TEST REPORT

Reference No......	:	WTD22X03050615W
FCC ID.....	:	2AEPIBLACKX
Applicant	:	COLOMBIANA DE COMERCIO S.A.
Address	:	Car. 43E No 8-71, Medellin, Colombia
Manufacturer.....		COOSEA GROUP (HK) COMPANY LIMITED LIMITED
Address		UNIT 5-6,16F.,MULTIFIELD PLAZA 3-7A PRAT AVENUE TSIM SHA TSUI KL, HONG KONG
Product Name	:	CELLPHONE
Model No......	:	Black X
Standards	:	FCC Part 2.1093 IEEE Std C95.1: 2019 IEEE Std C95.3: 2002 + Rev. 2008 IEEE 1528 :2013
Date of Receipt sample....	:	2022-04-06
Date of Test.....	:	2022-04-06 to 2022-04-16
Date of Issue	:	2022-04-18
Test Report Form No.	:	WTX_IEEE_1528_2020W
Test Result.....	:	**Pass**

Remarks:

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

Prepared By:

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Report version

Version No.	Date of issue	Description
Rev.00	2022-04-18	Original
/	/	/

1. General Information

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT:	
Product Name:	CELLPHONE
Brand Name:	/
Model No.:	Black X
Adding Model(s):	/
Rated Voltage:	DC 3.87V
Battery:	5000mAh
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT:	
U-NIII	
Support Standards:	802.11a, 802.11n-HT20/40,802.11ac-HT20/40/80
Frequency Range:	U-NIII-1: 5180-5240MHz, U-NIII-2A: 5260-5320MHz, U-NIII-2C: 5500-5700MHz, U-NIII-3: 5745-5825MHz
RF Output Power:	14.50dBm (Conducted)
Type of Modulation:	BPSK,QPSK, 16QAM, 64QAM, 256-QAM
Type of Antenna:	Integral Antenna
Antenna Gain:	0.8dBi
Note: 1. Note: The Antenna Gain is provided by the customer and can affect the validity of results.. 2.This report only evaluates 5G WIFI SAR.	

1.2 Test Standards

IEEE Std C95.1: 2019, IEEE Std C95.3: 2002 + Rev. 2008, IEEE 1528-2013, KDB 447498 D01 v06, KDB 648474 D04 v01r03, KDB 248227 D01 v02r02, KDB 941225 D01 v03r01, KDB 941225 D05 v02r05 , and KDB 865664 D01 v01r04 and KDB 865664 D02 v01r02.

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

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

1.3 Test Methodology

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

1.4 Test Facility

Address of the test laboratory
Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.
Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road,Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990
Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010.Test Firm Registration Number is 125990.

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

2. Summary of Test Results

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

Frequency Band	Head SAR	Body-worn (10mm Gap)	Hotspot (10mm Gap)	SAR_{1g} Limit (W/kg)
	Maximum SAR_{1g} (W/kg)	Maximum SAR_{1g} (W/kg)	Maximum SAR_{1g} (W/kg)	
U-NIII	**0.755**	**0.291**	**0.493**	1.6

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

3. Specific Absorption Rate (SAR)

3.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techiques 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:

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

SAR is expressed in units of Watts per kilogram (W/kg)
SAR measurement can be either related to the temperature elevation in tissue by

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

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

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

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

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

4. SAR Measurement System

4.1 The Measurement System

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

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

The following figure shows the system.

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

4.2 Probe

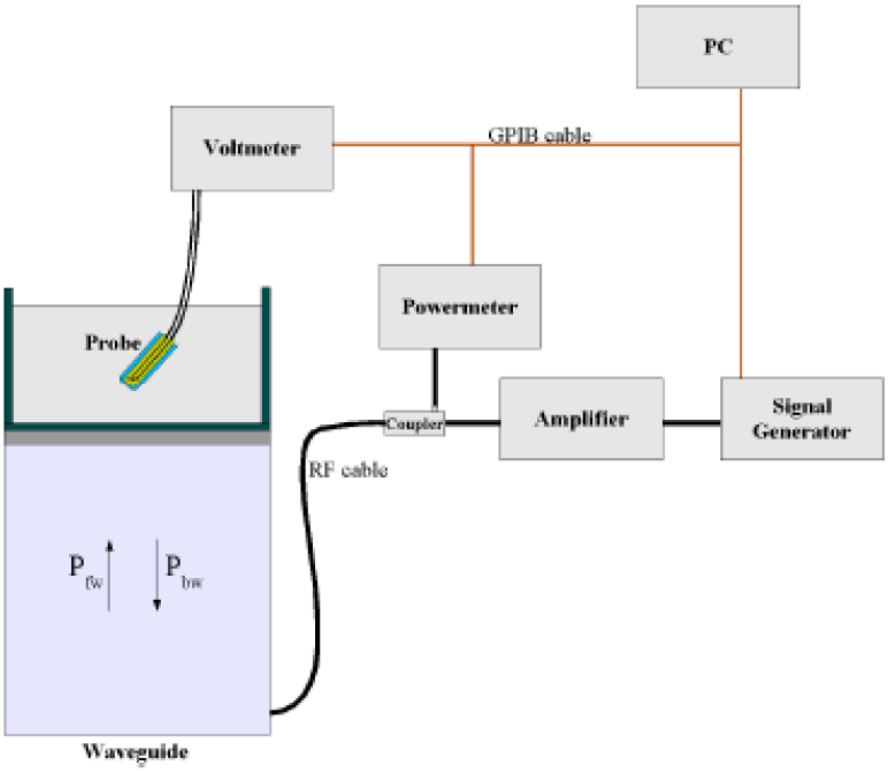
For the measurements the Specific Dosimetric E-Field Probe SSE2 SN 45/15 EPGO280 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Probe Length: 330 mm
- Length of Individual Dipoles: 4.5 mm
- Maximum external diameter: 8 mm
- 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 suface normal line:1ess 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 :

Pfw = Forward Power

Pbw = Backward Power

a and b =Waveguide dimensions

I = Skin depth

Keithley configuration:

Rate = Medium; Filter = ON; RDGS = 10; Filter type = Moving Average; Range auto after each calibration, a SAR measurement is performed on a validation dipole and compared with a NPL calibrated probe, to verify it.

The calibration factors, CF(N), for the 3 sensors corresponding to dipole 1, dipole 2 and dipole 3 are:

$$CF(N)=SAR(N)/Vlin(N) \quad (N=1,2,3)$$

The linearised output voltage Vlin(N) is obtained from the displayed output voltage V(N) using

$$Vlin(N)=V(N)*(1+V(N)/DCP(N)) \quad (N=1,2,3)$$

where DCP is the diode compression point in mV.

4.3 Probe Calibration Process

Dosimetric Assessment Procedure

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

Free Space Assessment Procedure

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

Temperature Assessment Procedure

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

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

Where:

Δt = exposure time (30 seconds),

C = heat capacity of tissue (brain or muscle),

ΔT = temperature increase due to RF exposure.

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

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

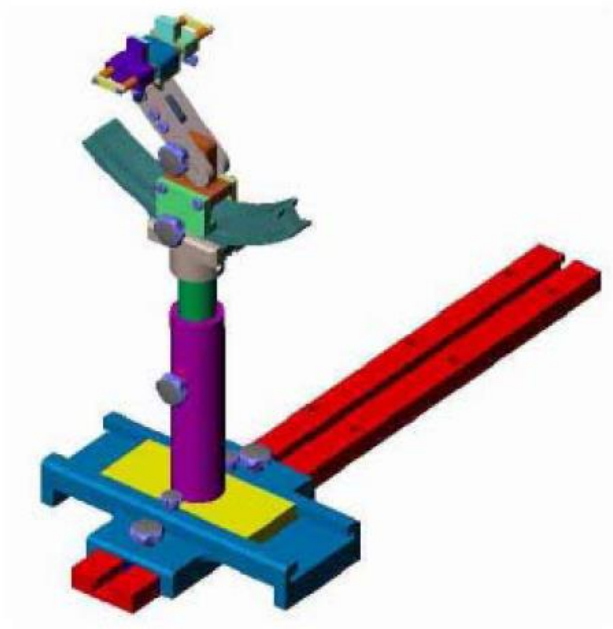
Where:
σ = simulated tissue conductivity,
ρ = Tissue density (1.25 g/cm3 for brain tissue)

4.4 Phantom

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

4.5 Device Holder

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



System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

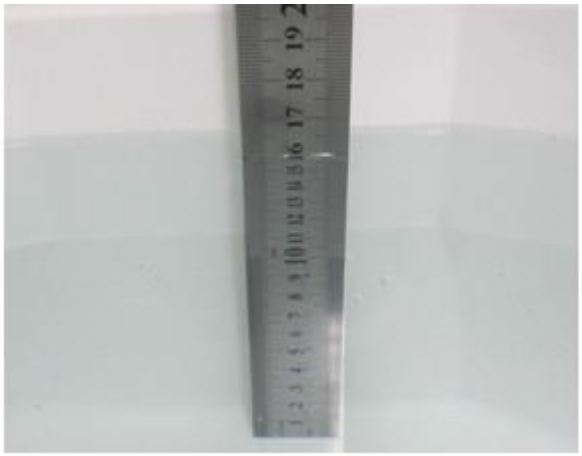
4.6 Test Equipment List

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
E-Field Probe	MVG	SSE2	SN 18/21 EPGO356	2021-07-16	2022-07-15
835MHz Dipole	MVG	SID835	SN 47/12 DIP 0G835-204	2020-03-11	2023-03-10
900MHz Dipole	MVG	SID900	SN 47/12 DIP 0G900-205	2020-03-11	2023-03-10
1800MHz Dipole	MVG	SID1800	SN 47/12 DIP 1G800-206	2020-03-11	2023-03-10
1900MHz Dipole	MVG	SID1900	SN 47/12 DIP 1G900-207	2020-03-11	2023-03-10
2000MHz Dipole	MVG	SID2000	SN 47/12 DIP 2G000-208	2020-03-11	2023-03-10
2450MHz Dipole	MVG	SID2450	SN 13/15 DIP 2G450-364	2020-03-11	2023-03-10
2600MHz Dipole	MVG	SID2600	SN 28/21 DIP 2G600-590	2021-07-16	2024-07-15
5 GHz Dipole	MVG	SWG5500	SN 49/16 WGA45	2020-07-03	2023-07-02
Dielectric Probe	SATIMO	SCLMP	SN 47/12 OCPG49	2022-03-22	2023-03-21
SAM Phantom	SATIMO	SAM	SN/ 47/12 SAM95	N/A	N/A
Multi Meter	Keithley	Keithley 2000	4006367	2022-03-22	2023-03-21
Power meter	Keithley	3500	JC-2017-09-001	2022-03-22	2023-03-21
Power meter	Keithley	3500	JC-2017-09-001	2022-03-22	2023-03-21
Power Sensor	HP	11636B	JC-2017-10-002	2022-03-22	2023-03-21
MXG X-Series RF Vector Signal Generato	KEYSIGHT	N5182B	MY57300664	2022-03-22	2023-03-21
Universal Tester	Rohde & Schwarz	CMU200	112315	2022-03-22	2023-03-21
Universal Radio Communication Tester	Rohde & Schwarz	CMW500	148650	2022-03-22	2023-03-21
Network Analyzer	HP	8753C	2901A00831	2022-03-22	2023-03-21

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 Head SAR

Liquid Height for Body SAR

The Composition of Tissue Simulating Liquid

Frequency (MHz)	Water (%)	Salt (%)	Sugar (%)	HEC (%)	Preventol (%)	DGBE (%)
Head						
2450	55.0	0.1	0	0	0	44.9

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

5.2 Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 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 P1528 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 P1528.

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

5.3 Tissue Calibration Result

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

Calibration Result for Dielectric Parameters of Tissue Simulating Liquid

Head Tissue Simulating Liquid									
Freq. MHz.	Temp. (℃)	Conductivity			Permittivity			Limit (%)	Date
		Reading (σ)	Target (σ)	Delta (%)	Reading (ε r)	Target (ε r)	Delta (%)		
5200	22.5	4.71	4.66	1.07	36.65	36.0	1.81	±5	2022-04-16
5400	22.5	4.90	4.86	0.82	35.59	35.8	-0.59	±5	2022-04-16
5600	22.5	5.02	5.07	-0.99	35.34	35.5	-0.45	±5	2022-04-16
5800	22.5	5.23	5.27	-0.76	34.99	35.3	-0.88	±5	2022-04-16

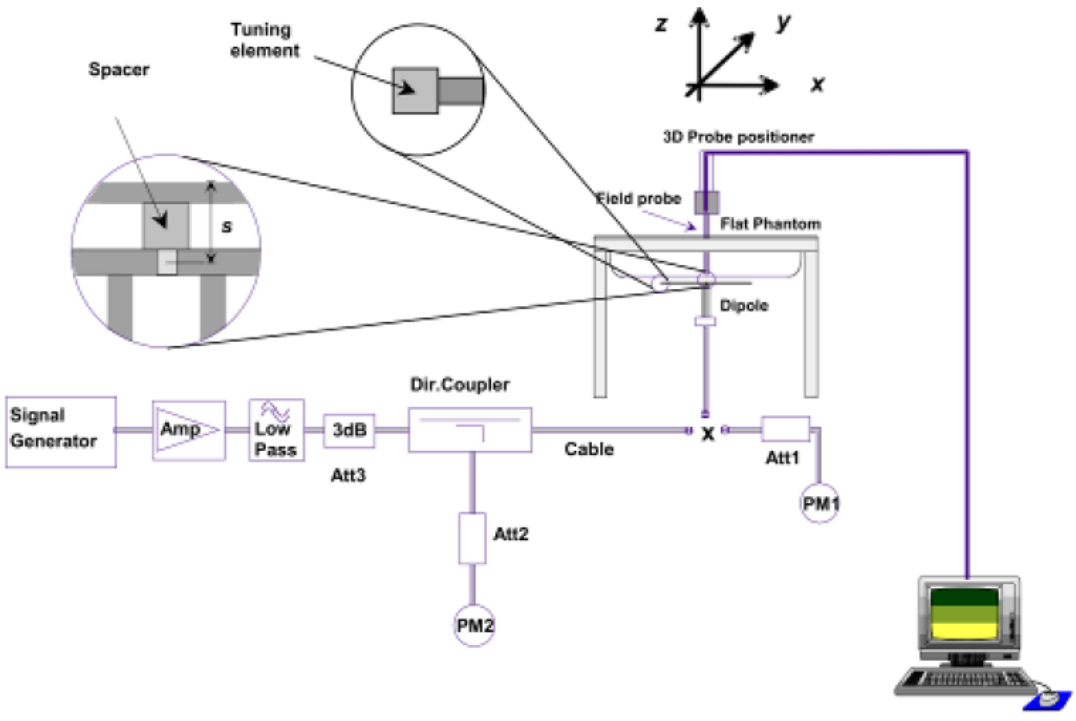
6. SAR Measurement Evaluation

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 835MHz ,1800MHz, 1900MHz 2450MHz,2600MHz,and 5GHz. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom.



System Verification Setup Block Diagram

Setup Photo of Dipole Antenna

The output power on dipole port must be calibrated to 24 dBm(250 mW) before dipole is connected.
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	Liquid	Power (mw)	Targeted SAR_{1g}	Measured SAR_{1g}	Normalized SAR_{1g}	Tolerance	Date
5200	Head	100	161.23	16.746	167.46	3.86	2022-04-16
5400	Head	100	165.58	17.481	174.81	5.57	2022-04-16
5600	Head	100	173.58	17.604	176.04	1.42	2022-04-16
5800	Head	100	179.32	17.961	179.61	0.16	2022-04-16

Remark: Referring to IEEE 1528-2013, Section 8.2, The system check shall be performed at a test frequency that is within ±10% or ±100 MHz of the compliance test mid-band frequency, so the 1750 MHz system verification is made of 1800MHz Dipole.

Targeted and Measurement SAR

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

7. EUT Testing Position

7.1 Define Two Imaginary Lines on The Handset

(a) The vertical centerline passes through two points on the front side of the handset - the midpoint of the width w_t of the handset at the level of the acoustic output, and the midpoint of the width w_b of the bottom of the handset.

(b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.

(c) The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

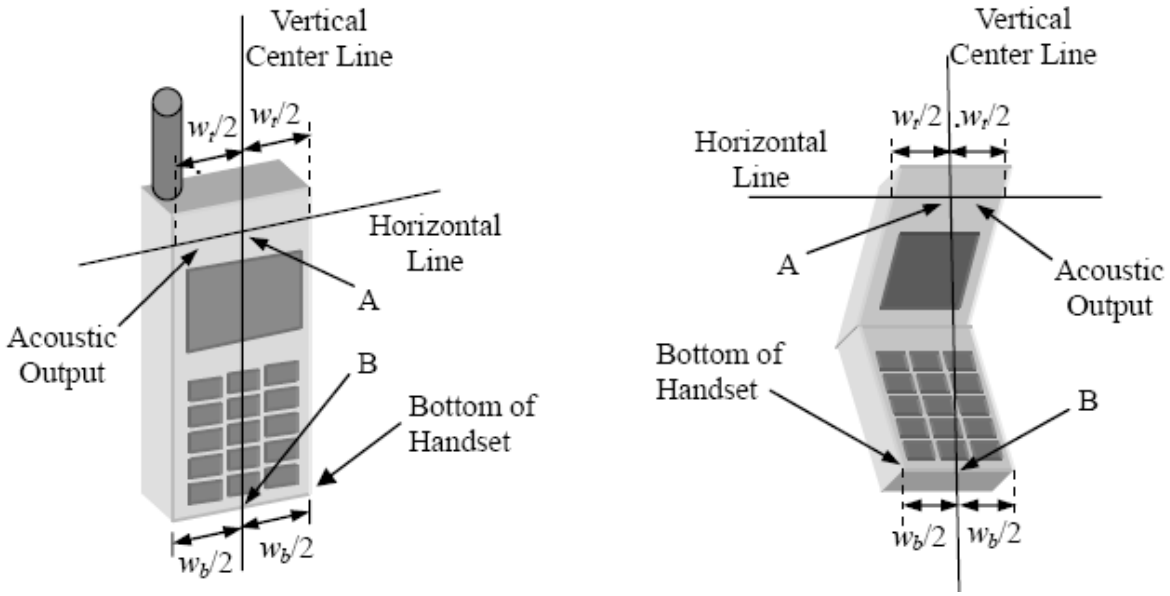


Illustration for Handset Vertical and Horizontal Reference Lines

7.2 Cheek Position

(a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.
(b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see Fig. 7.2).

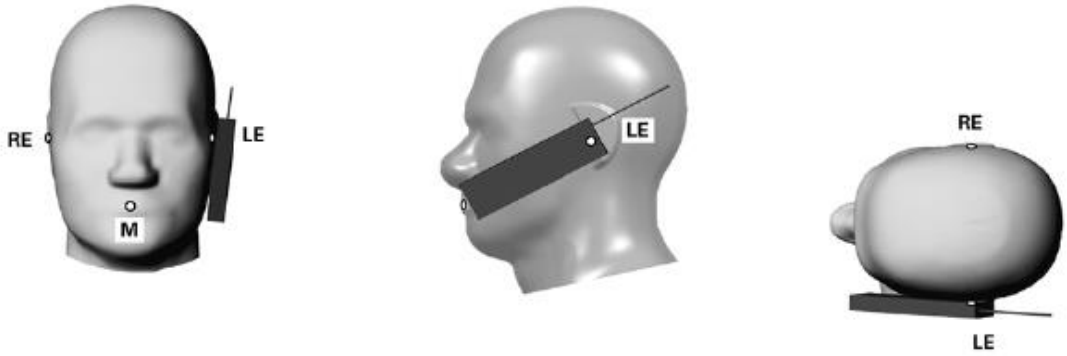


Illustration for Cheek Position

7.3 Tilted Position

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

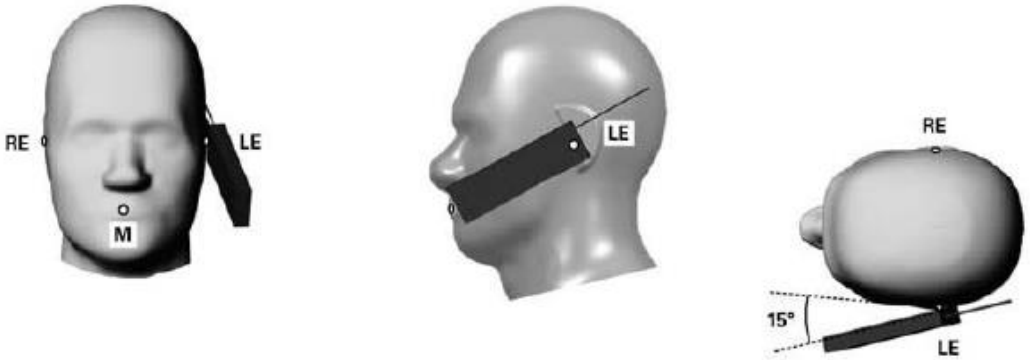


Illustration for Tilted Position

7.4 Body Position

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

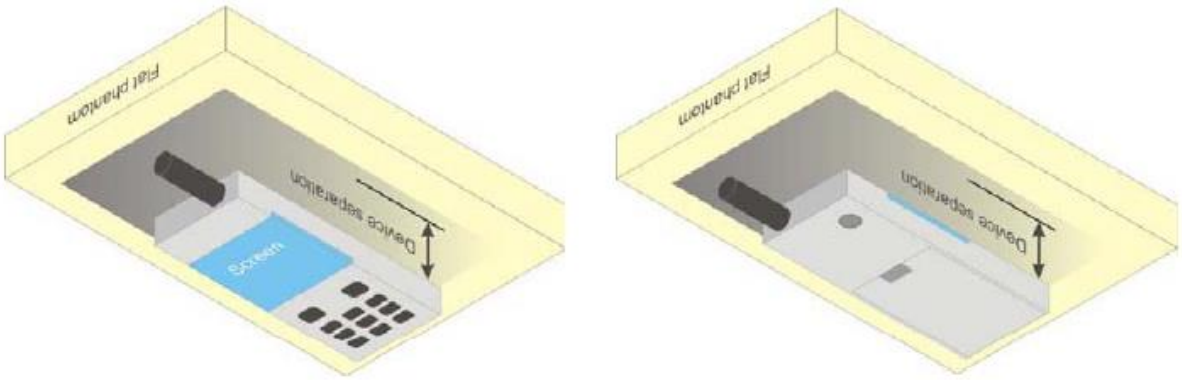
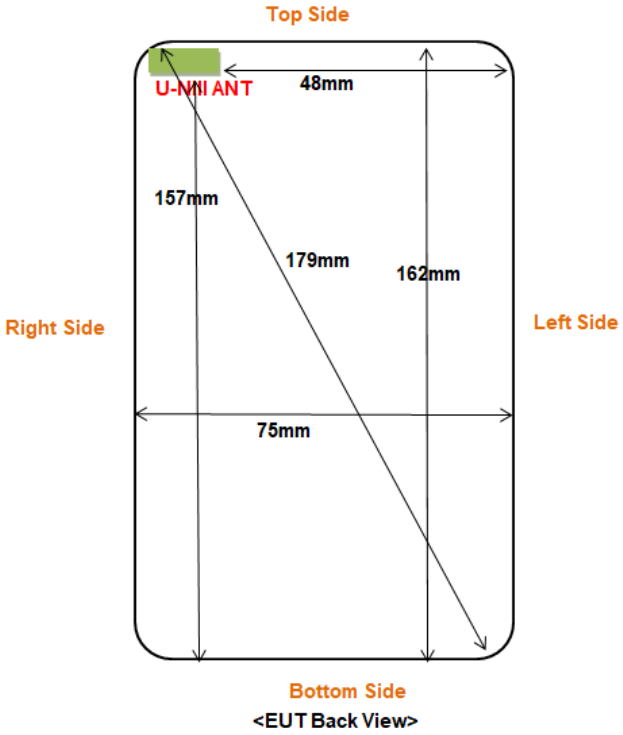


Illustration for Body Position

7.5 EUT Antenna Position



Block Diagram for EUT Antenna Position

Distance of EUT antenna-to-edge/surface(mm), Test distance:10mm						
Antennas	Back side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
U-NIII	<25	<25	48	<25	<25	157

7.6 EUT Testing Position

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

Head SAR tests				
Antennas	**Right Cheek**	**Left Cheek**	**Right Tilted**	**Left Tilted**
U-NIII	Yes	Yes	Yes	Yes

Body-worn SAR tests, Test distance: 10mm		
Antennas	**Front**	**Back**
U-NIII	Yes	Yes

Hotspot SAR tests, Test distance: 10mm						
Antennas	**Front**	**Back**	**Left Side**	**Right Side**	**Top Side**	**Bottom Side**
U-NIII	Yes	Yes	No	Yes	Yes	No

Remark:

1. Referring to KDB 941225 D06, when the overall device length and width are >= 9cm*5cm, the test separation distances is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

2. Referring to KDB 648474 D04 Handset SAR v01r03, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg

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

8. SAR Measurement Procedures

8.1 Measurement Procedures

The measurement procedures are as follows:
(a) Use base station simulator (if applicable) or engineering software to transmit RF power continuously (continuous Tx) in the highest power channel.
(b) Keep EUT to radiate maximum output power or 100% factor (if applicable)
(c) Measure output power through RF cable and power meter.
(d) Place the EUT in the positions as Annex D demonstrates.
(e) Set scan area, grid size and other setting on the SATIMO software.
(f) Measure SAR results for the highest power channel on each testing position.
(g) Find out the largest SAR result on these testing positions of each band
(h) Measure SAR results for other channels in worst SAR testing position if the SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:
(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

8.2 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The SATIMO software includes all numerical procedures necessary to evaluate the spatial peak SAR value.
The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.
The entire evaluation of the spatial peak values is performed within the post-processing engine. The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:
(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form 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

U-NIII-1 – Conducted Power				
Test Mode	**Channel**	**Frequency (MHz)**	**Average Power (dBm)**	**Tune-up power (dBm)**
802.11a	CH 36	5180	14.22	14.5
	CH 40	5200	13.71	14.0
	CH 48	5240	13.68	14.0
802.11n (HT20)	CH 36	5180	13.99	14.0
	CH 40	5200	13.92	14.0
	CH 48	5240	13.65	14.0
802.11n (HT40)	CH 38	5190	13.80	14.0
	CH 46	5230	13.87	14.0
802.11ac (20MHz)	CH 36	5180	13.72	14.0
	CH 40	5200	13.64	14.0
	CH 48	5240	13.80	14.0
802.11ac (40MHz)	CH 38	5190	13.90	14.0
	CH 46	5230	13.12	13.5
802.11ac (80MHz)	CH 42	5210	**14.50**	15.0

U-NIII-2A– Conducted Power				
Test Mode	**Channel**	**Frequency (MHz)**	**Average Power (dBm)**	**Tune-up power (dBm)**
802.11a	CH 52	5260	13.86	14.0
	CH 56	5280	13.79	14.0
	CH 64	5320	13.89	14.0
802.11n (20MHz)	CH 52	5260	13.98	14.0
	CH 56	5280	13.99	14.0
	CH 64	5320	14.27	14.5
802.11n (40MHz)	CH 54	5270	13.72	14.0
	CH 62	5310	13.95	14.0
802.11ac (20MHz)	CH 52	5260	13.63	14.0
	CH 56	5280	14.08	14.5
	CH 64	5320	13.49	13.5
802.11ac (40MHz)	CH 54	5270	13.80	14.0
	CH 62	5310	13.36	13.5
802.11ac (80MHz)	CH 58	5290	**14.47**	14.5

U-NIII-2C– Conducted Power				
Test Mode	**Channel**	**Frequency (MHz)**	**Average Power (dBm)**	**Tune-up power (dBm)**
802.11a	CH 100	5500	13.60	14.0
	CH 120	5600	13.74	14.0
	CH 140	5700	13.52	14.0
802.11n (20MHz)	CH 100	5500	**14.12**	14.5
	CH 120	5600	13.78	14.0
	CH 140	5700	13.29	13.5
802.11n (40MHz)	CH 102	5510	13.60	14.0
	CH 118	5590	13.71	14.0
	CH 134	5670	13.81	14.0
802.11ac (20MHz)	CH 100	5500	13.78	14.0
	CH 120	5600	13.66	14.0
	CH 140	5700	13.48	13.5
802.11ac (40MHz)	CH 102	5510	13.76	14.0
	CH 118	5590	13.86	14.0
	CH 134	5670	13.13	13.5
802.11ac (80MHz)	CH 106	5530	13.84	14.0
	CH 122	5610	14.07	14.5

U-NIII-3– Conducted Power				
Test Mode	**Channel**	**Frequency (MHz)**	**Average Power (dBm)**	**Tune-up power (dBm)**
802.11a	CH 149	5745	13.46	14.0
	CH 157	5785	13.73	14.0
	CH 165	5825	13.31	13.5
802.11n (20MHz)	CH 149	5745	13.73	14.0
	CH 157	5785	13.38	13.5
	CH 165	5825	13.28	13.5
802.11n (40MHz)	CH 151	5755	13.78	14.0
	CH 159	5795	13.19	13.5
802.11ac (20MHz)	CH 149	5745	**13.97**	14.0
	CH 157	5785	13.53	14.0
	CH 165	5825	12.63	13.0
802.11ac (40MHz)	CH 151	5755	13.77	14.0
	CH 159	5795	13.14	13.5
802.11ac (80MHz)	CH 155	5775	13.91	14.0

Remark:

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

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

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

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

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

9.2 Test Results for Standalone SAR Test

Head SAR

U-NIII-1– Head SAR Test									
Plot No.	**Mode**	**Test Position Head**	**Frequency**		**Output Power (dBm)**	**Rated Limit (dBm)**	**Scaling Factor**	**SAR1g (W/kg)**	**Scaled SAR1g (W/kg)**
			CH.	**MHz**					
	802.11ac (80MHz)	Right Cheek	42	5210	14.50	15.0	1.122	0.311	0.349
	802.11ac (80MHz)	Right Tilted	42	5210	14.50	15.0	1.122	0.185	0.208
1	802.11ac (80MHz)	Left Cheek	42	5210	14.50	15.0	1.122	0.464	**0.521**
	802.11ac (80MHz)	Left Tilted	42	5210	14.50	15.0	1.122	0.211	0.237

U-NIII-2A– Head SAR Test									
Plot No.	**Mode**	**Test Position Head**	**Frequency**		**Output Power (dBm)**	**Rated Limit (dBm)**	**Scaling Factor**	**SAR1g (W/kg)**	**Scaled SAR1g (W/kg)**
			CH.	**MHz**					
	802.11ac (80MHz)	Right Cheek	58	5290	14.47	14.5	1.007	0.323	0.325
	802.11ac (80MHz)	Right Tilted	58	5290	14.47	14.5	1.007	0.181	0.182
2	802.11ac (80MHz)	Left Cheek	58	5290	14.47	14.5	1.007	0.537	**0.541**
	802.11ac (80MHz)	Left Tilted	58	5290	14.47	14.5	1.007	0.232	0.234

U-NIII-2C– Head SAR Test									
Plot No.	**Mode**	**Test Position Head**	**Frequency**		**Output Power (dBm)**	**Rated Limit (dBm)**	**Scaling Factor**	**SAR1g (W/kg)**	**Scaled SAR1g (W/kg)**
			CH.	**MHz**					
	802.11n (20MHz)	Right Cheek	100	5500	14.12	14.5	1.091	0.173	0.189
	802.11n (20MHz)	Right Tilted	100	5500	14.12	14.5	1.091	0.099	0.108
3	802.11n (20MHz)	Left Cheek	100	5500	14.12	14.5	1.091	0.669	**0.730**
	802.11n (20MHz)	Left Tilted	100	5500	14.12	14.5	1.091	0.341	0.372

U-NIII-3– Head SAR Test									
Plot No.	**Mode**	**Test Position Head**	**Frequency**		**Output Power (dBm)**	**Rated Limit (dBm)**	**Scaling Factor**	**SAR1g (W/kg)**	**Scaled SAR1g (W/kg)**
			CH.	**MHz**					
	802.11ac (20MHz)	Right Cheek	149	5745	13.97	14.0	1.007	0.452	0.455
	802.11ac (20MHz)	Right Tilted	149	5745	13.97	14.0	1.007	0.225	0.227
4	802.11ac (20MHz)	Left Cheek	149	5745	13.97	14.0	1.007	0.750	**0.755**
	802.11ac (20MHz)	Left Tilted	149	5745	13.97	14.0	1.007	0.351	0.353

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.

Body-worn SAR

U-NIII-1–Body SAR Test (Gap: 10mm)									
Plot No.	**Mode**	**Test Position Body**	**Frequency**		**Output Power (dBm)**	**Rated Limit (dBm)**	**Scaling Factor**	**SAR1g (W/kg)**	**Scaled SAR1g (W/kg)**
			CH.	**MHz**					
5	802.11ac (80MHz)	Back Side	42	5210	14.50	15.0	1.122	0.215	**0.241**
	802.11ac (80MHz)	Front Side	42	5210	14.50	15.0	1.122	0.206	0.231

U-NIII-2A–Body SAR Test (Gap: 10mm)									
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 (80MHz)	Back Side	58	5290	14.47	14.5	1.007	0.185	0.186
6	802.11ac (80MHz)	Front Side	58	5290	14.47	14.5	1.007	0.210	**0.211**

U-NIII-2C–Body SAR Test (Gap: 10mm)									
Plot No.	**Mode**	**Test Position Body**	**Frequency**		**Output Power (dBm)**	**Rated Limit (dBm)**	**Scaling Factor**	**SAR1g (W/kg)**	**Scaled SAR1g (W/kg)**
			CH.	**MHz**					
	802.11n (20MHz)	Back Side	100	5500	14.12	14.5	1.091	0.184	0.201
7	802.11n (20MHz)	Front Side	100	5500	14.12	14.5	1.091	0.255	**0.278**

U-NIII-3–Body SAR Test (Gap: 10mm)									
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 (20MHz)	Back Side	149	5745	13.97	14.0	1.007	0.258	0.260
8	802.11ac (20MHz)	Front Side	149	5745	13.97	14.0	1.007	0.289	**0.291**

Hotspot SAR

U-NIII-1 –Body SAR Test (Gap: 10mm)									
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 (80MHz)	Back Side	42	5210	14.50	15.0	1.122	0.215	0.241
	802.11ac (80MHz)	Front Side	42	5210	14.50	15.0	1.122	0.206	0.231
	802.11ac (80MHz)	Right side	42	5210	14.50	15.0	1.122	0.124	0.139
9	802.11ac (80MHz)	Top Side	42	5210	14.50	15.0	1.122	0.250	**0.281**

U-NIII-2A–Body SAR Test (Gap: 10mm)									
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 (80MHz)	Back Side	58	5290	14.47	14.5	1.007	0.185	0.186
	802.11ac (80MHz)	Front Side	58	5290	14.47	14.5	1.007	0.210	0.211
	802.11ac (80MHz)	Right side	58	5290	14.47	14.5	1.007	0.123	0.124
10	802.11ac (80MHz)	Top Side	58	5290	14.47	14.5	1.007	0.294	**0.296**

U-NIII-2C–Body SAR Test (Gap: 10mm)									
Plot No.	**Mode**	**Test Position Body**	**Frequency**		**Output Power (dBm)**	**Rated Limit (dBm)**	**Scaling Factor**	**SAR1g (W/kg)**	**Scaled SAR1g (W/kg)**
			CH.	**MHz**					
	802.11n (20MHz)	Back Side	100	5500	14.12	14.5	1.091	0.184	0.201
	802.11n (20MHz)	Front Side	100	5500	14.12	14.5	1.091	0.255	0.278
	802.11n (20MHz)	Right side	100	5500	14.12	14.5	1.091	0.166	0.181
11	802.11n (20MHz)	Top Side	100	5500	14.12	14.5	1.091	0.448	**0.489**

U-NIII-3–Body SAR Test (Gap: 10mm)									
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 (20MHz)	Back Side	149	5745	13.97	14.0	1.007	0.258	0.260
	802.11ac (20MHz)	Front Side	149	5745	13.97	14.0	1.007	0.289	0.291
	802.11ac (20MHz)	Right side	149	5745	13.97	14.0	1.007	0.185	0.186
12	802.11ac (20MHz)	Top Side	149	5745	13.97	14.0	1.007	0.490	**0.493**

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

10. Measurement Uncertainty

10.1 Uncertainty for SAR Test

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	√3	(1_Cp)^1/2	(1_Cp)^1/2	1.02	1.02	∝
Hemispherical Isotropy	E.2.2	4.0	R	√3	(Cp)^1/2	(Cp)^1/2	1.63	1.63	∝
Boundary effect	E.2.3	1.0	R	√3	1	1	0.58	0.58	∝
Linearity	E.2.4	5.0	R	√3	1	1	2.89	2.89	∝
System detection limits	E.2.5	1.0	R	√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	√3	1	1	1.73	1.73	∝
Integration Time	E.2.8	2.0	R	√3	1	1	1.15	1.15	∝
RF ambient Conditions – Noise	E.6.1	0	R	√3	1	1	1.73	1.73	∝
RF ambient Conditions - Reflections	E.6.1	0	R	√3	1	1	1.73	1.73	∝
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	√3	1	1	1.15	1.15	∝
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	√3	1	1	0.03	0.03	∝
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5	5.0	R	√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	√3	1	1	6.94	6.94	∝
SAR scaling	E6.5	0.0	R	√3	1	1	0.0	0.0	∝
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	√3	1	1	0.03	0.03	∝
Uncertainty in SAR correction for deviations in permittivity and conductivity	E3.2	1.9	R	√3	1	0.84	1.10	0.90	∝

Liquid conductivity - deviation from target value	E.3.2	5.00	R	√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	√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				10.20	10.00	
Expanded Uncertainty (95% Confidence interval)			K=2				20.40	20.00	

Annex A. Plots of System Performance Check

MEASUREMENT 1

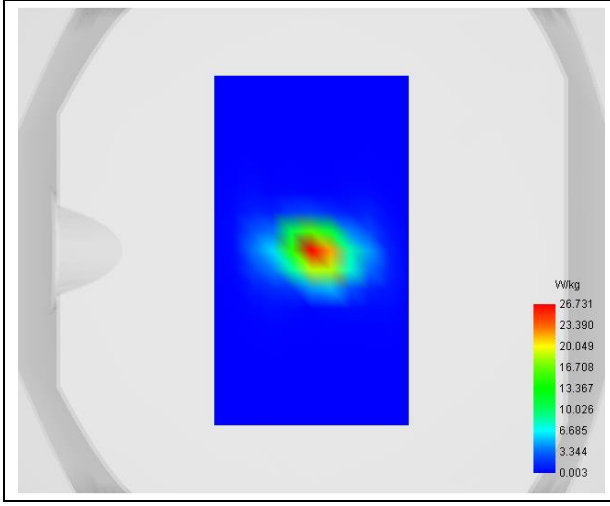
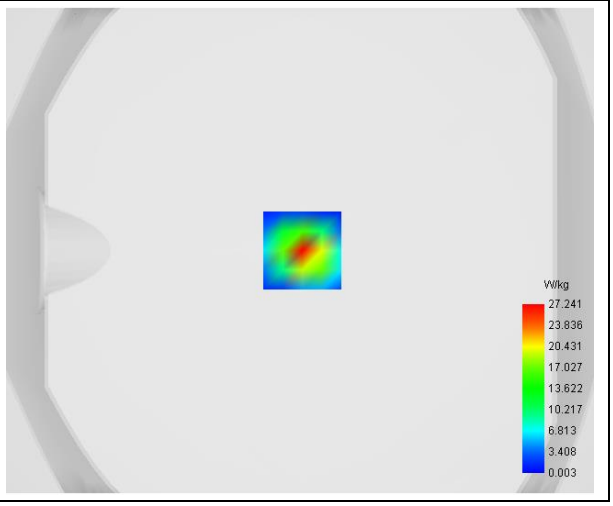
Type: Validation measurement (Fast, 75.00 %)
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - SN 18/21 EPGO356; ConvF: 1.91; Calibrated: 2021-07-16

A. Experimental conditions

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

B. SAR Measurement Results

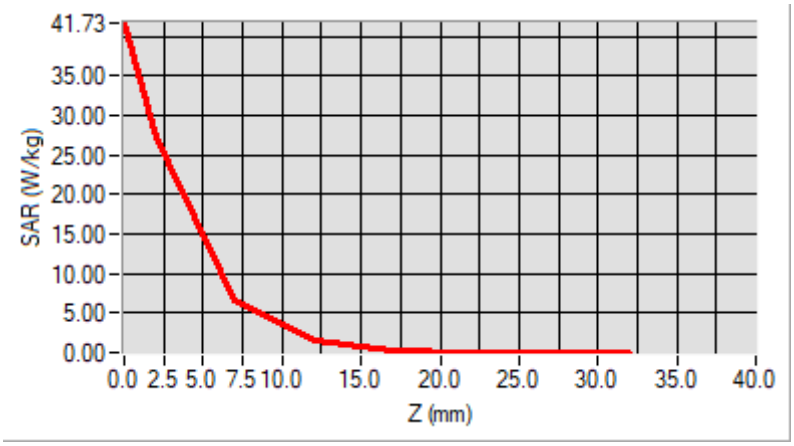
Frequency (MHz)	5200.000000
Relative Permittivity (real part)	36.652915
Conductivity (S/m)	4.714268
Power Variation (%)	-0.340000
Ambient Temperature	22.5
Liquid Temperature	22.5

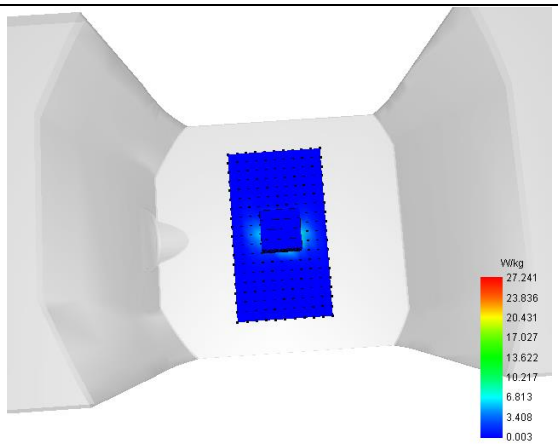
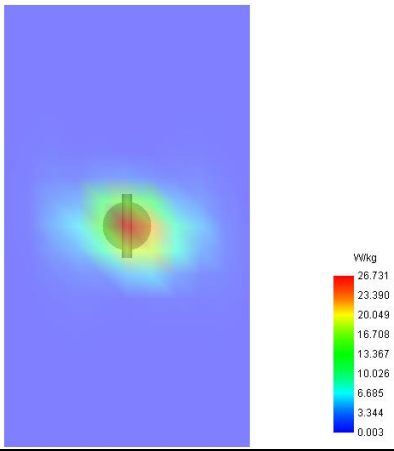
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=0.00

SAR 10g (W/Kg)	5.910334
SAR 1g (W/Kg)	16.746226

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	41.7264	27.2408	6.5746	1.6234	0.3765	0.0793	0.0129



3D screen shot	Hot spot position
	

MEASUREMENT 2

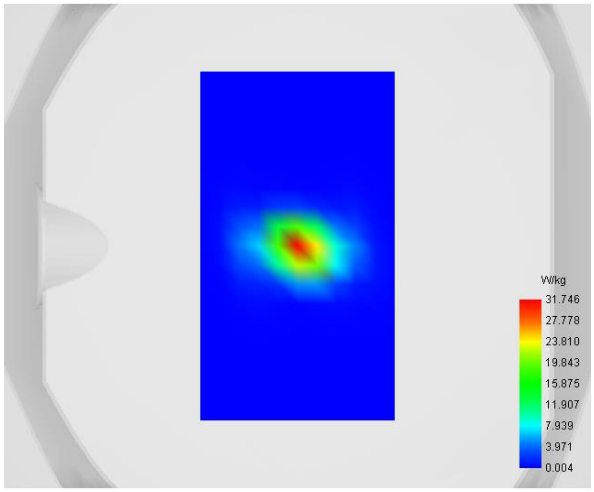
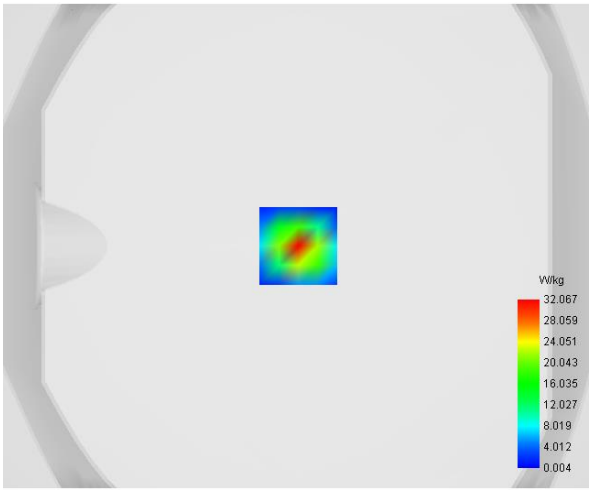
Type: Validation measurement (Fast, 75.00 %)
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - SN 18/21 EPGO356; ConvF: 2.12; Calibrated: 2021-07-16

A. Experimental conditions

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

B. SAR Measurement Results

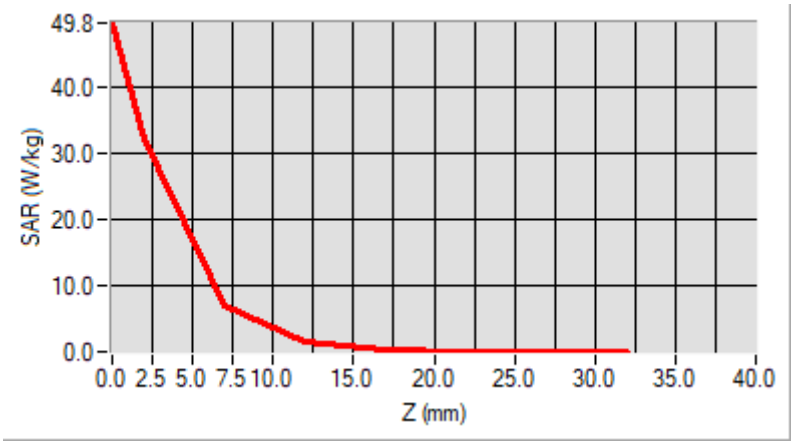
Frequency (MHz)	5400.000000
Relative Permittivity (real part)	35.590398
Conductivity (S/m)	4.901928
Power Variation (%)	1.020000
Ambient Temperature	22.5
Liquid Temperature	22.5

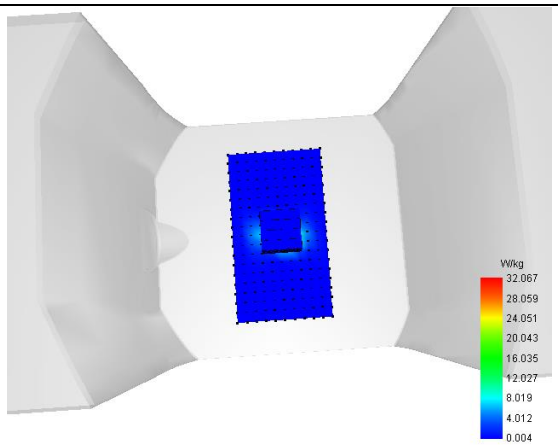
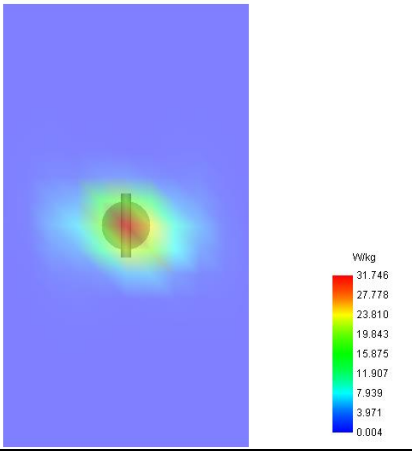
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=0.00

SAR 10g (W/Kg)	6.047588
SAR 1g (W/Kg)	17.481175

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	49.8193	32.0669	7.0244	1.5969	0.3410	0.0635	0.0070



3D screen shot	Hot spot position
	

MEASUREMENT 3

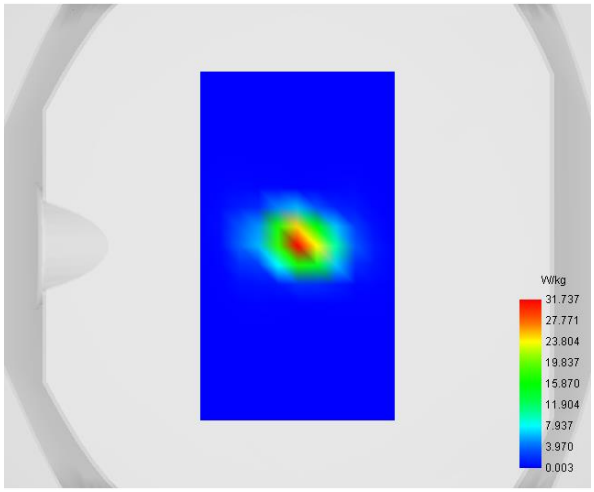
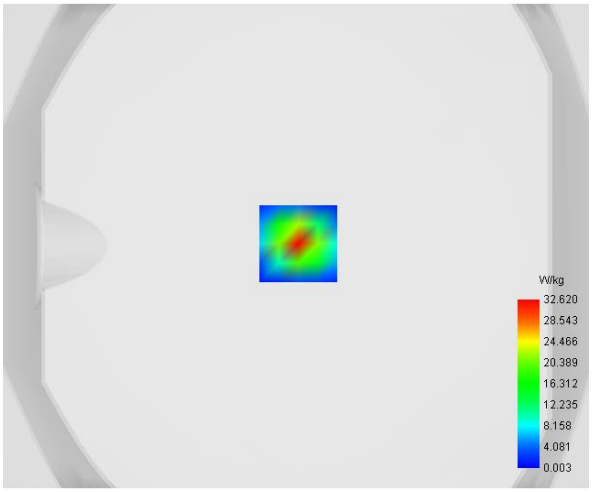
Type: Validation measurement (Fast, 75.00 %)
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - SN 18/21 EPGO356; ConvF: 2.25; Calibrated: 2021-07-16

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	CW (Crest factor: 1.0)

B. SAR Measurement Results

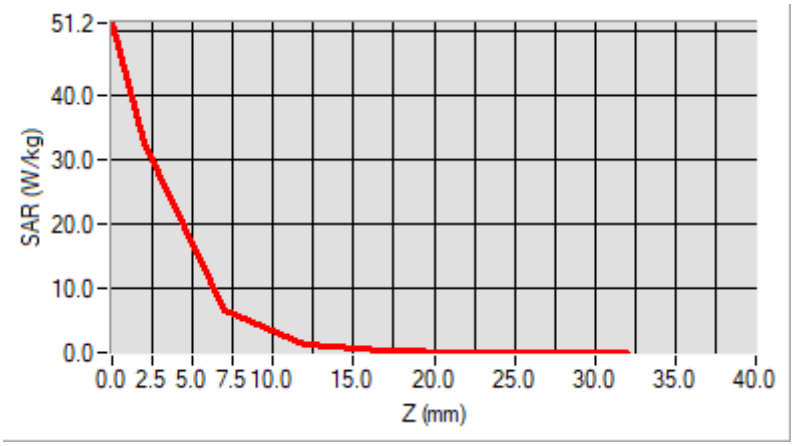
Frequency (MHz)	5600.000000
Relative Permittivity (real part)	35.342057
Conductivity (S/m)	5.023578
Power Variation (%)	-0.610000
Ambient Temperature	22.5
Liquid Temperature	22.5

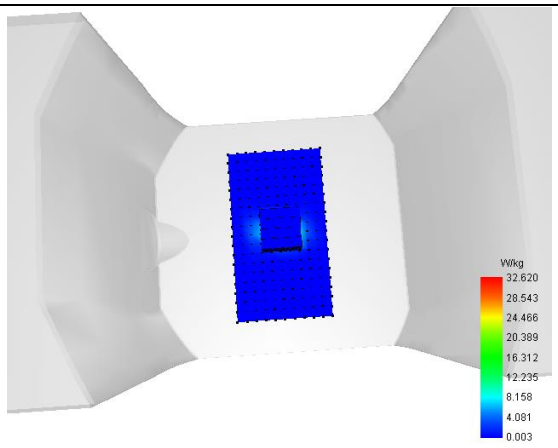
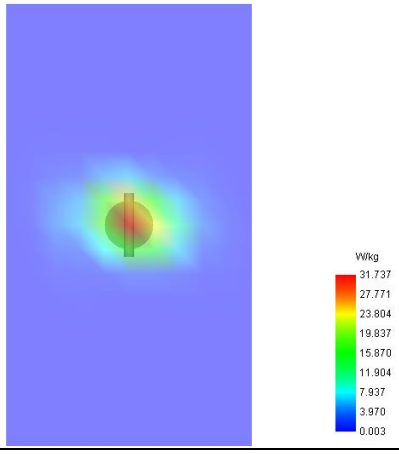
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=1.00

SAR 10g (W/Kg)	5.922791
SAR 1g (W/Kg)	17.604052

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	51.2061	32.6198	6.6166	1.3486	0.2638	0.0509	0.0050



3D screen shot	Hot spot position
	

MEASUREMENT 4

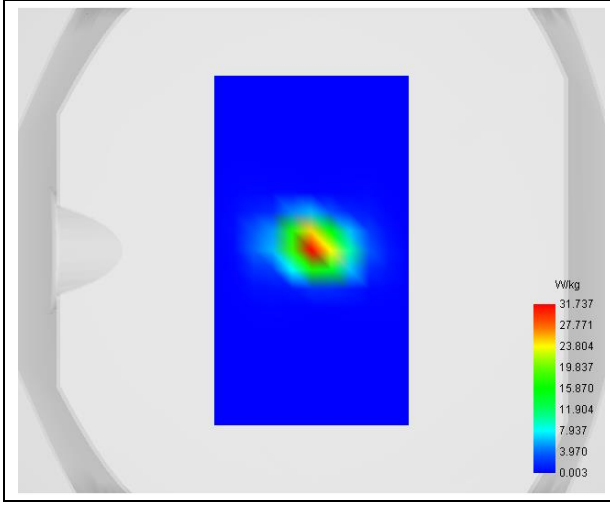
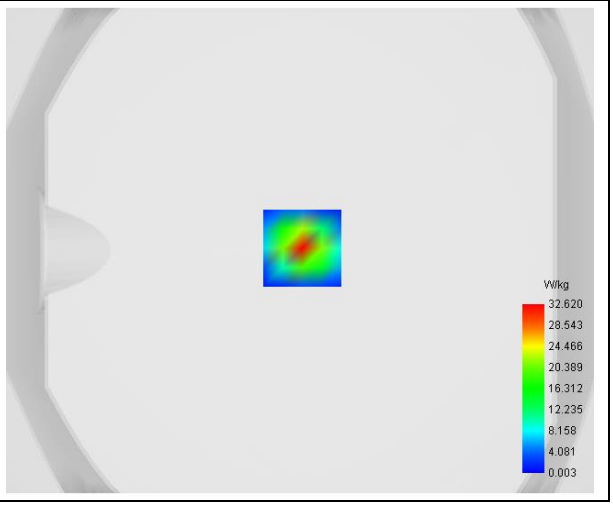
Type: Validation measurement (Fast, 75.00 %)
Measurement duration: 12 minutes 21 seconds
E-field Probe: SSE2 - SN 18/21 EPGO356; ConvF: 2.15; Calibrated: 2021-07-16

A. Experimental conditions

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

B. SAR Measurement Results

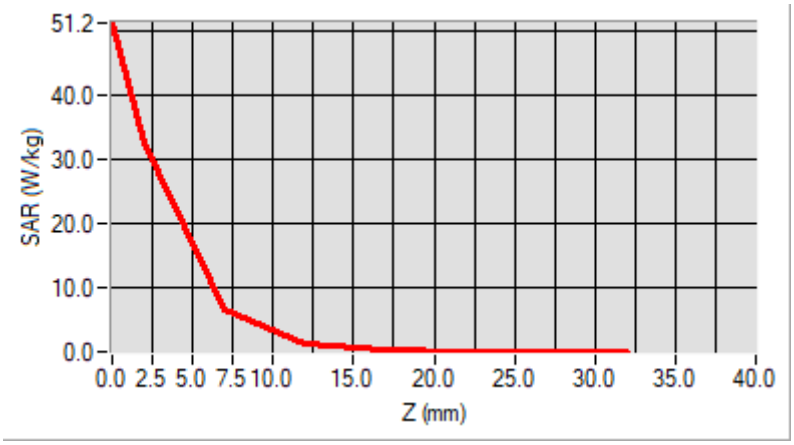
Frequency (MHz)	5800.000000
Relative Permittivity (real part)	34.992314
Conductivity (S/m)	5.232058
Power Variation (%)	1.630000
Ambient Temperature	22.5
Liquid Temperature	22.5

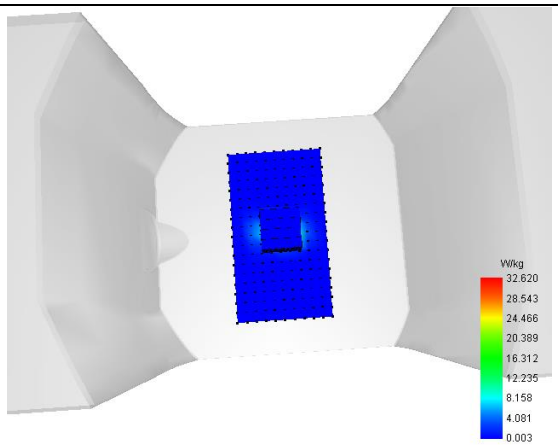
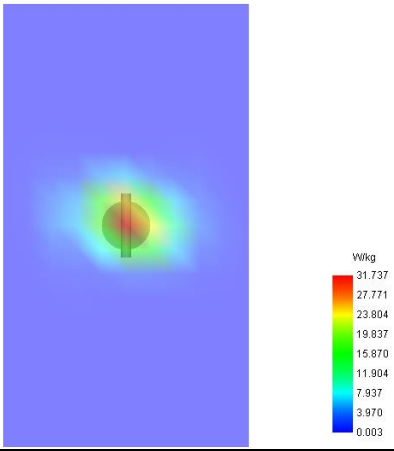
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=1.00

SAR 10g (W/Kg)	5.983506
SAR 1g (W/Kg)	17.960742

Z (mm)	0.00	2.00	7.00	12.00	17.00	22.00	27.00
SAR (W/Kg)	51.2061	32.6198	6.6166	1.3486	0.2638	0.0509	0.0050



3D screen shot	Hot spot position
	

Annex B. Plots of SAR Measurement

MEASUREMENT 1

Type: Phone measurement (Complete)
Date of measurement: 2022-04-16
Measurement duration: 12 minutes 3 seconds

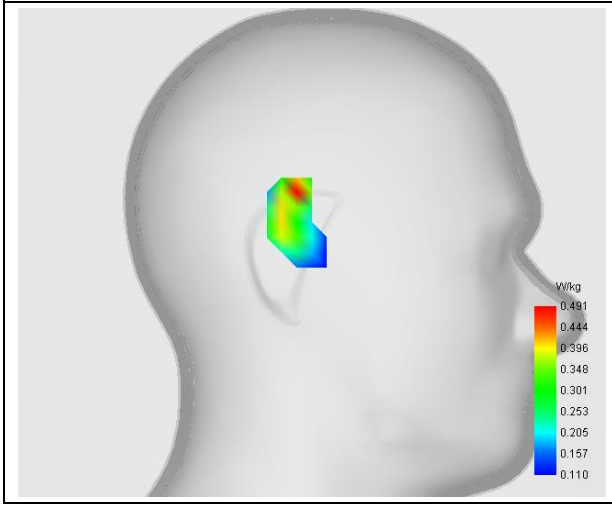
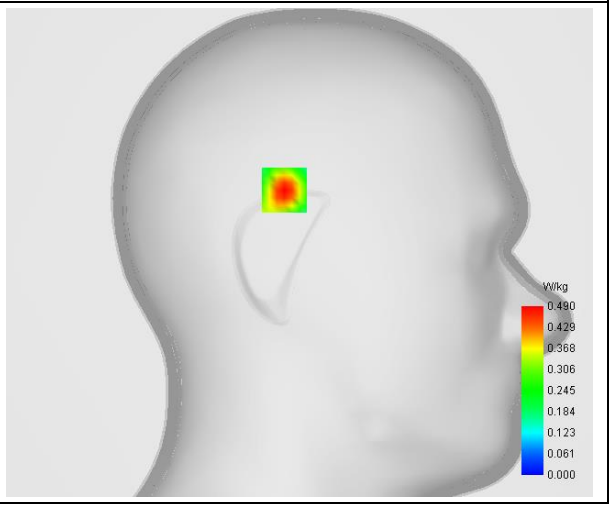
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Left Head
Device Position	Cheek
Band	U-NIII-1_802.11ac(80MHz)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5210.000000
Relative Permittivity (real part)	36.653869
Conductivity (S/m)	4.713611
Power Variation (%)	-1.150000
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

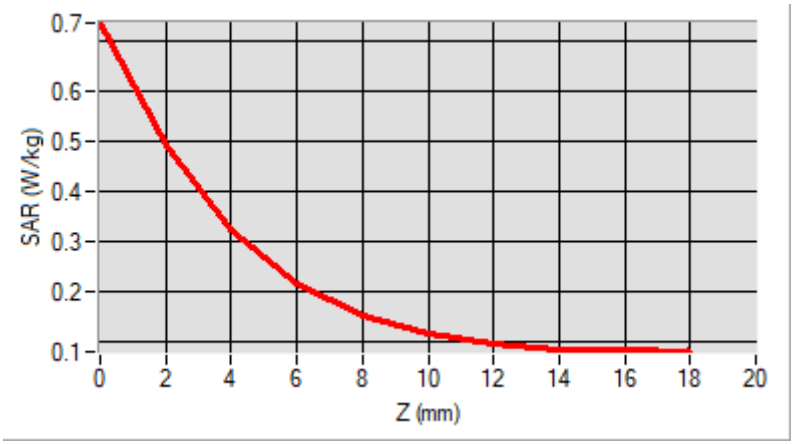
Maximum location: X=8.00, Y=33.00

D. SAR 1g & 10g

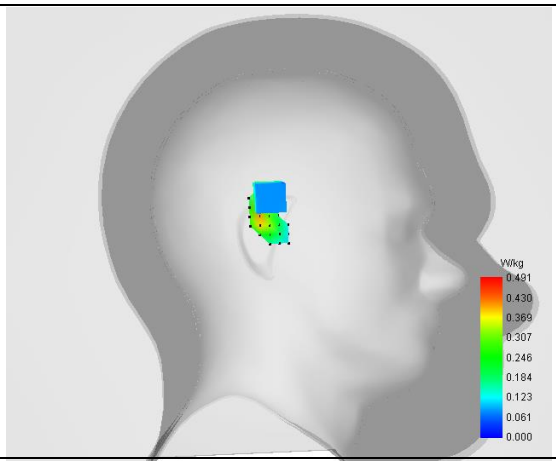
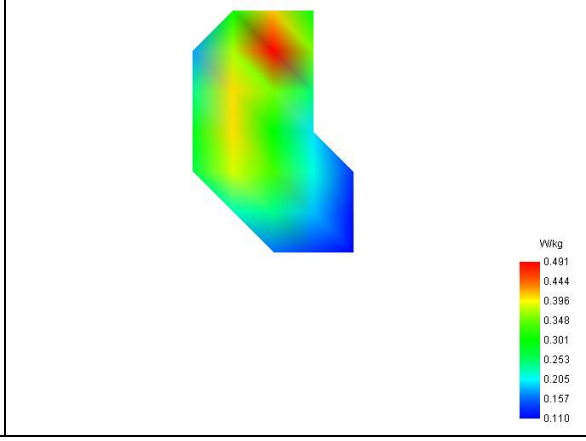
SAR 10g (W/Kg)	**0.223292**
SAR 1g (W/Kg)	**0.463752**

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)	**0.7356**	**0.4903**	**0.3236**	**0.2162**	**0.1523**	**0.1155**	**0.0955**	**0.0856**	**0.0836**



F. 3D Image

3D screen shot	**Hot spot position**
	

MEASUREMENT 2

Type: Phone measurement (Complete)
Date of measurement: 2022-04-16
Measurement duration: 12 minutes 3 seconds

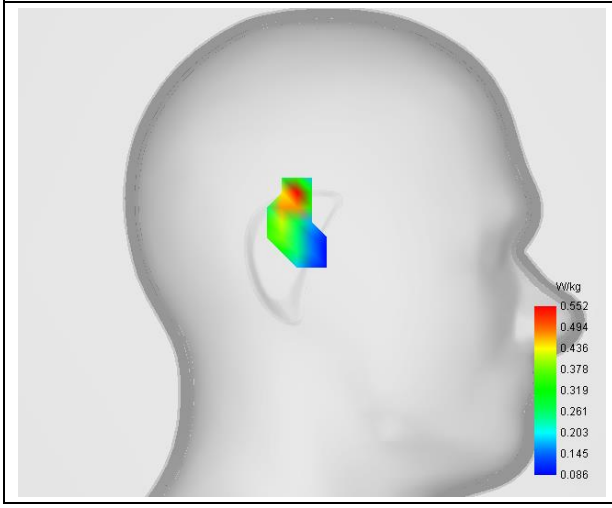
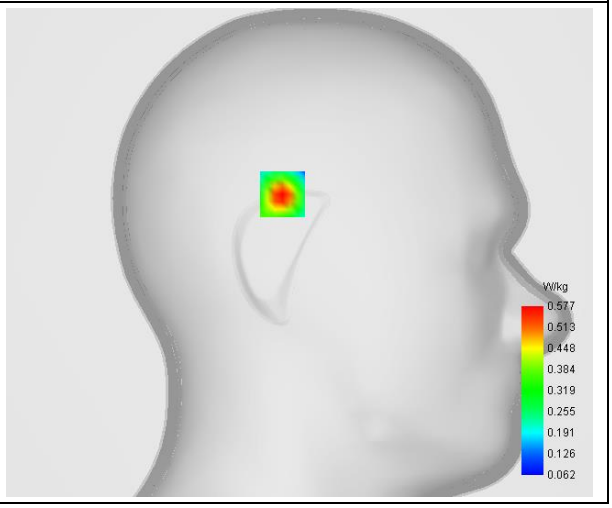
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Left Head
Device Position	Cheek
Band	U-NIII-2A_802.11ac(80MHz)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5290.000000
Relative Permittivity (real part)	35.592839
Conductivity (S/m)	4.901928
Power Variation (%)	0.460000
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

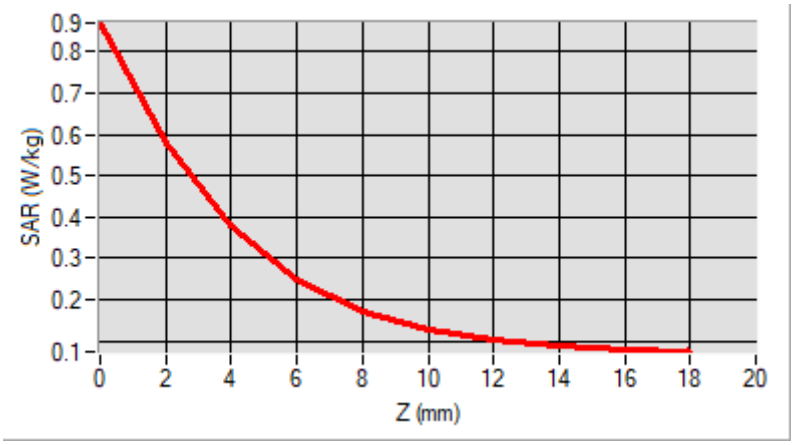
Maximum location: X=9.00, Y=31.00

D. SAR 1g & 10g

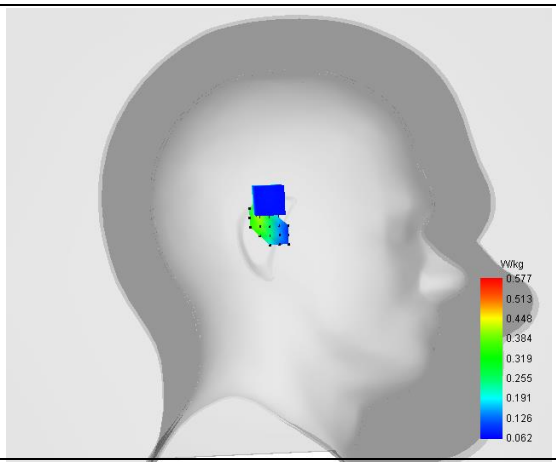
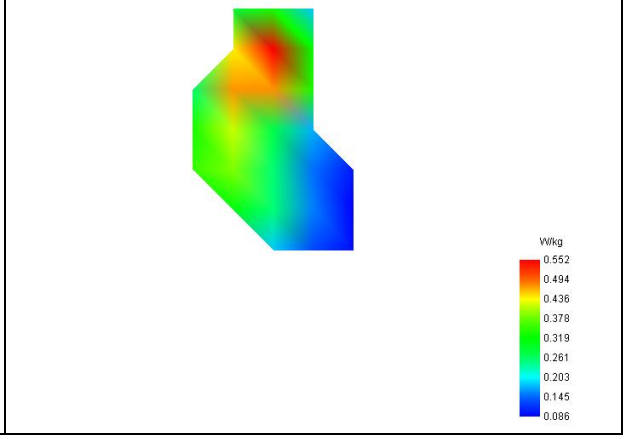
SAR 10g (W/Kg)	**0.239496**
SAR 1g (W/Kg)	**0.536664**

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)	**0.8689**	**0.5769**	**0.3792**	**0.2508**	**0.1733**	**0.1276**	**0.1014**	**0.0870**	**0.0792**



F. 3D Image

3D screen shot	**Hot spot position**
	

MEASUREMENT 3

Type: Phone measurement (Complete)
Date of measurement: 2022-04-16
Measurement duration: 12 minutes 21 seconds

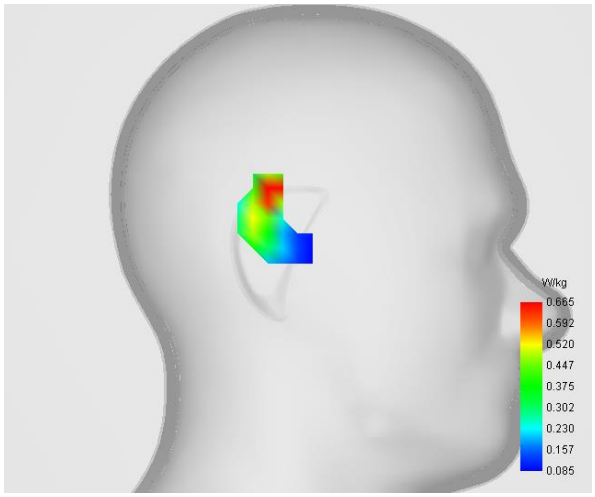
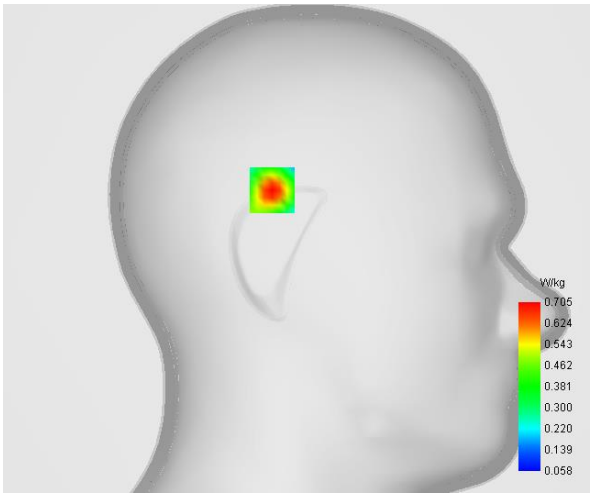
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Left Head
Device Position	Cheek
Band	U-NIII-2C_802.11n (20MHz)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5500.000000
Relative Permittivity (real part)	35.342963
Conductivity (S/m)	5.023278
Power Variation (%)	-1.840000
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

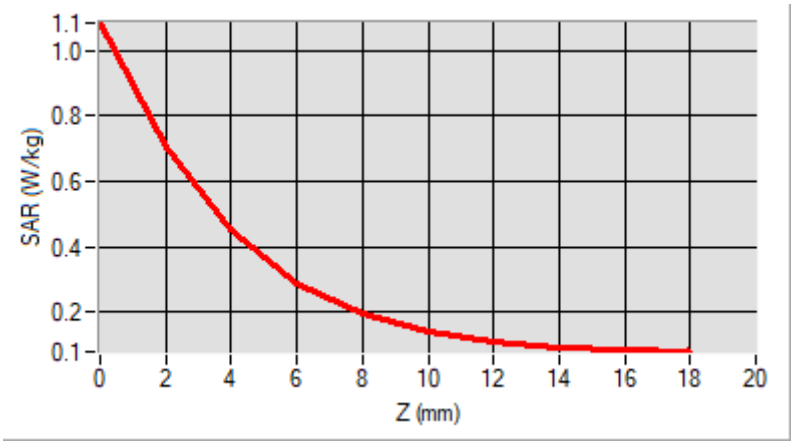
Maximum location: X=13.00, Y=31.00

D. SAR 1g & 10g

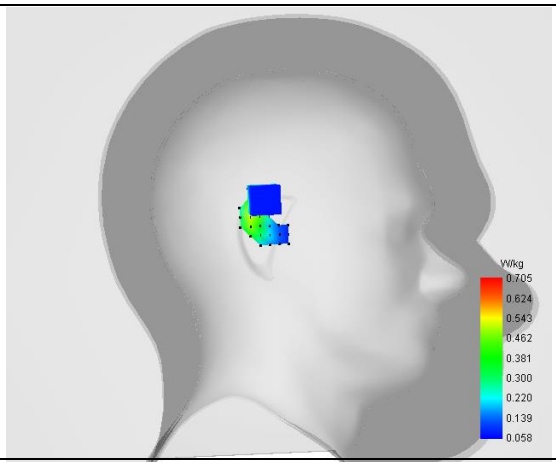
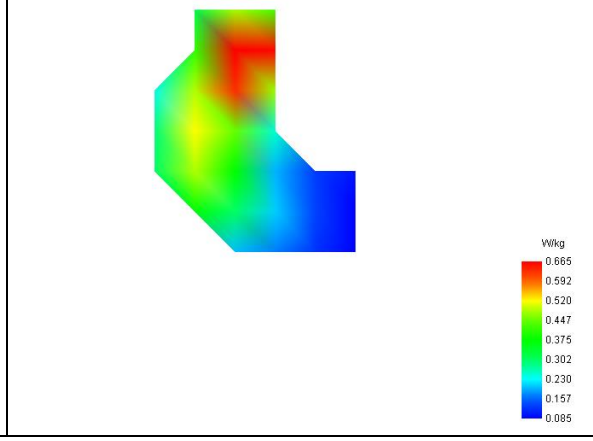
SAR 10g (W/Kg)	**0.300240**
SAR 1g (W/Kg)	**0.669175**

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)	**1.0853**	**0.7048**	**0.4503**	**0.2881**	**0.1924**	**0.1374**	**0.1069**	**0.0908**	**0.0828**



F. 3D Image

3D screen shot	**Hot spot position**
	

MEASUREMENT 4

Type: Phone measurement (Complete)
Date of measurement: 2022-04-16
Measurement duration: 12 minutes 21 seconds

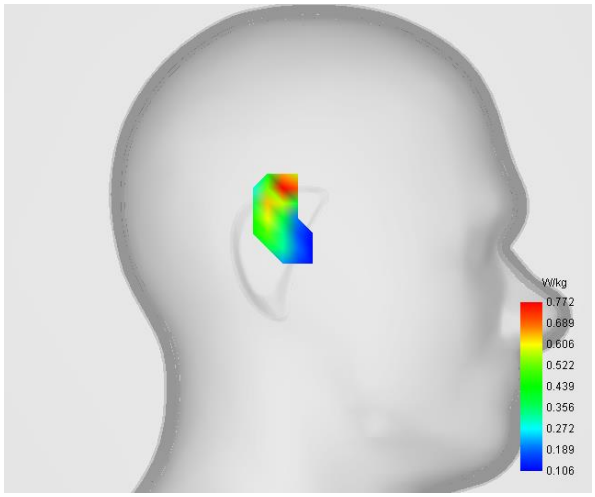
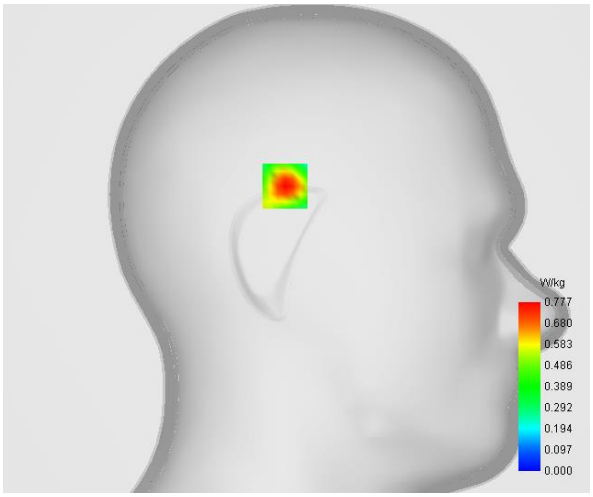
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Left Head
Device Position	Cheek
Band	U-NIII-3_802.11ac (20MHz)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5745.000000
Relative Permittivity (real part)	34.992273
Conductivity (S/m)	5.230836
Power Variation (%)	-1.290000
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

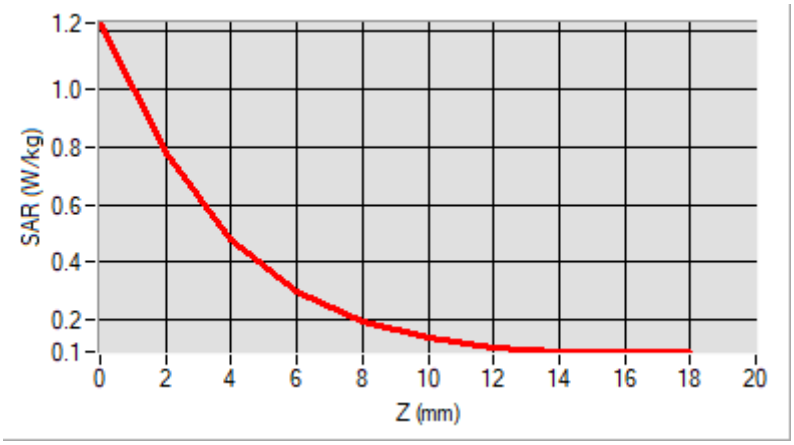
Maximum location: X=6.00, Y=33.00

D. SAR 1g & 10g

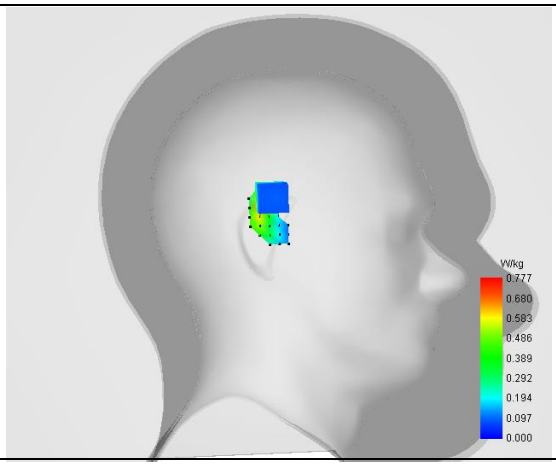
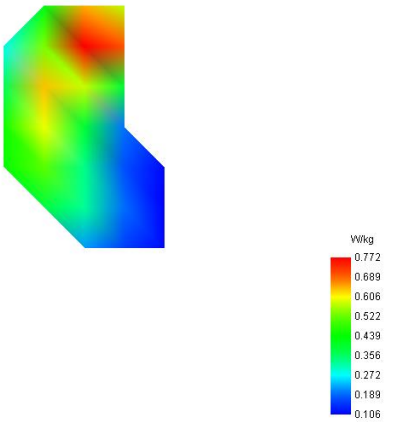
SAR 10g (W/Kg)	**0.334960**
SAR 1g (W/Kg)	**0.749759**

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)	**1.2274**	**0.7774**	**0.4804**	**0.2969**	**0.1931**	**0.1365**	**0.1076**	**0.0948**	**0.0926**



F. 3D Image

3D screen shot	**Hot spot position**
	

MEASUREMENT 5

Type: Phone measurement (Complete)
Date of measurement: 2022-04-16
Measurement duration: 12 minutes 3 seconds

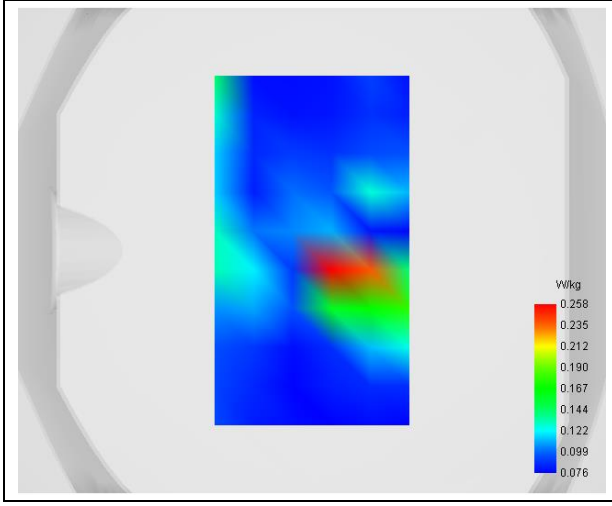
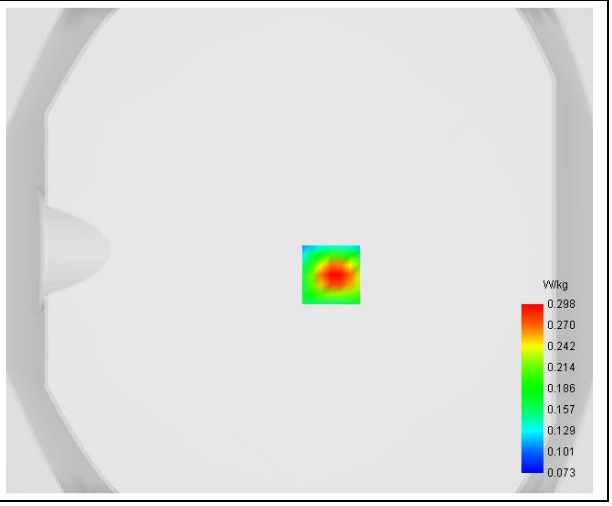
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Flat Plane
Device Position	Back
Band	U-NIII-1_802.11ac(80MHz)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5210.000000
Relative Permittivity (real part)	36.653869
Conductivity (S/m)	4.713611
Power Variation (%)	1.550000
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

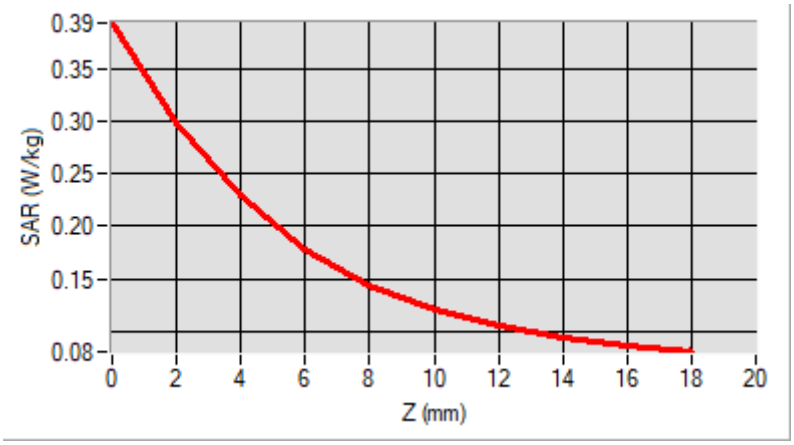
Maximum location: X=13.00, Y=-10.00

D. SAR 1g & 10g

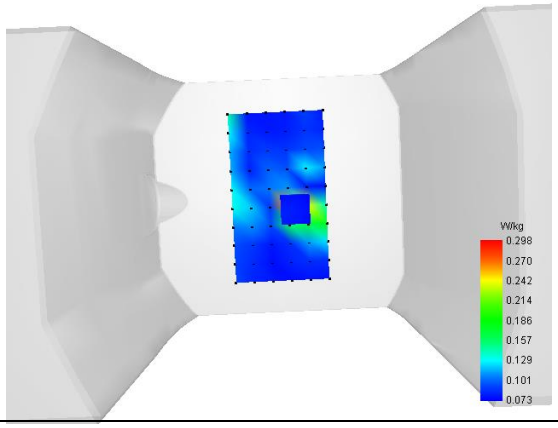
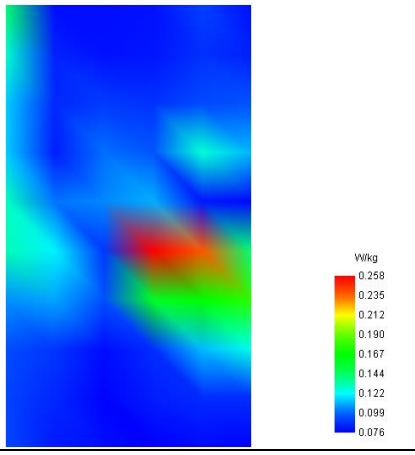
SAR 10g (W/Kg)	**0.128933**
SAR 1g (W/Kg)	**0.214991**

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)	**0.3929**	**0.2980**	**0.2287**	**0.1787**	**0.1445**	**0.1212**	**0.1055**	**0.0948**	**0.0872**



F. 3D Image

3D screen shot	**Hot spot position**
	

MEASUREMENT 6

Type: Phone measurement (Complete)
Date of measurement: 2022-04-16
Measurement duration: 12 minutes 3 seconds

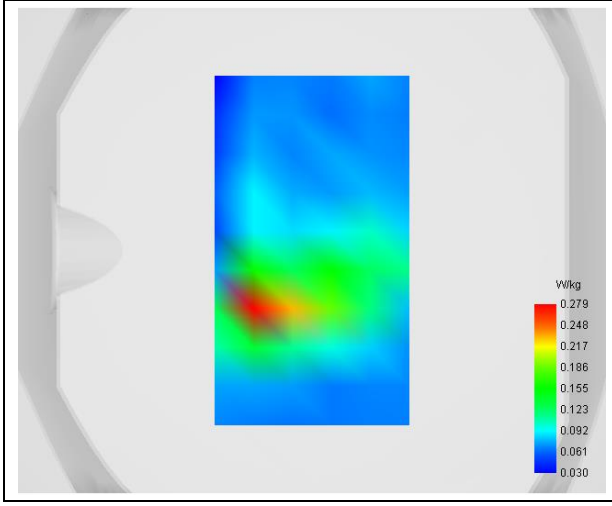
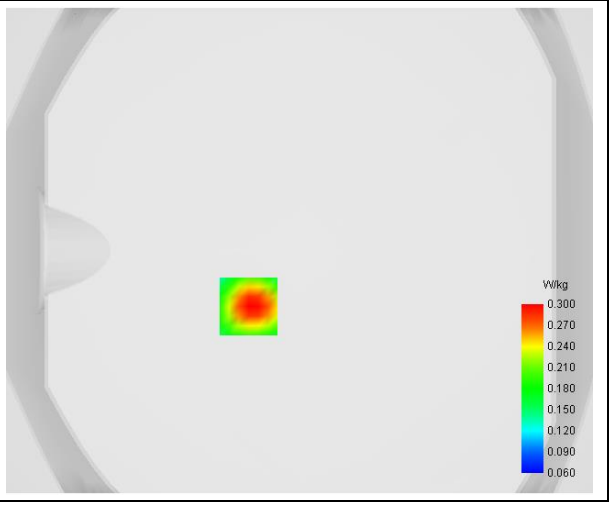
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Flat Plane
Device Position	Front
Band	U-NIII-2A_802.11ac(80MHz)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5290.000000
Relative Permittivity (real part)	35.592839
Conductivity (S/m)	4.901928
Power Variation (%)	1.110000
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

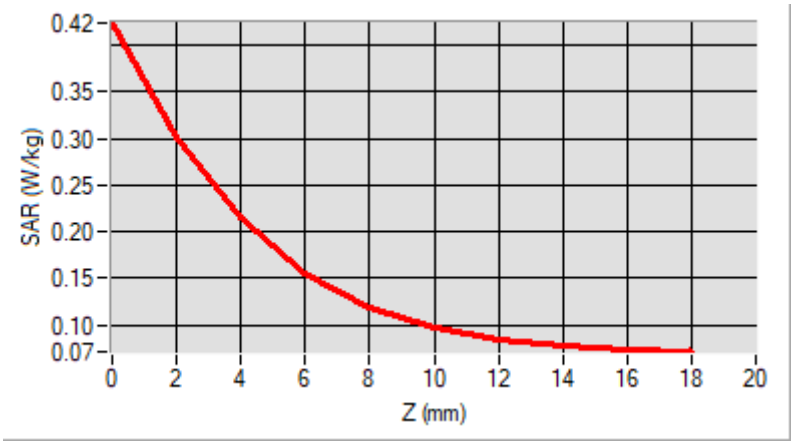
Maximum location: X=-21.00, Y=-23.00

D. SAR 1g & 10g

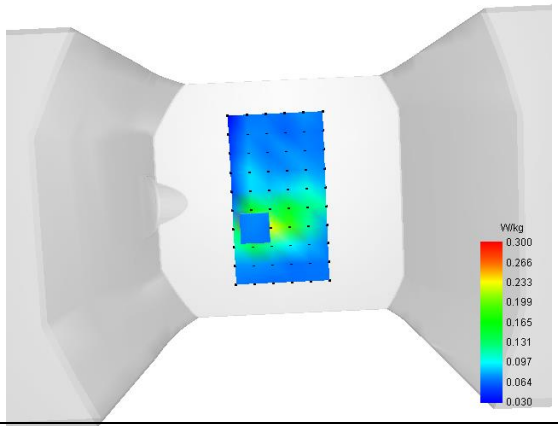
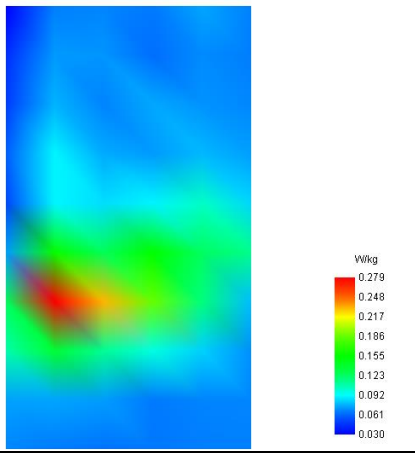
SAR 10g (W/Kg)	**0.122364**
SAR 1g (W/Kg)	**0.210160**

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)	**0.4233**	**0.3002**	**0.2144**	**0.1564**	**0.1198**	**0.0975**	**0.0844**	**0.0772**	**0.0736**



F. 3D Image

3D screen shot	**Hot spot position**
	

MEASUREMENT 7

Type: Phone measurement (Complete)
Date of measurement: 2022-04-16
Measurement duration: 12 minutes 21 seconds

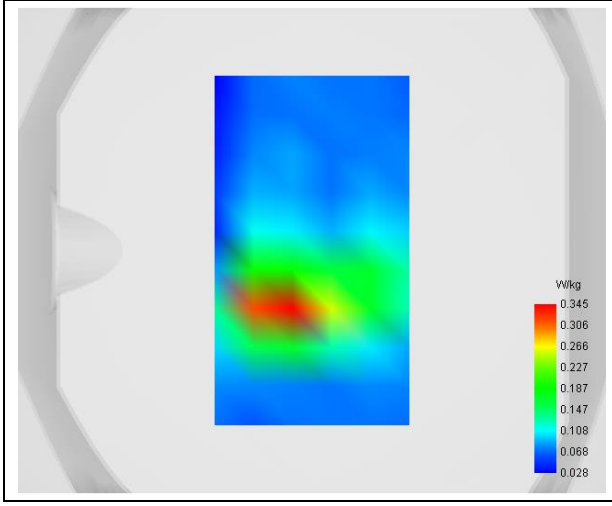
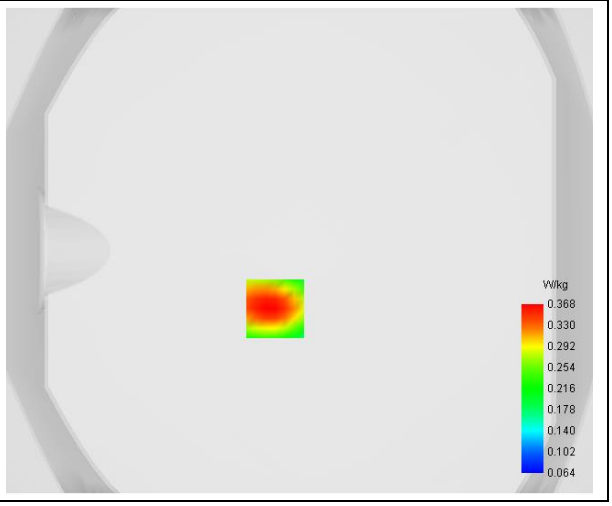
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Flat Plane
Device Position	Front
Band	U-NIII-2C_802.11n(20MHz)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5500.000000
Relative Permittivity (real part)	35.342963
Conductivity (S/m)	5.023278
Power Variation (%)	0.750000
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

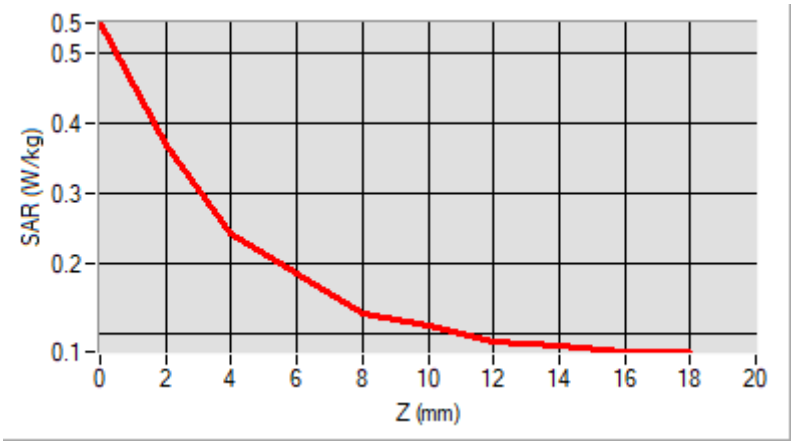
Maximum location: X=-10.00, Y=-24.00

D. SAR 1g & 10g

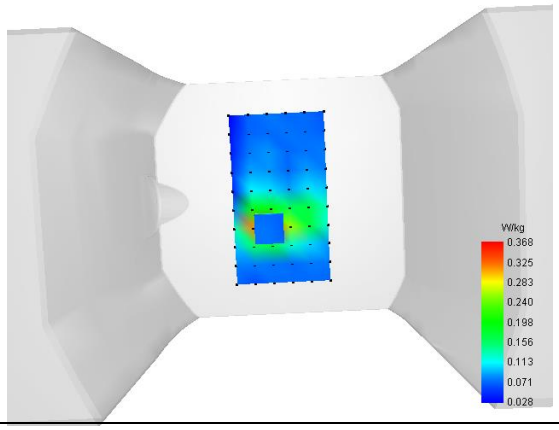
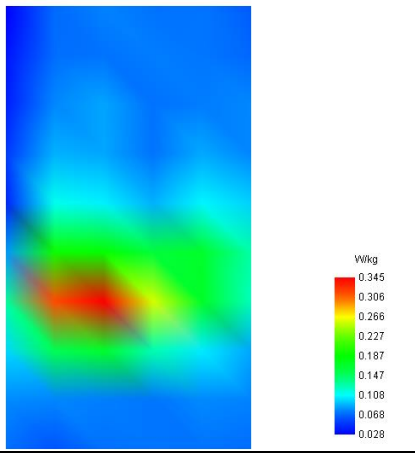
SAR 10g (W/Kg)	**0.144925**
SAR 1g (W/Kg)	**0.255382**

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)	**0.5428**	**0.3677**	**0.2445**	**0.1871**	**0.1308**	**0.1124**	**0.0886**	**0.0853**	**0.0756**



F. 3D Image

3D screen shot	**Hot spot position**
	

MEASUREMENT 8

Type: Phone measurement (Complete)
Date of measurement: 2022-04-16
Measurement duration: 12 minutes 21 seconds

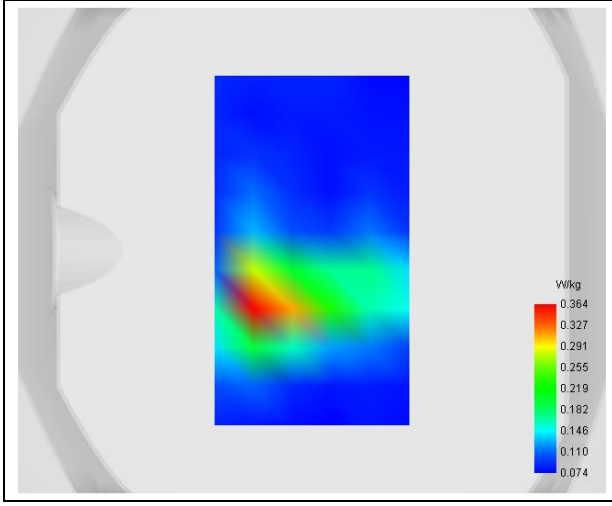
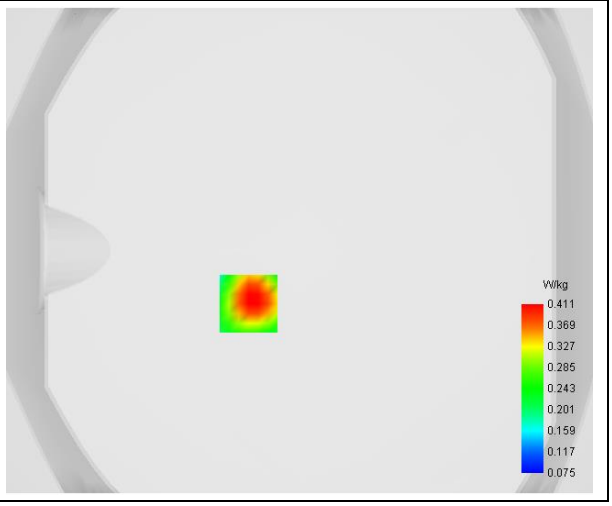
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Flat Plane
Device Position	Front
Band	U-NIII-3_802.11ac (20MHz)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5745.000000
Relative Permittivity (real part)	34.992273
Conductivity (S/m)	5.230836
Power Variation (%)	1.330000
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

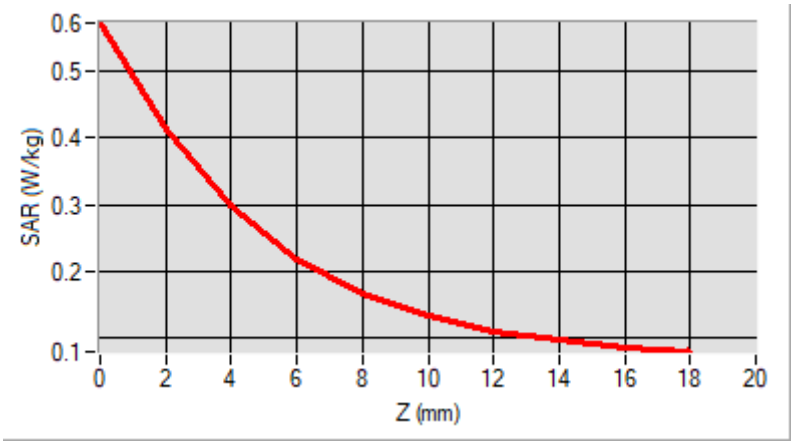
Maximum location: X=-21.00, Y=-22.00

D. SAR 1g & 10g

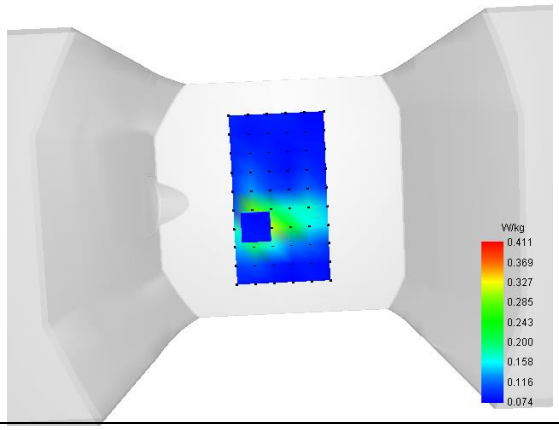
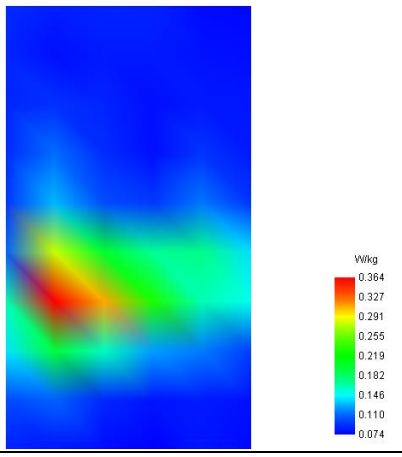
SAR 10g (W/Kg)	**0.159393**
SAR 1g (W/Kg)	**0.289118**

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)	**0.5711**	**0.4114**	**0.2979**	**0.2188**	**0.1668**	**0.1330**	**0.1111**	**0.0970**	**0.0874**



F. 3D Image

3D screen shot	**Hot spot position**
	

MEASUREMENT 9

Type: Phone measurement (Complete)
Date of measurement: 2022-04-16
Measurement duration: 12 minutes 3 seconds

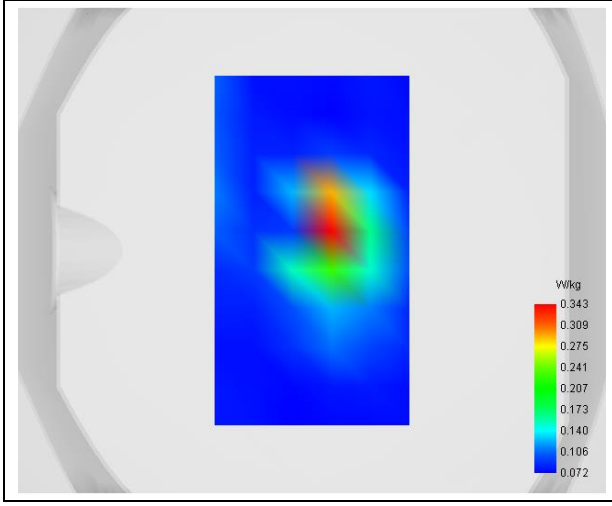
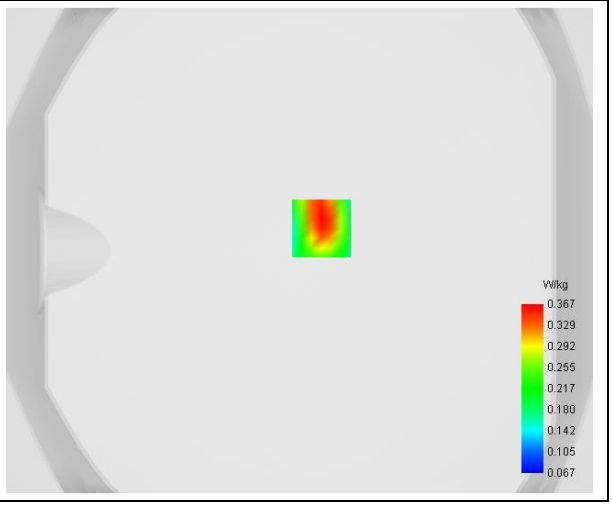
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Flat Plane
Device Position	Top
Band	U-NIII-1_802.11ac(80MHz)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5210.000000
Relative Permittivity (real part)	36.653869
Conductivity (S/m)	4.713611
Power Variation (%)	-1.050000
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

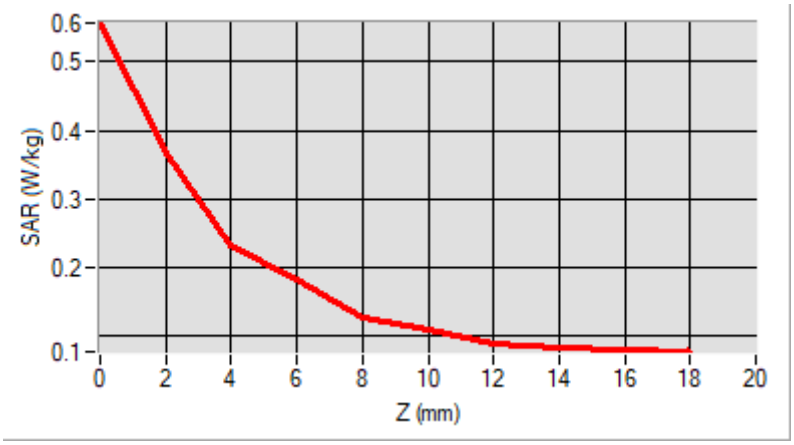
Maximum location: X=9.00, Y=9.00

D. SAR 1g & 10g

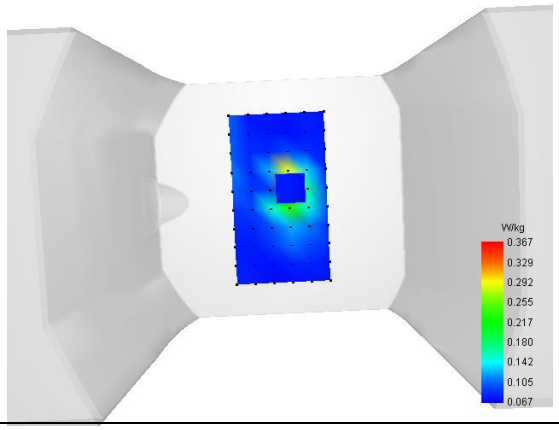
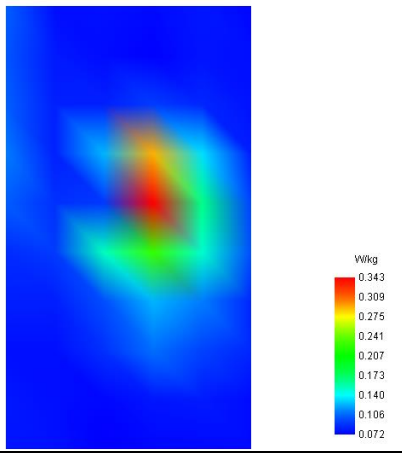
SAR 10g (W/Kg)	**0.139269**
SAR 1g (W/Kg)	**0.249825**

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)	**0.5569**	**0.3668**	**0.2323**	**0.1818**	**0.1260**	**0.1081**	**0.0880**	**0.0835**	**0.0793**



F. 3D Image

3D screen shot	**Hot spot position**
	

MEASUREMENT 10

Type: Phone measurement (Complete)
Date of measurement: 2022-04-16
Measurement duration: 12 minutes 3 seconds

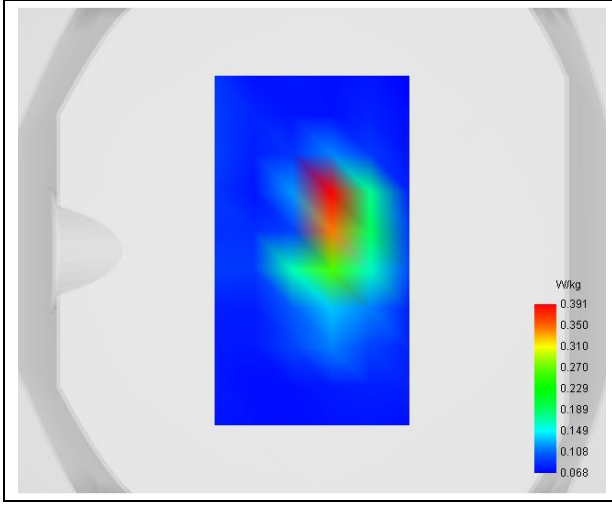
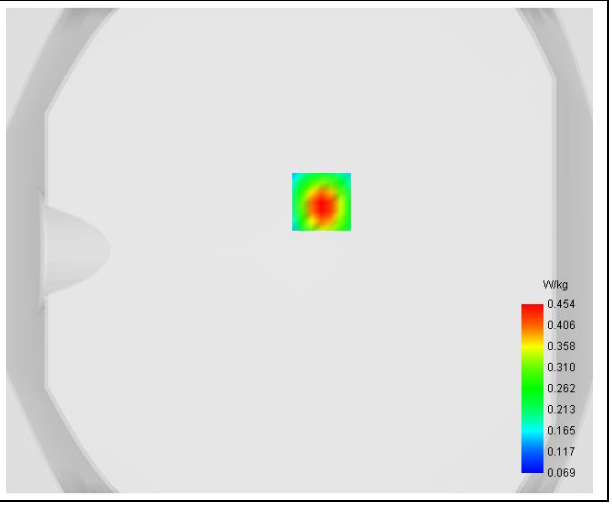
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Flat Plane
Device Position	Top
Band	U-NIII-2A_802.11ac(80MHz)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5290.000000
Relative Permittivity (real part)	35.592839
Conductivity (S/m)	4.901928
Power Variation (%)	-1.630000
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

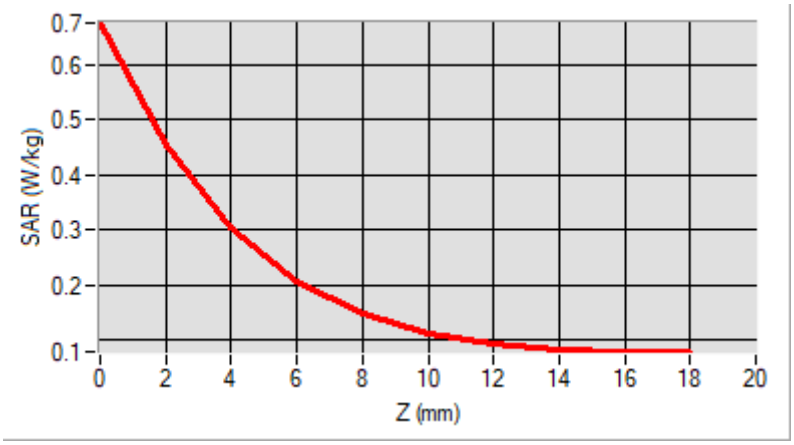
Maximum location: X=9.00, Y=20.00

D. SAR 1g & 10g

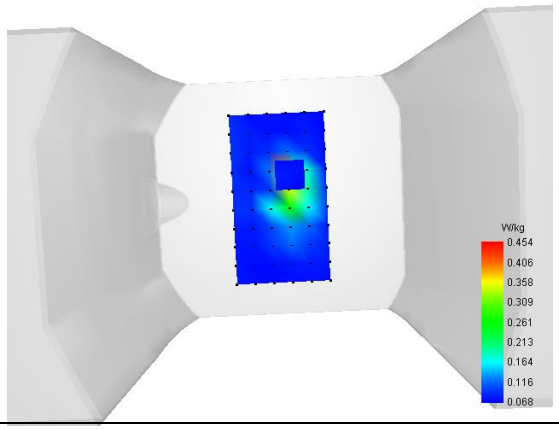
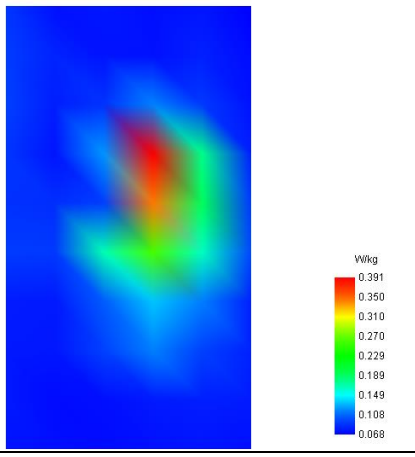
SAR 10g (W/Kg)	**0.151467**
SAR 1g (W/Kg)	**0.294391**

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)	**0.6753**	**0.4540**	**0.3039**	**0.2063**	**0.1476**	**0.1134**	**0.0944**	**0.0848**	**0.0808**



F. 3D Image

3D screen shot	**Hot spot position**
	

MEASUREMENT 11

Type: Phone measurement (Complete)
Date of measurement: 2022-04-16
Measurement duration: 12 minutes 21 seconds

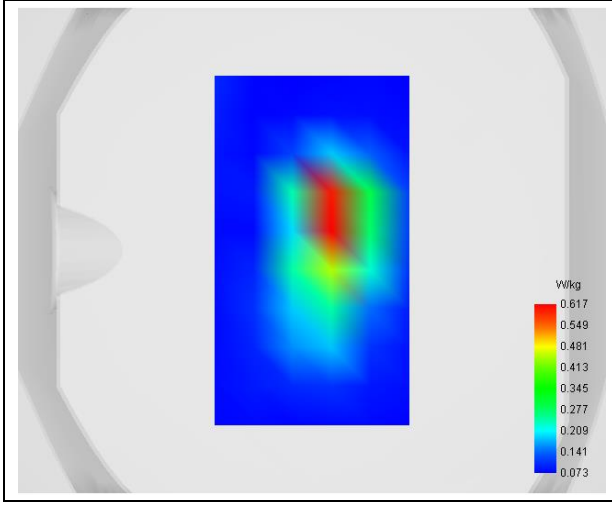
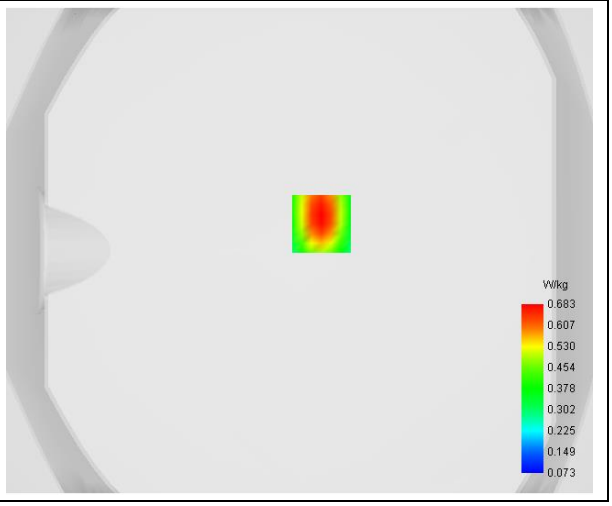
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Flat Plane
Device Position	Top
Band	U-NIII-2C_802.11n(20MHz)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5500.000000
Relative Permittivity (real part)	35.342963
Conductivity (S/m)	5.023278
Power Variation (%)	-0.780000
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

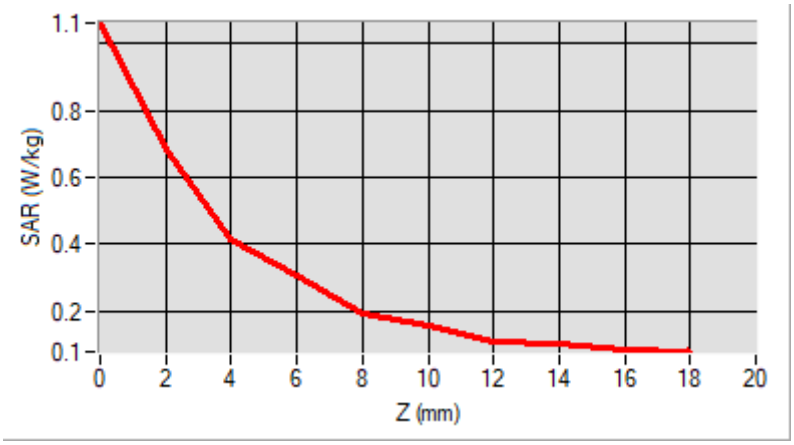
Maximum location: X=9.00, Y=11.00

D. SAR 1g & 10g

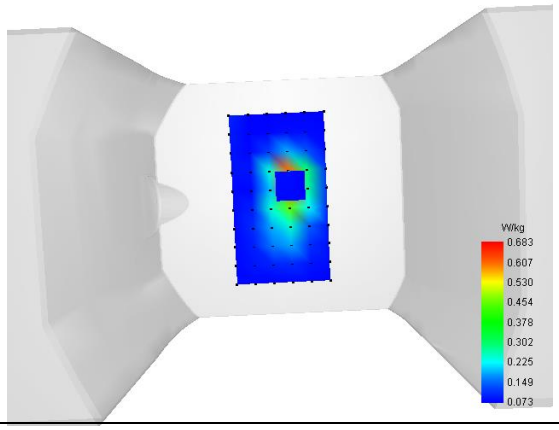
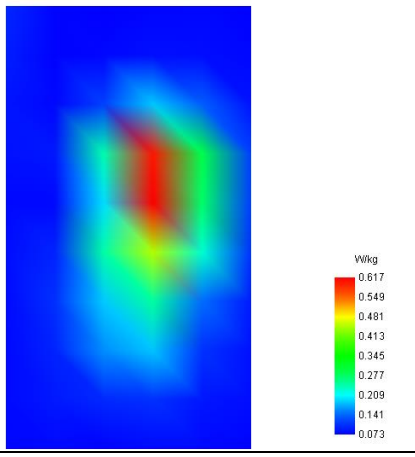
SAR 10g (W/Kg)	**0.219598**
SAR 1g (W/Kg)	**0.447856**

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)	**1.0605**	**0.6831**	**0.4162**	**0.3058**	**0.1909**	**0.1560**	**0.1109**	**0.1015**	**0.0890**



F. 3D Image

3D screen shot	**Hot spot position**
	

MEASUREMENT 12

Type: Phone measurement (Complete)
Date of measurement: 2022-04-16
Measurement duration: 12 minutes 21 seconds

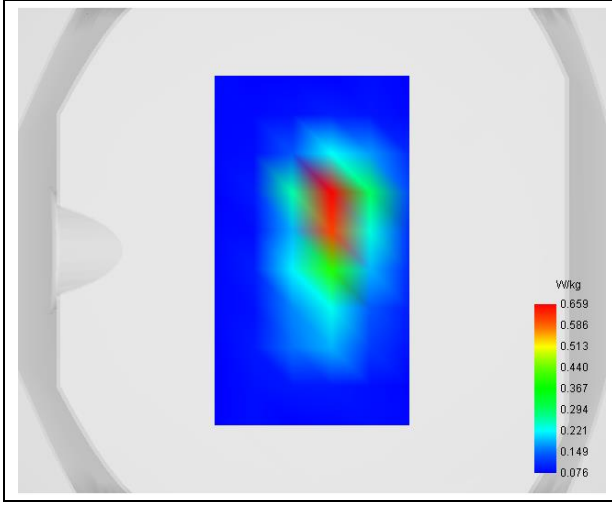
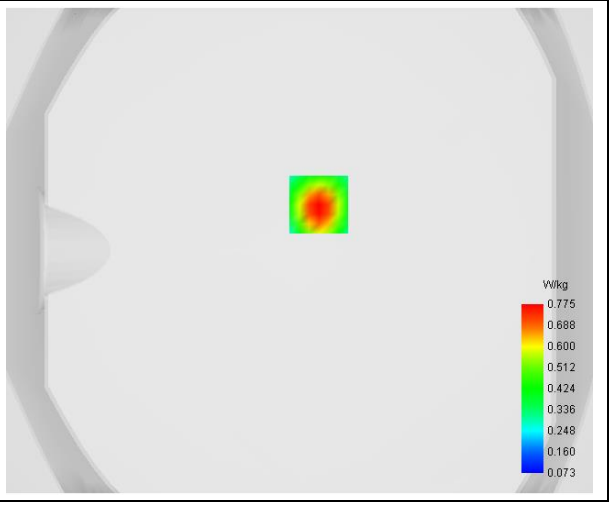
A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Phantom	Flat Plane
Device Position	Top
Band	U-NIII-3_802.11ac (20MHz)
Channels	Low
Signal	Duty Cycle: 1:1

B. SAR Measurement Results

Frequency (MHz)	5745.000000
Relative Permittivity (real part)	34.992273
Conductivity (S/m)	5.230836
Power Variation (%)	1.270000
Ambient Temperature	22.5
Liquid Temperature	22.5

C. SAR Surface and Volume

SURFACE SAR	VOLUME SAR
	

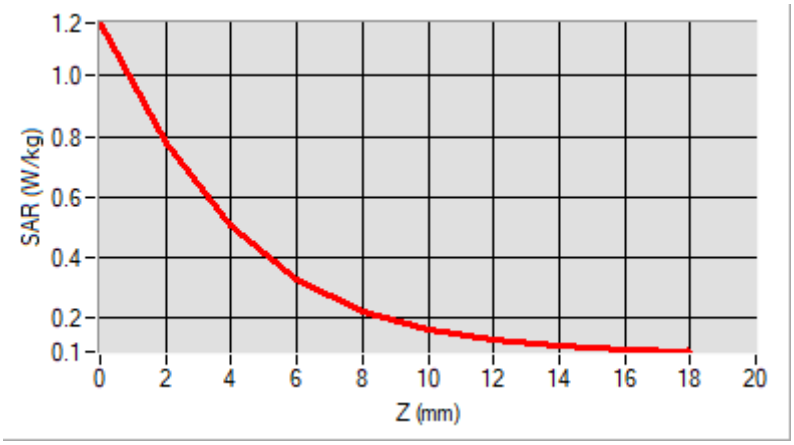
Maximum location: X=8.00, Y=19.00

D. SAR 1g & 10g

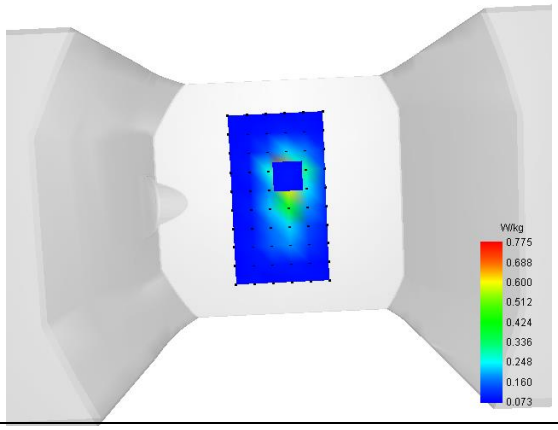
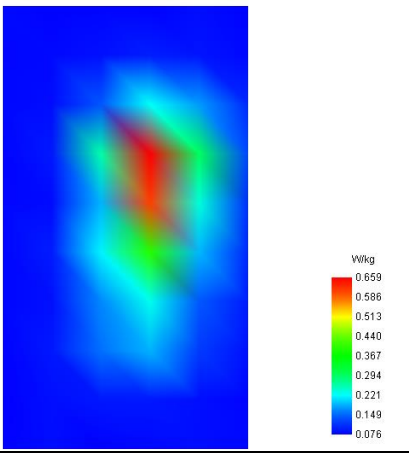
SAR 10g (W/Kg)	**0.229445**
SAR 1g (W/Kg)	**0.490152**

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)	**1.1745**	**0.7754**	**0.5056**	**0.3309**	**0.2257**	**0.1637**	**0.1280**	**0.1082**	**0.0973**

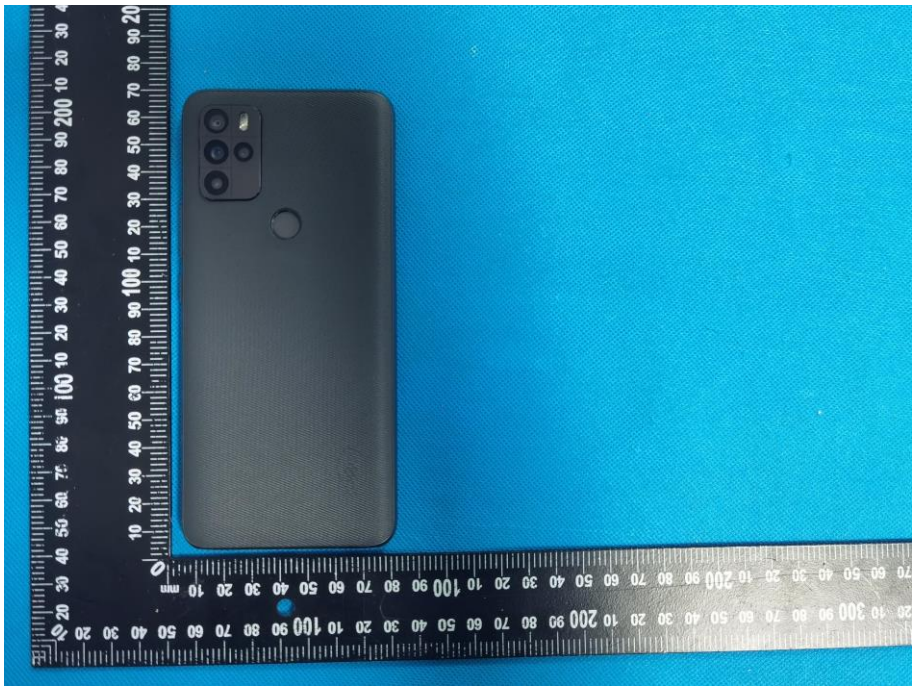


F. 3D Image

3D screen shot	**Hot spot position**
	

Annex C. EUT Photos

EUT View 1



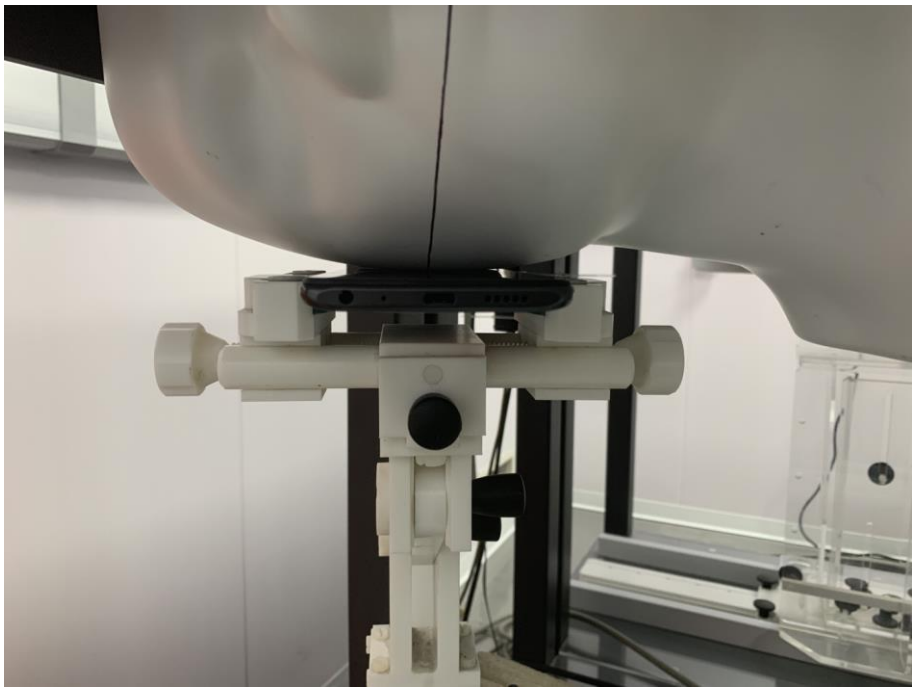
EUT View 2

Antenna View

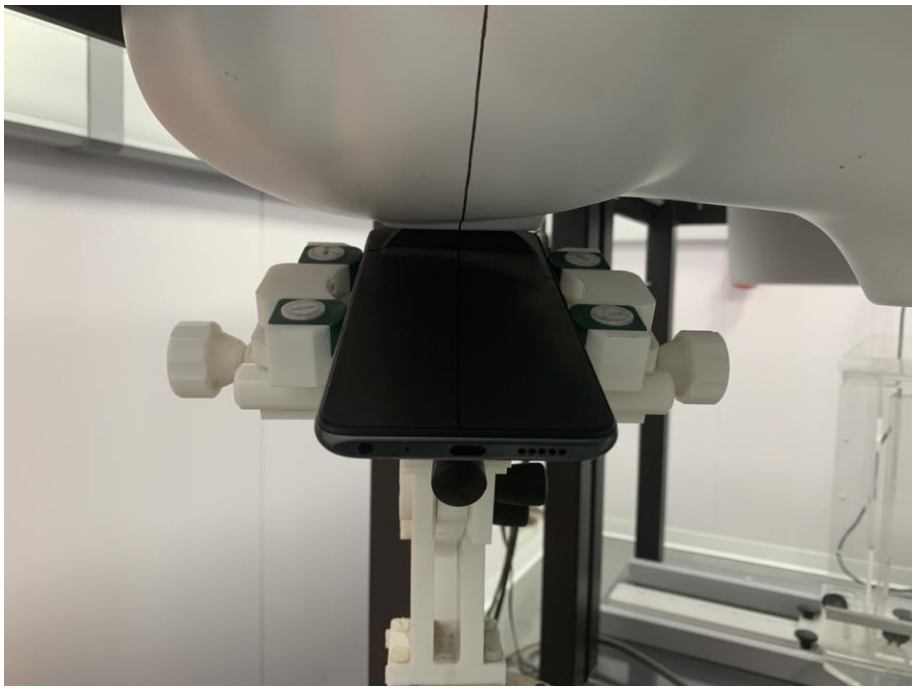
Annex D. Test Setup Photos

Head Exposure Conditions

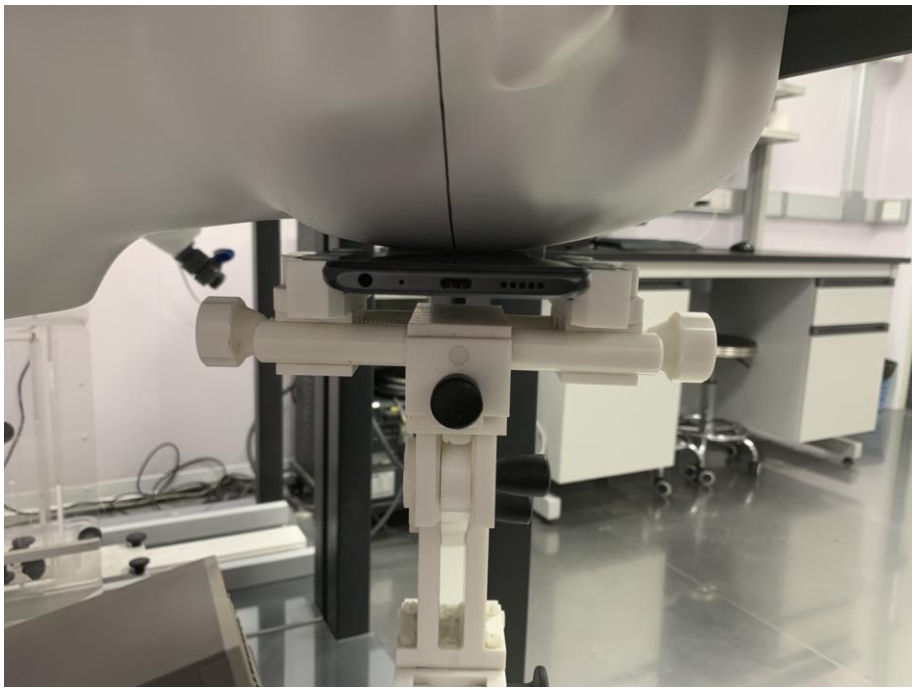
Right Cheek



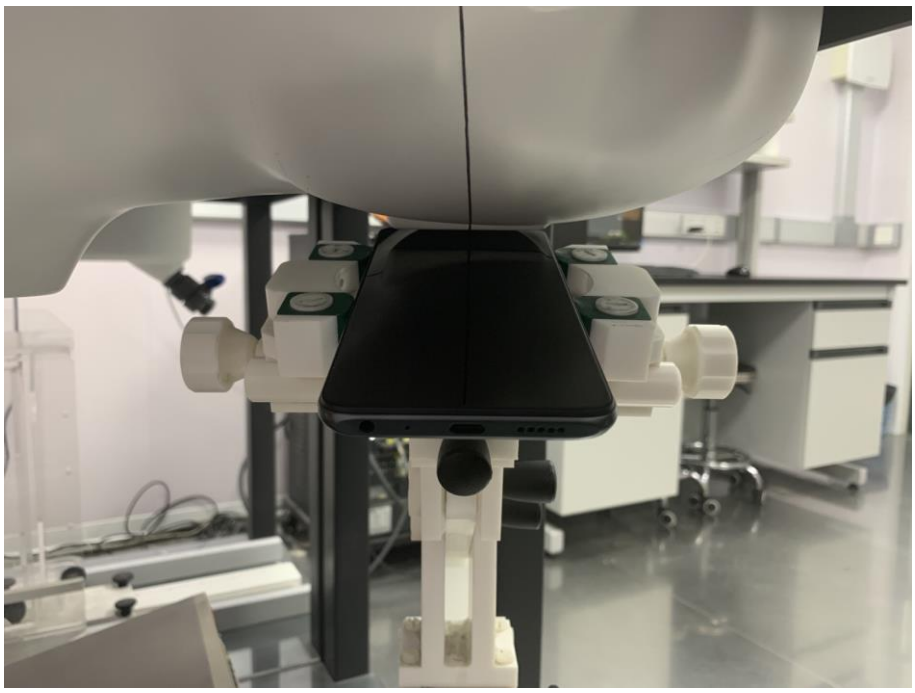
Right Tilt



Left Cheek

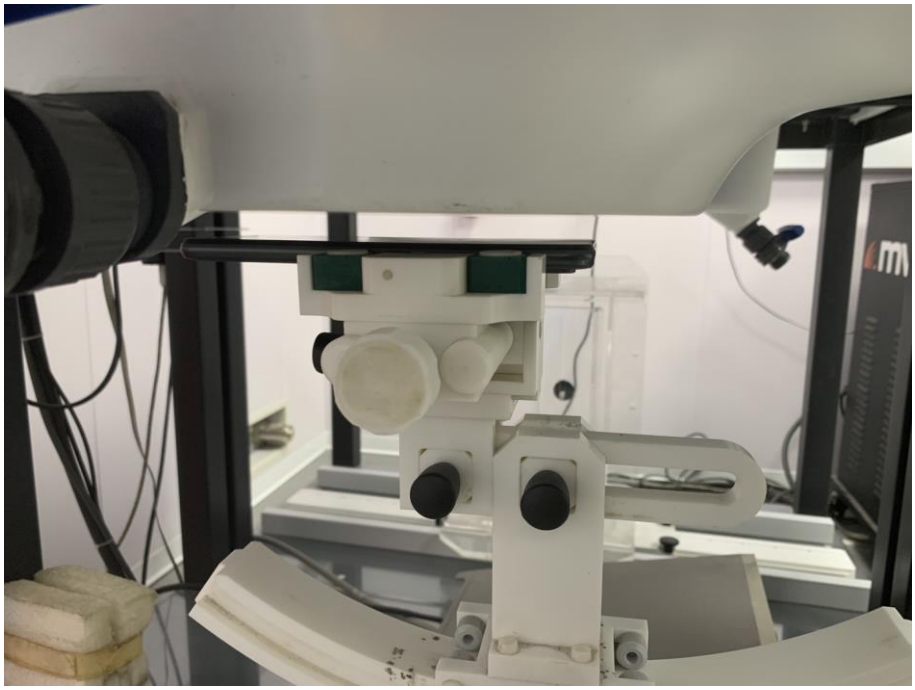


Left Tilt

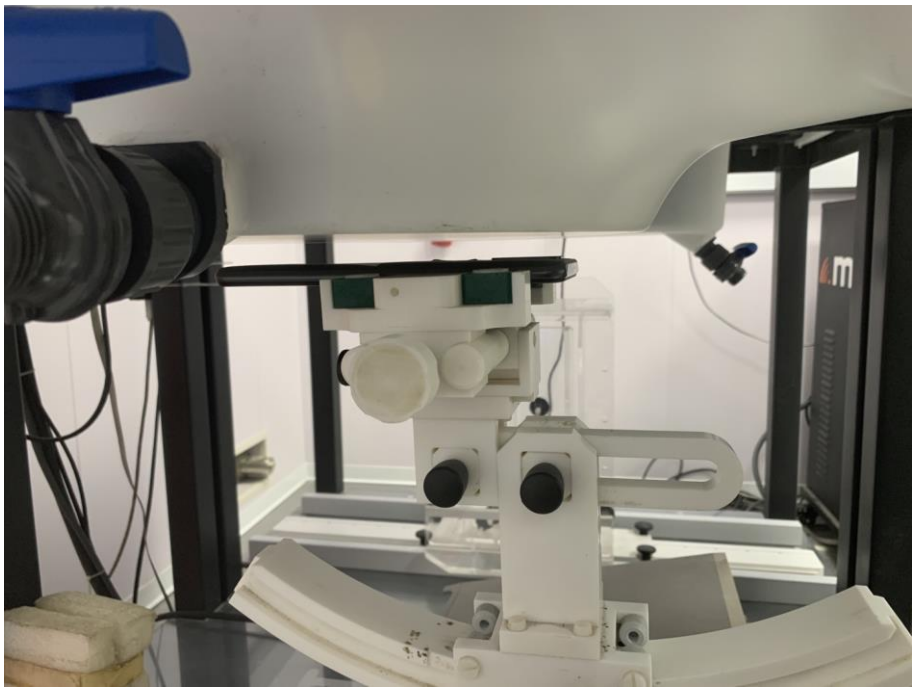


Body mode Exposure Conditions
Test distance: 10mm

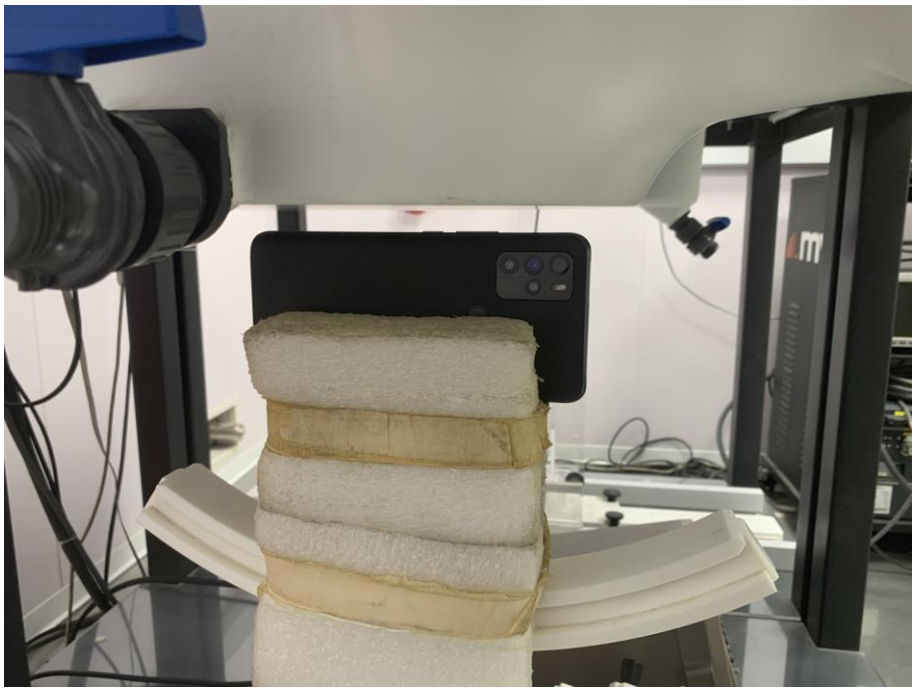
Body Front



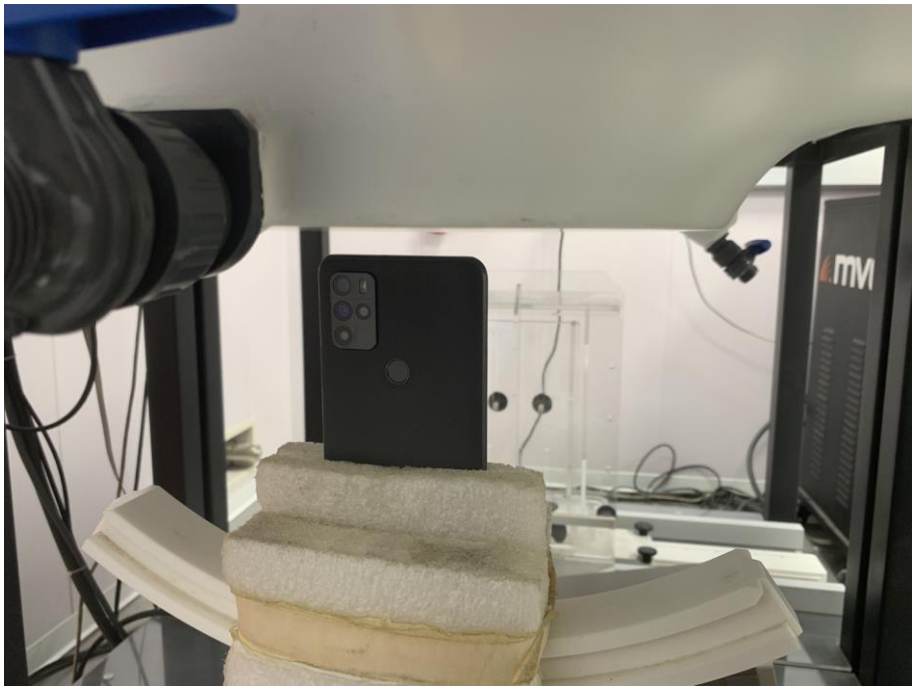
Body Back



Body Right



Body Top



Annex E. Calibration Certificate

Please refer to the exhibit for the calibration certificate

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