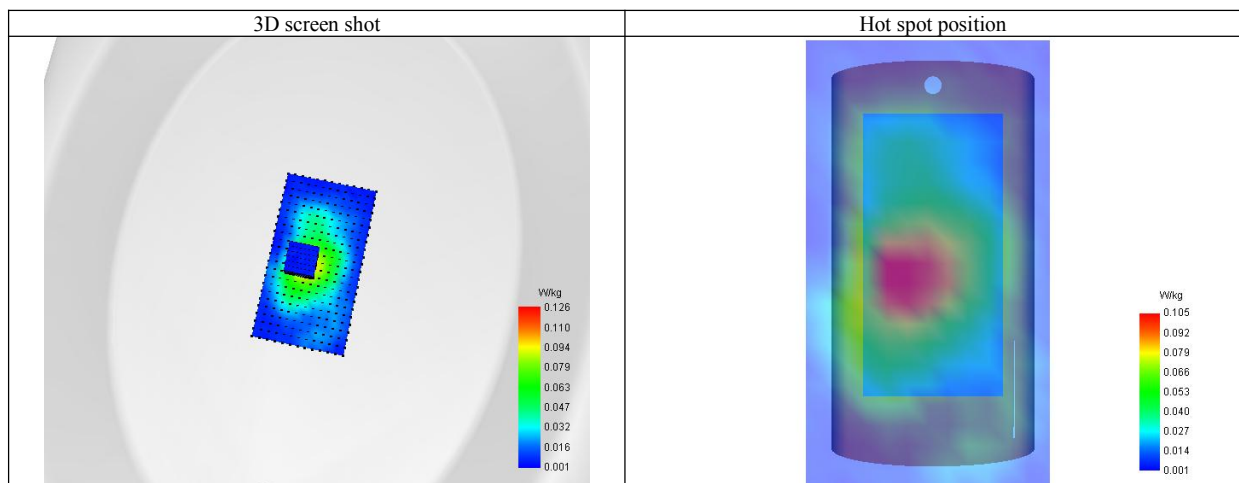
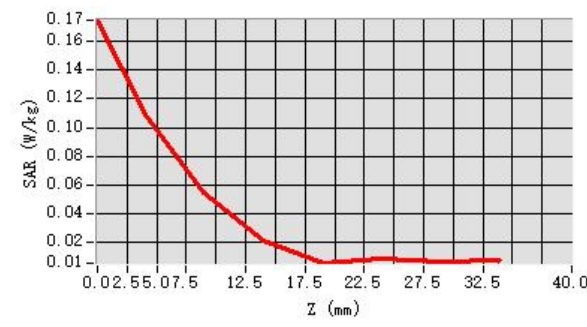
Maximum location: X=-15.00, Y=-3.00 ; SAR Peak: 0.29 W/kg

SAR 10g (W/Kg)	0.044
SAR 1g (W/Kg)	0.110
Variation (%)	-3.610
Horizontal validation criteria: minimum distance (mm)	15.000000
Vertical validation criteria: SAR ratio M2/M1 (%)	49.570020

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Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.175	0.109	0.054	0.021	0.005	0.009	0.006



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Module RTL8821CS-Battery 1#
Test Laboratory: AGC Lab
802.11b High- Body back
DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 24, 2025

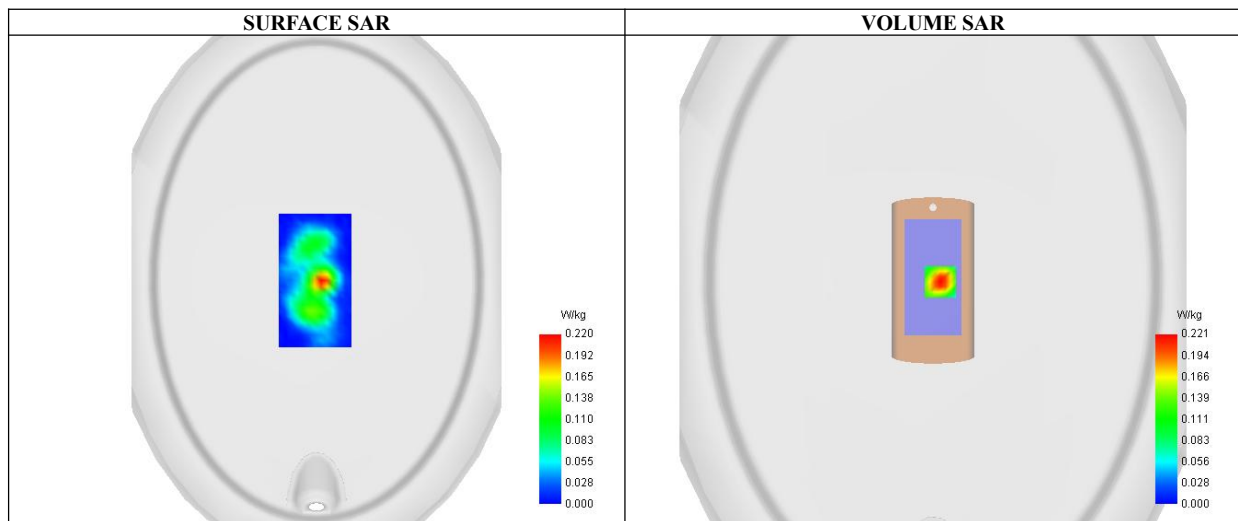
Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1; Conv.F=2.29;
Frequency: 2462 MHz; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.88$ mho/m; $\epsilon_r = 39.70$; $\rho = 1000$ kg/m³ ;
Phantom section: Flat Section

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/802.11b High- Body back /Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/802.11b High- Body back /Zoom Scan: Measurement grid: dx=5mm,dy=5mm, dz=5mm;

Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	ELLI
Device Position	Body back
Band	2450MHz
Channels	High
Signal	Crest factor: 1.0



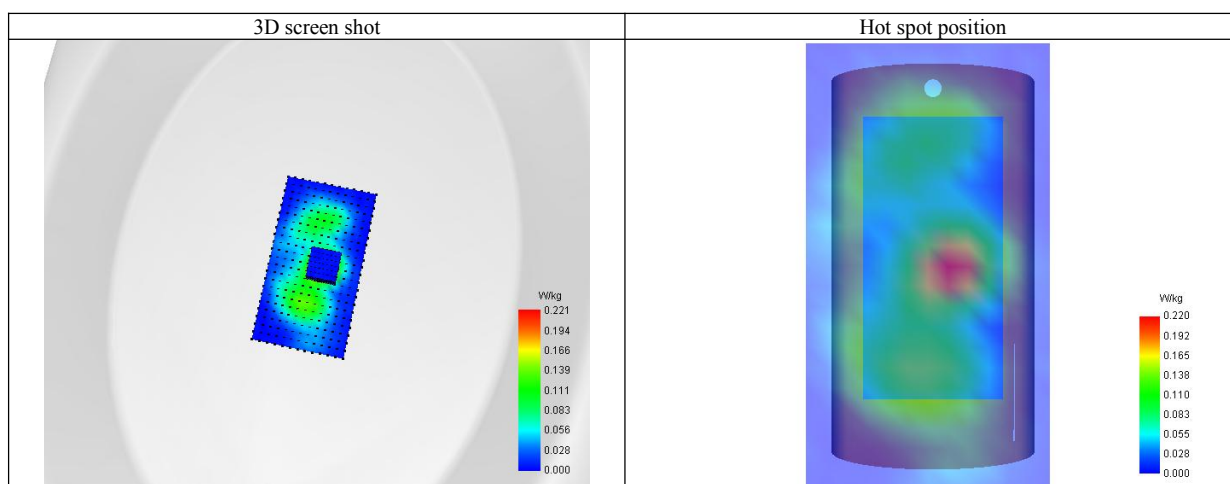
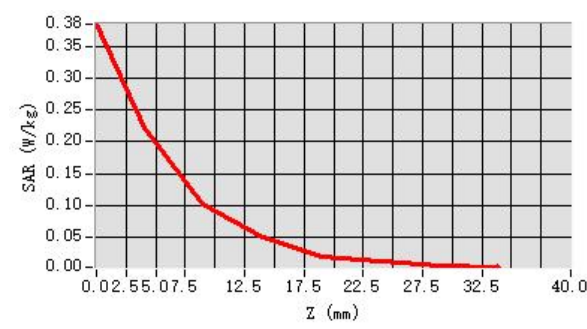
Maximum location: X=7.00, Y=-1.00 ; SAR Peak: 0.39 W/kg

SAR 10g (W/Kg)	0.100
SAR 1g (W/Kg)	0.208
Variation (%)	-1.510
Horizontal validation criteria: minimum distance (mm)	15.811388
Vertical validation criteria: SAR ratio M2/M1 (%)	46.012568

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Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.384	0.221	0.102	0.050	0.020	0.012	0.005



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Module RTL8821CS-Battery 2#
Test Laboratory: AGC Lab
802.11b High- Body back
DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 24, 2025

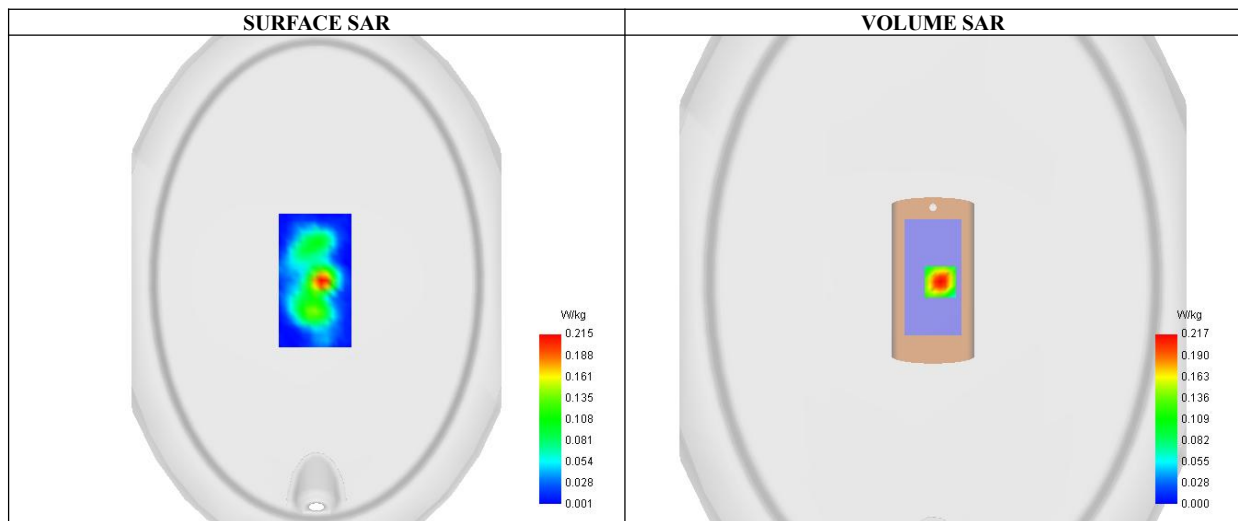
Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1; Conv.F=2.29;
Frequency: 2462 MHz; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.88$ mho/m; $\epsilon_r = 39.70$; $\rho = 1000$ kg/m³ ;
Phantom section: Flat Section

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/802.11b High- Body back /Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/802.11b High- Body back /Zoom Scan: Measurement grid: dx=5mm,dy=5mm, dz=5mm;

Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	ELLI
Device Position	Body back
Band	2450MHz
Channels	High
Signal	Crest factor: 1.0



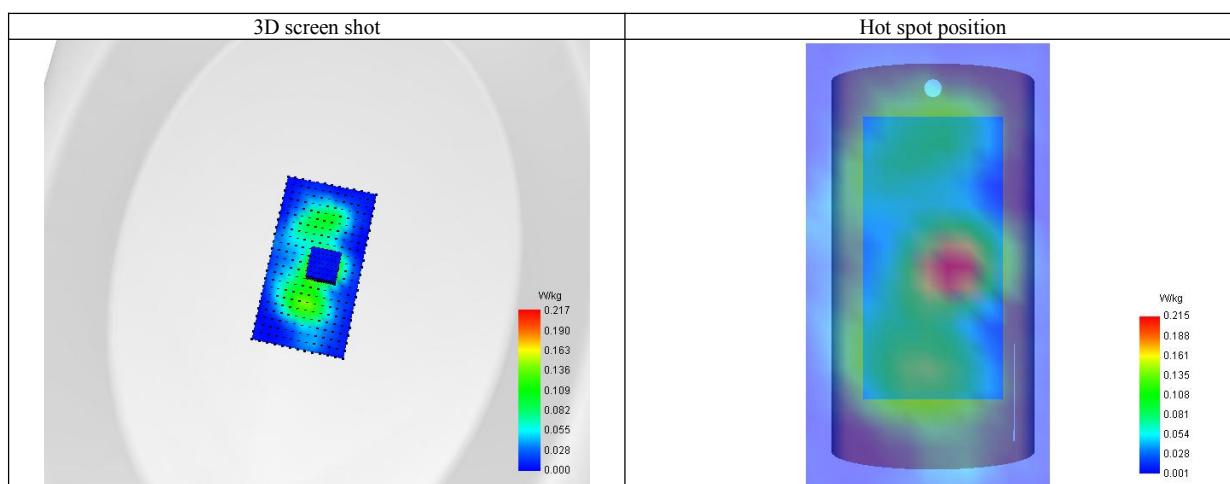
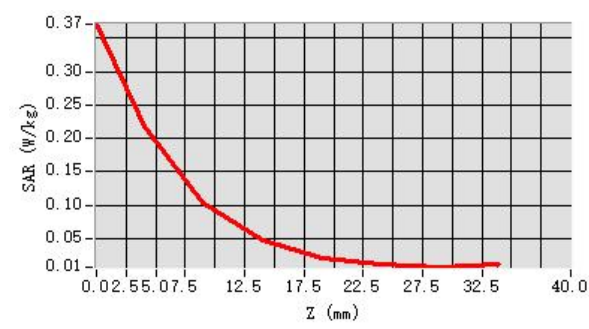
Maximum location: X=7.00, Y=-1.00 ; SAR Peak: 0.37 W/kg

SAR 10g (W/Kg)	0.099
SAR 1g (W/Kg)	0.204
Variation (%)	-2.020
Horizontal validation criteria: minimum distance (mm)	15.811388
Vertical validation criteria: SAR ratio M2/M1 (%)	47.230781

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Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.371	0.217	0.103	0.048	0.019	0.011	0.007



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Module RTL8821CS-Battery 1#
Test Laboratory: AGC Lab
802.11a CH64-Body back
DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 21, 2025

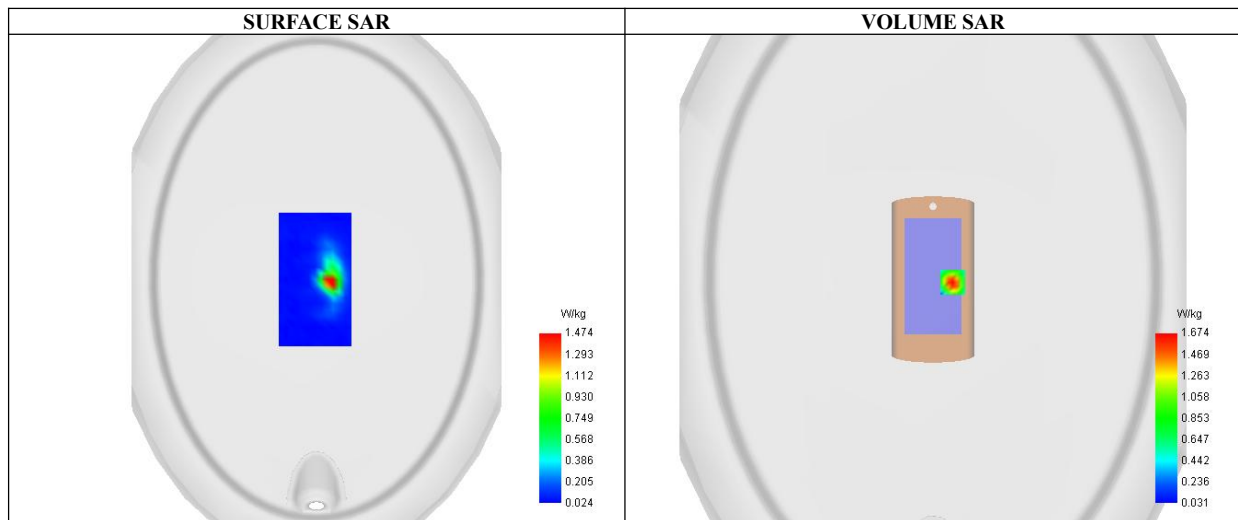
Communication System: Wi-Fi; Communication System Band: 802.11a; Duty Cycle: 1:1; Conv.F=1.54;
Frequency: 5320MHz; Medium parameters used: $f = 5250 \text{ MHz}$; $\sigma = 4.78 \text{ mho/m}$; $\epsilon_r = 34.36$; $\rho = 1000 \text{ kg/m}^3$;
Phantom section: Flat Section

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/802.11a CH64- Body back /Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/802.11a CH64- Body back /Zoom Scan: Measurement grid: dx=4mm,dy=4mm, dz=2mm

Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	7x7x12 dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Body back
Band	5300MHz
Channels	CH64
Signal	Crest factor: 1.0



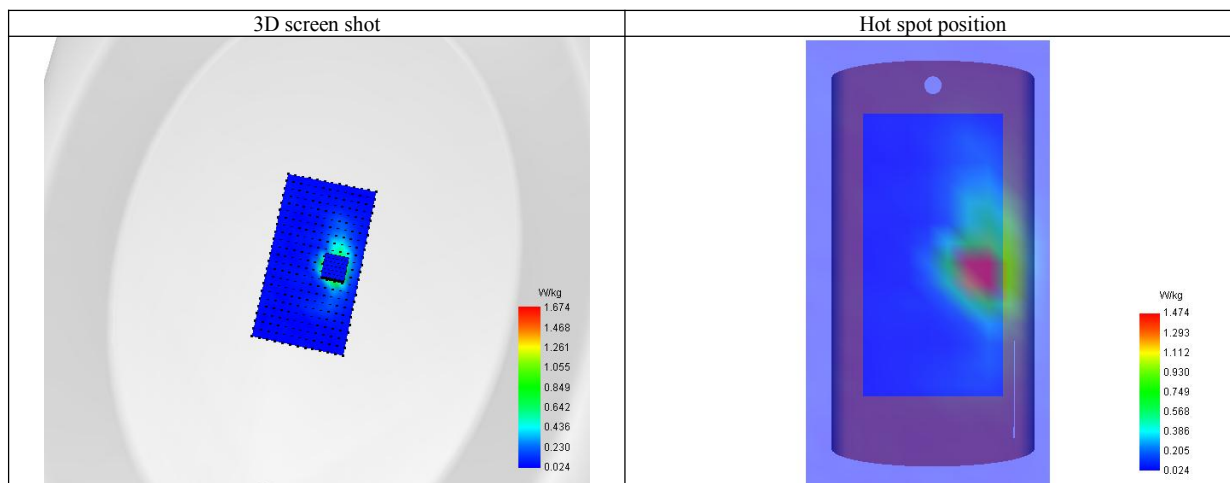
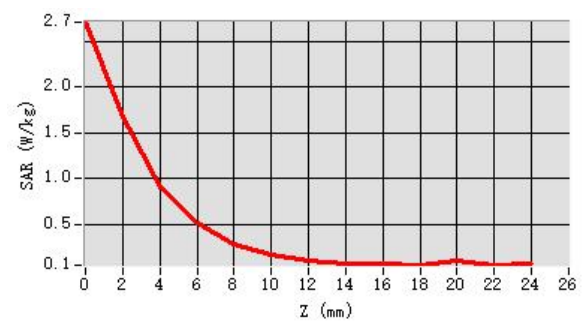
Maximum location: X=19.00, Y=-3.00 ; SAR Peak: 2.92 W/kg

SAR 10g (W/Kg)	0.370
SAR 1g (W/Kg)	0.991
Variation (%)	-1.640
Horizontal validation criteria: minimum distance (mm)	11.313708
Vertical validation criteria: SAR ratio M2/M1 (%)	54.281099

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Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	2.709	1.674	0.909	0.513	0.282	0.161	0.102	0.067	0.061	0.050	0.104	0.051



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Module RTL8821CS-Battery 2#
Test Laboratory: AGC Lab
802.11a CH564-Body back
DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 21, 2025

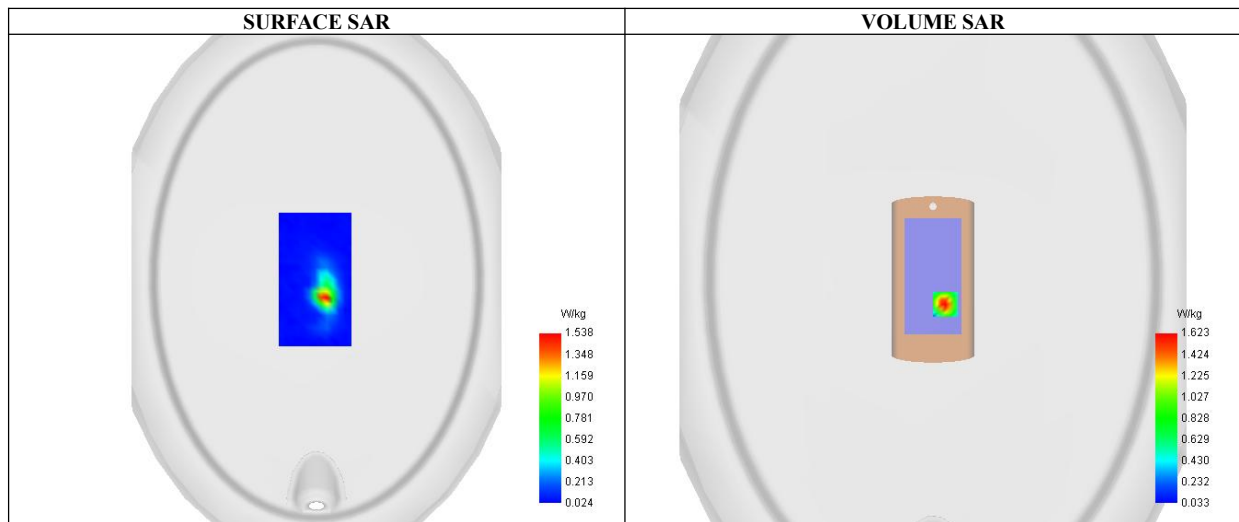
Communication System: Wi-Fi; Communication System Band: 802.11a; Duty Cycle: 1:1; Conv.F=1.54;
Frequency: 5320MHz; Medium parameters used: $f = 5250 \text{ MHz}$; $\sigma = 4.78 \text{ mho/m}$; $\epsilon_r = 34.36$; $\rho = 1000 \text{ kg/m}^3$;
Phantom section: Flat Section

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/802.11a CH64- Body back /Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/802.11a CH64- Body back /Zoom Scan: Measurement grid: dx=4mm,dy=4mm, dz=2mm

Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	7x7x12 dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Body back
Band	5300MHz
Channels	CH64
Signal	Crest factor: 1.0



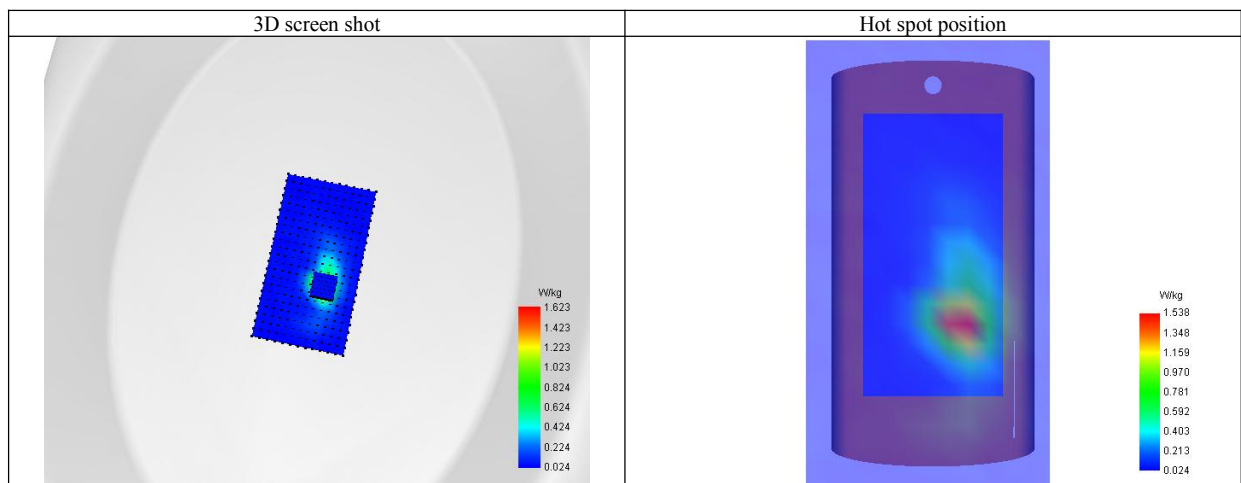
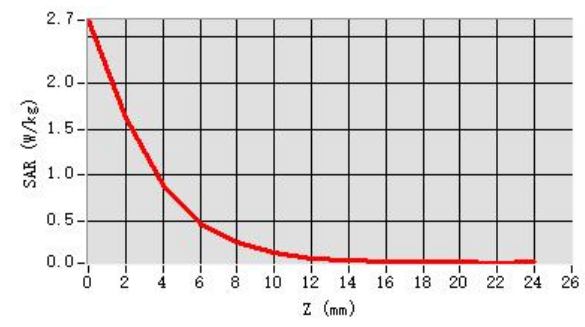
Maximum location: X=12.00, Y=-24.00 ; SAR Peak: 2.77 W/kg

SAR 10g (W/Kg)	0.360
SAR 1g (W/Kg)	0.956
Variation (%)	-3.780
Horizontal validation criteria: minimum distance (mm)	11.313708
Vertical validation criteria: SAR ratio M2/M1 (%)	54.570195

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Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	2.684	1.623	0.886	0.467	0.272	0.149	0.092	0.081	0.058	0.057	0.055	0.043



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Module RTL8821CS-Battery 1#
Test Laboratory: AGC Lab
802.11a CH116- Body back
DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 22, 2025

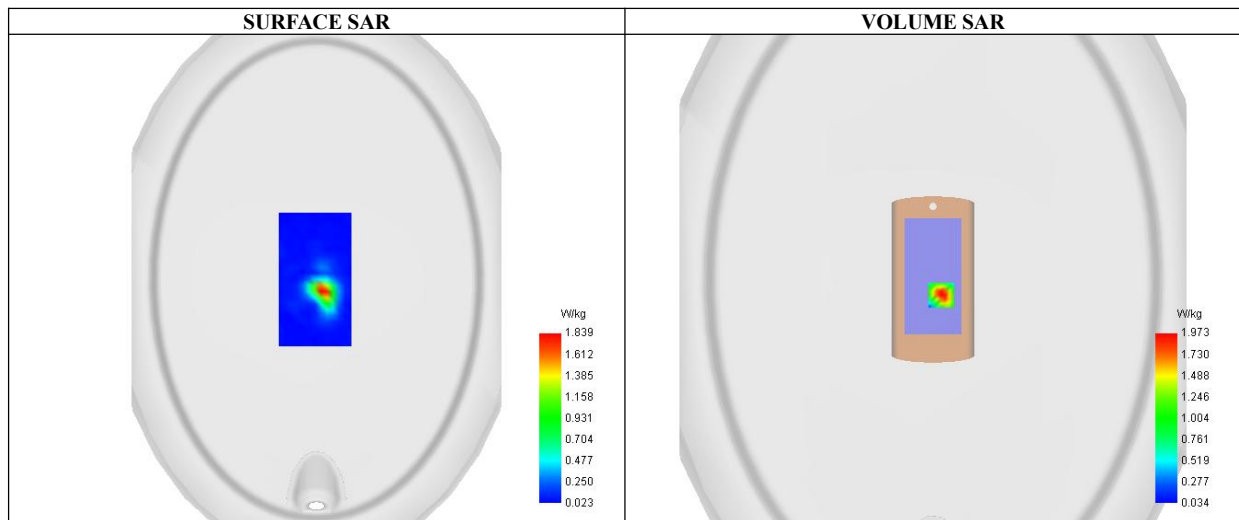
Communication System: Wi-Fi; Communication System Band: 802.11a; Duty Cycle: 1:1; Conv.F=1.44;
Frequency: 5580MHz; Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 5.10 \text{ mho/m}$; $\epsilon_r = 35.16$; $\rho = 1000 \text{ kg/m}^3$;
Phantom section: Flat Section

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/802.11a CH116- Body back /Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/802.11a CH116- Body back /Zoom Scan: Measurement grid: dx=4mm,dy=4mm, dz=2mm

Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	7x7x12 dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Body back
Band	5600MHz
Channels	CH116
Signal	Crest factor: 1.0



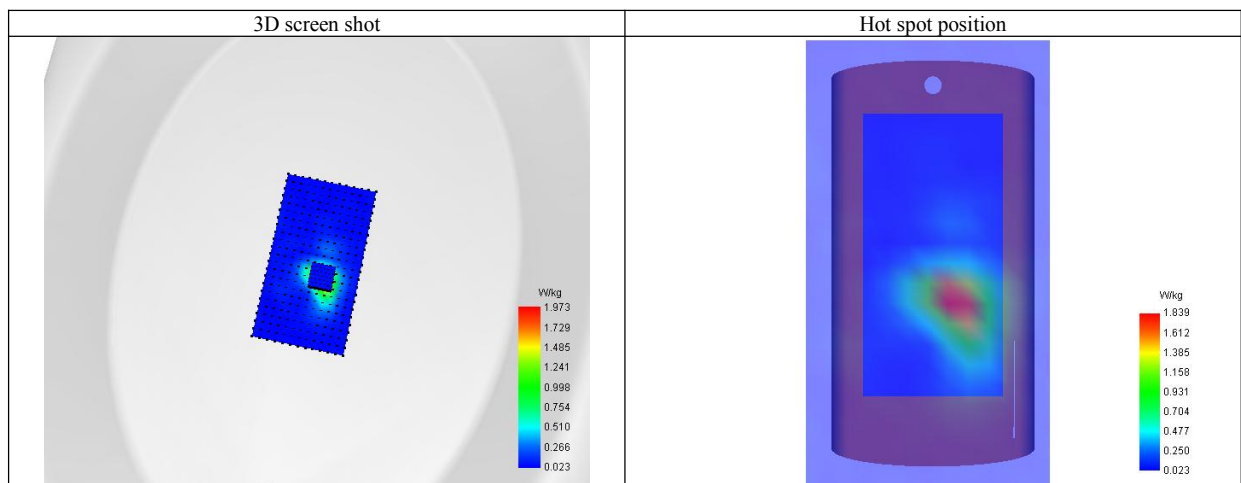
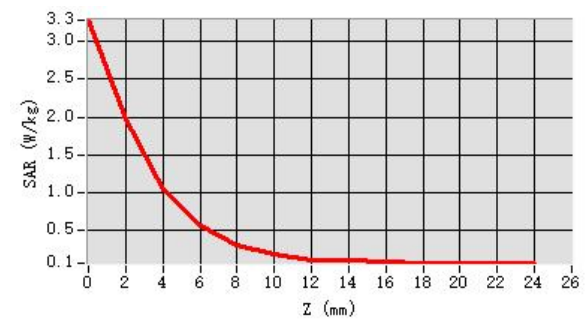
Maximum location: X=8.00, Y=-15.00 ; SAR Peak: 3.48 W/kg

SAR 10g (W/Kg)	0.447
SAR 1g (W/Kg)	1.172
Variation (%)	-2.710
Horizontal validation criteria: minimum distance (mm)	11.313708
Vertical validation criteria: SAR ratio M2/M1 (%)	52.266189

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Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	3.290	1.973	1.031	0.554	0.298	0.179	0.084	0.091	0.064	0.052	0.053	0.051



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Module RTL8821CS-Battery 2#
Test Laboratory: AGC Lab
802.11a CH116- Body back
DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 22, 2025

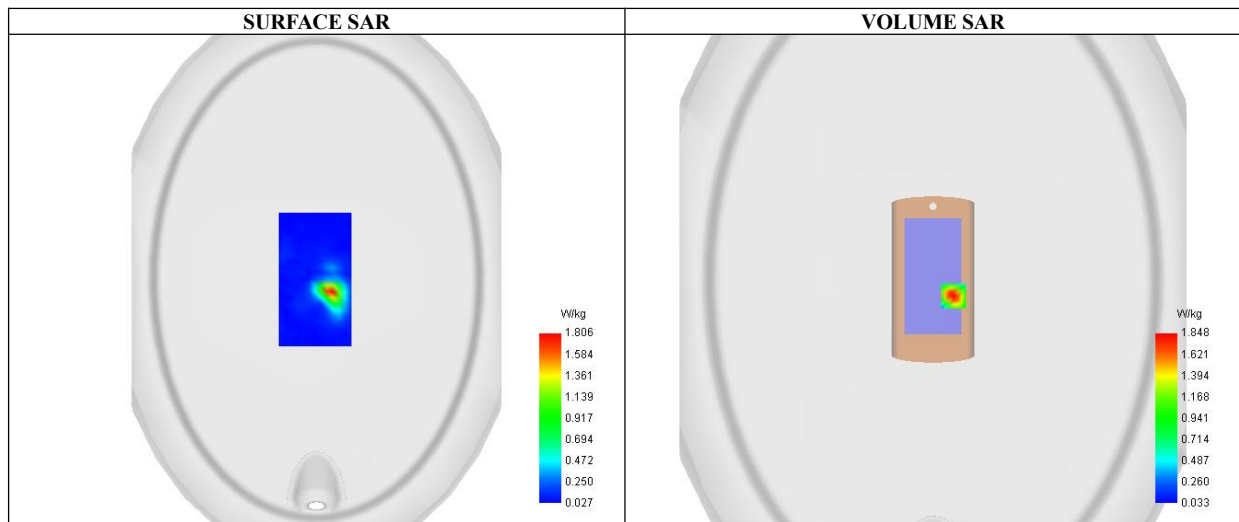
Communication System: Wi-Fi; Communication System Band: 802.11a; Duty Cycle: 1:1; Conv.F=1.44;
Frequency: 5580MHz; Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 5.10 \text{ mho/m}$; $\epsilon_r = 35.16$; $\rho = 1000 \text{ kg/m}^3$;
Phantom section: Flat Section

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/802.11a CH116- Body back /Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/802.11a CH116- Body back /Zoom Scan: Measurement grid: dx=4mm,dy=4mm, dz=2mm

Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	7x7x12 dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Body back
Band	5600MHz
Channels	CH116
Signal	Crest factor: 1.0



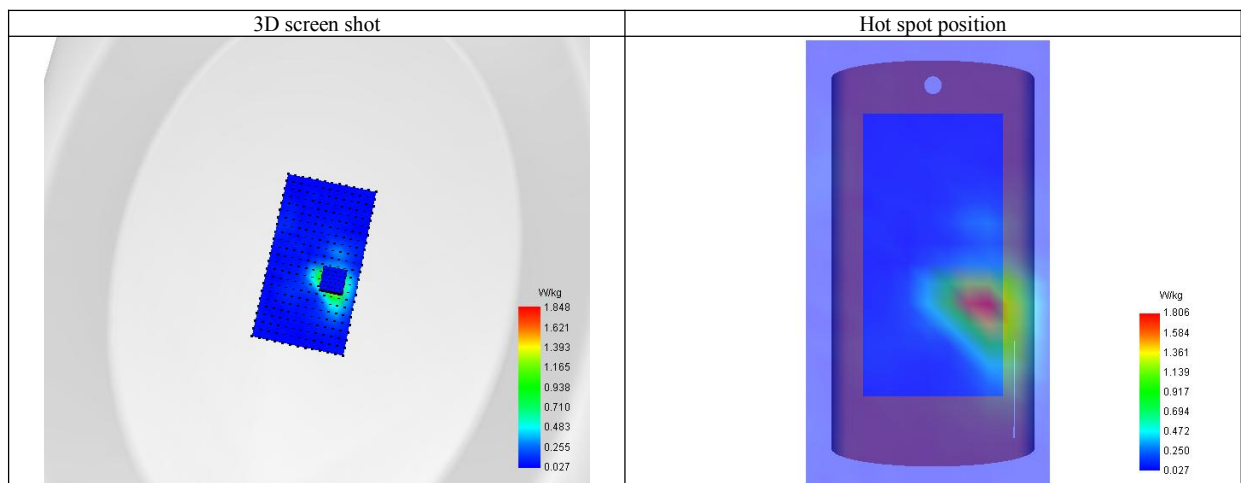
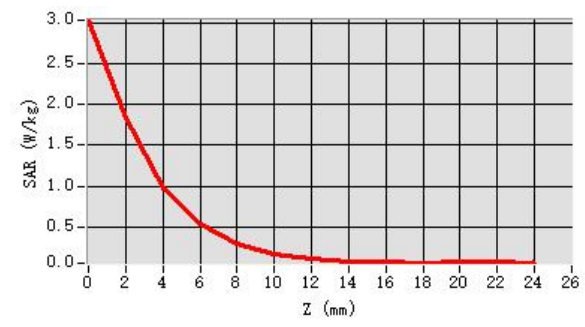
Maximum location: X=20.00, Y=-16.00 ; SAR Peak: 3.21 W/kg

SAR 10g (W/Kg)	0.426
SAR 1g (W/Kg)	1.098
Variation (%)	-2.330
Horizontal validation criteria: minimum distance (mm)	11.313708
Vertical validation criteria: SAR ratio M2/M1 (%)	52.909098

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Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: <http://www.agccert.com/>

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	3.040	1.848	0.978	0.538	0.284	0.170	0.101	0.070	0.063	0.052	0.062	0.073



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Module RTL8821CS-Battery 1#

Test Laboratory: AGC Lab

802.11a CH157- Body back

DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 23, 2025

Communication System: Wi-Fi; Communication System Band: 802.11a; Duty Cycle: 1:1; Conv.F=1.41;
Frequency: 5785MHz; Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 5.41 \text{ mho/m}$; $\epsilon_r = 36.91$; $\rho = 1000 \text{ kg/m}^3$;
Phantom section: Flat Section

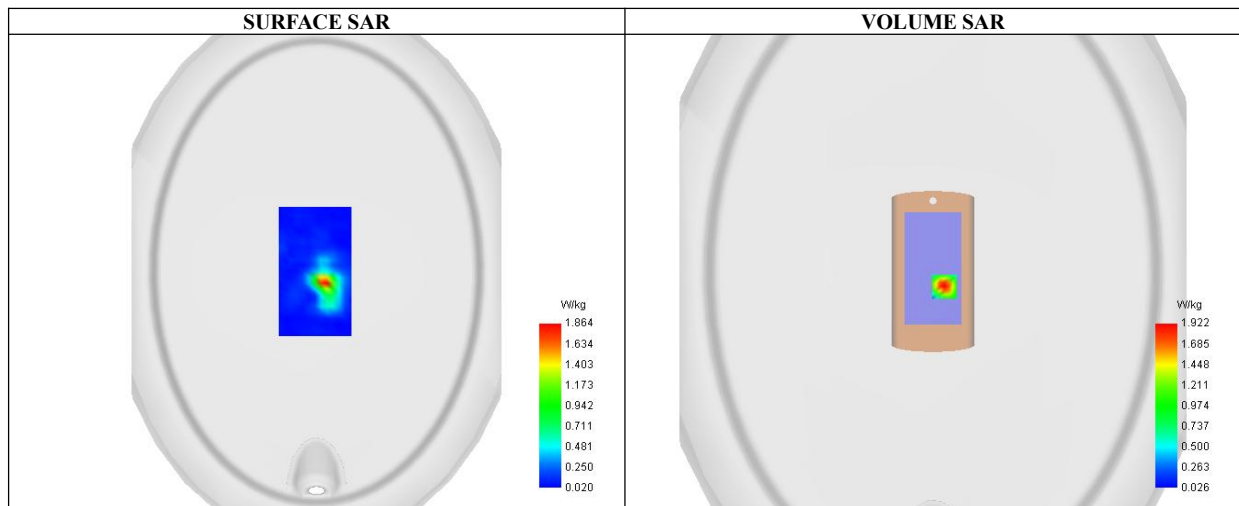
SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/ 802.11a CH157- Body back /Area Scan: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$

Configuration/ 802.11a CH157- Body back /Zoom Scan: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	7x7x12 $dx=4\text{mm}$ $dy=4\text{mm}$ $dz=2\text{mm}$
Phantom	Validation plane
Device Position	Body back
Band	5800MHz
Channels	CH157
Signal	Crest factor: 1.0



Maximum location: $X=11.00$, $Y=-15.00$; SAR Peak: 3.39 W/kg

SAR 10g (W/Kg)	0.431
SAR 1g (W/Kg)	1.143
Variation (%)	-1.270
Horizontal validation criteria: minimum distance (mm)	11.313708
Vertical validation criteria: SAR ratio M2/M1 (%)	52.348985

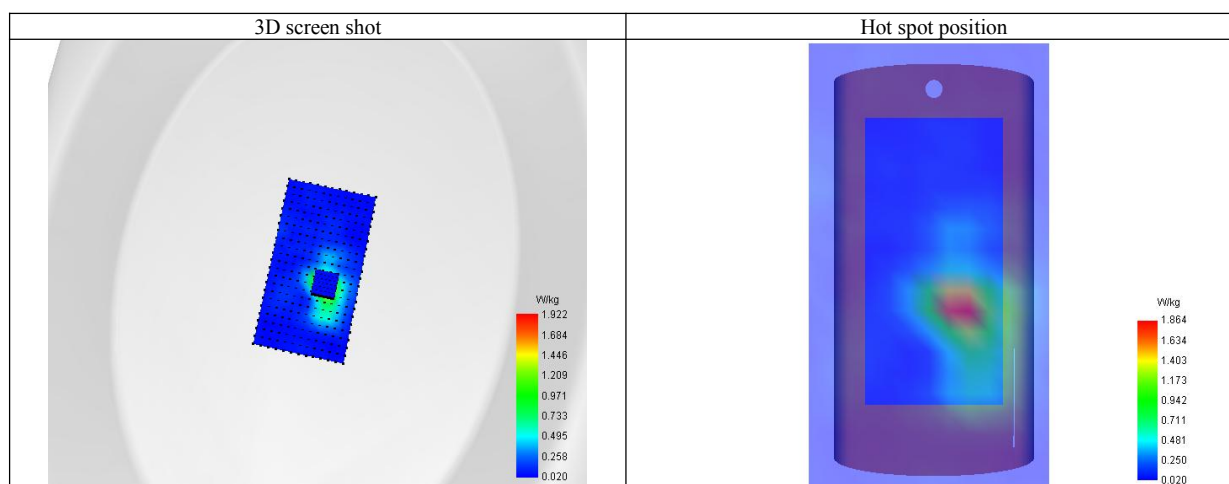
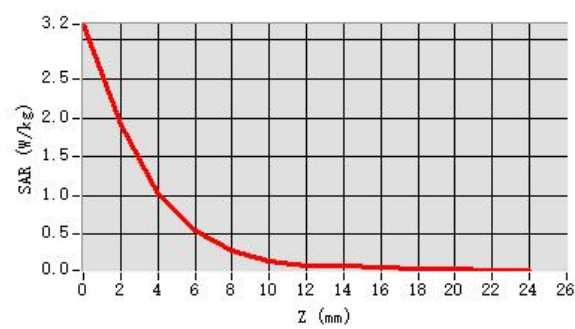
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Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	3.201	1.922	1.006	0.552	0.287	0.159	0.093	0.090	0.069	0.067	0.060	0.038



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Module RTL8821CS-Battery 2#
Test Laboratory: AGC Lab
802.11a CH157- Body back
DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 23, 2025

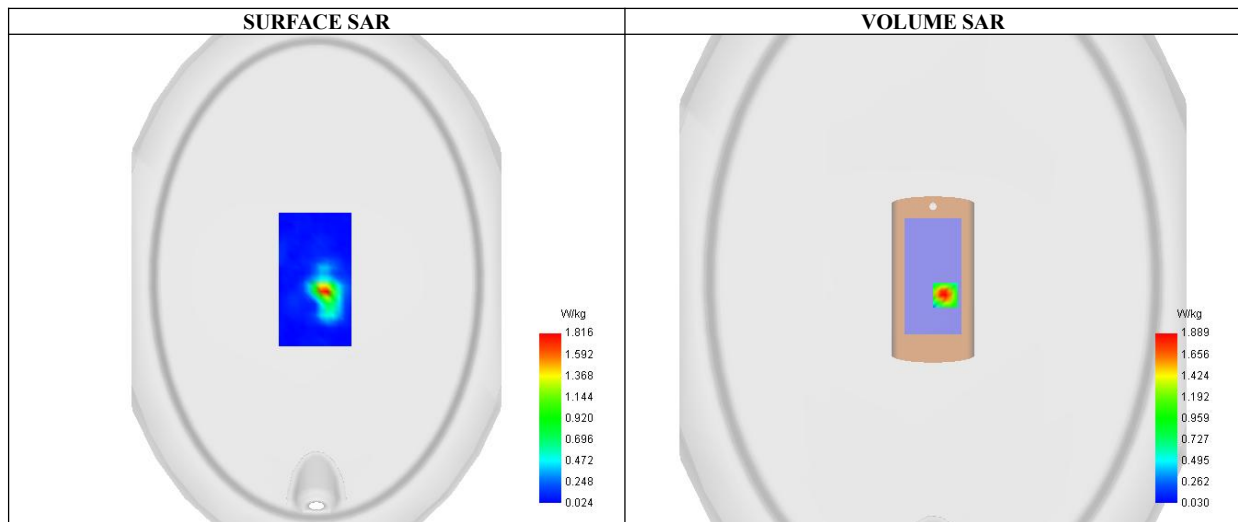
Communication System: Wi-Fi; Communication System Band: 802.11a; Duty Cycle: 1:1; Conv.F=1.41;
Frequency: 5785MHz; Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 5.41 \text{ mho/m}$; $\epsilon_r = 36.91$; $\rho = 1000 \text{ kg/m}^3$;
Phantom section: Flat Section

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/ 802.11a CH157- Body back /Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/ 802.11a CH157- Body back /Zoom Scan: Measurement grid: dx=4mm,dy=4mm, dz=2mm

Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	7x7x12 dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Body back
Band	5800MHz
Channels	CH157
Signal	Crest factor: 1.0



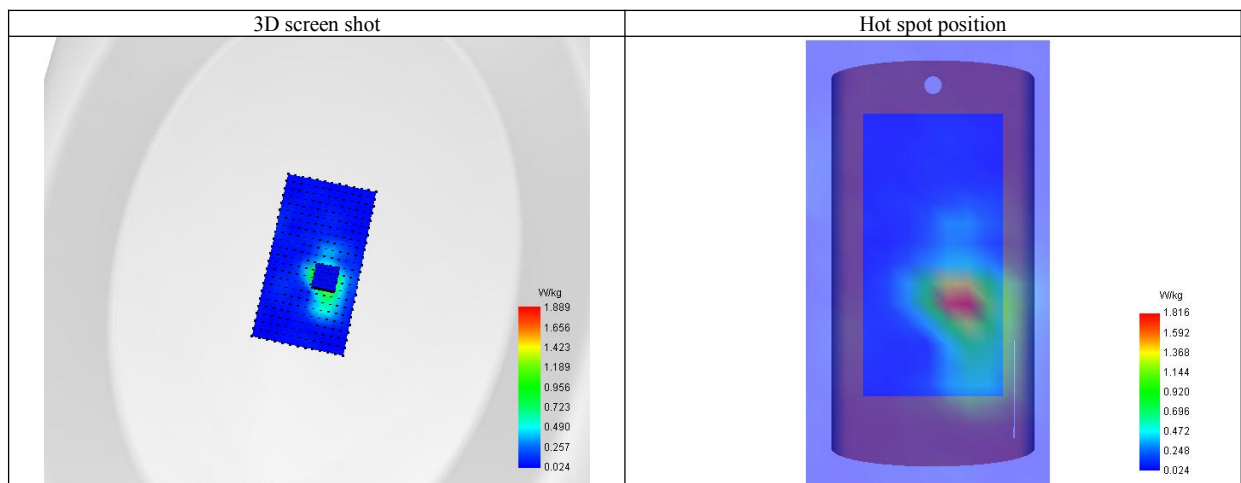
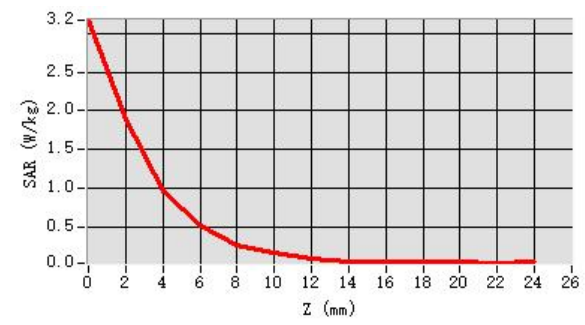
Maximum location: X=12.00, Y=-15.00 ; SAR Peak: 3.47 W/kg

SAR 10g (W/Kg)	0.422
SAR 1g (W/Kg)	1.131
Variation (%)	-0.370
Horizontal validation criteria: minimum distance (mm)	11.313708
Vertical validation criteria: SAR ratio M2/M1 (%)	50.825976

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Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	3.168	1.889	0.960	0.521	0.270	0.169	0.092	0.056	0.056	0.058	0.046	0.036



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Repeated SAR

Test Laboratory: AGC Lab

802.11a CH564-Body back

DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 21, 2025

Communication System: Wi-Fi; Communication System Band: 802.11a; Duty Cycle: 1:1; Conv.F=1.54;
Frequency: 5320MHz; Medium parameters used: $f = 5250$ MHz; $\sigma = 4.78$ mho/m; $\epsilon_r = 34.36$; $\rho = 1000$ kg/m³ ;
Phantom section: Flat Section

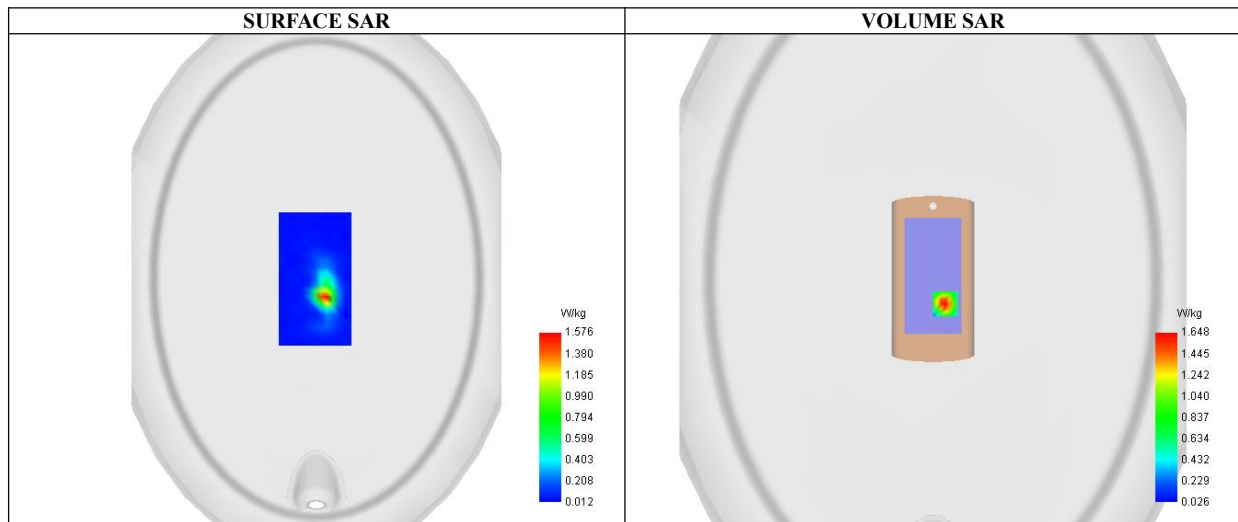
SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/802.11a CH64- Body back /Area Scan: Measurement grid: dx=8mm, dy=8mm

Configuration/802.11a CH64- Body back /Zoom Scan: Measurement grid: dx=4mm,dy=4mm, dz=2mm

Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	7x7x12 dx=4mm dy=4mm dz=2mm
Phantom	Validation plane
Device Position	Body back
Band	5300MHz
Channels	CH64
Signal	Crest factor: 1.0



Maximum location: X=12.00, Y=-24.00 ; SAR Peak: 2.91 W/kg

SAR 10g (W/Kg)	0.363
SAR 1g (W/Kg)	0.969
Variation (%)	-1.730
Horizontal validation criteria: minimum distance (mm)	11.313708
Vertical validation criteria: SAR ratio M2/M1 (%)	54.028997

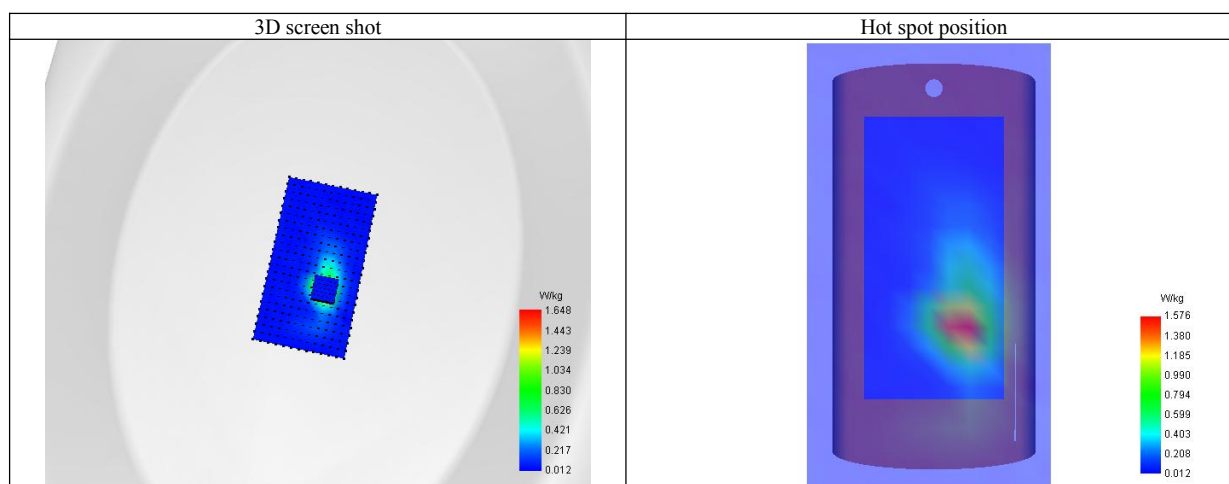
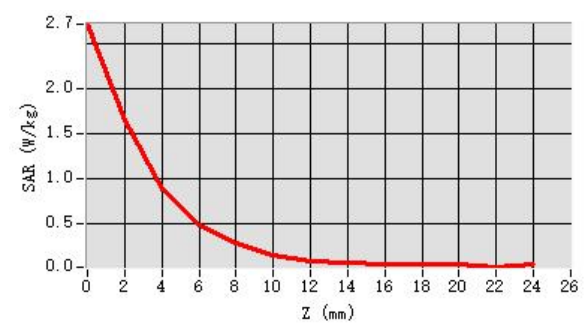
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Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	2.713	1.648	0.890	0.483	0.290	0.161	0.096	0.071	0.066	0.060	0.060	0.026



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Test Laboratory: AGC Lab
802.11a CH116- Body back
DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 22, 2025

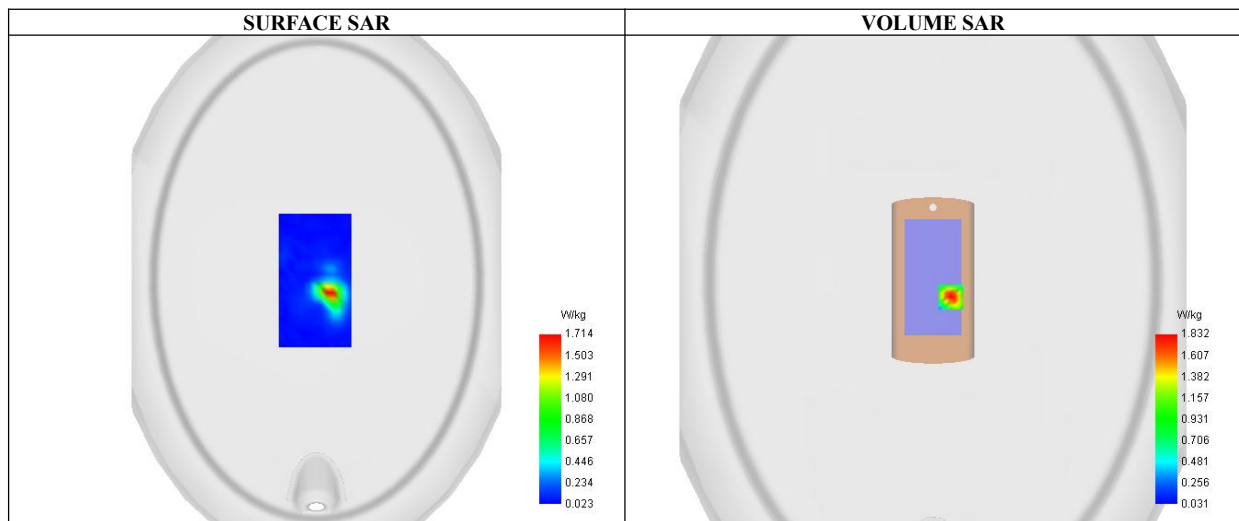
Communication System: Wi-Fi; Communication System Band: 802.11a; Duty Cycle: 1:1; Conv.F=1.44;
Frequency: 5580MHz; Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 5.10 \text{ mho/m}$; $\epsilon_r = 35.16$; $\rho = 1000 \text{ kg/m}^3$;
Phantom section: Flat Section

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/802.11a CH116- Body back /Area Scan: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$
Configuration/802.11a CH116- Body back /Zoom Scan: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	7x7x12 $dx=4\text{mm}$ $dy=4\text{mm}$ $dz=2\text{mm}$
Phantom	Validation plane
Device Position	Body back
Band	5600MHz
Channels	CH116
Signal	Crest factor: 1.0



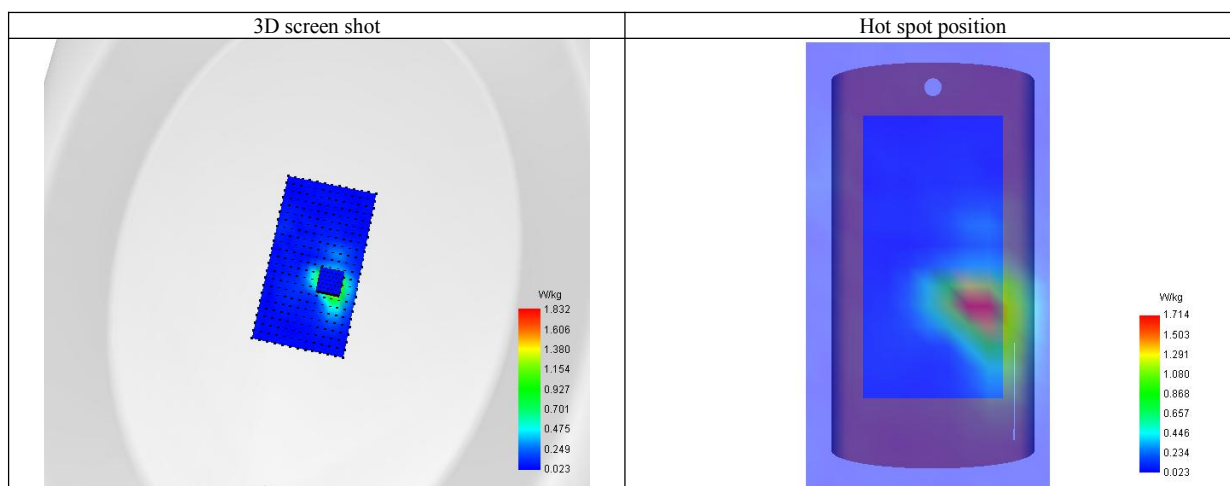
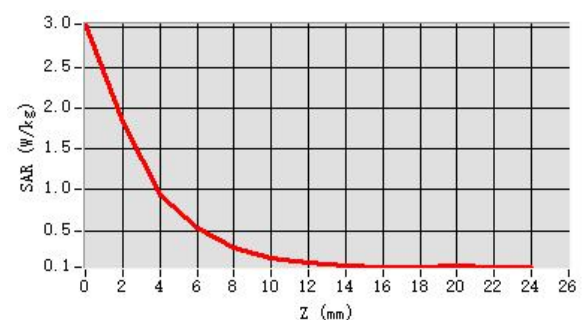
Maximum location: $X=17.00$, $Y=-16.00$; SAR Peak: 3.31 W/kg

SAR 10g (W/Kg)	0.421
SAR 1g (W/Kg)	1.093
Variation (%)	-1.150
Horizontal validation criteria: minimum distance (mm)	11.313708
Vertical validation criteria: SAR ratio M2/M1 (%)	51.102109

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Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	3.034	1.832	0.936	0.522	0.293	0.167	0.109	0.076	0.050	0.052	0.062	0.058



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Test Laboratory: AGC Lab
802.11a CH157- Body back
DUT: TPMS Diagnostic Tool; Type: F520

Date: Oct. 23, 2025

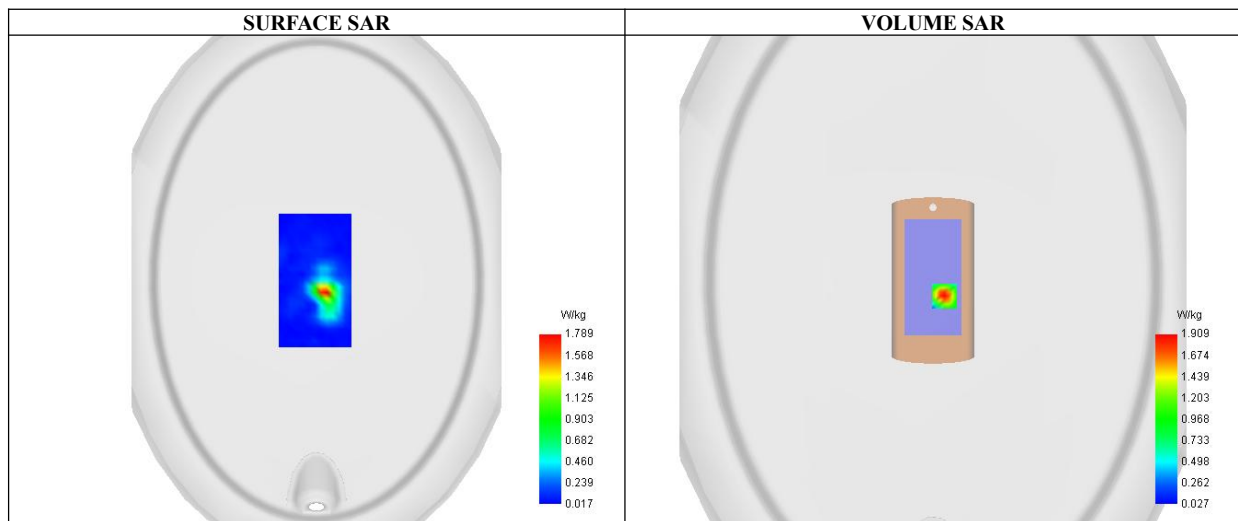
Communication System: Wi-Fi; Communication System Band: 802.11a; Duty Cycle: 1:1; Conv.F=1.41;
Frequency: 5785MHz; Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 5.41 \text{ mho/m}$; $\epsilon_r = 36.91$; $\rho = 1000 \text{ kg/m}^3$;
Phantom section: Flat Section

SATIMO Configuration:

- Probe: SSE2; Calibrated: 2025-05-06; Serial No.: 2023-EPGO-414
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: ELLI39 Phantom
- Measurement SW: OpenSAR V5.3.15.8

Configuration/ 802.11a CH157- Body back /Area Scan: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$
Configuration/ 802.11a CH157- Body back /Zoom Scan: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$

Area Scan	sam_direct_droit2_surf8mm.txt
ZoomScan	7x7x12 $dx=4\text{mm}$ $dy=4\text{mm}$ $dz=2\text{mm}$
Phantom	Validation plane
Device Position	Body back
Band	5800MHz
Channels	CH157
Signal	Crest factor: 1.0



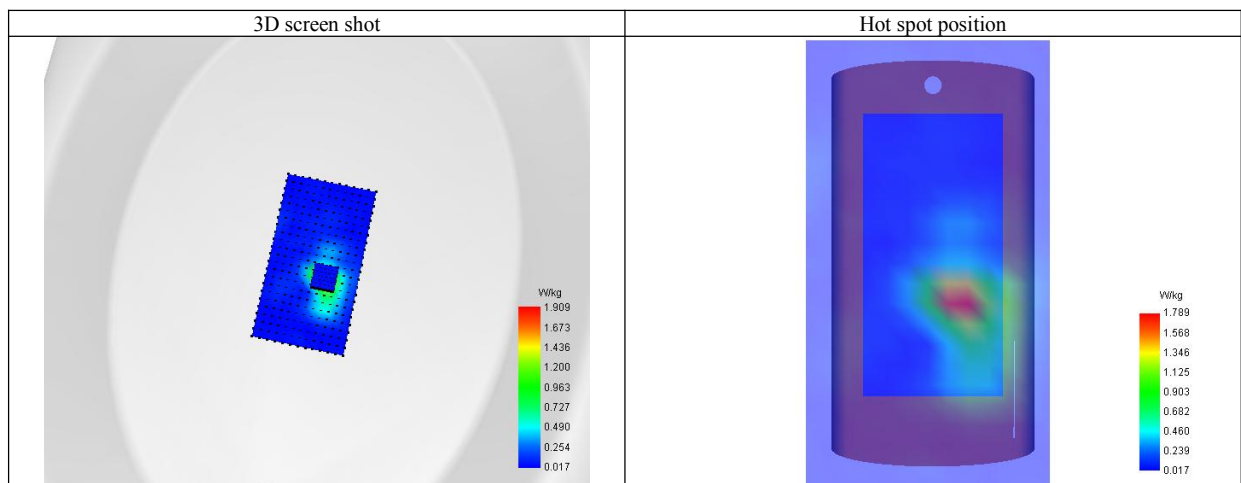
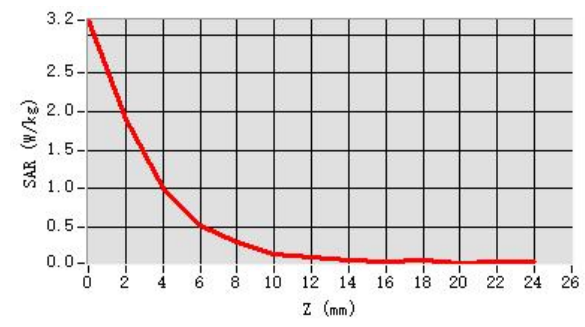
Maximum location: $X=11.00$, $Y=-15.00$; SAR Peak: 3.37 W/kg

SAR 10g (W/Kg)	0.420
SAR 1g (W/Kg)	1.121
Variation (%)	-4.230
Horizontal validation criteria: minimum distance (mm)	11.313708
Vertical validation criteria: SAR ratio M2/M1 (%)	52.265686

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Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	22.00
SAR (W/Kg)	3.189	1.909	0.998	0.522	0.303	0.142	0.108	0.058	0.056	0.063	0.028	0.052



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APPENDIX C. TEST SETUP PHOTOGRAPHS

Body Back 5mm



Body Front 5mm



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Edge2(Right)



Edge4(Left)

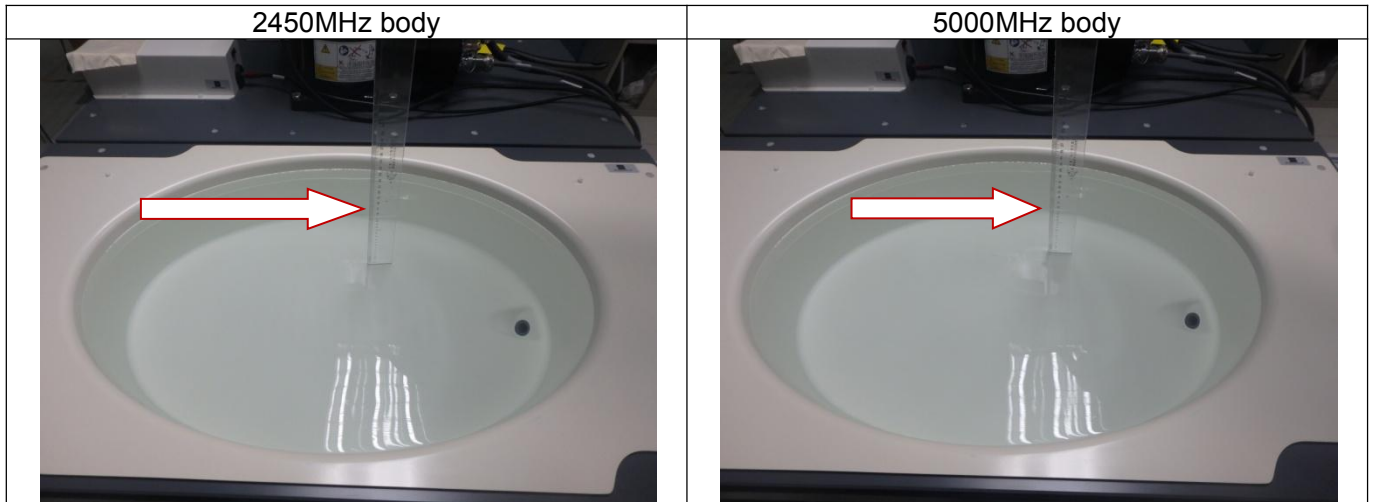


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DEPTH OF THE LIQUID IN THE PHANTOM—ZOOM IN

Note : The position used in the measurement were according to IEEE Std. 1528:2013



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APPENDIX D. CALIBRATION DATA

Refer to Attached files.

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1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the “Company”) solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the “Clients”).
2. Any report issued by Company as a result of this application for testing services (the “Report”) shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.
3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.
5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.
6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.
7. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.
8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

----END OF REPORT----

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