

TEST REPORT

Reference No..... : WTD21X08082199W
FCC ID : JVPWDR02U
IC : 6175A-WDR02U
Applicant : BenQ Corporation
Address : 16 Jihu Road, Neihu, Taipei 114, Taiwan
Product Name : BenQ Wireless Dongle
Test Model. : WDR02U
Standards : FCC Part 2.1093,
ANSI / IEEE C95.1 :2005+A1:2010
ANSI / IEEE C95.3 :2002(R2008)
RSS-102 ISSUE 5 (2015-03)
Date of Receipt sample : Aug. 12, 2021
Date of Test..... : Aug. 13, 2021 to Sept. 29, 2021
Date of Issue : Sept. 29, 2021
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 compiler and 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

Tested by:

Reviewed By:

Approved & Authorized By:

Jack Sun

Jason Su

Silin Chen

Jack Sun / Project Engineer

Jason Su/ RF Manager

Silin Chen / Manager

TABLE OF CONTENTS

1. General Information	3
1.1 Product Description for Equipment Under Test (EUT)	3
1.2 Test Standards	4
1.3 Test Methodology	4
1.4 Test Facility	4
2. Summary of Test Results	5
3. Specific Absorption Rate (SAR)	6
3.1 Introduction	6
3.2 SAR Definition	6
4. SAR Measurement System	7
4.1 The Measurement System	7
4.2 Probe	7
4.3 Probe Calibration Process	9
4.4 Phantom	10
4.5 Device Holder	10
4.6 Test Equipment List	11
5. Tissue Simulating Liquids	12
5.1 Composition of Tissue Simulating Liquid	12
5.2 Tissue Dielectric Parameters for Head and Body Phantoms	13
5.3 Tissue Calibration Result	14
6. SAR Measurement Evaluation	15
6.1 Purpose of System Performance Check	15
6.2 System Setup	15
6.3 Validation Results	16
7. EUT Testing Position	17
7.1 EUT Antenna Position	17
7.2 EUT Testing Position	17
8. SAR Measurement Procedures	18
8.1 Measurement Procedures	18
8.2 Spatial Peak SAR Evaluation	18
8.3 Area & Zoom Scan Procedures	19
8.4 Volume Scan Procedures	19
8.5 SAR Averaged Methods	19
8.6 Power Drift Monitoring	19
9. SAR Test Result	20
9.1 Conducted RF Output Power	20
9.2 Test Results for Standalone SAR Test	24
9.3 Simultaneous Multi-band Transmission SAR Analysis	26
10. Measurement Uncertainty	27
10.1 Uncertainty for EUT SAR Test	27
10.2 Uncertainty for System Performance Check	28
Annex A. Plots of System Performance Check	30
Annex B. Plots of SAR Measurement	34
Annex C. EUT Photos	42
Annex D. Test Setup Photos	44
Annex E. Calibration Certificate	46

1. General Information

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: BenQ Corporation
Address of applicant: 16 Jihu Road, Neihu, Taipei 114, Taiwan

Manufacturer: BenQ Corporation
Address of manufacturer: 16 Jihu Road, Neihu, Taipei 114, Taiwan

General Description of EUT:	
Product Name:	BenQ Wireless Dongle
Trade Name:	/
Model No.:	WDR02U
Adding Model:	/
Rated Voltage:	DC5V
Software Version:	CT-UNITE-USB V1.1
Hardware Version:	RJ001
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT:	
Wi-Fi(5G)	
Support Standards:	802.11a, 802.11n(HT20/40), 802.11ac(VHT20/40/80)
Frequency Range:	Band 2: 5250-5350MHz, Band 3: 5470-5725MHz
RF Output Power:	ANT A: 7.86dBm(Conducted) ANT B: 7.78Bm(Conducted) ANT A + ANT B: 10.71Bm(Conducted)
Type of Modulation:	BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
Type of Antenna:	PCB Antenna
Antenna Gain:	Antenna A: Band 2: 2dBi; Band 3: 2dBi Antenna B: Band 2: 2dBi; Band 3: 2dBi

1.2 Test Standards

The following report is accordance with RSS-102 ISSUE 5 (2015-03), FCC 47 CFR Part 2.1093, ANSI/IEEE C95.1-2005+A1:2010, ANSI / IEEE C95.3 :2002(R2008), IEEE 62209-1528:2020, and KDB 865664 D01 v01r04, KDB 865664 D02 v01r02002E.

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 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. KDB 447498 D02 SAR Procedures for Dongle Xmtr v02r01 SAR MEASUREMENT PROCEDURES FOR USB DONGLE TRANSMITTERS

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.

2. Summary of Test Results

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

Frequency Band	Body (0mm Gap)	SAR _{1g} Limit (W/kg)
	Maximum SAR _{1g} (W/kg)	
WLAN ANT A	0.682	1.6
WLAN ANT B	0.528	1.6
Simultaneous Transmission	1.070	1.6

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in RSS-102 ISSUE 5 (2015-03) and FCC 47 CFR Part 2.1093 and ANSI/IEEE C95.1-2005+A1:2010, and had been tested in accordance with the measurement methods and procedure specified in 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:

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

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

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

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

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

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

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 SSE5 SN 09/13 EP168 with following specifications is used

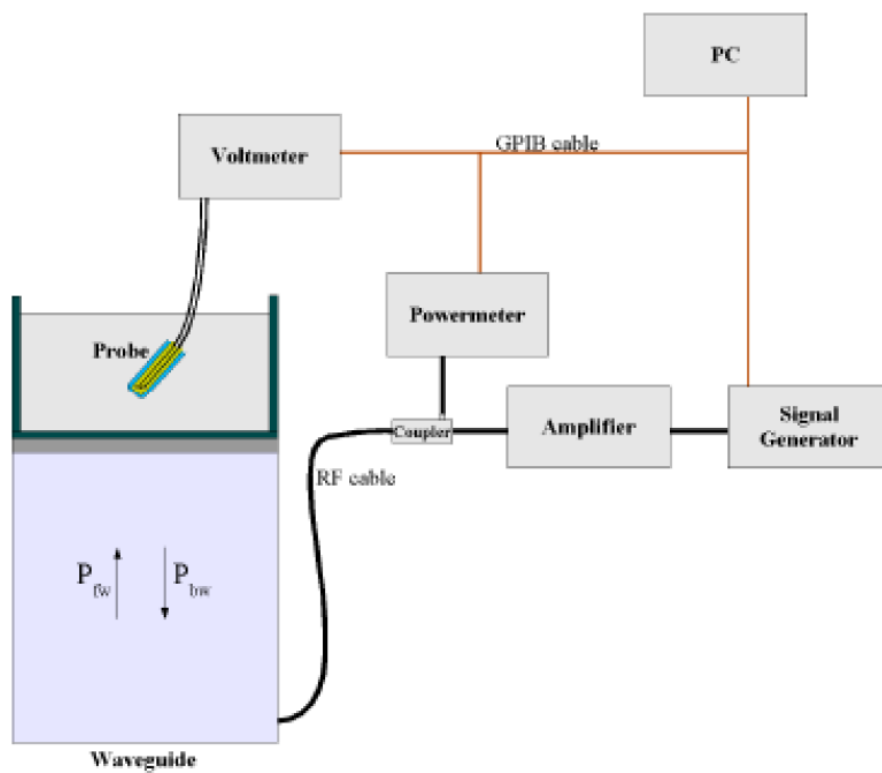
- Dynamic range: 0.01-100 W/kg
- Probe Length: 330 mm
- Length of Individual Dipoles: 4.5 mm
- Maximum external diameter: 8 mm

Waltek Testing Group (Shenzhen) Co., Ltd.

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

- Probe Tip External Diameter : 5 mm
 - Distance between dipoles / probe extremity: 2.7mm
 - Probe linearity: <0.25 dB
 - Axial Isotropy: <0.25 dB
 - Spherical Isotropy: <0.50 dB
 - Calibration range: 700 to 3000MHz for head & body simulating liquid.
- Angle between probe axis (evaluation axis) and surface normal line: less than 30°

Probe calibration is realized, in compliance with EN 62209-1 and IEEE 1528 STD, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the EN 62209-1 annexe 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:

Waltek Testing Group (Shenzhen) Co., Ltd.

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

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.

Where:

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

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,

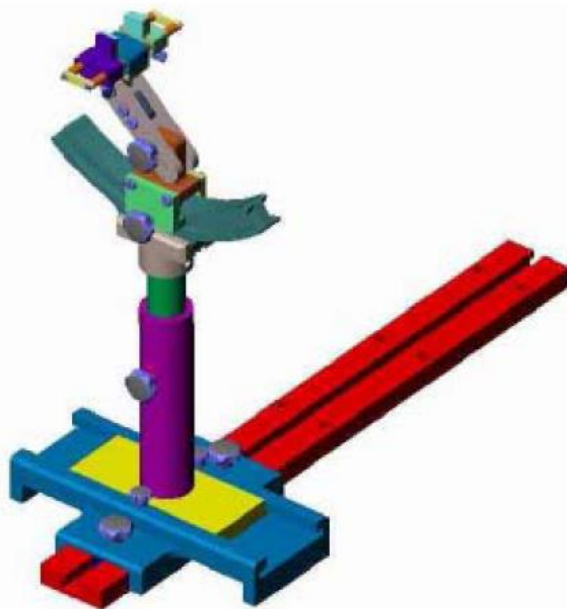
ρ = Tissue density (1.25 g/cm³ for brain tissue)

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

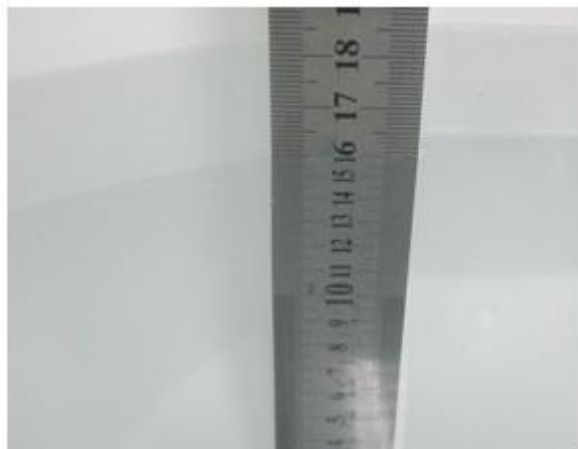
4.6 Test Equipment List

No.	Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
SEMT-1104	E-Field Probe	MVG	SSE5	SN 09/13 EP168	2020-05-22	2022-05-21
SEMT-1372	E-Field Probe	MVG	SSE2	SN 18/21 EPGO356	2021-07-16	2022-07-15
SEMT-1193	5 GHz Dipole	MVG	SWG5500	SN 49/16 WGA45	2020-07-03	2023-07-02
SEMT-12101	Dielectric Probe	SATIMO	SCLMP	SN 47/12 OCPG49	2020-03-11	2022-03-10
SEMT-12102	SAM Phantom	SATIMO	SAM	SN/ 47/12 SAM95	N/A	N/A
SEMT-12103	Multi Meter	Keithley	Keithley 2000	4006367	2021-03-27	2022-03-26
SEMT-1196	Power meter	Keithley	3500	JC-2017-09-001	2021-03-27	2022-03-26
SEMT-1197	Power meter	Keithley	3500	JC-2017-09-001	2021-03-27	2022-03-26
SEMT-1198	Power Sensor	HP	11636B	JC-2017-10-002	2021-03-27	2022-03-26
SEMT-1321	MXG X-Series RF Vector Signal Generato	KEYSIGHT	N5182B	MY57300664	2021-04-14	2022-04-13
SEMT-1122	Universal Tester	Rohde & Schwarz	CMU200	112315	2021-03-27	2022-03-26
SEMT-1075	Communications Tester	Rohde & Schwarz	CMW500	148650	2021-03-27	2022-03-26
SEMT-1064	Network Analyzer	HP	8753C	2901A00831	2021-03-27	2022-03-26

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 (%)
Body			
5200-5800	78.6	10.7	10.7

5.2 Tissue Dielectric Parameters for Head and Body Phantoms

The IEEE Std. 1528, FCC KDBs 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
2450	1.80	39.2	1.95	52.7
3000	2.40	38.5	2.73	52.0
5200	4.66	36.0	5.30	49.0
5300	35.9	4.76	5.42	48.9
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

Body Tissue Simulating Liquid									
Freq. MHz.	Temp. (°C)	Conductivity			Permittivity			Limit (%)	Date
		Reading (σ)	Target (σ)	Delta (%)	Reading (ϵ_r)	Target (ϵ_r)	Delta (%)		
5300	21.3	5.26	5.42	-2.95	48.50	48.9	-0.82	±5	2021-09-28
5600	21.3	5.52	5.77	-4.33	48.30	48.5	-0.41	±5	2021-09-29

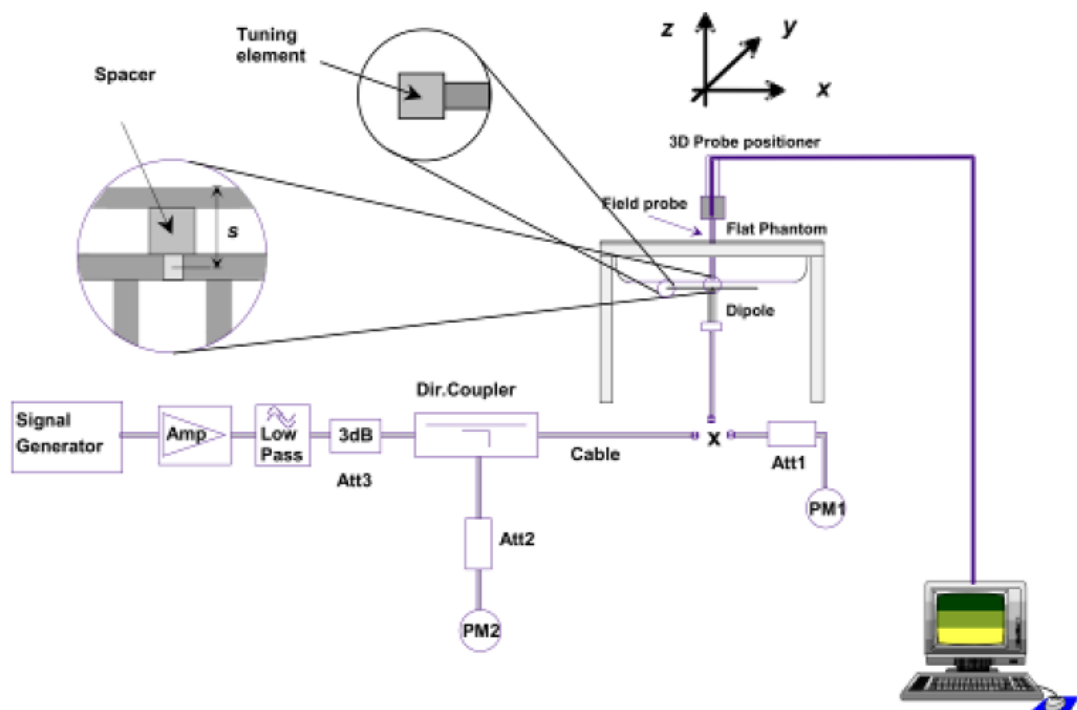
6. SAR Measurement Evaluation

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 5260MHz, 5280MHz, 5320MHz, 5580 MHz, and 5700MHz. 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.

The output power on 5 GHz Waveguide must be calibrated to 20 dBm (100mW) before 5 GHz Waveguide 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.

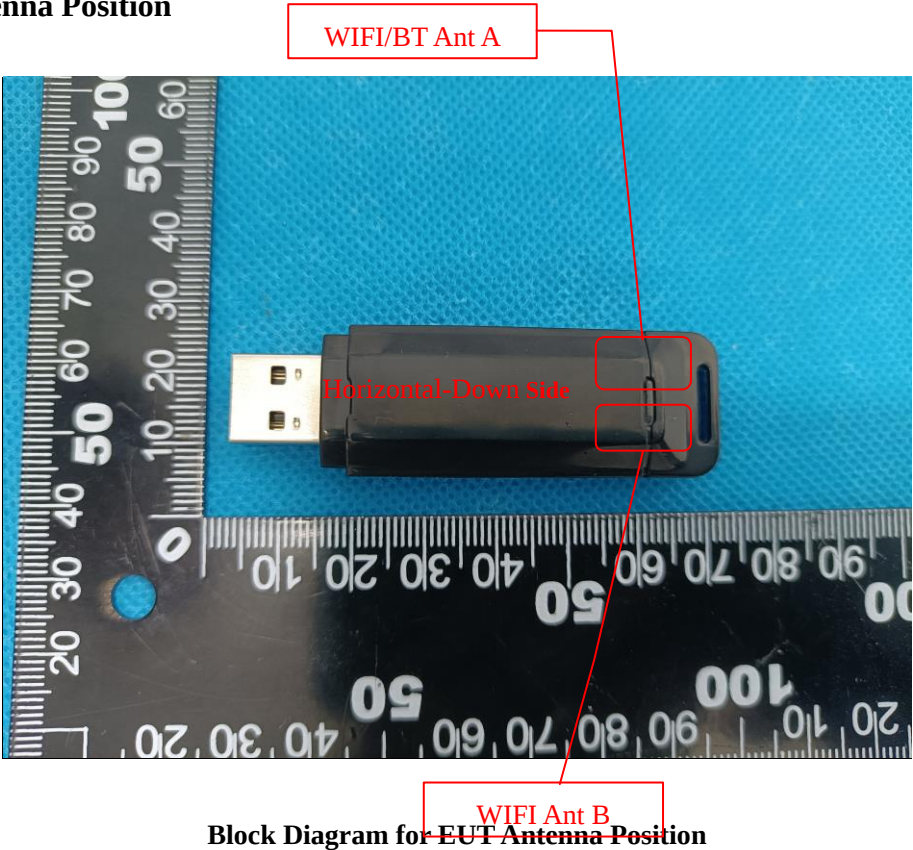
Frequency	Targeted SAR _{1g}	Measured SAR _{1g}	Normalized SAR _{1g}	Tolerance	Date
MHz	(W/kg)	(W/kg)	(W/kg)	(%)	
Body					
5400	163.31	17.330	173.33	6.14	2021-09-28
5600	165.72	17.111	171.11	3.25	2021-09-29

Targeted and Measurement SAR

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

7. EUT Testing Position

7.1 EUT Antenna Position



7.2 EUT Testing Position

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:

Body SAR tests, Test distance: 0mm				
Antennas	Vertical-Front	Vertical-Back	Horizontal-Up	Horizontal-Down
WLAN(5.3G)	Yes	Yes	Yes	Yes
WLAN(5.6G)	Yes	Yes	Yes	Yes

Remark:

- Referring to RSS-102 ISSUE 5 (2015-03),KDB 616217 D04 v01r02, KDB 248227 D01 v02r02 and KDB 447498 D01 v06, this device is overall diagonal dimension(>20cm) tablet, tested in direct contact (no gap) with flat phantom.
- Referring to KDB 616217 D04 v01r02, Exposures from antennas through the front (top) surface of the display section of a full-size tablet, away from the edges, are generally limited to the user's hands. Exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR evaluation for the front surface of tablet display screens are generally not necessary.

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(5.3G) - Maximum Average Power ANT A				
Test Mode	Channel	Frequency	Average Power	Tune-up power
		(MHz)	(dBm)	(dBm)
802.11a	CH 52	5260	7.32	7.5
	CH 60	5300	7.41	7.5
	CH 64	5320	7.25	7.5
802.11n (20MHz)	CH 52	5260	7.35	7.5
	CH 60	5300	7.44	7.5
	CH 64	5320	7.24	7.5
802.11n (40MHz)	CH 54	5270	6.32	6.5
	CH 62	5310	6.12	6.5
802.11ac VHT20	CH 52	5260	7.56	8.0
	CH 60	5300	7.53	8.0
	CH 64	5320	7.35	7.5
802.11ac VHT40	CH 54	5270	6.54	7.0
	CH 62	5310	6.24	6.5
802.11ac (80MHz)	CH 58	5290	4.02	4.5

WLAN(5.3G) - Maximum Average Power ANT B				
Test Mode	Channel	Frequency	Average Power	Tune-up power
		(MHz)	(dBm)	(dBm)
802.11a	CH 52	5260	7.22	7.5
	CH 60	5300	7.03	7.5
	CH 64	5320	7.13	7.5
802.11n (20MHz)	CH 52	5260	7.52	8.0
	CH 60	5300	7.12	7.5
	CH 64	5320	7.16	7.5
802.11n (40MHz)	CH 54	5270	4.02	4.5
	CH 62	5310	3.40	3.5
802.11ac VHT20	CH 52	5260	7.58	8.0
	CH 60	5300	7.24	7.5
	CH 64	5320	7.35	7.5
802.11ac VHT40	CH 54	5270	4.04	4.5

	CH 62	5310	3.43	3.5
802.11ac (80MHz)	CH 58	5290	1.02	1.5

WLAN(5.6G) - Maximum Average Power ANT A				
Test Mode	Channel	Frequency	Average Power	Tune-up power
		(MHz)	(dBm)	(dBm)
802.11a	CH 100	5500	7.65	8.0
	CH 116	5580	7.86	8.0
	CH 140	5700	7.27	7.5
802.11n (20MHz)	CH 100	5500	7.30	7.5
	CH 116	5580	7.44	7.5
	CH 140	5700	7.28	7.5
802.11n (40MHz)	CH 102	5510	6.00	6.5
	CH 110	5550	6.12	6.5
	CH 134	5670	6.32	6.5
802.11ac VHT20	CH 100	5500	7.31	7.5
	CH 116	5580	7.46	7.5
	CH 140	5700	7.32	7.5
802.11ac VHT40	CH 102	5510	6.02	6.5
	CH 110	5550	6.19	6.5
	CH 134	5670	6.33	6.5
802.11ac (80MHz)	CH 106	5530	3.92	4.0

WLAN(5.6G) - Maximum Average Power ANT B				
Test Mode	Channel	Frequency	Average Power	Tune-up power
		(MHz)	(dBm)	(dBm)
802.11a	CH 100	5500	7.35	7.5
	CH 116	5580	7.54	8.0
	CH 140	5700	7.31	7.5
802.11n (20MHz)	CH 100	5500	6.94	7.0
	CH 116	5580	7.72	8.0
	CH 140	5700	7.15	7.5
802.11n (40MHz)	CH 102	5510	6.28	6.5
	CH 110	5550	6.50	7.0
	CH 134	5670	6.36	6.5
802.11ac VHT20	CH 100	5500	6.98	7.0
	CH 116	5580	7.78	8.0

	CH 140	5700	7.16	7.5
802.11ac VHT40	CH 102	5510	6.33	6.5
	CH 110	5550	6.53	7.0
	CH 134	5670	6.41	6.5
802.11ac (80MHz)	CH 106	5530	4.25	4.5

WLAN(5.3G) - Maximum Average Power ANT A+ ANT B				
Test Mode	Channel	Frequency	Average Power	Tune-up power
		(MHz)	(dBm)	(dBm)
802.11a	CH 52	5260	10.28	10.5
	CH 60	5300	10.23	10.5
	CH 64	5320	10.20	10.5
802.11n (20MHz)	CH 52	5260	10.45	10.5
	CH 60	5300	10.29	10.5
	CH 64	5320	10.21	10.5
802.11n (40MHz)	CH 54	5270	8.33	8.5
	CH 62	5310	7.98	8.0
802.11ac VHT20	CH 52	5260	10.58	11.0
	CH 60	5300	10.40	10.5
	CH 64	5320	10.36	10.5
802.11ac VHT40	CH 54	5270	8.48	8.5
	CH 62	5310	8.07	8.5
802.11ac (80MHz)	CH 58	5290	5.78	6.0

WLAN(5.6G) - Maximum Average Power ANT A+ ANT B				
Test Mode	Channel	Frequency	Average Power	Tune-up power
		(MHz)	(dBm)	(dBm)
802.11a	CH 100	5500	10.51	11.0
	CH 116	5580	10.71	11.0
	CH 140	5700	10.30	10.5
802.11n (20MHz)	CH 100	5500	10.13	10.5
	CH 116	5580	10.59	11.0
	CH 140	5700	10.23	10.5
802.11n (40MHz)	CH 102	5510	9.15	9.5
	CH 110	5550	9.32	9.5
	CH 134	5670	9.35	9.5
802.11ac VHT20	CH 100	5500	10.16	10.5
	CH 116	5580	10.63	11.0

	CH 140	5700	10.25	10.5
802.11ac VHT40	CH 102	5510	9.19	9.5
	CH 110	5550	9.37	9.5
	CH 134	5670	9.38	9.5
802.11ac (80MHz)	CH 106	5530	7.10	7.5

Remark:

1. Per KDB 248227 D01 v02r02, SAR is not required for the following U-NII-1 and U-NII-2A bands conditions.

a. When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.

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.

2. 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

Body SAR

WLAN 5.3GHz– Body SAR Test ANT A									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
	802.11ac VHT20	Horizontal-Up	52	5260	7.56	8.0	1.107	0.583	0.645
	802.11ac VHT20	Horizontal-Down	52	5260	7.56	8.0	1.107	0.351	0.388
1	802.11ac VHT20	Vertical-Front	52	5260	7.56	8.0	1.107	0.616	0.682
	802.11ac VHT20	Vertical-Back	52	5260	7.56	8.0	1.107	0.118	0.131

WLAN 5.6GHz– Body SAR Test ANT A									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
	802.11a	Horizontal-Up	116	5580	7.86	8.0	1.033	0.551	0.569
2	802.11a	Horizontal-Down	116	5580	7.86	8.0	1.033	0.598	0.618
	802.11a	Vertical-Front	116	5580	7.86	8.0	1.033	0.574	0.593
	802.11a	Vertical-Back	116	5580	7.86	8.0	1.033	0.122	0.126

WLAN 5.3GHz– Body SAR Test ANT B									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
	802.11ac VHT20	Horizontal-Up	52	5260	7.58	8.0	1.102	0.333	0.367
3	802.11ac VHT20	Horizontal-Down	52	5260	7.58	8.0	1.102	0.410	0.452
	802.11ac VHT20	Vertical-Front	52	5260	7.58	8.0	1.102	0.100	0.110
	802.11ac VHT20	Vertical-Back	52	5260	7.58	8.0	1.102	0.376	0.414

WLAN 5.6GHz– Body SAR Test ANT B									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR1g (W/kg)	Scaled SAR1g (W/kg)
			CH.	MHz					
	802.11ac VHT20	Horizontal-Up	116	5580	7.78	8.0	1.052	0.304	0.320
	802.11ac VHT20	Horizontal-Down	116	5580	7.78	8.0	1.052	0.286	0.301
	802.11ac VHT20	Vertical-Front	116	5580	7.78	8.0	1.052	0.131	0.138
4	802.11ac VHT20	Vertical-Back	116	5580	7.78	8.0	1.052	0.502	0.528

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.

9.3 Simultaneous Multi-band Transmission SAR Analysis

List of Mode for Simultaneous Multi-band Transmission

No.	Configurations	Body SAR
1	WLAN5G ANT A + WLAN5G ANT B	Yes

Remark:

One way of determining the threshold power level available to the secondary transmitter ($P_{\text{available}}$) is to calculate it from the measured peak spatial-average SAR of the primary transmitter (SAR_1) according to the equation:

$$P_{\text{available}} = P_{\text{th,m}} \times (\text{SAR}_{\text{lim}} - \text{SAR}_1) / \text{SAR}_{\text{lim}}$$

where $P_{\text{th,m}}$ is the threshold exclusion power level taken from Annex B of IEC 62479⁷ for the frequency of the secondary transmitter at the separation distance used in the testing.

Body SAR

	WLAN(5G) ANT A	WLAN(5G) ANT B	Summed SAR (W/kg)
Position	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Horizontal-Up	0.645	0.367	1.012
Horizontal-Down	0.618	0.452	1.070
Vertical-Front	0.682	0.138	0.820
Vertical-Back	0.131	0.528	0.659

10. Measurement Uncertainty

10.1 Uncertainty for EUT SAR Test

a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+- %)	10g Ui (+- %)	Vi
Measurement System									
Probe calibration	E.2.1	7.0	N	1	1	1	7.00	7.00	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	$(1_{Cp})^{1/2}$	$(1_{Cp})^{1/2}$	1.02	1.02	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	$(Cp)^{1/2}$	$(Cp)^{1/2}$	1.63	1.63	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
RF ambient Conditions – Noise	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	E.5	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Test Sample Related									
Test sample positioning	E.4.2	0.03	N	1	1	1	0.03	0.03	N-1
Device Holder Uncertainty	E.4.1	5.00	N	1	1	1	5.00	5.00	
Output power Variation - SAR drift measurement	E.2.9	12.02	R	$\sqrt{3}$	1	1	6.94	6.94	∞
SAR scaling	E6.5	0.0	R	$\sqrt{3}$	1	1	0.0	0.0	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞

Uncertainty in SAR correction for deviations in permittivity and conductivity	E3.2	1.9	R	$\sqrt{3}$	1	0.84	1.10	0.90	∞
Liquid conductivity - deviation from target value	E.3.2	5.00	R	$\sqrt{3}$	0.64	0.43	1.85	1.24	∞
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.20	2.15	∞
Liquid permittivity - deviation from target value	E.3.2	0.37	R	$\sqrt{3}$	0.6	0.49	0.13	0.10	∞
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	1	0.6	0.49	6.00	4.90	∞
Combined Standard Uncertainty			RSS				12.98	12.53	
Expanded Uncertainty (95% Confidence interval)			K=2				25.32	24.43	

10.2 Uncertainty for System Performance Check

a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	7.0	N	1	1	1	7.00	7.00	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	$(1_{-}Cp)^{1/2}$	$(1_{-}Cp)^{1/2}$	1.02	1.02	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	$(Cp)^{1/2}$	$(Cp)^{1/2}$	1.63	1.63	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	E.2.5	0	R	$\sqrt{3}$	0	0	0.0	0.0	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.02	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
RF ambient Conditions – Noise	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient Conditions - Reflections	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞

Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Dipole									
Dipole axis to liquid Distance	8,E.4.2	1.00	N	$\sqrt{3}$	1	1	0.58	0.58	N-1
Input power and SAR drift measurement	8,6.6.2	12.02	R	$\sqrt{3}$	1	1	6.94	6.94	∞
Deviation of experimental dipole from numerical dipole	E.6.4	5.5	R	$\sqrt{3}$	1	1	3.20	3.20	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E.3.2	2.0	R	$\sqrt{3}$	1	0.84	1.10	1.10	∞
Liquid conductivity - deviation from target value	E.3.2	5.00	R	$\sqrt{3}$	0.64	0.43	1.85	1.24	
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	1	0.64	0.43	3.20	2.15	
Liquid permittivity - deviation from target value	E.3.2	0.37	R	$\sqrt{3}$	0.6	0.49	0.13	0.10	
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	1	0.6	0.49	6.00	4.90	M
Combined Standard Uncertainty			RSS				12.00	11.50	
Expanded Uncertainty (95% Confidence interval)			K=2				23.39	22.43	

Annex A. Plots of System Performance Check

MEASUREMENT 1

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 12 minutes 21 seconds

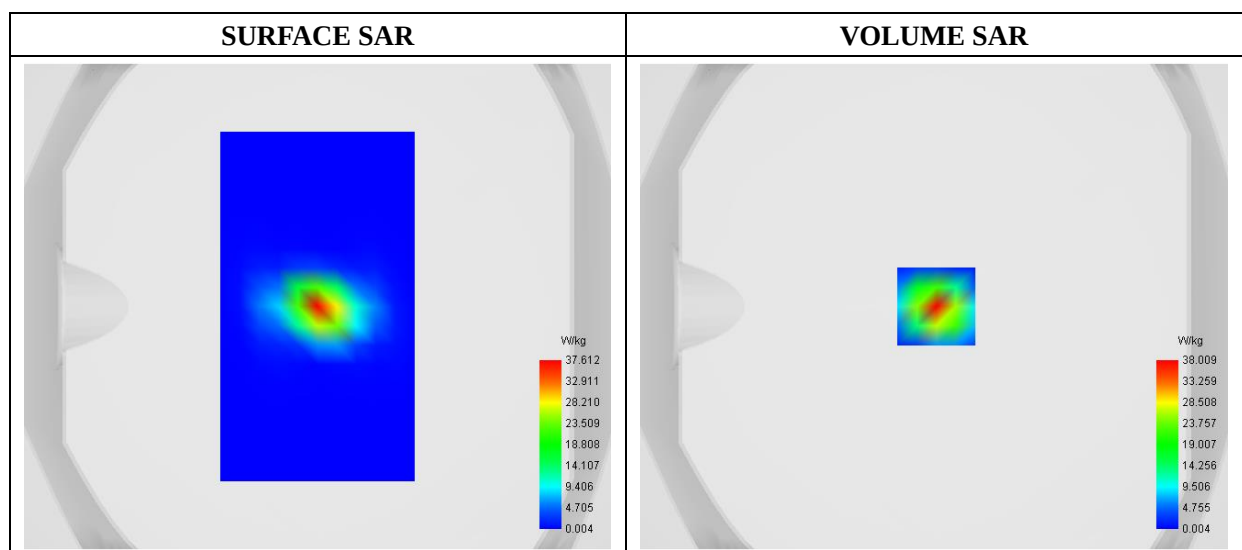
E-field Probe: SSE5 - SN 18/21 EPG0356; ConvF: 1.67; Calibrated: 2021-07-16

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
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)	48.500839
Conductivity (S/m)	5.260192
Power Variation (%)	1.020000
Ambient Temperature	21.0
Liquid Temperature	21.0



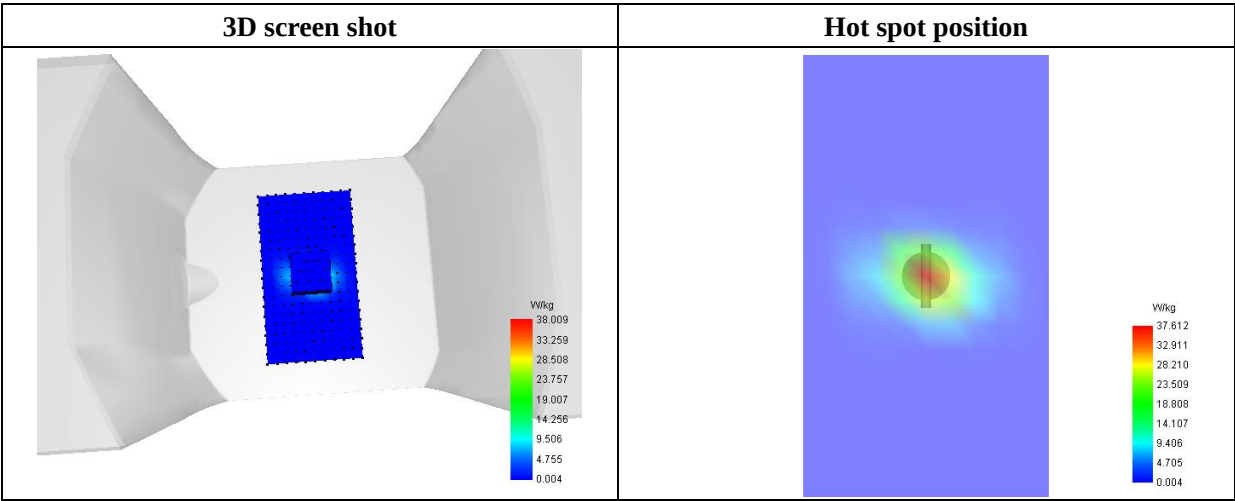
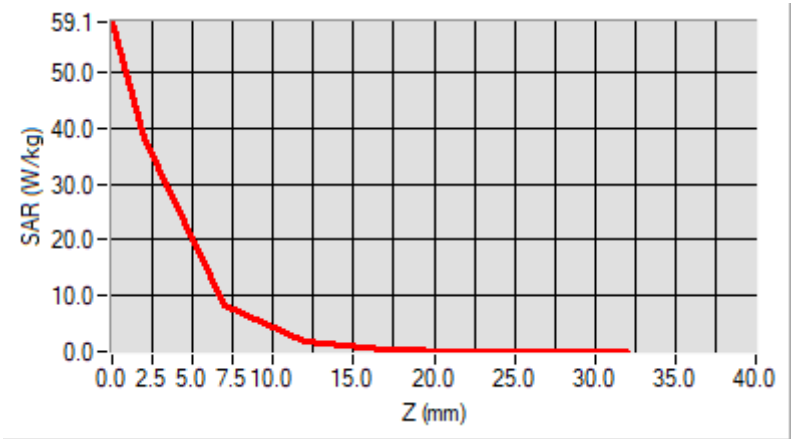
Maximum location: X=1.00, Y=0.00

Waltek Testing Group (Shenzhen) Co., Ltd.

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

SAR 10g (W/Kg)	5.872241
SAR 1g (W/Kg)	17.329716

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	59.0521	38.0093	8.3284	1.8732	0.3993	0.0816	0.0132



MEASUREMENT 2

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 12 minutes 21 seconds

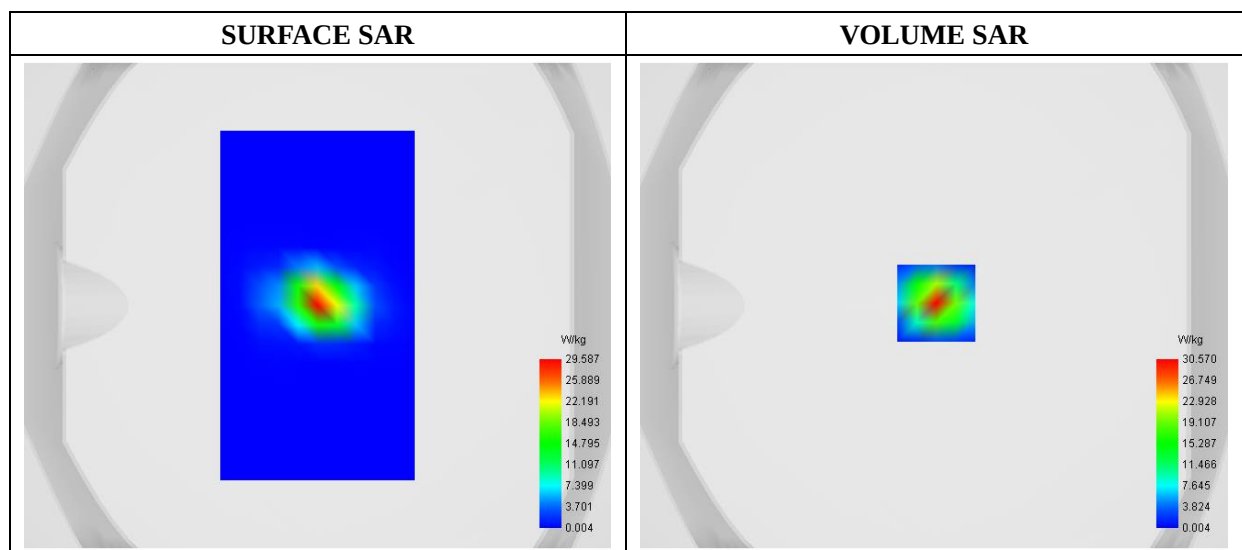
E-field Probe: SSE5 - SN 18/21 EPG0356; ConvF: 1.67; Calibrated: 2021-07-16

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	Duty Cycle 1:1

B. SAR Measurement Results

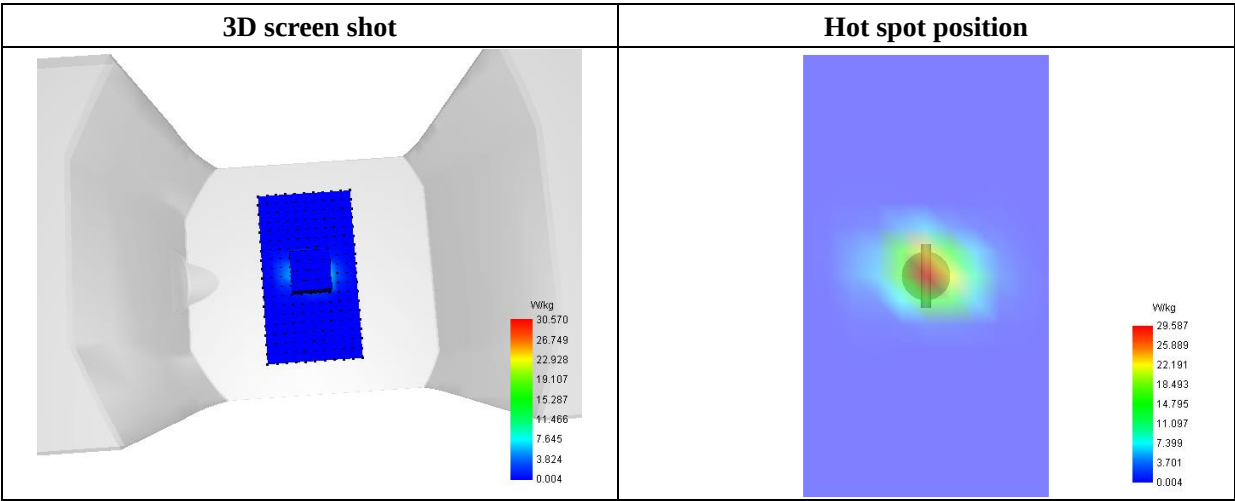
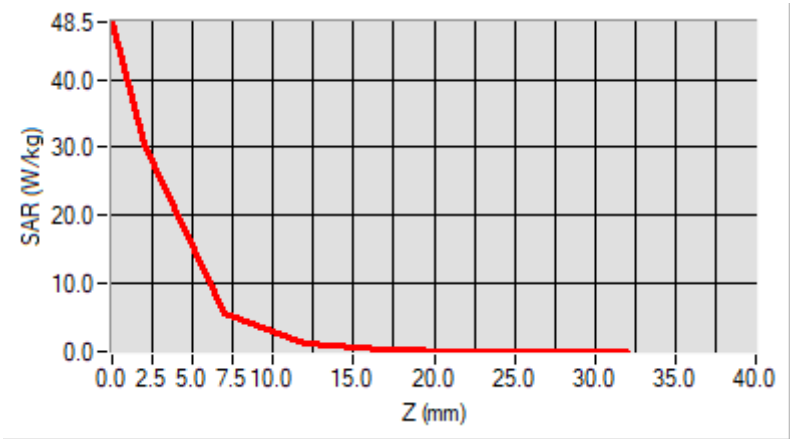
Frequency (MHz)	5600.000000
Relative Permittivity (real part)	48.302143
Conductivity (S/m)	5.521688
Power Variation (%)	0.749201
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=1.00, Y=1.00

SAR 10g (W/Kg)	5.912341
SAR 1g (W/Kg)	17.110732

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	48.4695	30.5699	5.7100	1.0698	0.1906	0.0364	0.0052



Annex B. Plots of SAR Measurement

MEASUREMENT 1

Type: Phone measurement (Complete)

Date of measurement: 09/28/2021

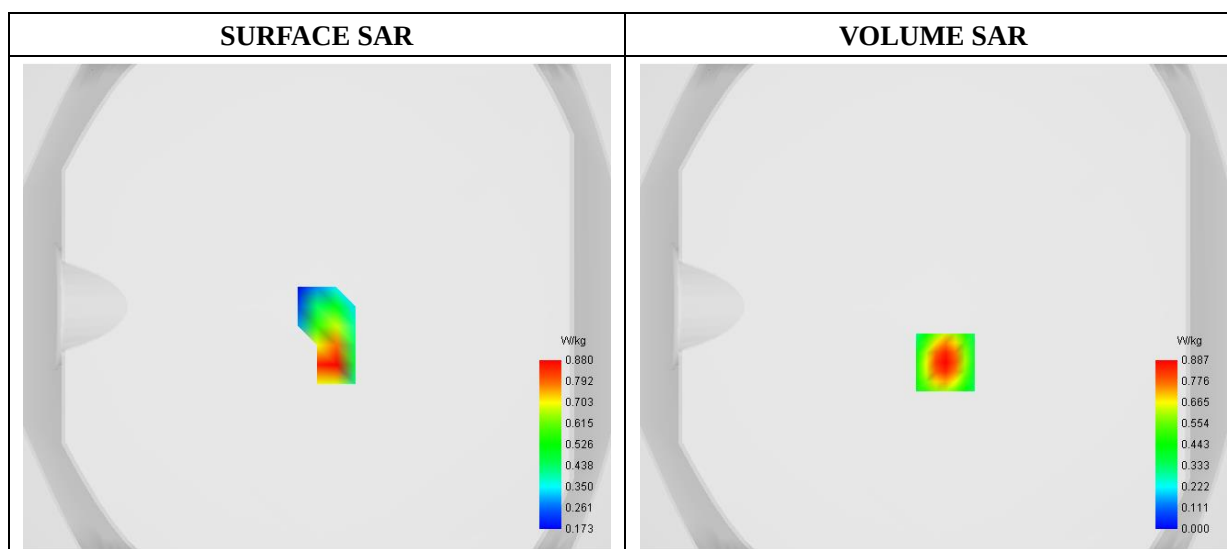
Measurement duration: 12 minutes 3 seconds

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Vertical-Front
Band	WiFi(5.3G)_802.11ac VHT20 ANT A
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5260.000000
Relative Permittivity (real part)	48.502135
Conductivity (S/m)	5.261501
Power Variation (%)	0.848378
Ambient Temperature	21.1
Liquid Temperature	21.2



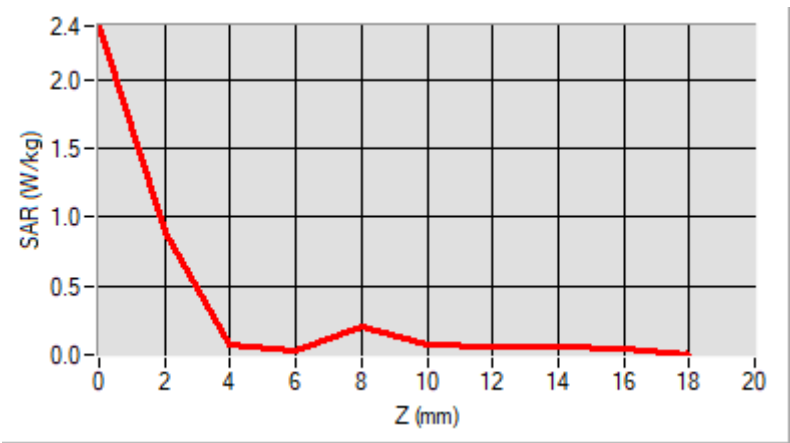
Maximum location: X=5.00, Y=-23.00

D. SAR 1g & 10g

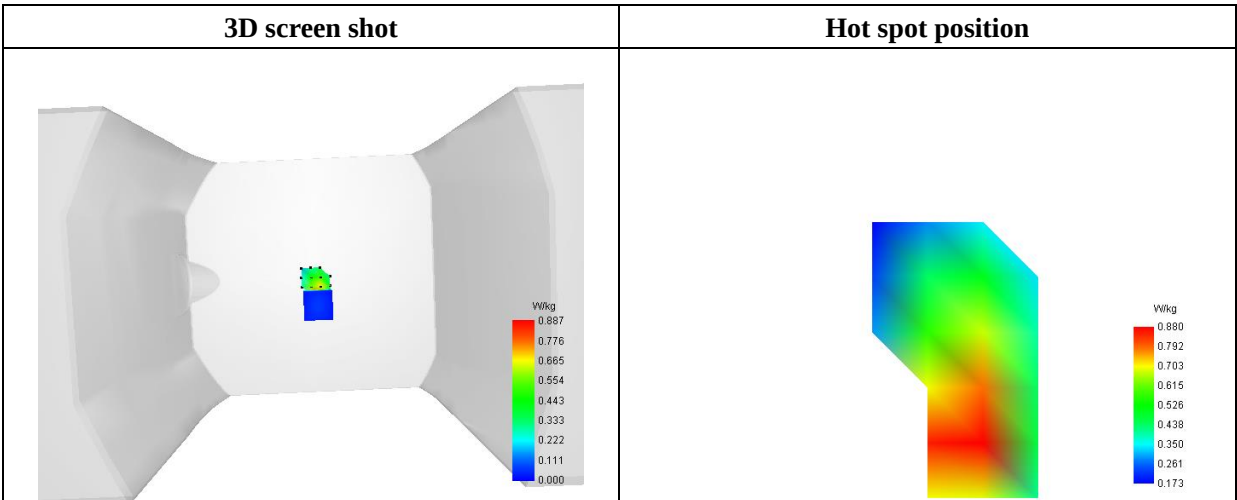
SAR 10g (W/Kg)	0.123361
SAR 1g (W/Kg)	0.615607

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)	2.3915	0.8869	0.0690	0.0335	0.1982	0.0787	0.0600	0.0571	0.0382



F. 3D Image



MEASUREMENT 2

Type: Phone measurement (Complete)

Date of measurement: 09/28/2021

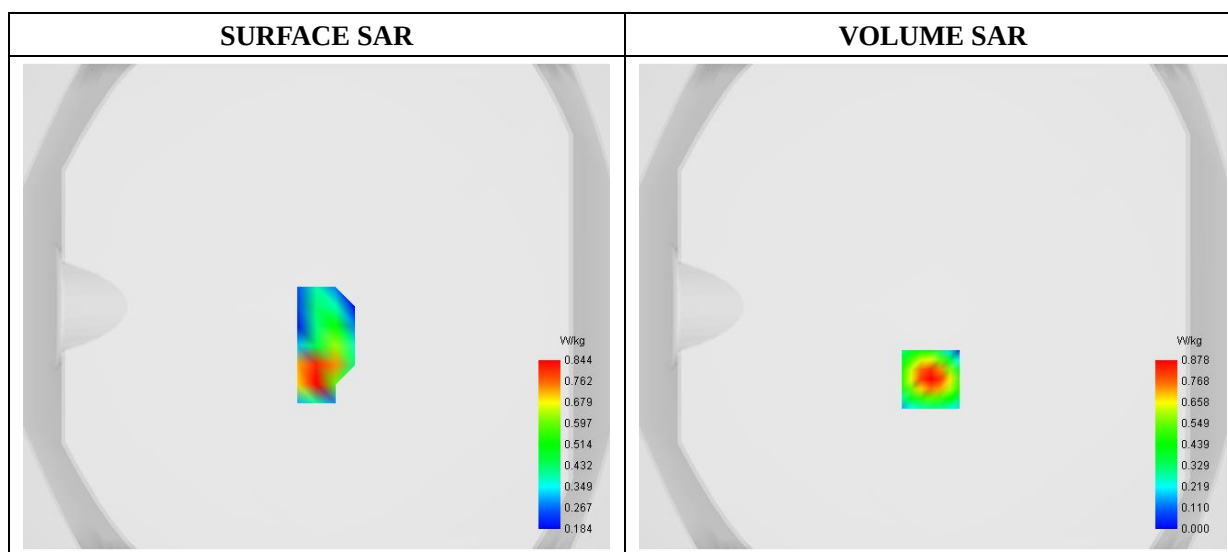
Measurement duration: 12 minutes 3 seconds

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Horizontal-Down
Band	WiFi(5.6G)_802.11a ANT A
Channels	Middle
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5580.000000
Relative Permittivity (real part)	48.302135
Conductivity (S/m)	5.521501
Power Variation (%)	0.848378
Ambient Temperature	21.1
Liquid Temperature	21.2



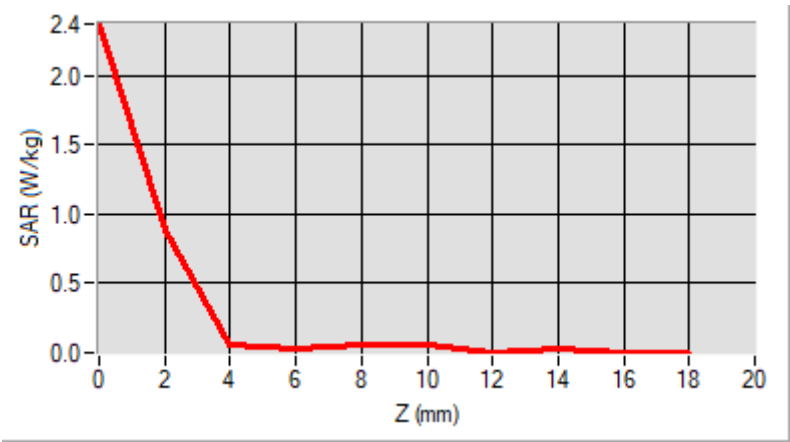
Maximum location: X=-1.00, Y=-30.00

D. SAR 1g & 10g

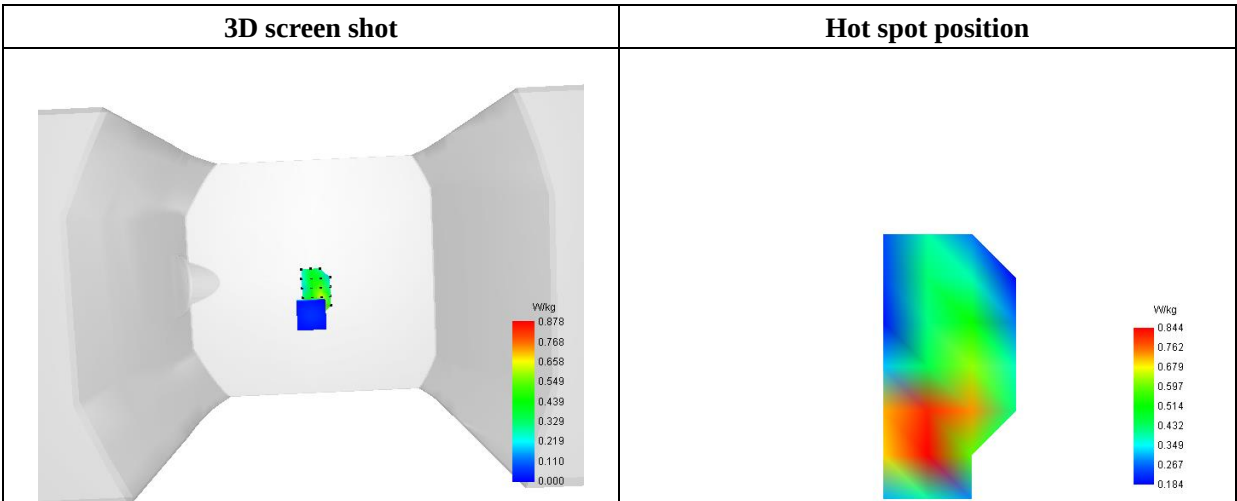
SAR 10g (W/Kg)	0.101263
SAR 1g (W/Kg)	0.597732

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)	2.3702	0.8778	0.0617	0.0272	0.0569	0.0577	0.0047	0.0224	0.0000



F. 3D Image



MEASUREMENT 3

Type: Phone measurement (Complete)

Date of measurement: 09/28/2021

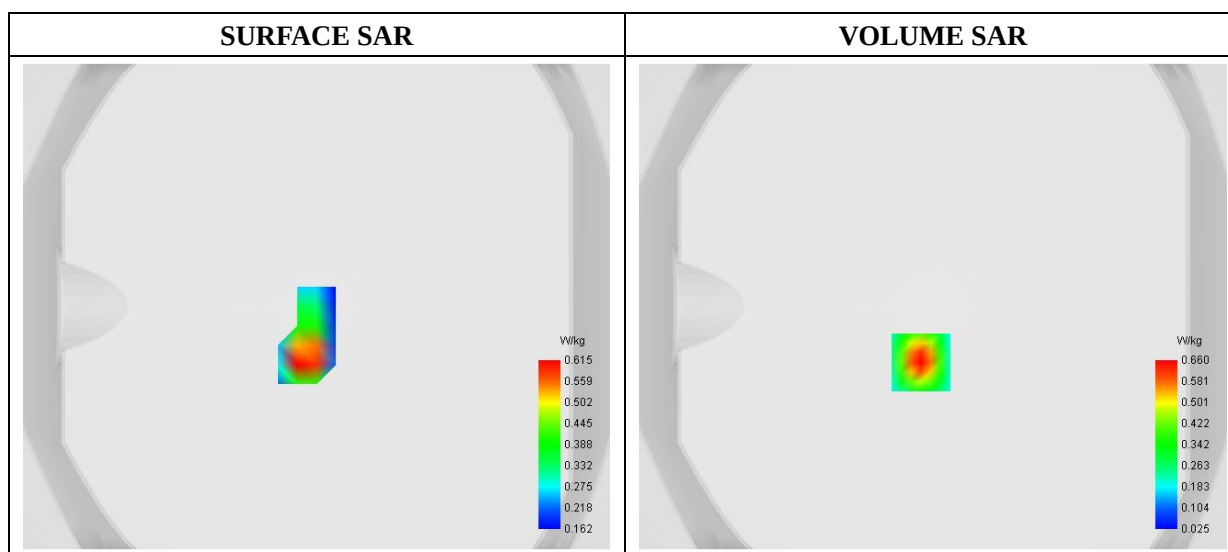
Measurement duration: 12 minutes 3 seconds

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Horizontal-Down
Band	WiFi(5.3G)_ 802.11ac VHT20 ANT B
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5260.000000
Relative Permittivity (real part)	48.501945
Conductivity (S/m)	5.263251
Power Variation (%)	1.155771
Ambient Temperature	21.1
Liquid Temperature	21.2



Maximum location: X=-5.00, Y=-23.00

Waltek Testing Group (Shenzhen) Co., Ltd.

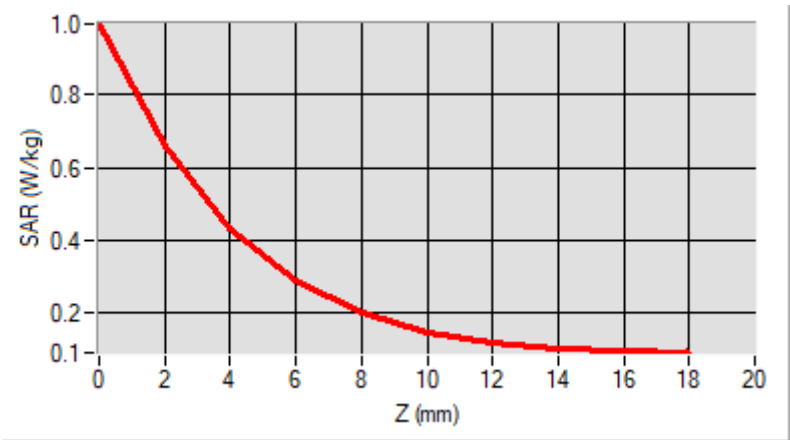
[Http://www.waltek.com.cn](http://www.waltek.com.cn)

D. SAR 1g & 10g

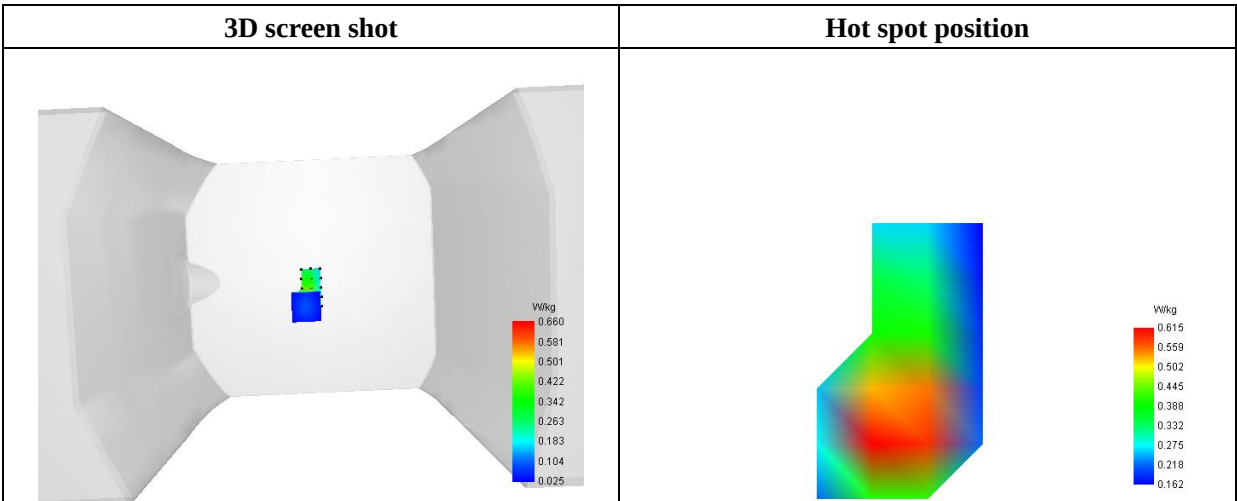
SAR 10g (W/Kg)	0.182319
SAR 1g (W/Kg)	0.409810

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)	0.9935	0.6602	0.4347	0.2885	0.2005	0.1489	0.1196	0.1038	0.0959



F. 3D Image



MEASUREMENT 4

Type: Phone measurement (Complete)

Date of measurement: 09/28/2021

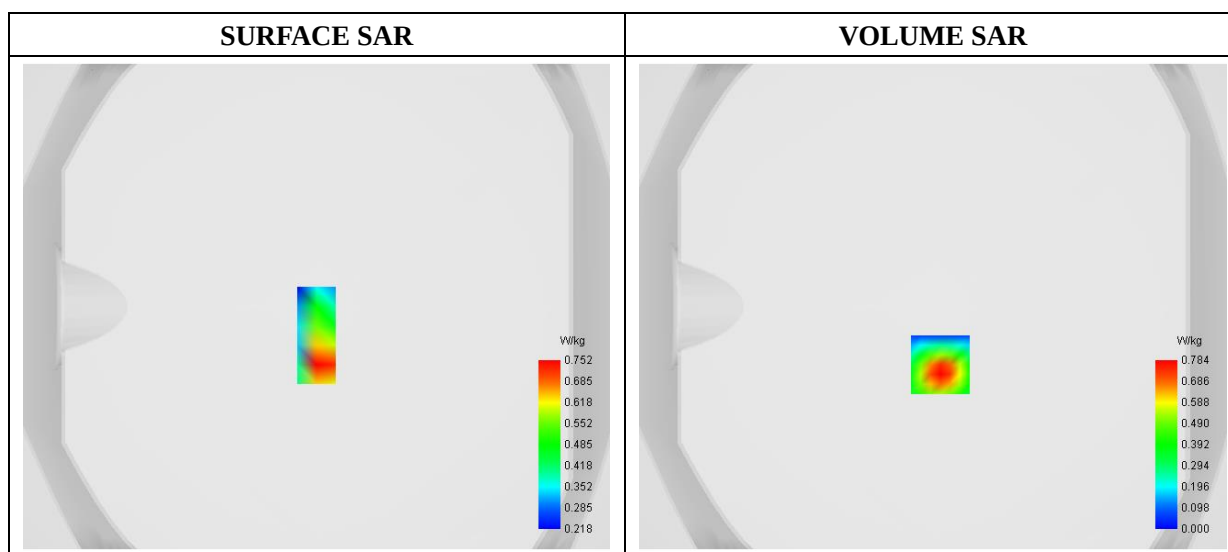
Measurement duration: 12 minutes 3 seconds

A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Vertical-Back
Band	WiFi(5.6G)_ 802.11ac VHT20 ANT B
Channels	Middle
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5580.000000
Relative Permittivity (real part)	48.306945
Conductivity (S/m)	5.523251
Power Variation (%)	1.155771
Ambient Temperature	21.1
Liquid Temperature	21.2



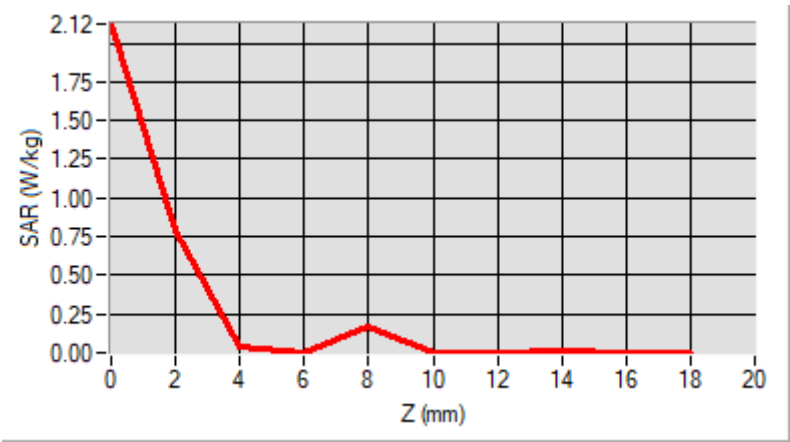
Maximum location: X=3.00, Y=-24.00

D. SAR 1g & 10g

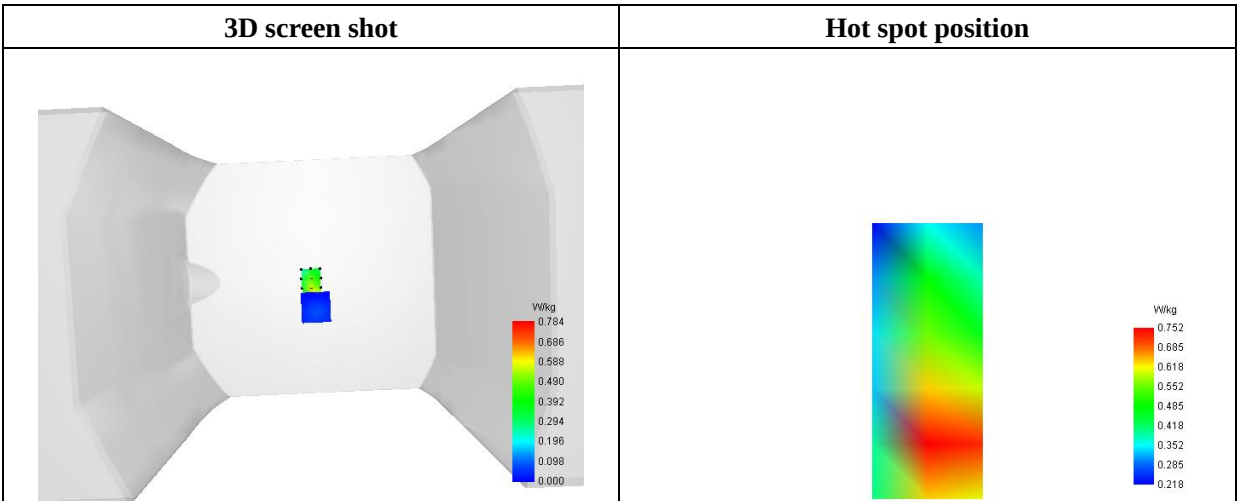
SAR 10g (W/Kg)	0.100908
SAR 1g (W/Kg)	0.501807

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)	2.1235	0.7842	0.0340	0.0002	0.1647	0.0007	0.0018	0.0093	0.0063



F. 3D Image



Annex C. EUT Photos

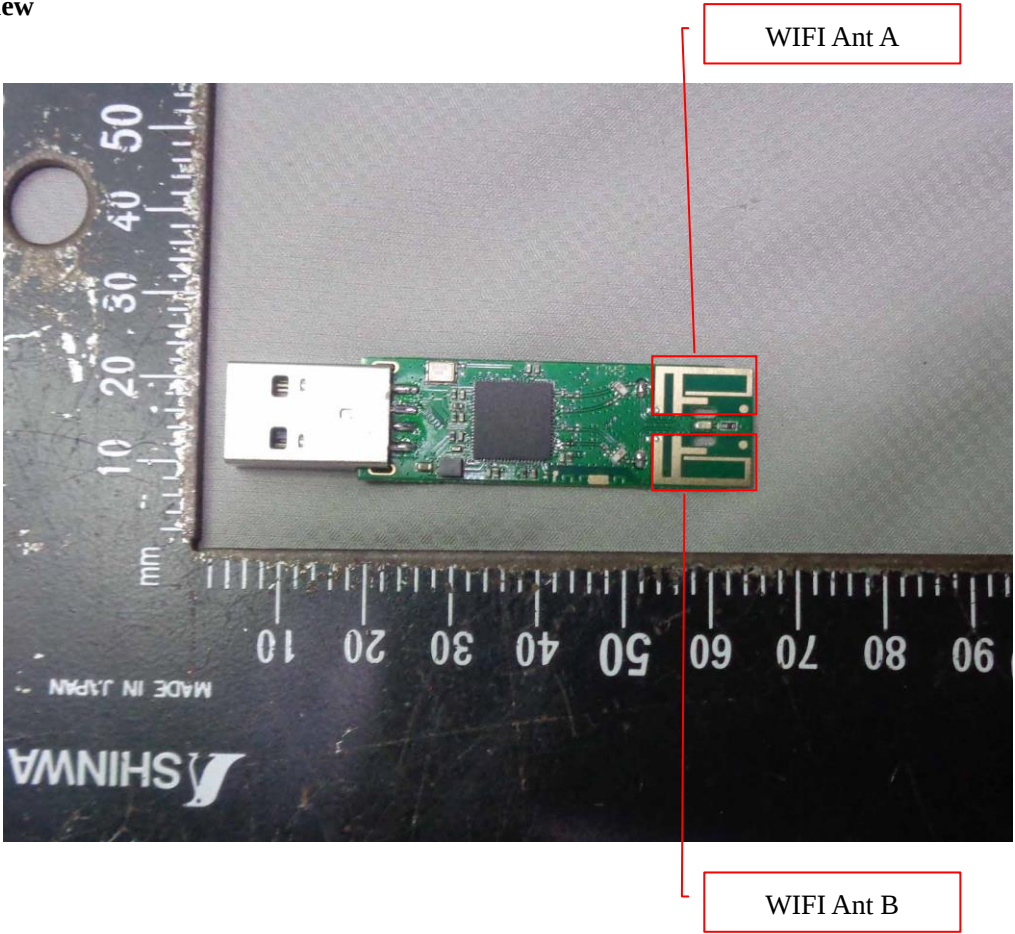
EUT View_1



EUT View_2



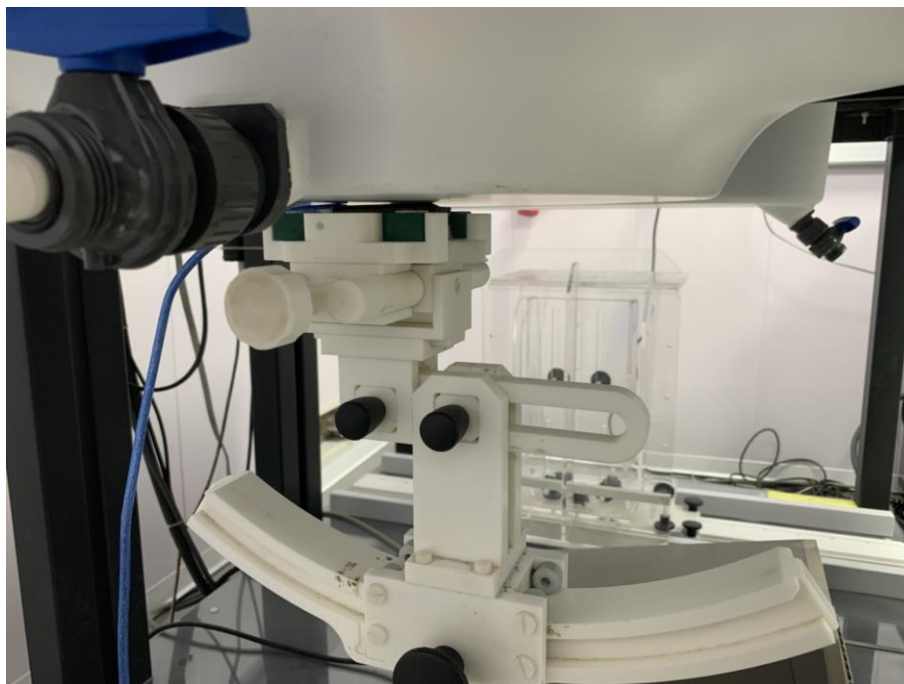
Antenna View



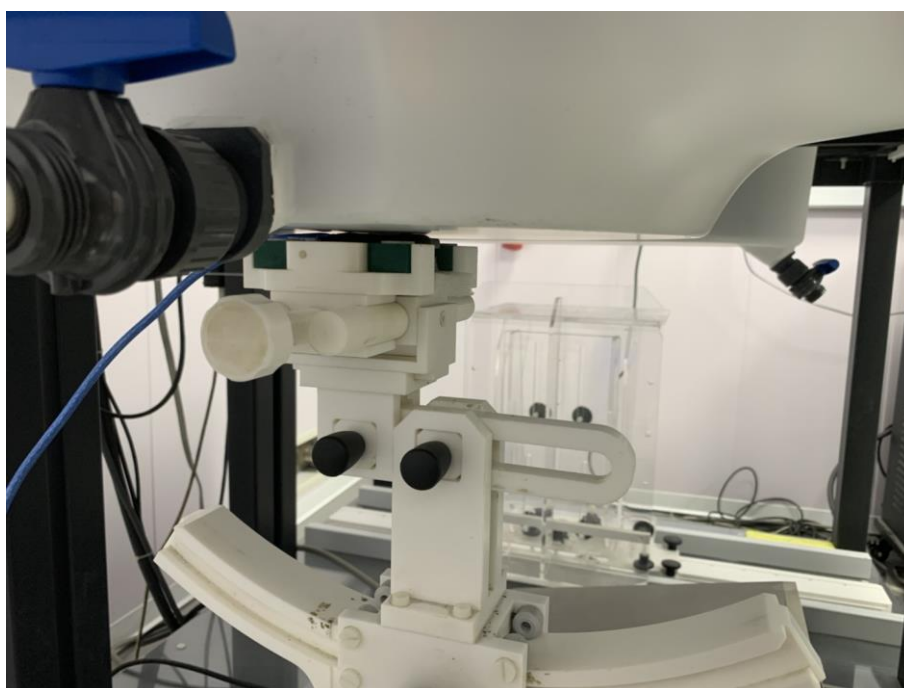
Annex D. Test Setup Photos

Body mode Exposure Conditions

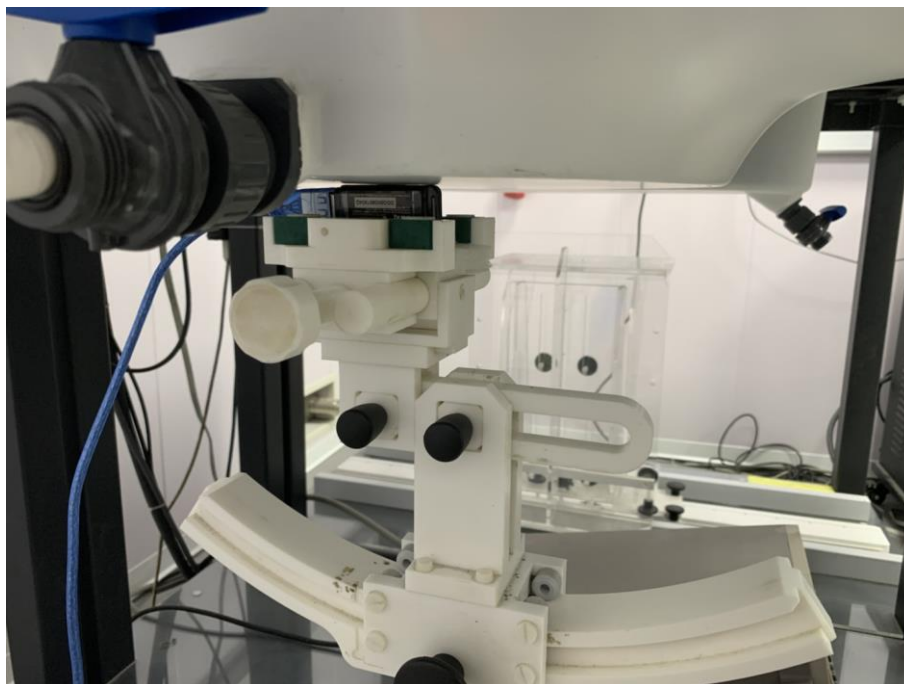
Horizontal-UP



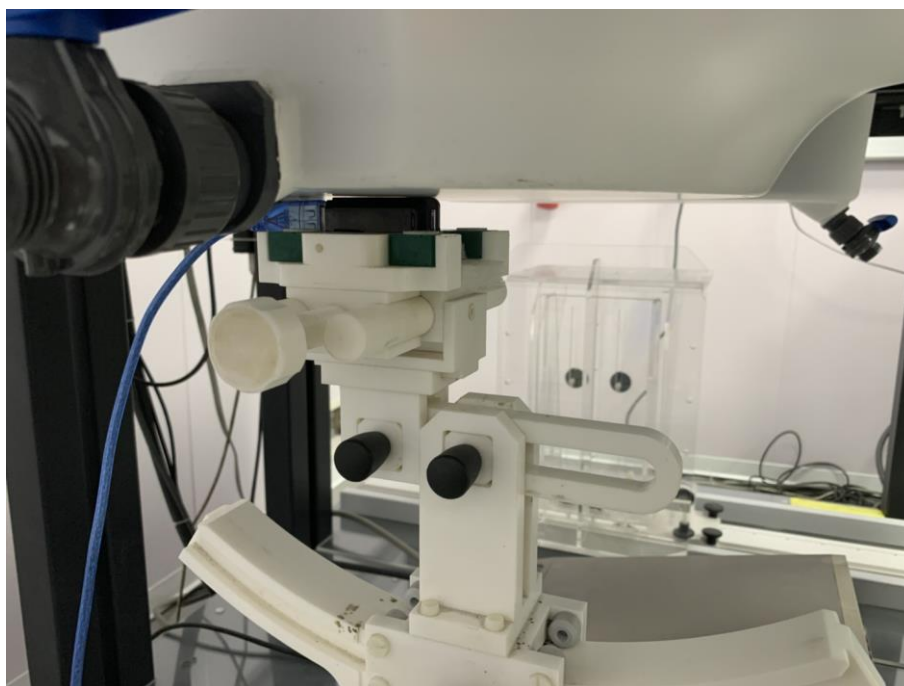
Horizontal-Down



Vertical-Front



Vertical-Back



Annex E. Calibration Certificate

Please refer to the exhibit for the calibration certificate

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