

# TEST REPORT

**Reference No.**..... : WTX22X07138976W  
**FCC ID** ..... : 2ATA2-BRMV61  
**Applicant** ..... : Geosatis SA  
**Address** ..... : Rue St-Hubert 7, 2340 Le Noirmont, Jura, Switzerland  
**Manufacturer** ..... : The same as Applicant  
**Address** ..... : The same as Applicant  
**Product Name** ..... : BRM V6.1  
**Model No.**..... : V6.1  
**Standards** ..... : FCC Part 2.1093  
IEEE Std C95.1: 2019  
IEEE Std C95.3: 2002 + Rev. 2008  
IEEE 1528:2013  
**Date of Receipt sample** .... : 2022-07-08  
**Date of Test**..... : 2022-08-01 to 2022-08-19  
**Date of Issue** ..... : 2022-08-20  
**Test Report Form No.** ..... : WTX\_IEEE\_1528\_2013W  
**Test Result**..... : **Pass**

Remarks:

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

**Prepared By:**

**Waltek Testing Group (Shenzhen) Co., Ltd.**

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

Tested by:

Jack Sun

Jack Sun

Approved by:

Silin Chen

Silin Chen

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**Report version**

Version No.	Date of issue	Description
Rev.00	2022-08-20	Original
/	/	/

## 1. General Information

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### 1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT:	
Product Name:	BRM V6.1
Brand Name:	/
Model No.:	V6.1
Adding Model(s):	/
Rated Voltage:	DC7.6V
Rated Current:	1A
Software Version:	01.01.03.00
Hardware Version:	1.0
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

<b>Technical Characteristics of EUT:</b>	
<b>4G</b>	
Support Networks:	FDD-LTE CAT-M1
Support Band:	FDD-LTE CAT-M1 Band 2, 4, 5, 12, 13, 25, 26, 66
Uplink Frequency:	FDD-LTE Band 2: Tx: 1850-1910MHz, FDD-LTE Band 4: Tx: 1710-1755MHz, FDD-LTE Band 5: Tx: 824-849MHz, FDD-LTE Band 12: Tx: 699-716MHz, FDD-LTE Band 13: Tx: 777-787MHz FDD-LTE Band 25: Tx: 1850-1915MHz FDD-LTE Band 26: Tx: 814-849MHz FDD-LTE Band 66: Tx: 1710-1780MHz
Downlink Frequency:	FDD-LTE CAT-M1 Band 2: Rx: 1930-1990MHz, FDD-LTE CAT-M1 Band 4: Rx: 2110-2155MHz, FDD-LTE CAT-M1 Band 5: Rx: 869-894MHz, FDD-LTE CAT-M1 Band 12: Rx: 729-746MHz, FDD-LTE CAT-M1 Band 13: Rx: 746-756MHz, FDD-LTE CAT-M1 Band 25: Rx:1930-1995MHz, FDD-LTE CAT-M1 Band 26: Rx: 859-894MHz, FDD-LTE CAT-M1 Band 66: Rx: 2110-2200MHz
RF Output Power:	FDD-LTE CAT-M1 Band 2: 22.67dBm, FDD-LTE CAT-M1 Band 4: 23.17dBm, FDD-LTE CAT-M1 Band 5: 23.0dBm, FDD-LTE CAT-M1 Band 12: 22.21dBm, FDD-LTE CAT-M1 Band 13: 22.62dBm, FDD-LTE CAT-M1 Band 25: 22.62dBm, FDD-LTE CAT-M1 Band 26(814-824MHz): 22.64dBm, FDD-LTE CAT-M1 Band 26(824-849MHz): 22.57dBm, FDD-LTE CAT-M1 Band66: 23.79dBm,
Type of Modulation:	QPSK, 16QAM
Antenna Type:	Chip Antenna
Antenna Gain:	FDD-LTE CAT-M1 Band 2: 3.1dBi, FDD-LTE CAT-M1 Band 4: 3.1dBi, FDD-LTE CAT-M1 Band 5: 1.2dBi, FDD-LTE CAT-M1 Band 12: 1.2dBi, FDD-LTE CAT-M1 Band 13: 1.2dBi, FDD-LTE CAT-M1 Band 25: 3.1dBi, FDD-LTE CAT-M1 Band 26(814-824MHz): 1.2dBi, FDD-LTE CAT-M1 Band 26(824-849MHz): 1.2dBi, FDD-LTE CAT-M1 Band 66: 3.1dBi
<b>Bluetooth</b>	
Bluetooth Version:	V5.0

Frequency Range:	2402-2480MHz
RF Output Power:	10.0dBm (Conducted)
Data Rate:	1Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Antenna Type:	Chip Antenna
Antenna Gain:	0.23dBi
<i>Note: The Antenna Gain is provided by the customer and can affect the validity of results.</i>	

## 1.2 Test Standards

The following report is accordance with FCC 47 CFR Part 2.1093, 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

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

Frequency Band	Limb (0mm Gap)	SAR <sub>10g</sub> Limit (W/kg)
	Maximum SAR <sub>10g</sub> (W/kg)	
LTE CAT-M1	<b>1.619</b>	4.0
Bluetooth	0.035	4.0
Simultaneous Transmission	<b>1.654</b>	4.0

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 IEEE 1528:2013 and KDB 865664 D01 v01r04 and KDB 865664 D02 v01r02.



### 3. Specific Absorption Rate (SAR)

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#### 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 ( $\rho$ ). 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,  $\delta T$  is the temperature rise and  $\delta t$  is the exposure duration, or related to the electrical field in the tissue by

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

Where:  $\sigma$  is the conductivity of the tissue,  $\rho$  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

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### 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

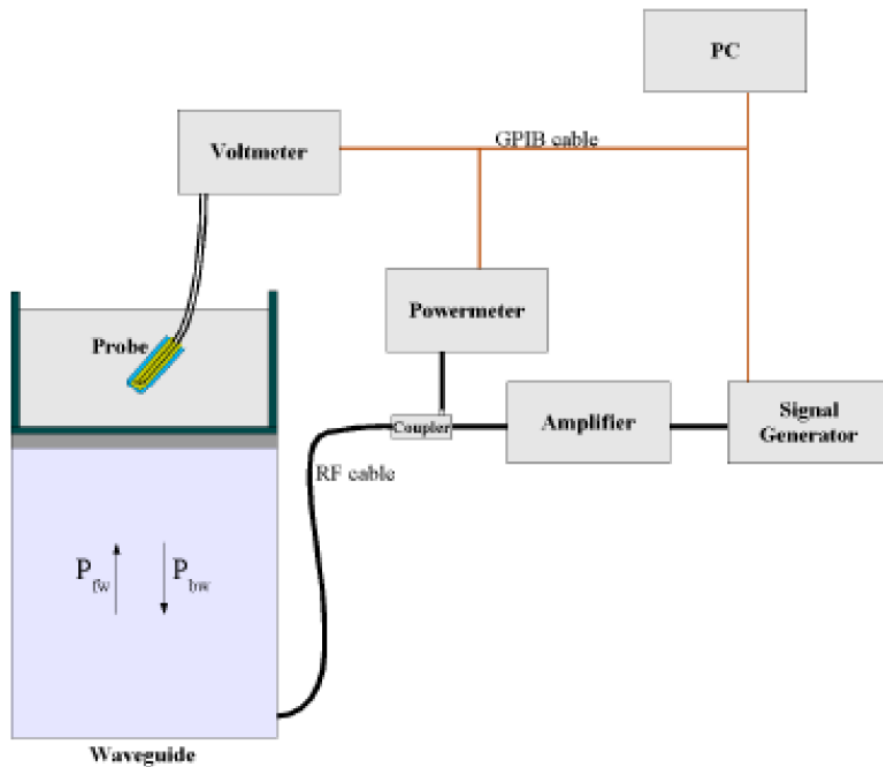
For the measurements the Specific Dosimetric E-Field Probe SSE2 SN 45/15 EPGO280 with following specifications is used

- 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

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- 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<sub>fw</sub> = Forward Power

P<sub>bw</sub> = Backward Power

a and b = Waveguide dimensions

l = Skin depth

Keithley configuration:

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

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

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

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

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

where DCP is the diode compression point in mV.

### 4.3 Probe Calibration Process

#### Dosimetric Assessment Procedure

Each E-Probe/Probe Amplifier combination has unique calibration parameters. SATIMO Probe calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm<sup>2</sup>) 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/cm<sup>2</sup>.

#### 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:

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

$\Delta t$  = exposure time (30 seconds),

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

$\Delta T$  = 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:

$\sigma$  = simulated tissue conductivity,

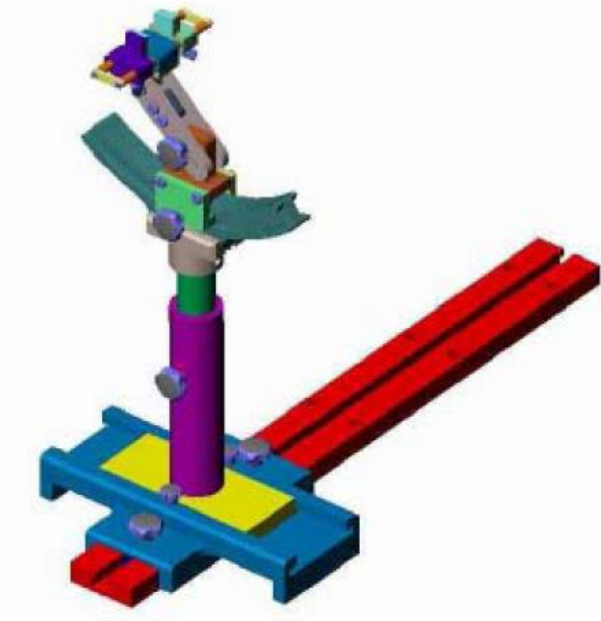
$\rho$  = Tissue density (1.25 g/cm<sup>3</sup> for brain tissue)

#### 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

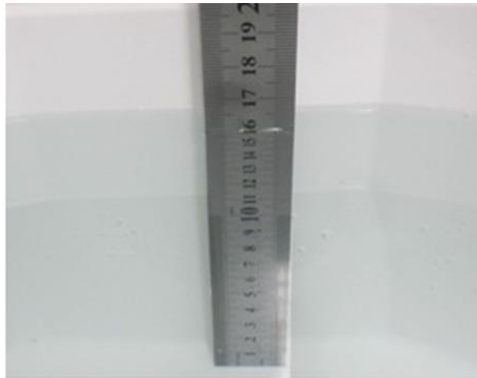
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
E-Field Probe	MVG	SSE2	SN 18/21 EPGO356	2022-07-08	2023-07-07
750MHz Dipole	MVG	SID750	SN 47/12 DIP 0G750-203	2020-03-11	2023-03-10
835MHz Dipole	MVG	SID835	SN 47/12 DIP 0G835-204	2020-03-11	2023-03-10
900MHz Dipole	MVG	SID900	SN 47/12 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
2300 MHz Dipole	MVG	SID2300	SN 50/20 DIP 2G300-513	2021-01-14	2024-01-13
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

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### 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/Body SAR

#### The Composition of Tissue Simulating Liquid

Frequency (MHz)	Water (%)	Salt (%)	Sugar (%)	HEC (%)	Preventol (%)	DGBE (%)
<b>Head/Body</b>						
750	41.1	1.4	57.0	0.2	0.3	0
835	40.3	1.4	57.9	0.2	0.2	0
1700-1900	55.2	0.3	0	0	0	44.5
2450	55.0	0.1	0	0	0	44.9
2600	54.9	0.1	0	0	0	45.0

## 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 ( $\sigma$ )	Permittivity ( $\epsilon_r$ )	Conductivity ( $\sigma$ )	Permittivity ( $\epsilon_r$ )
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
<b>750</b>	<b>0.89</b>	<b>41.9</b>	<b>0.96</b>	<b>55.5</b>
<b>835</b>	<b>0.90</b>	<b>41.5</b>	<b>0.97</b>	<b>55.2</b>
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
<b>1800-2000</b>	<b>1.40</b>	<b>40.0</b>	<b>1.52</b>	<b>53.3</b>
<b>2450</b>	<b>1.80</b>	<b>39.2</b>	<b>1.95</b>	<b>52.7</b>
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

Body Tissue Simulating Liquid									
Freq. MHz.	Temp. (°C)	Conductivity			Permittivity			Limit (%)	Date
		Reading ( $\sigma$ )	Target ( $\sigma$ )	Delta (%)	Reading ( $\epsilon_r$ )	Target ( $\epsilon_r$ )	Delta (%)		
750	22.2	0.94	0.96	-2.08	54.66	55.5	-1.51	±5	2022-08-19
835	22.2	0.96	0.97	-1.03	53.85	55.2	-2.45	±5	2022-08-19
1800	22.2	1.53	1.52	0.66	53.36	53.3	0.11	±5	2022-08-19
1900	22.2	1.50	1.52	-1.32	52.42	53.3	-1.65	±5	2022-08-19
2450	22.2	1.96	1.95	0.51	51.24	52.7	-2.77	±5	2022-08-19

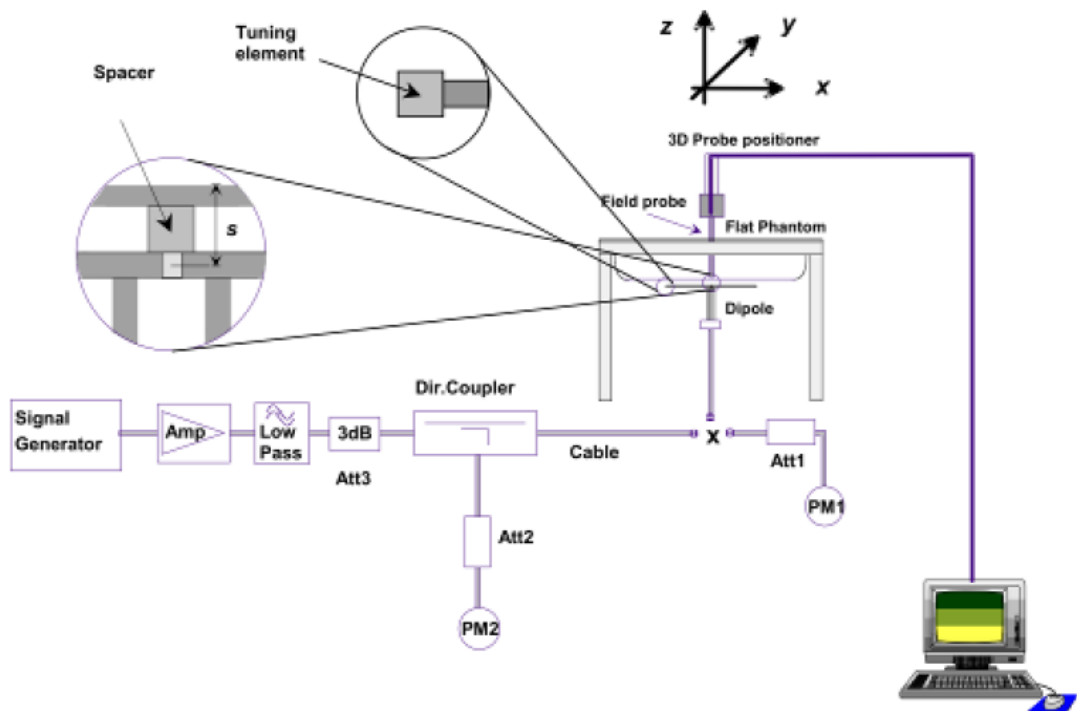
## 6. SAR Measurement Evaluation

### 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.

### 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 <sub>10g</sub>	Measured SAR <sub>10g</sub>	Normalized SAR <sub>10g</sub>	Tolerance	Date
MHz	(W/kg)	(W/kg)	(W/kg)	(%)	
Body					
750	5.51	1.34	5.36	-2.72	2022-08-19
835	6.19	1.52	6.08	-1.78	2022-08-19
1800	20.88	5.08	20.32	-2.68	2022-08-19
1900	20.62	5.17	20.68	0.29	2022-08-19
2450	23.38	5.82	23.28	-0.43	2022-08-19

**Remark:** Referring to IEEE 1528:2013 Section 8.2, the system check shall be performed at a test frequency that is within  $\pm 10\%$  or  $\pm 100$  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

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### 7.1 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 0mm.

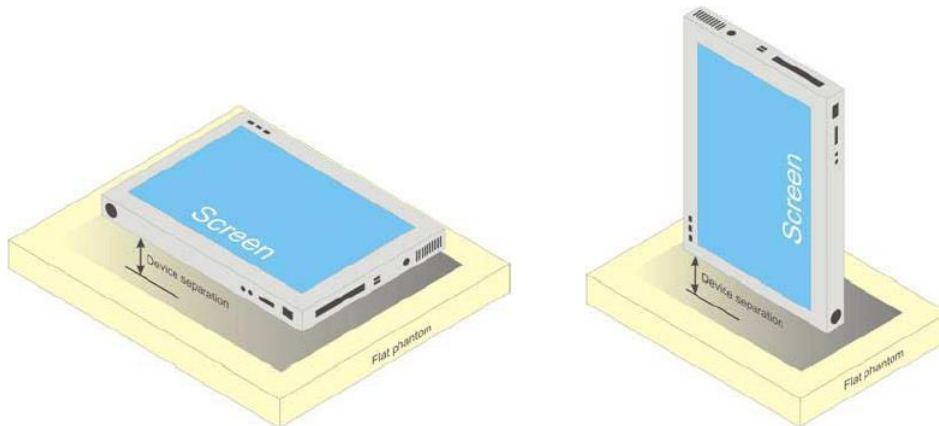
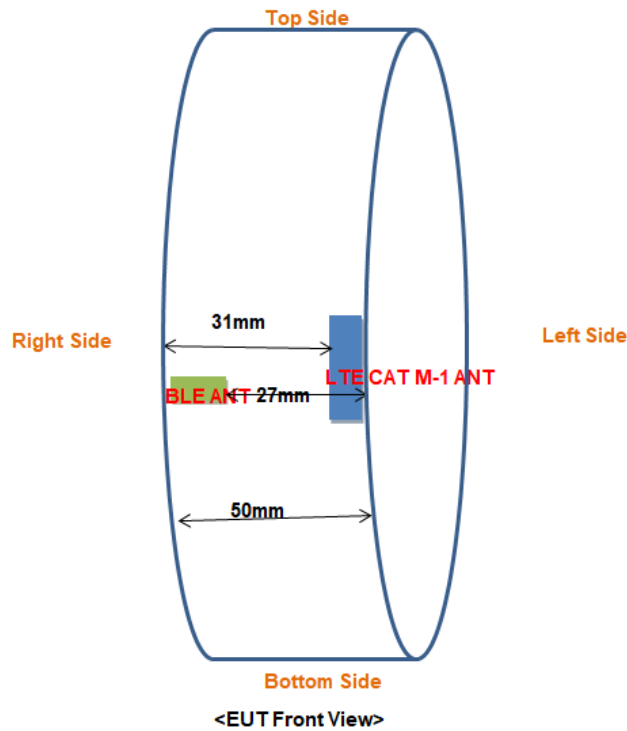


Illustration for Body Position

### 7.2 EUT Antenna Position



Block Diagram for EUT Antenna Position

Distance of EUT antenna-to-edge/surface(mm), Test distance:0mm						
Antennas	Back side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
LTE CAT-M1	<25	<25	<25	31	/	/
Bluetooth	<25	<25	27	<25	/	/

### 7.3 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:

Limb SAR tests, Test distance: 0mm						
Antennas	Front	Back	Right Side	Left Side	Top Side	Bottom Side
LTE CAT-M1	Yes	/	No	Yes	/	/
Bluetooth	Yes	/	Yes	No	/	/

**Remark:**

1. Referring to KDB 447498 D01, the test separation distances is 0 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
2. The EUT is a ring-shaped device, and the EUT can work normally only when it is closed; and the inner ring surface of the EUT cannot be close to the flat phantom, so we removed the shell of the device and tested the front of the antenna of the wireless module of the device is 0mm. According to the test results, the limb (0mm) SAR of the inner torus of the EUT is evaluated.

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

## 8. SAR Measurement Procedures

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### 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

Radio Technology	Channel	Resource Blocks / Subcarrier	Bandwidth [MHz]	RMS Cond. Power [dBm]	FCC EIRP Limit [W]	IC EIRP Limit [W]	Max. Antenna Gain FCC [dBi]	Max. Antenna Gain IC [dBi]
CAT-M1 eFDD 5 QPSK	low	1	1.4	23.00	11.5	11.5	17.6	17.6
CAT-M1 eFDD 5 QPSK	low	3	1.4	21.88	11.5	11.5	18.72	18.72
CAT-M1 eFDD 5 QPSK	low	6	1.4	20.84	11.5	11.5	19.76	19.76
CAT-M1 eFDD 5 QPSK	mid	1	1.4	22.81	11.5	11.5	17.79	17.79
CAT-M1 eFDD 5 QPSK	mid	3	1.4	21.83	11.5	11.5	18.77	18.77
CAT-M1 eFDD 5 QPSK	mid	6	1.4	20.93	11.5	11.5	19.67	19.67
CAT-M1 eFDD 5 QPSK	high	1	1.4	22.81	11.5	11.5	17.79	17.79
CAT-M1 eFDD 5 QPSK	high	3	1.4	21.85	11.5	11.5	18.75	18.75
CAT-M1 eFDD 5 QPSK	high	6	1.4	20.85	11.5	11.5	19.75	19.75
CAT-M1 eFDD 5 16QAM	low	1	1.4	21.63	11.5	11.5	18.97	18.97
CAT-M1 eFDD 5 16QAM	low	5	1.4	21.02	11.5	11.5	19.58	19.58
CAT-M1 eFDD 5 16QAM	mid	1	1.4	21.52	11.5	11.5	19.08	19.08
CAT-M1 eFDD 5 16QAM	mid	5	1.4	21.13	11.5	11.5	19.47	19.47
CAT-M1 eFDD 5 16QAM	high	1	1.4	21.72	11.5	11.5	18.88	18.88
CAT-M1 eFDD 5 16QAM	high	5	1.4	21.08	11.5	11.5	19.52	19.52
CAT-M1 eFDD 26 QPSK	low	1	1.4	22.57	11.5	11.5	18.03	18.03
CAT-M1 eFDD 26 QPSK	low	3	1.4	21.45	11.5	11.5	19.15	19.15
CAT-M1 eFDD 26 QPSK	low	6	1.4	20.38	11.5	11.5	20.22	20.22
CAT-M1 eFDD 26 QPSK	mid	1	1.4	22.36	11.5	11.5	18.24	18.24
CAT-M1 eFDD 26 QPSK	mid	3	1.4	21.39	11.5	11.5	19.21	19.21
CAT-M1 eFDD 26 QPSK	mid	6	1.4	20.49	11.5	11.5	20.11	20.11
CAT-M1 eFDD 26 QPSK	high	1	1.4	22.37	11.5	11.5	18.23	18.23
CAT-M1 eFDD 26 QPSK	high	3	1.4	21.40	11.5	11.5	19.2	19.2
CAT-M1 eFDD 26 QPSK	high	6	1.4	20.41	11.5	11.5	20.19	20.19
CAT-M1 eFDD 26 16QAM	low	1	1.4	21.26	11.5	11.5	19.34	19.34
CAT-M1 eFDD 26 16QAM	low	5	1.4	20.60	11.5	11.5	20	20
CAT-M1 eFDD 26 16QAM	mid	1	1.4	21.01	11.5	11.5	19.59	19.59
CAT-M1 eFDD 26 16QAM	mid	5	1.4	20.73	11.5	11.5	19.87	19.87
CAT-M1 eFDD 26 16QAM	high	1	1.4	21.14	11.5	11.5	19.46	19.46
CAT-M1 eFDD 26 16QAM	high	5	1.4	20.64	11.5	11.5	19.96	19.96

FDD-LTE Band 26(814-824MHz):

Radio Technology	Channel	Resource Blocks	Bandwidth [MHz]	RMS Conducted Power [dBm]	FCC EIRP Limit [W]	IC EIRP Limit [W]	Maximum Antenna Gain FCC [dBi]	Maximum Antenna Gain IC [dBi]
CAT-M1 eFDD 26 QPSK	low	1	1.4	22.56	1	1	7.44	7.44
CAT-M1 eFDD 26 QPSK	low	3	1.4	21.46	1	1	8.54	8.54
CAT-M1 eFDD 26 QPSK	low	6	1.4	20.46	1	1	9.54	9.54
CAT-M1 eFDD 26 QPSK	mid	1	1.4	22.64	1	1	7.36	7.36
CAT-M1 eFDD 26 QPSK	mid	3	1.4	21.54	1	1	8.46	8.46
CAT-M1 eFDD 26 QPSK	mid	6	1.4	20.48	1	1	9.52	9.52
CAT-M1 eFDD 26 QPSK	high	1	1.4	22.57	1	1	7.43	7.43
CAT-M1 eFDD 26 QPSK	high	3	1.4	21.48	1	1	8.52	8.52
CAT-M1 eFDD 26 QPSK	high	6	1.4	20.41	1	1	9.59	9.59
CAT-M1 eFDD 26 16QAM	low	1	1.4	21.17	1	1	8.83	8.83
CAT-M1 eFDD 26 16QAM	low	5	1.4	20.65	1	1	9.35	9.35
CAT-M1 eFDD 26 16QAM	mid	1	1.4	21.19	1	1	8.81	8.81
CAT-M1 eFDD 26 16QAM	mid	5	1.4	20.73	1	1	9.27	9.27
CAT-M1 eFDD 26 16QAM	high	1	1.4	21.26	1	1	8.74	8.74
CAT-M1 eFDD 26 16QAM	high	5	1.4	20.62	1	1	9.38	9.38

Radio Technology	Channel	Resource Blocks / Sub-carrier	Bandwidth [MHz]	RMS Conducted Power [dBm]	FCC EIRP Limit [W]	IC EIRP Limit [W]	Maximum Antenna Gain FCC [dBi]	Maximum Antenna Gain IC [dBi]
CAT-M1 eFDD 2 QPSK	low	1	1.4	22.57	2	2	10.43	10.43
CAT-M1 eFDD 2 QPSK	low	3	1.4	21.42	2	2	11.58	11.58
CAT-M1 eFDD 2 QPSK	low	6	1.4	20.4	2	2	12.6	12.6
CAT-M1 eFDD 2 QPSK	mid	1	1.4	22.43	2	2	10.57	10.57
CAT-M1 eFDD 2 QPSK	mid	3	1.4	21.38	2	2	11.62	11.62
CAT-M1 eFDD 2 QPSK	mid	6	1.4	20.27	2	2	12.73	12.73
CAT-M1 eFDD 2 QPSK	high	1	1.4	22.67	2	2	10.33	10.33
CAT-M1 eFDD 2 QPSK	high	3	1.4	21.48	2	2	11.52	11.52
CAT-M1 eFDD 2 QPSK	high	6	1.4	20.52	2	2	12.48	12.48
CAT-M1 eFDD 2 16QAM	low	1	1.4	20.87	2	2	12.13	12.13
CAT-M1 eFDD 2 16QAM	low	5	1.4	20.62	2	2	12.38	12.38
CAT-M1 eFDD 2 16QAM	mid	1	1.4	20.9	2	2	12.1	12.1
CAT-M1 eFDD 2 16QAM	mid	5	1.4	20.41	2	2	12.59	12.59
CAT-M1 eFDD 2 16QAM	high	1	1.4	21.16	2	2	11.84	11.84
CAT-M1 eFDD 2 16QAM	high	5	1.4	20.64	2	2	12.36	12.36
CAT-M1 eFDD 25 QPSK	low	1	1.4	22.62	2	2	10.38	10.38
CAT-M1 eFDD 25 QPSK	low	3	1.4	21.43	2	2	11.57	11.57
CAT-M1 eFDD 25 QPSK	low	6	1.4	20.42	2	2	12.58	12.58
CAT-M1 eFDD 25 QPSK	mid	1	1.4	22.5	2	2	10.5	10.5
CAT-M1 eFDD 25 QPSK	mid	3	1.4	21.45	2	2	11.55	11.55
CAT-M1 eFDD 25 QPSK	mid	6	1.4	20.38	2	2	12.62	12.62
CAT-M1 eFDD 25 QPSK	high	1	1.4	22.59	2	2	10.41	10.41
CAT-M1 eFDD 25 QPSK	high	3	1.4	21.52	2	2	11.48	11.48
CAT-M1 eFDD 25 QPSK	high	6	1.4	20.37	2	2	12.63	12.63
CAT-M1 eFDD 25 16QAM	low	1	1.4	20.89	2	2	12.11	12.11
CAT-M1 eFDD 25 16QAM	low	5	1.4	20.53	2	2	12.47	12.47
CAT-M1 eFDD 25 16QAM	mid	1	1.4	20.88	2	2	12.12	12.12
CAT-M1 eFDD 25 16QAM	mid	5	1.4	20.55	2	2	12.45	12.45
CAT-M1 eFDD 25 16QAM	high	1	1.4	20.95	2	2	12.05	12.05
CAT-M1 eFDD 25 16QAM	high	5	1.4	20.61	2	2	12.39	12.39

Radio Technology	Channel	Res- source Blocks	Band- width [MHz]	RMS Conducted Power (dBm)	FCC EIRP Limit (W)	IC EIRP Limit (W)	Maximum Antenna Gain FCC (dBi)	Maximum Antenna Gain IC (dBi)
CAT-M1 eFDD 4 QPSK	low	1	1.4	23.17	1	1	6.83	6.83
CAT-M1 eFDD 4 QPSK	low	3	1.4	21.91	1	1	8.09	8.09
CAT-M1 eFDD 4 QPSK	low	6	1.4	20.35	1	1	9.65	9.65
CAT-M1 eFDD 4 QPSK	mid	1	1.4	22.93	1	1	7.07	7.07
CAT-M1 eFDD 4 QPSK	mid	3	1.4	21.63	1	1	8.37	8.37
CAT-M1 eFDD 4 QPSK	mid	6	1.4	20.24	1	1	9.76	9.76
CAT-M1 eFDD 4 QPSK	high	1	1.4	23.00	1	1	7	7
CAT-M1 eFDD 4 QPSK	high	3	1.4	21.68	1	1	8.32	8.32
CAT-M1 eFDD 4 QPSK	high	6	1.4	20.61	1	1	9.39	9.39
CAT-M1 eFDD 4 16QAM	low	1	1.4	21.30	1	1	8.7	8.7
CAT-M1 eFDD 4 16QAM	low	5	1.4	20.45	1	1	9.55	9.55
CAT-M1 eFDD 4 16QAM	mid	1	1.4	21.03	1	1	8.97	8.97
CAT-M1 eFDD 4 16QAM	mid	5	1.4	20.40	1	1	9.6	9.6
CAT-M1 eFDD 4 16QAM	high	1	1.4	21.32	1	1	8.68	8.68
CAT-M1 eFDD 4 16QAM	high	5	1.4	20.77	1	1	9.23	9.23
CAT-M1 eFDD 12 QPSK	low	1	1.4	22.21	1	1	7.79	7.79
CAT-M1 eFDD 12 QPSK	low	3	1.4	20.94	1	1	9.06	9.06
CAT-M1 eFDD 12 QPSK	low	6	1.4	20.14	1	1	9.86	9.86
CAT-M1 eFDD 12 QPSK	mid	1	1.4	22.13	1	1	7.87	7.87
CAT-M1 eFDD 12 QPSK	mid	3	1.4	21.15	1	1	8.85	8.85
CAT-M1 eFDD 12 QPSK	mid	6	1.4	20.06	1	1	9.94	9.94
CAT-M1 eFDD 12 QPSK	high	1	1.4	22.12	1	1	7.88	7.88
CAT-M1 eFDD 12 QPSK	high	3	1.4	21.11	1	1	8.89	8.89
CAT-M1 eFDD 12 QPSK	high	6	1.4	20.09	1	1	9.91	9.91
CAT-M1 eFDD 12 16QAM	low	1	1.4	20.77	1	1	9.23	9.23
CAT-M1 eFDD 12 16QAM	low	5	1.4	20.35	1	1	9.65	9.65
CAT-M1 eFDD 12 16QAM	mid	1	1.4	20.66	1	1	9.34	9.34
CAT-M1 eFDD 12 16QAM	mid	5	1.4	20.31	1	1	9.69	9.69
CAT-M1 eFDD 12 16QAM	high	1	1.4	20.35	1	1	9.65	9.65
CAT-M1 eFDD 12 16QAM	high	5	1.4	20.31	1	1	9.69	9.69
CAT-M1 eFDD 13 QPSK	low	1	1.4	22.59	3	3	12.18	12.18
CAT-M1 eFDD 13 QPSK	low	3	1.4	21.47	3	3	13.3	13.3
CAT-M1 eFDD 13 QPSK	low	6	1.4	20.26	3	3	14.51	14.51
CAT-M1 eFDD 13 QPSK	mid	1	1.4	22.62	3	3	12.15	12.15
CAT-M1 eFDD 13 QPSK	mid	3	1.4	21.48	3	3	13.29	13.29
CAT-M1 eFDD 13 QPSK	mid	6	1.4	20.27	3	3	14.5	14.5
CAT-M1 eFDD 13 QPSK	high	1	1.4	22.6	3	3	12.17	12.17
CAT-M1 eFDD 13 QPSK	high	3	1.4	21.46	3	3	13.31	13.31
CAT-M1 eFDD 13 QPSK	high	6	1.4	20.17	3	3	14.6	14.6
CAT-M1 eFDD 13 16QAM	low	1	1.4	20.77	3	3	14	14
CAT-M1 eFDD 13 16QAM	low	5	1.4	20.44	3	3	14.33	14.33
CAT-M1 eFDD 13 16QAM	mid	1	1.4	20.95	3	3	13.82	13.82
CAT-M1 eFDD 13 16QAM	mid	5	1.4	20.55	3	3	14.22	14.22
CAT-M1 eFDD 13 16QAM	high	1	1.4	20.98	3	3	13.79	13.79
CAT-M1 eFDD 13 16QAM	high	5	1.4	20.51	3	3	14.26	14.26

Radio Technology	Channel	Resource Blocks	Bandwidth [MHz]	RMS Cond. Power (dBm)	FCC EIRP Limit	IC EIRP Limit	Max. Antenna Gain FCC (dBi)	Max. Antenna Gain IC (dBi)
CAT-M1 eFDD 66 QPSK	low	1	1.4	23.37	1 (EIRP)	1 (EIRP)	6.63	6.63
CAT-M1 eFDD 66 QPSK	low	3	1.4	22.29	1 (EIRP)	1 (EIRP)	7.71	7.71
CAT-M1 eFDD 66 QPSK	low	6	1.4	21.40	1 (EIRP)	1 (EIRP)	8.6	8.6
CAT-M1 eFDD 66 QPSK	mid	1	1.4	23.79	1 (EIRP)	1 (EIRP)	6.21	6.21
CAT-M1 eFDD 66 QPSK	mid	3	1.4	22.47	1 (EIRP)	1 (EIRP)	7.53	7.53
CAT-M1 eFDD 66 QPSK	mid	6	1.4	21.62	1 (EIRP)	1 (EIRP)	8.38	8.38
CAT-M1 eFDD 66 QPSK	high	1	1.4	23.77	1 (EIRP)	1 (EIRP)	6.23	6.23
CAT-M1 eFDD 66 QPSK	high	3	1.4	22.45	1 (EIRP)	1 (EIRP)	7.55	7.55
CAT-M1 eFDD 66 QPSK	high	6	1.4	21.58	1 (EIRP)	1 (EIRP)	8.42	8.42
CAT-M1 eFDD 66 16QAM	low	1	1.4	21.85	1 (EIRP)	1 (EIRP)	8.15	8.15
CAT-M1 eFDD 66 16QAM	low	5	1.4	21.56	1 (EIRP)	1 (EIRP)	8.44	8.44
CAT-M1 eFDD 66 16QAM	mid	1	1.4	22.20	1 (EIRP)	1 (EIRP)	7.8	7.8
CAT-M1 eFDD 66 16QAM	mid	5	1.4	21.78	1 (EIRP)	1 (EIRP)	8.22	8.22
CAT-M1 eFDD 66 16QAM	high	1	1.4	22.12	1 (EIRP)	1 (EIRP)	7.88	7.88
CAT-M1 eFDD 66 16QAM	high	5	1.4	21.74	1 (EIRP)	1 (EIRP)	8.26	8.26

**Remark:**

- Per KDB941225 D05 v02r05, Start with the largest channel bandwidth then measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle, and lower edge of each required test channel. When the reported SAR is  $\leq 0.8$  W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. 6 When the reported SAR of a required test channel is  $> 1.45$  W/kg, SAR is required for all three RB offset configurations for that required test channel.
- Per KDB941225 D05 v02r05, The procedures required for 1 RB allocation in 5.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.
- Per KDB941225 D05 v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations, and the highest reported SAR for 1 RB and 50% RB allocation in 5.2.1 and 5.2.2 are  $\leq 0.8$  W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is  $> 1.45$  W/kg, the remaining required test channels must also be tested.
- Per KDB941225 D05 v02r05, For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in 5.2.1, 5.2.2, and 5.2.3 to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is  $> \frac{1}{2}$  dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is  $> 1.45$  W/kg.

Bluetooth - Maximum Average Power					
Test Mode	Data Rate	Channel	Frequency (MHz)	Average Power (dBm)	Tune-up power (dBm)
BLE	1Mbps	CH 00	2402	9.9	10.0
		CH 19	2440	10.0	10.5
		CH 39	2480	10.0	10.5

**Remark:**

The LTE CAT-M1 Band 2, 4, 5, 12, 13, 25, 26 Output power are provided by FCC ID: XPYUBX19KM01.

The LTE CAT-M1 Band 66 Output power is provided by FCC ID: XPYUBX19KM01 (C2PC).

The BLE Output power is provided by FCC ID: 2ATA2-BT1.

## 9.2 Test Results for Standalone SAR Test

### Limb SAR

LTE CAT-M1 Band 2–Limb SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR <sub>10g</sub> (W/kg)	Scaled SAR <sub>10g</sub> (W/kg)
	Modulation, Bandwidth, RB		MHz					
1.	QPSK 1.4MHz 1RB	Front Face	1909.3	22.67	23.0	1.079	1.103	<b>1.190</b>
	QPSK 1.4MHz 1RB	Left Side	1909.3	22.67	23.0	1.079	0.463	0.500
	QPSK 1.4MHz 50%RB	Front Face	1909.3	22.67	23.0	1.079	0.968	1.044
	QPSK 1.4MHz 50%RB	Left Side	1909.3	22.67	23.0	1.079	0.216	0.233

LTE CAT-M1 Band 4–Limb SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR <sub>10g</sub> (W/kg)	Scaled SAR <sub>10g</sub> (W/kg)
	Modulation, Bandwidth, RB		MHz					
2.	QPSK 1.4MHz 1RB	Front Face	1710.7	23.17	23.5	1.079	1.501	<b>1.619</b>
	QPSK 1.4MHz 1RB	Left Side	1710.7	23.17	23.5	1.079	0.460	0.496
	QPSK 1.4MHz 50%RB	Front Face	1710.7	23.17	23.5	1.079	1.153	1.244
	QPSK 1.4MHz 50%RB	Left Side	1710.7	23.17	23.5	1.079	0.268	0.289

LTE CAT-M1 Band 5–Limb SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR <sub>10g</sub> (W/kg)	Scaled SAR <sub>10g</sub> (W/kg)
	Modulation, Bandwidth, RB		MHz					
3.	QPSK 1.4MHz 1RB	Front Face	824.7	23.0	23.5	1.122	0.838	<b>0.940</b>
	QPSK 1.4MHz 1RB	Left Side	824.7	23.0	23.5	1.122	0.146	0.164
	QPSK 1.4MHz 50%RB	Front Face	824.7	23.0	23.5	1.122	0.742	0.833
	QPSK 1.4MHz 50%RB	Left Side	824.7	23.0	23.5	1.122	0.098	0.110

LTE CAT-M1 Band 12–Limb SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR <sub>10g</sub> (W/kg)	Scaled SAR <sub>10g</sub> (W/kg)
	Modulation, Bandwidth, RB		MHz					
4.	QPSK 1.4MHz 1RB	Front Face	699.7	22.21	22.5	1.069	1.449	<b>1.549</b>
	QPSK 1.4MHz 1RB	Left Side	699.7	22.21	22.5	1.069	0.325	0.347
	QPSK 1.4MHz 50%RB	Front Face	699.7	22.21	22.5	1.069	1.035	1.106
	QPSK 1.4MHz 50%RB	Left Side	699.7	22.21	22.5	1.069	0.233	0.249

LTE CAT-M1 Band 13–Limb SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR <sub>10g</sub> (W/kg)	Scaled SAR <sub>10g</sub> (W/kg)
	Modulation, Bandwidth, RB		MHz					
5.	QPSK 1.4MHz 1RB	Front Face	780.3	22.62	23.0	1.091	0.776	<b>0.847</b>
	QPSK 1.4MHz 1RB	Left Side	780.3	22.62	23.0	1.091	0.174	0.190
	QPSK 1.4MHz 50%RB	Front Face	780.3	22.62	23.0	1.091	0.637	0.695
	QPSK 1.4MHz 50%RB	Left Side	780.3	22.62	23.0	1.091	0.085	0.093

LTE CAT-M1 Band 25–Limb SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR <sub>10g</sub> (W/kg)	Scaled SAR <sub>10g</sub> (W/kg)
	Modulation, Bandwidth, RB		MHz					
6.	QPSK 1.4MHz 1RB	Front Face	1850.7	22.62	23.0	1.091	0.717	<b>0.783</b>
	QPSK 1.4MHz 1RB	Left Side	1850.7	22.62	23.0	1.091	0.256	0.279
	QPSK 1.4MHz 50%RB	Front Face	1850.7	22.62	23.0	1.091	0.609	0.665
	QPSK 1.4MHz 50%RB	Left Side	1850.7	22.62	23.0	1.091	0.169	0.184

LTE CAT-M1 Band 26(814-824MHz)–Limb SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR <sub>10g</sub> (W/kg)	Scaled SAR <sub>10g</sub> (W/kg)
	Modulation, Bandwidth, RB		MHz					
7.	QPSK 1.4MHz 1RB	Front Face	814.7	22.64	23.0	1.086	0.807	<b>0.877</b>
	QPSK 1.4MHz 1RB	Left Side	814.7	22.64	23.0	1.086	0.176	0.191
	QPSK 1.4MHz 50%RB	Front Face	814.7	22.64	23.0	1.086	0.721	0.783
	QPSK 1.4MHz 50%RB	Left Side	814.7	22.64	23.0	1.086	0.102	0.111

LTE CAT-M1 Band 26(824-849MHz)–Limb SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR <sub>10g</sub> (W/kg)	Scaled SAR <sub>10g</sub> (W/kg)
	Modulation, Bandwidth, RB		MHz					
8.	QPSK 1.4MHz 1RB	Front Face	836.5	22.57	23.0	1.104	0.881	<b>0.973</b>
	QPSK 1.4MHz 1RB	Left Side	836.5	22.57	23.0	1.104	0.245	0.270
	QPSK 1.4MHz 50%RB	Front Face	836.5	22.57	23.0	1.104	0.806	0.890
	QPSK 1.4MHz 50%RB	Left Side	836.5	22.57	23.0	1.104	0.181	0.200

LTE Band CAT-M1 66–Limb SAR Test (Gap: 0mm)								
Plot No.	Mode	Test Position Body	Frequency	Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR <sub>10g</sub> (W/kg)	Scaled SAR <sub>10g</sub> (W/kg)
	Modulation, Bandwidth, RB		MHz					
9.	QPSK 1.4MHz 1RB	Front Face	1745	23.79	24.0	1.050	0.891	<b>0.935</b>
	QPSK 1.4MHz 1RB	Left Side	1745	23.79	24.0	1.050	0.448	0.470
	QPSK 1.4MHz 50%RB	Front Face	1745	23.79	24.0	1.050	0.701	0.736
	QPSK 1.4MHz 50%RB	Left Side	1745	23.79	24.0	1.050	0.234	0.246

Bluetooth –Limb SAR Test(Gap: 0mm)									
Plot No.	Mode	Test Position Body	Frequency		Output Power (dBm)	Rated Limit (dBm)	Scaling Factor	SAR <sub>10g</sub> (W/kg)	Scaled SAR <sub>10g</sub> (W/kg)
			CH.	MHz					
10.	Bluetooth	Front Face	19	2440	10.0	10.5	1.122	0.031	<b>0.035</b>
	Bluetooth	Right Side	19	2440	10.0	10.5	1.122	0.023	0.026
	Bluetooth	Front Face	39	2480	10.0	10.5	1.122	0.029	0.033
	Bluetooth	Right Side	39	2480	10.0	10.5	1.122	0.025	0.028



### 9.3 Simultaneous Multi-band Transmission SAR Analysis

#### List of Mode for Simultaneous Multi-band Transmission

No.	Configurations	Limb SAR
1	LTE CAT-M1 (Voice/Data) + Bluetooth(Data)	Yes

#### Remark:

The maximum SAR summation is calculated based on the same configuration and test position.

#### WWAN and Bluetooth

Position	WWAN		Bluetooth	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Back	LTE CAT-M1	--	--	--
Front	LTE CAT-M1	<b>1.619</b>	<b>0.035</b>	<b>1.654</b>
Right side	LTE CAT-M1	--	0.028	0.028
Left side	LTE CAT-M1	0.500	--	0.500
Top side	LTE CAT-M1	--	--	--
Bottom side	LTE CAT-M1	--	--	--

## 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
<b>Measurement System</b>									
Probe calibration	E.2.1	7.0	N		1	1	7.00	7.00	
Axial Isotropy	E.2.2	2.5	R		$(1_{-Cp})^{1/2}$	$(1_{-Cp})^{1/2}$	1.02	1.02	
Hemispherical Isotropy	E.2.2	4.0	R		$(Cp)^{1/2}$	$(Cp)^{1/2}$	1.63	1.63	
Boundary effect	E.2.3	1.0	R		1	1	0.58	0.58	
Linearity	E.2.4	5.0	R		1	1	2.89	2.89	
System detection limits	E.2.5	1.0	R		1	1	0.58	0.58	
Readout Electronics	E.2.6	0.02	N		1	1	0.02	0.02	
Reponse Time	E.2.7	3.0	R		1	1	1.73	1.73	
Integration Time	E.2.8	2.0	R		1	1	1.15	1.15	
RF ambient Conditions -	E.6.1	0	R		1	1	1.73	1.73	
RF ambient Conditions - Reflections	E.6.1	0	R		1	1	1.73	1.73	
Probe positioner Mechanical Tolerance	E.6.2	2.0	R		1	1	1.15	1.15	
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R		1	1	0.03	0.03	
Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	E.5	5.0	R		1	1	2.89	2.89	
<b>Test Sample Related</b>									
Test sample positioning	E.4.2	0.03	N		1	1	0.03	0.03	
Device Holder Uncertainty	E.4.1	5.00	N		1	1	5.00	5.00	
Output power Variation - SAR drift measurement	E.2.9	12.02	R		1	1	6.94	6.94	
SAR scaling	E6.5	0.0	R		1	1	0.0	0.0	
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R		1	1	0.03	0.03	

Uncertainty in SAR correction for deviations in permittivity and conductivity	E3.2	1.9	R		1	0.84	1.10	0.90	
Liquid conductivity - deviation from target value	E.3.2	5.00	R		0.64	0.43	1.85	1.24	
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N		0.64	0.43	3.20	2.15	
Liquid permittivity - deviation from target value	E.3.2	0.37	R		0.6	0.49	0.13	0.10	
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N		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: 7 minutes 21 seconds

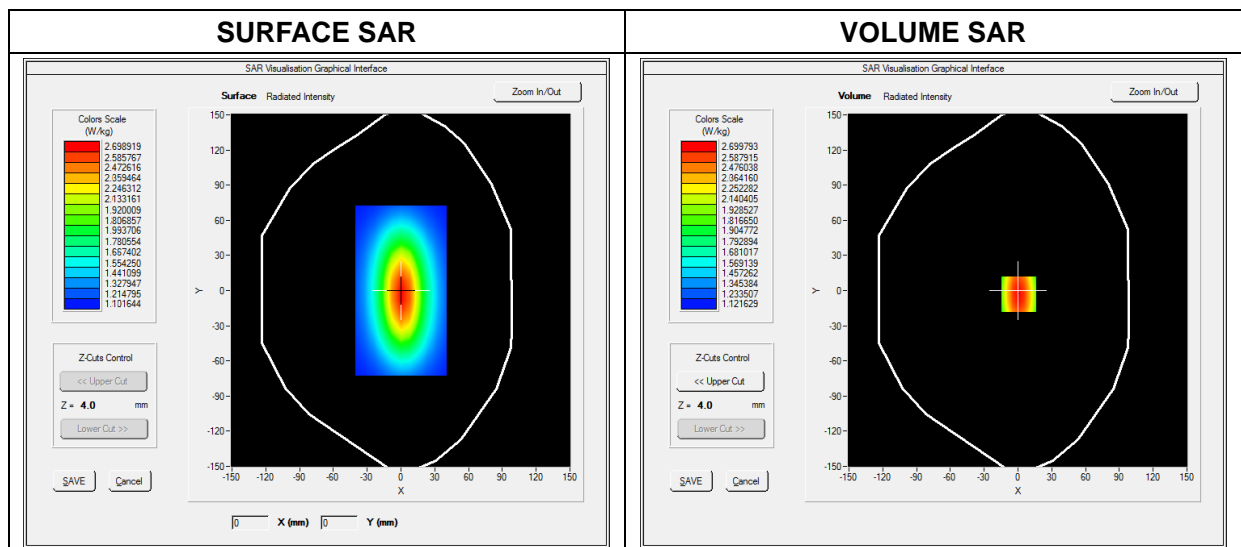
E-field Probe: SSE2 - SN 18/21 EPGO356; ConvF: 1.76; Calibrated: 2022-07-08

### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=5mm dy=5mm dz=4mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW750
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	750.000000
<b>Relative Permittivity (real part)</b>	54.660138
<b>Conductivity (S/m)</b>	0.944252
<b>Power Variation (%)</b>	0.030000
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2

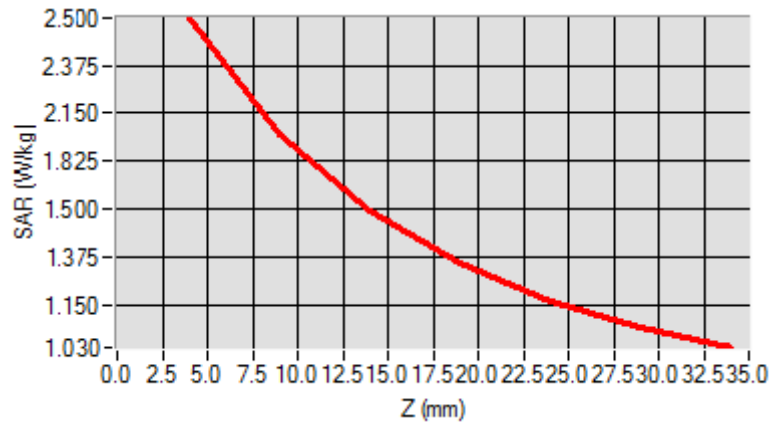


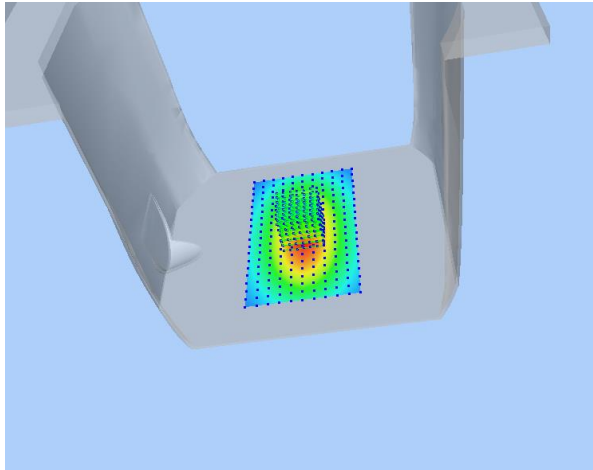
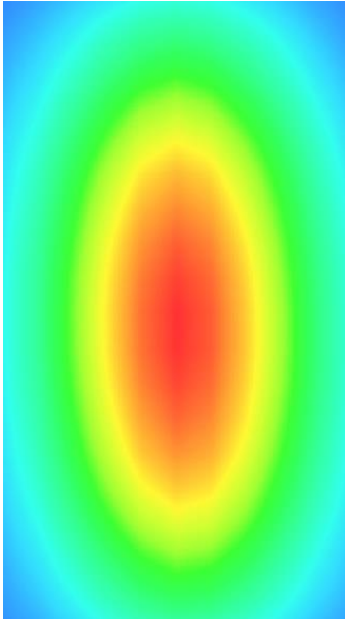
Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	1.342744
SAR 1g (W/Kg)	2.064534

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	2.3634	1.8023	1.4523	1.2514	1.1005	1.0245



3D screen shot	Hot spot position
	

# MEASUREMENT 2

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 7 minutes 21 seconds

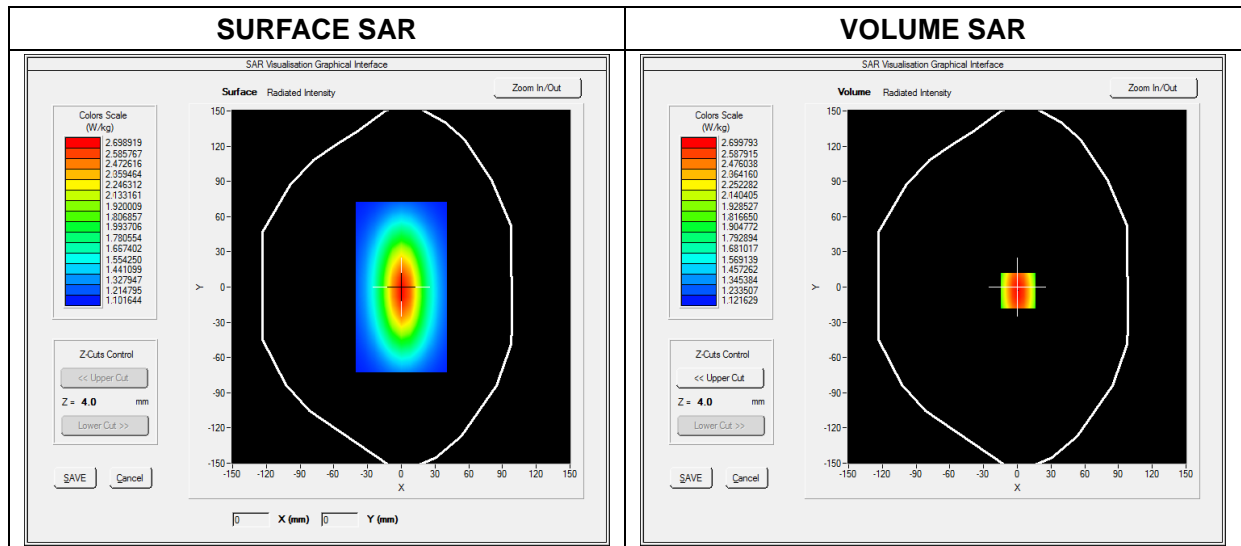
E-field Probe: SSE2 - SN 18/21 EPGO356; ConvF: 1.78; Calibrated: 2022-07-08

## A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=5mm dy=5mm dz=4mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW835
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	835.000000
<b>Relative Permittivity (real part)</b>	53.852245
<b>Conductivity (S/m)</b>	0.961245
<b>Power Variation (%)</b>	0.428437
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2

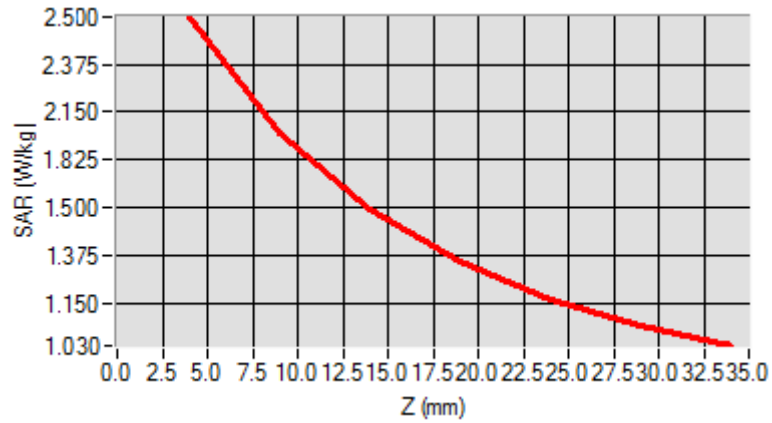


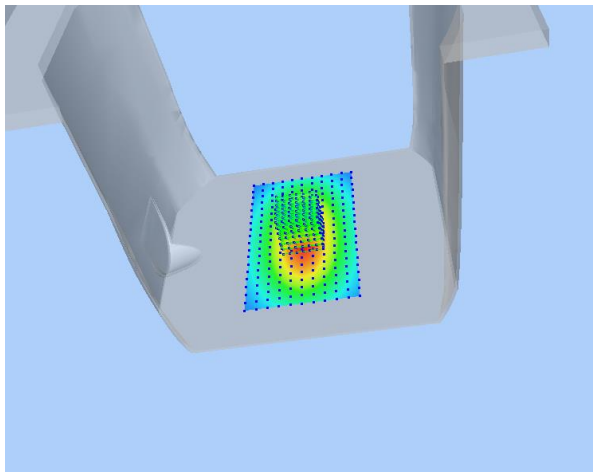
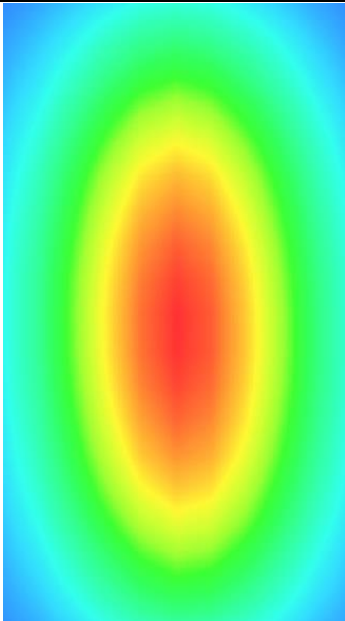
Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	1.519489
SAR 1g (W/Kg)	2.511253

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	2.4900	1.8942	1.4811	1.3541	1.1123	1.0539



3D screen shot	Hot spot position
	

# MEASUREMENT 3

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 12 minutes 21 seconds

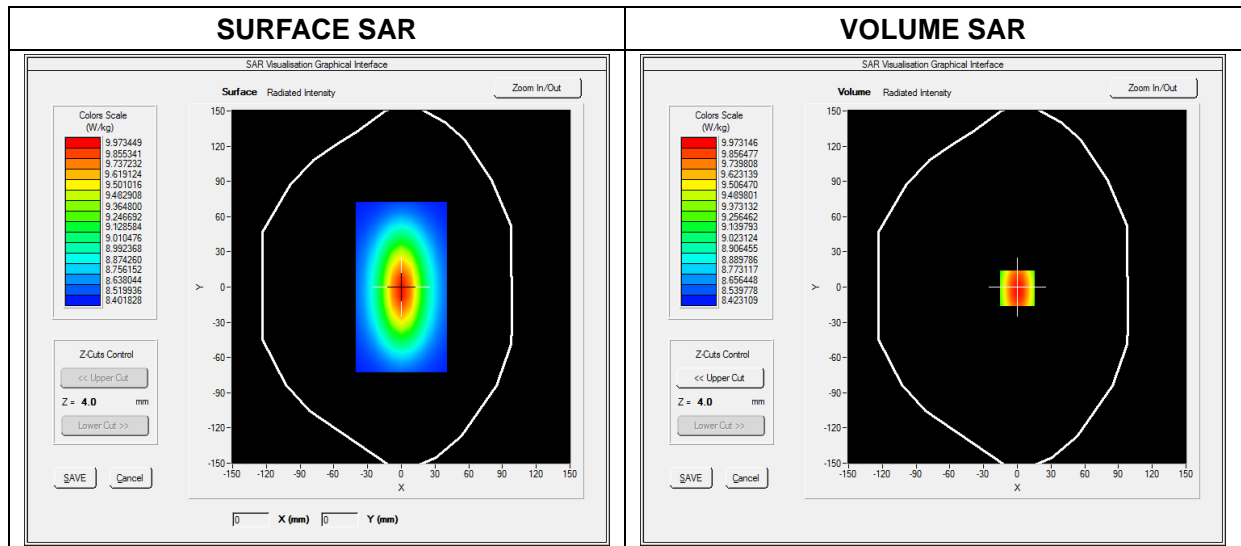
E-field Probe: SSE2 - SN 18/21 EPG0356; ConvF: 2.15; Calibrated: 2022-07-08

## A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=5mm dy=5mm dz=4mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW1800
<b>Signal</b>	CW (Crest factor: 1.0)

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	1800.000000
<b>Relative Permittivity (real part)</b>	53.362090
<b>Conductivity (S/m)</b>	1.532510
<b>Power Variation (%)</b>	1.041232
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2



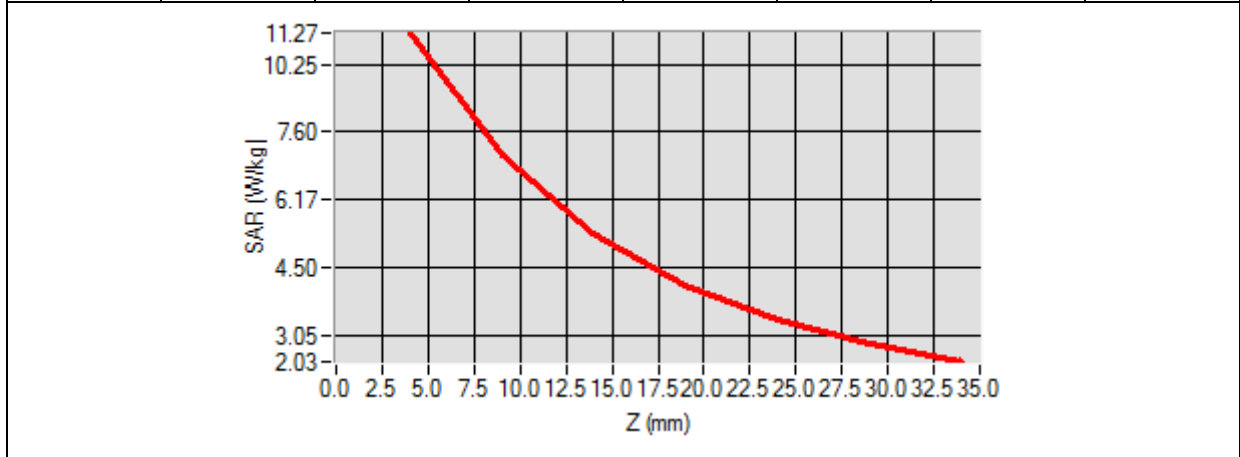


Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	5.081252
SAR 1g (W/Kg)	9.461217

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	10.3455	7.1125	5.1026	3.425	3.0242	2.1125



3D screen shot	Hot spot position

# MEASUREMENT 4

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 12 minutes 21 seconds

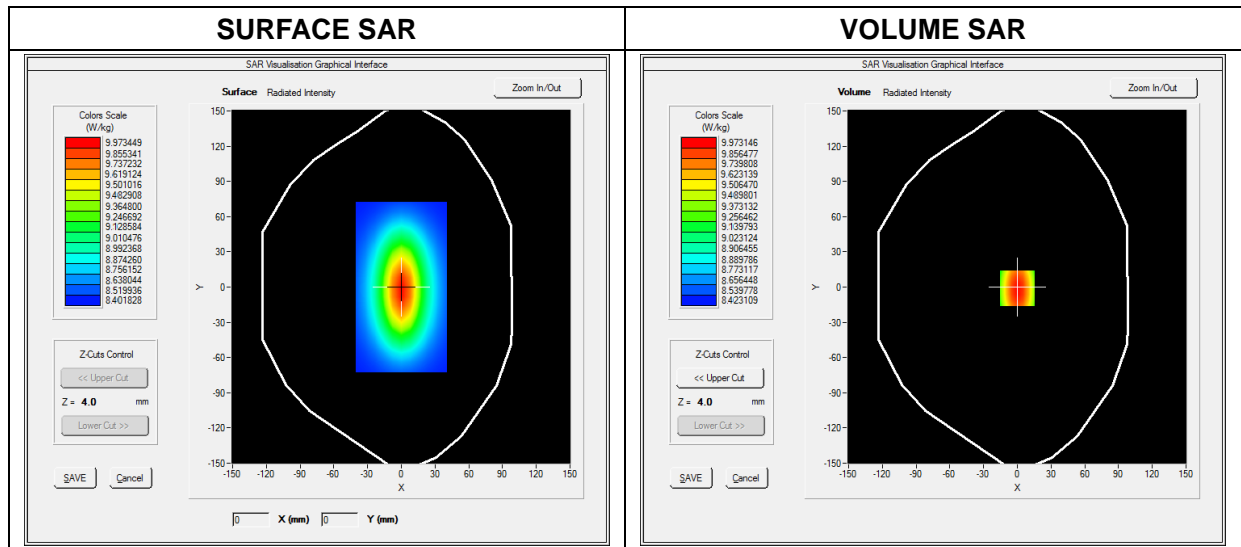
E-field Probe: SSE2 - SN 18/21 EPGO356; ConvF: 2.30; Calibrated: 2022-07-08

## A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=5mm dy=5mm dz=4mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW1900
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	1900.000000
<b>Relative Permittivity (real part)</b>	52.420124
<b>Conductivity (S/m)</b>	1.503607
<b>Power Variation (%)</b>	1.022540
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2

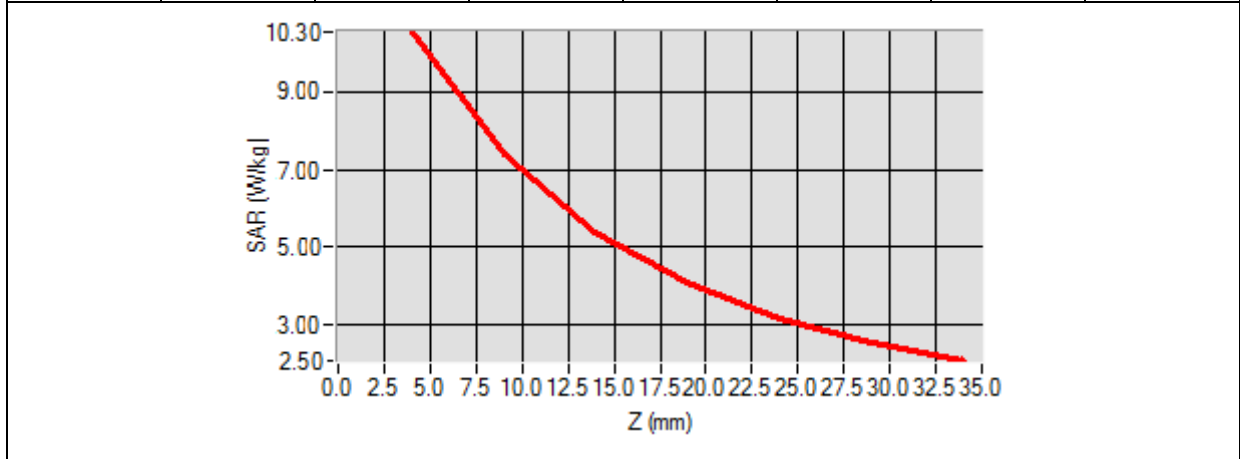


Maximum location: X=0.00, Y=0.00

SAR 10g (W/Kg)	5.174526
SAR 1g (W/Kg)	9.913214

Z Axis Scan

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.0000	10.2354	6.8400	5.0121	4.1189	3.0522	2.8424



3D screen shot	Hot spot position

# MEASUREMENT 5

Type: Validation measurement (Fast, 75.00 %)

Measurement duration: 12 minutes 21 seconds

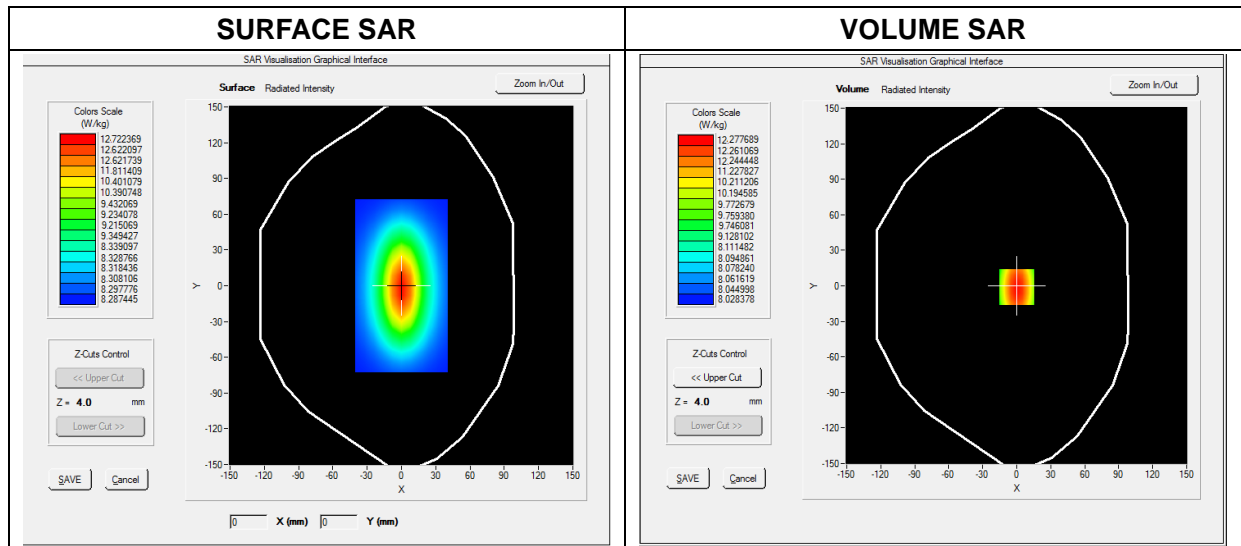
E-field Probe: SSE2 - SN 18/21 EPGO356; ConvF: 2.60; Calibrated: 2022-07-08

## A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=5mm dy=5mm dz=4mm
<b>Phantom</b>	Validation plane
<b>Device Position</b>	Dipole
<b>Band</b>	CW2450
<b>Signal</b>	CW (Crest factor: 1.0)

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	2450.000000
<b>Relative Permittivity (real part)</b>	51.243275
<b>Conductivity (S/m)</b>	1.962148
<b>Power Variation (%)</b>	-1.050000
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2

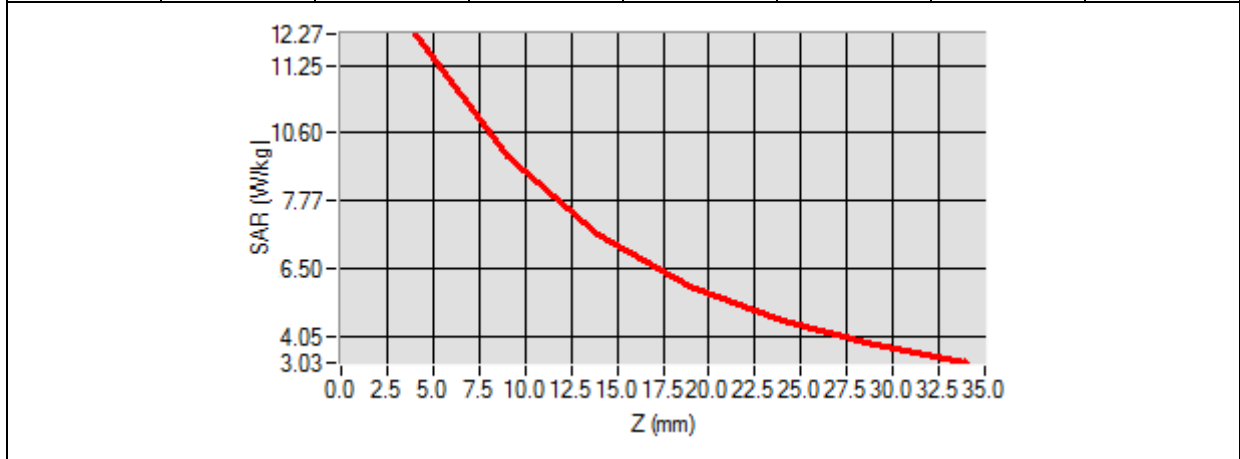


**Maximum location: X=0.00, Y=0.00**

<b>SAR 10g (W/Kg)</b>	<b>5.821735</b>
<b>SAR 1g (W/Kg)</b>	<b>13.031201</b>

**Z Axis Scan**

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>9.00</b>	<b>14.00</b>	<b>19.00</b>	<b>24.00</b>	<b>29.00</b>
<b>SAR (W/Kg)</b>	<b>0.0000</b>	<b>12.2365</b>	<b>10.3321</b>	<b>8.4512</b>	<b>6.4365</b>	<b>5.6123</b>	<b>3.5621</b>



<b>3D screen shot</b>	<b>Hot spot position</b>
<p>A 3D perspective view of a grey, L-shaped device. A rectangular area on the inner surface is highlighted with a color-coded grid, showing a hot spot in red and yellow, transitioning to green and blue towards the edges.</p>	<p>A 2D heatmap showing the spatial distribution of SAR. The central region is colored red, indicating the highest SAR values, surrounded by concentric rings of yellow, green, and cyan, indicating decreasing SAR values towards the periphery.</p>

## Annex B. Plots of SAR Measurement

# MEASUREMENT 1

Type: Phone measurement (Complete)

Date of measurement: 2022-08-19

Measurement duration: 12 minutes 3 seconds

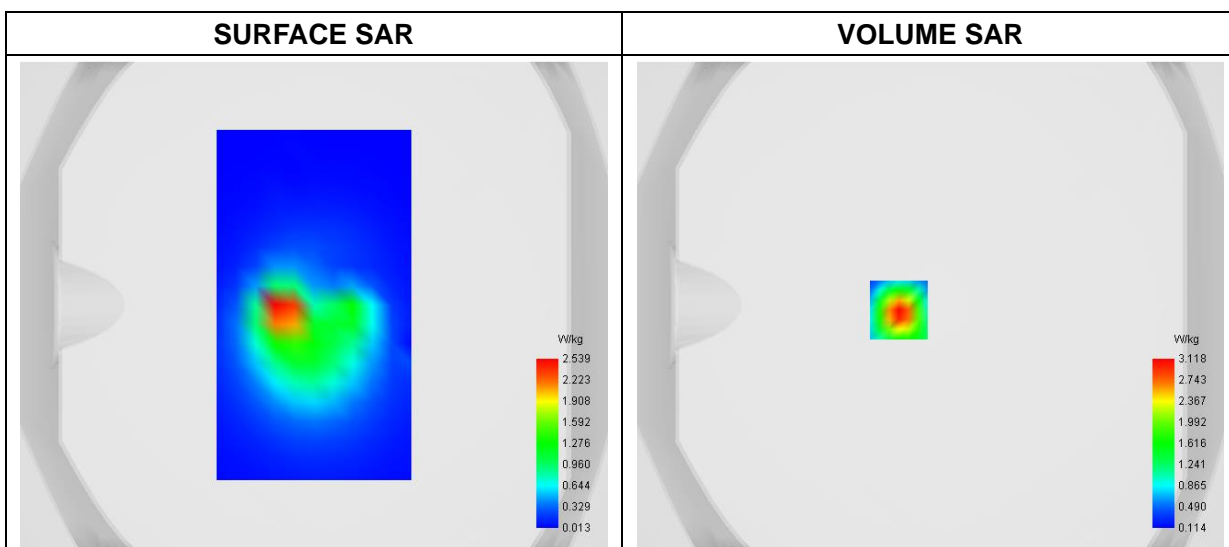
### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Front
Band	LTE CAT-M1 Band 2
Channels	QPSK, 1.4MHz, 1RB, High
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

Frequency (MHz)	1909.300000
Relative Permittivity (real part)	52.421248
Conductivity (S/m)	1.505369
Power Variation (%)	-1.340000
Ambient Temperature	22.2
Liquid Temperature	22.2

### C. SAR Surface and Volume



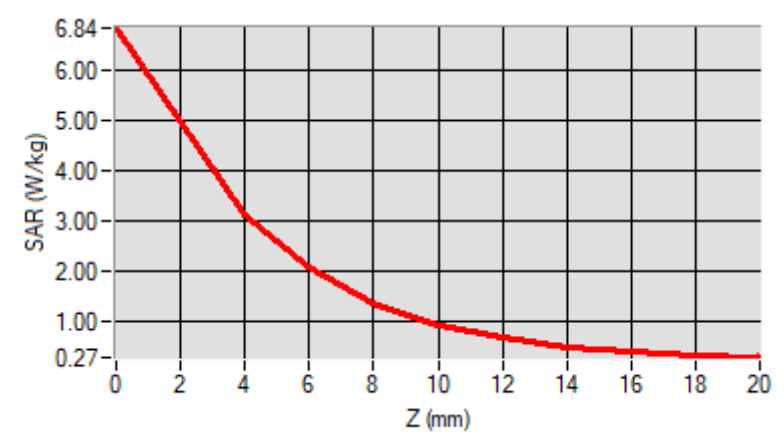
Maximum location: X=-13.00, Y=-2.00

D. SAR 1g & 10g

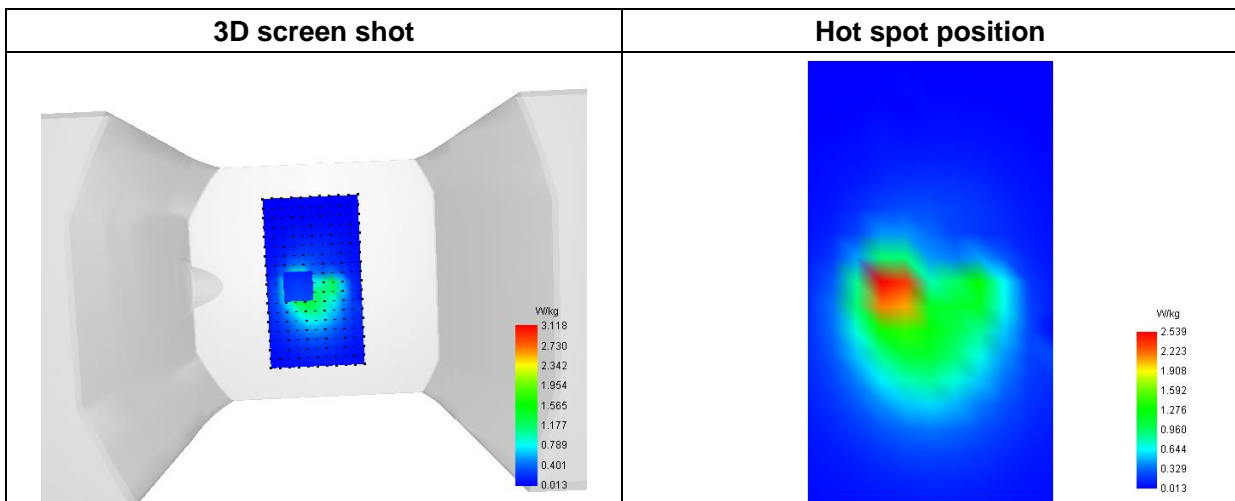
SAR 10g (W/Kg)	1.102686
SAR 1g (W/Kg)	2.790381

E. Z Axis Scan

Z (mm)	0.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00
SAR (W/Kg)	6.8413	3.1180	2.0568	1.3534	0.9157	0.6467	0.4821	0.3803	0.3141



F. 3D Image



# MEASUREMENT 2

Type: Phone measurement (Complete)  
 Date of measurement: 2022-08-19  
 Measurement duration: 12 minutes 3 seconds

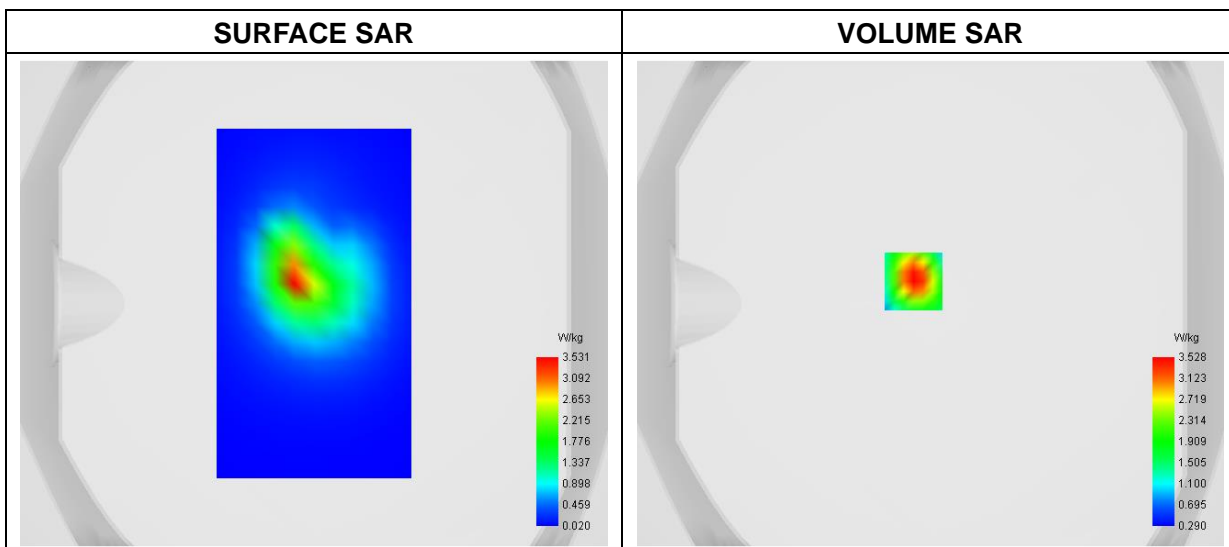
### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=4mm dy=4mm dz=2mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Front
<b>Band</b>	LTE CAT-M1 Band 4
<b>Channels</b>	QPSK, 1.4MHz, 1RB, Low
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	1710.700000
<b>Relative Permittivity (real part)</b>	53.362275
<b>Conductivity (S/m)</b>	1.532987
<b>Power Variation (%)</b>	1.080000
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2

### C. SAR Surface and Volume





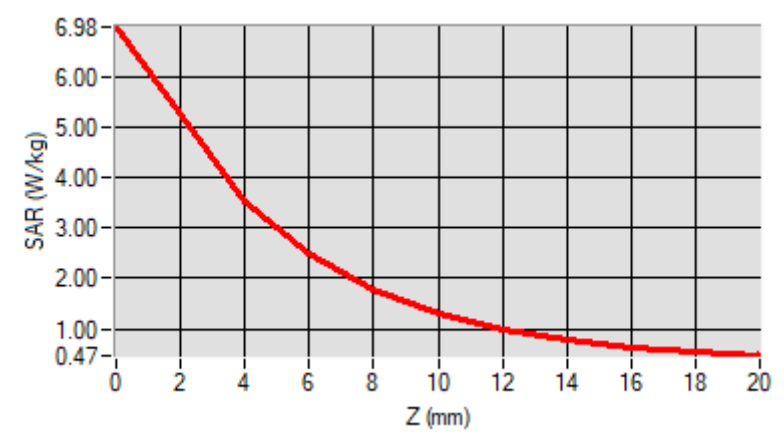
Maximum location: X=-7.00, Y=9.00

D. SAR 1g & 10g

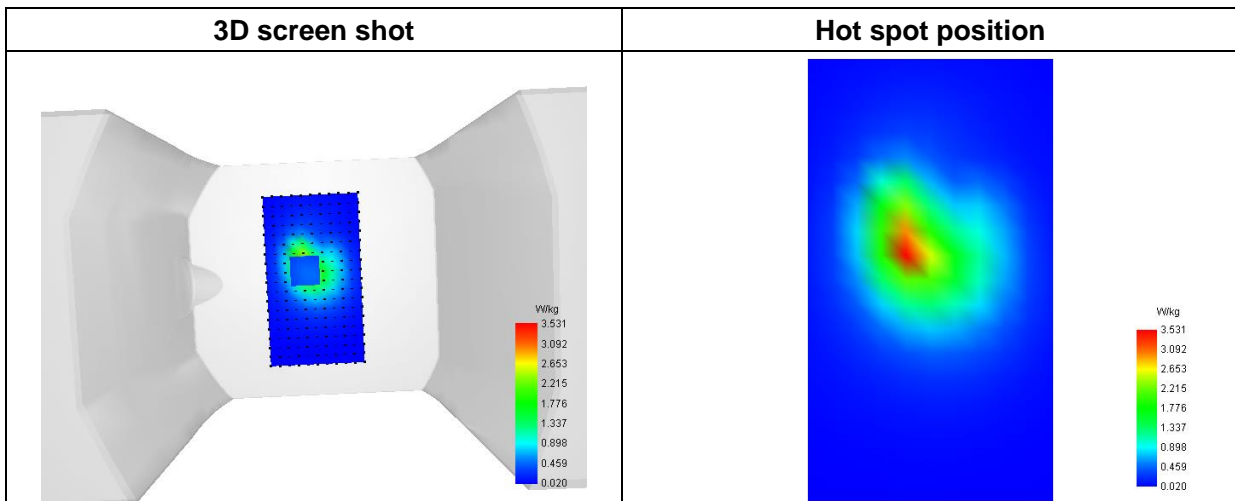
SAR 10g (W/Kg)	1.500521
SAR 1g (W/Kg)	3.238707

E. Z Axis Scan

Z (mm)	0.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00
SAR (W/Kg)	6.9765	3.5282	2.4947	1.7758	1.3014	0.9897	0.7843	0.6463	0.5485



F. 3D Image



# MEASUREMENT 3

Type: Phone measurement (Complete)  
 Date of measurement: 2022-08-19  
 Measurement duration: 12 minutes 3 seconds

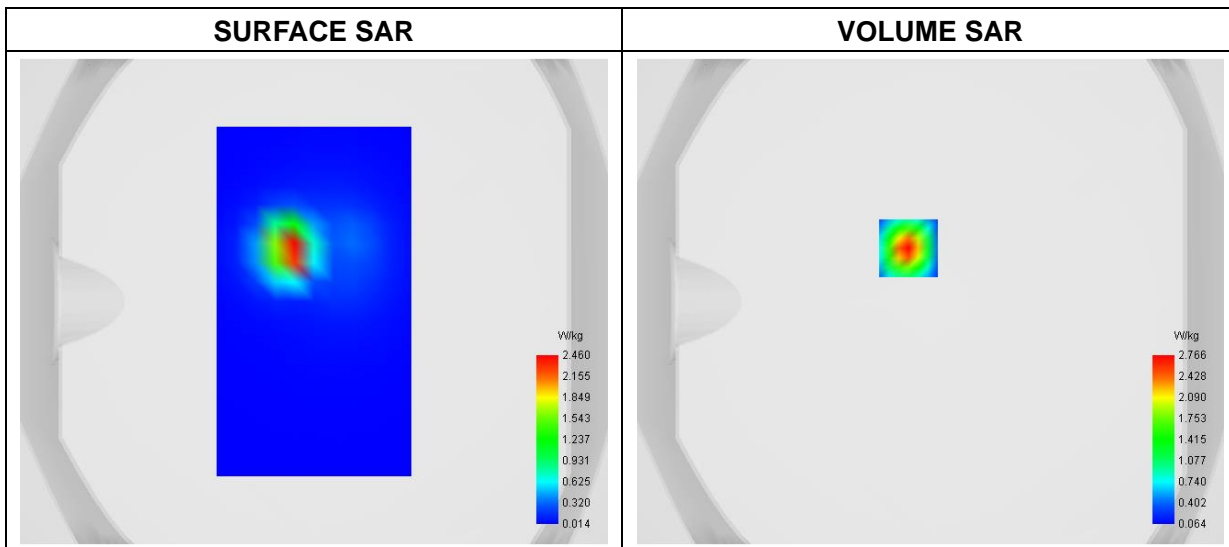
### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=4mm dy=4mm dz=2mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Front
<b>Band</b>	LTE CAT-M1 Band 5
<b>Channels</b>	QPSK, 1.4MHz, 1RB, Low
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	824.700000
<b>Relative Permittivity (real part)</b>	53.850245
<b>Conductivity (S/m)</b>	0.961245
<b>Power Variation (%)</b>	-0.870000
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2

### C. SAR Surface and Volume



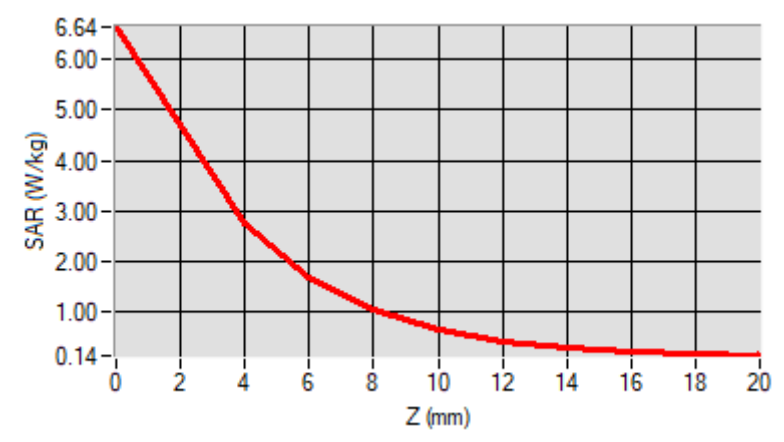
Maximum location: X=-9.00, Y=22.00

D. SAR 1g & 10g

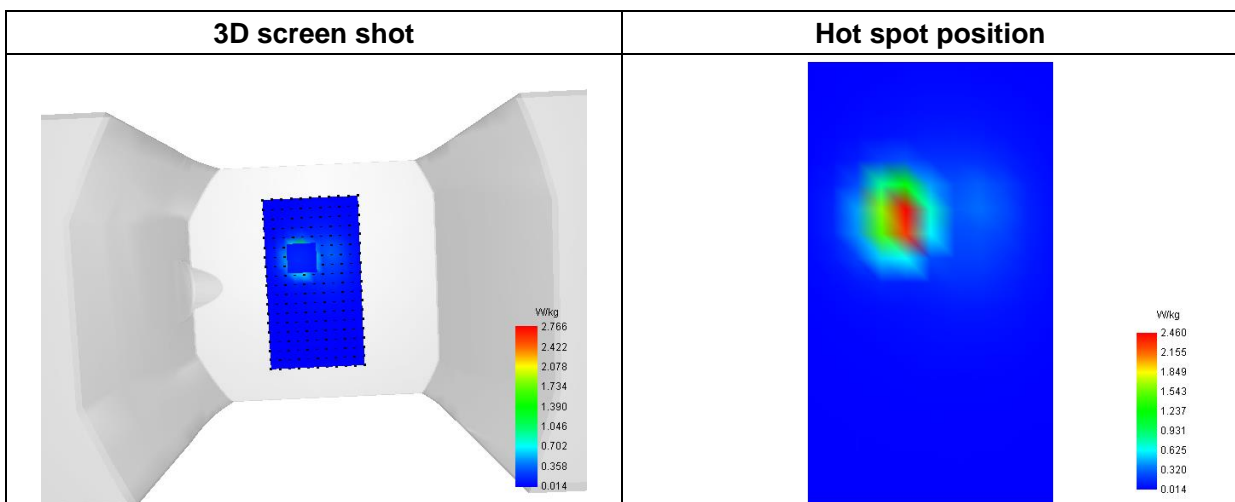
SAR 10g (W/Kg)	0.838339
SAR 1g (W/Kg)	2.430188

E. Z Axis Scan

Z (mm)	0.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00
SAR (W/Kg)	6.6404	2.7658	1.7083	1.0382	0.6443	0.4177	0.2894	0.2167	0.1739



F. 3D Image



# MEASUREMENT 4

Type: Phone measurement (Complete)  
 Date of measurement: 2022-08-19  
 Measurement duration: 12 minutes 3 seconds

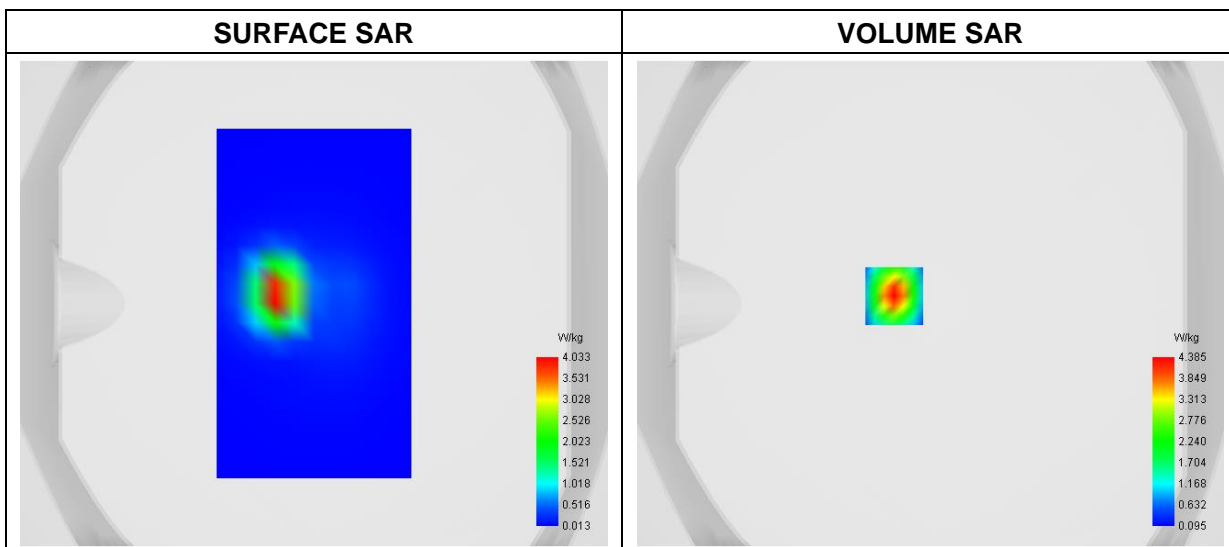
### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=4mm dy=4mm dz=2mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Front
<b>Band</b>	LTE CAT-M1 Band 12
<b>Channels</b>	QPSK, 1.4MHz, 1RB, Low
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	699.700000
<b>Relative Permittivity (real part)</b>	54.662667
<b>Conductivity (S/m)</b>	0.940182
<b>Power Variation (%)</b>	-1.700000
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2

### C. SAR Surface and Volume



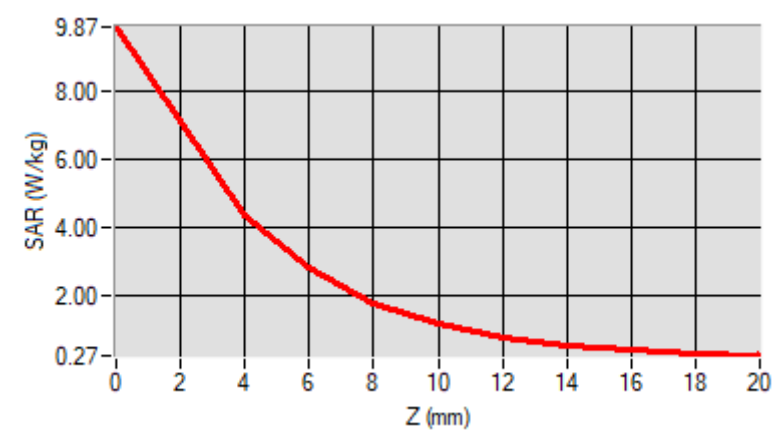
Maximum location: X=-15.00, Y=3.00

D. SAR 1g & 10g

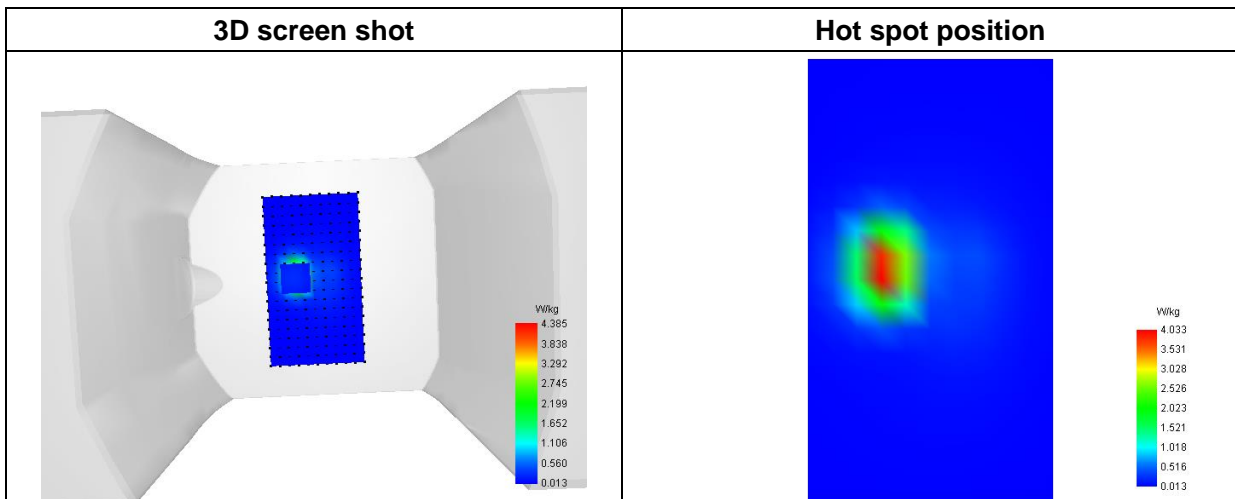
SAR 10g (W/Kg)	1.448908
SAR 1g (W/Kg)	3.986115

E. Z Axis Scan

Z (mm)	0.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00
SAR (W/Kg)	9.8721	4.3849	2.8342	1.8145	1.1858	0.8031	0.5710	0.4281	0.3354



F. 3D Image



# MEASUREMENT 5

Type: Phone measurement (Complete)  
 Date of measurement: 2022-08-19  
 Measurement duration: 12 minutes 3 seconds

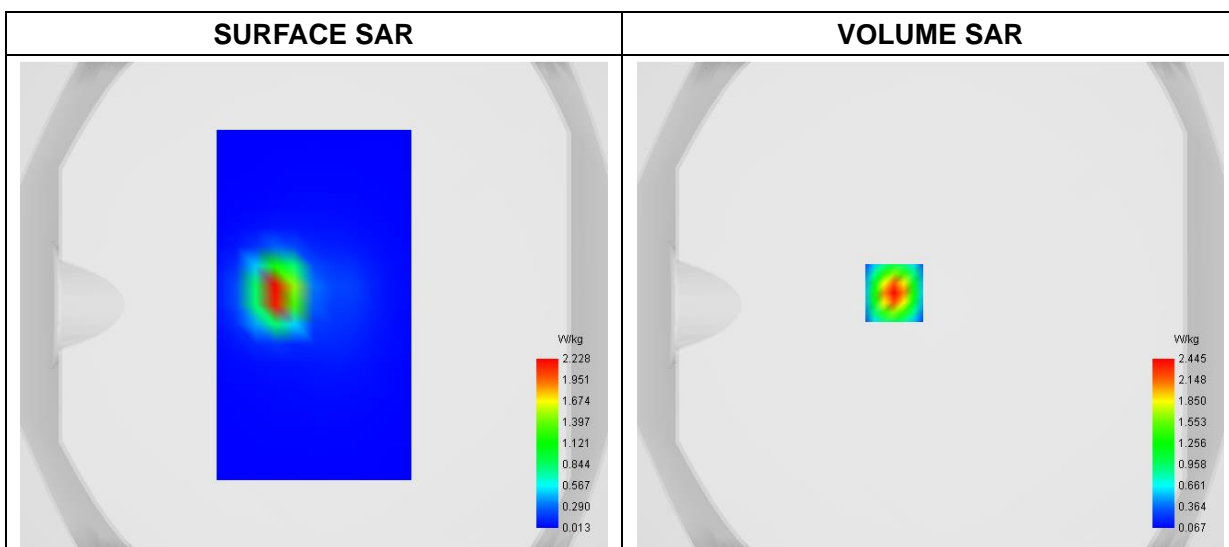
### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=4mm dy=4mm dz=2mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Front
<b>Band</b>	LTE CAT-M1 Band 13
<b>Channels</b>	QPSK, 1.4MHz, 1RB, Middle
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	780.300000
<b>Relative Permittivity (real part)</b>	54.661866
<b>Conductivity (S/m)</b>	0.943696
<b>Power Variation (%)</b>	-1.150000
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2

### C. SAR Surface and Volume



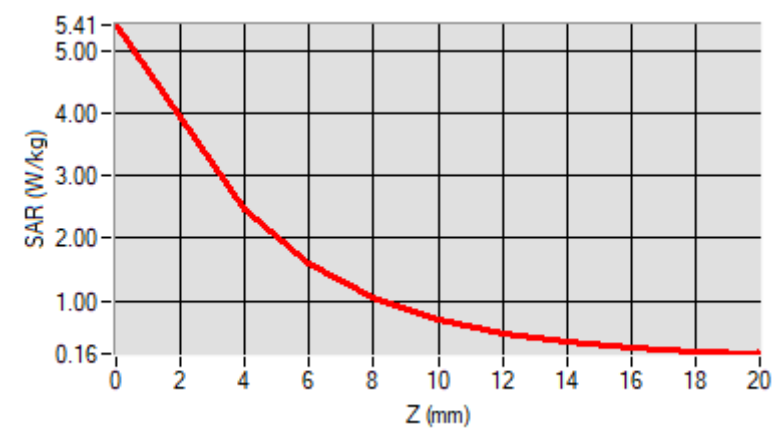
**Maximum location: X=-15.00, Y=5.00**

**D. SAR 1g & 10g**

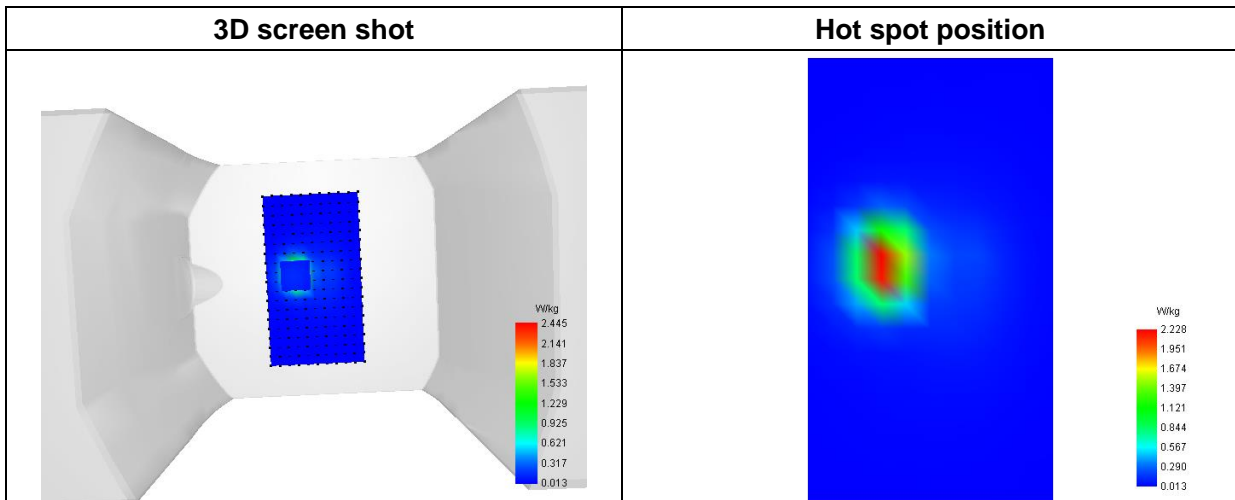
<b>SAR 10g (W/Kg)</b>	<b>0.775511</b>
<b>SAR 1g (W/Kg)</b>	<b>2.143428</b>

**E. Z Axis Scan**

Z (mm)	0.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00
<b>SAR (W/Kg)</b>	<b>5.4071</b>	<b>2.4450</b>	<b>1.5995</b>	<b>1.0378</b>	<b>0.6870</b>	<b>0.4703</b>	<b>0.3365</b>	<b>0.2524</b>	<b>0.1966</b>



**F. 3D Image**



# MEASUREMENT 6

Type: Phone measurement (Complete)  
 Date of measurement: 2022-08-19  
 Measurement duration: 12 minutes 3 seconds

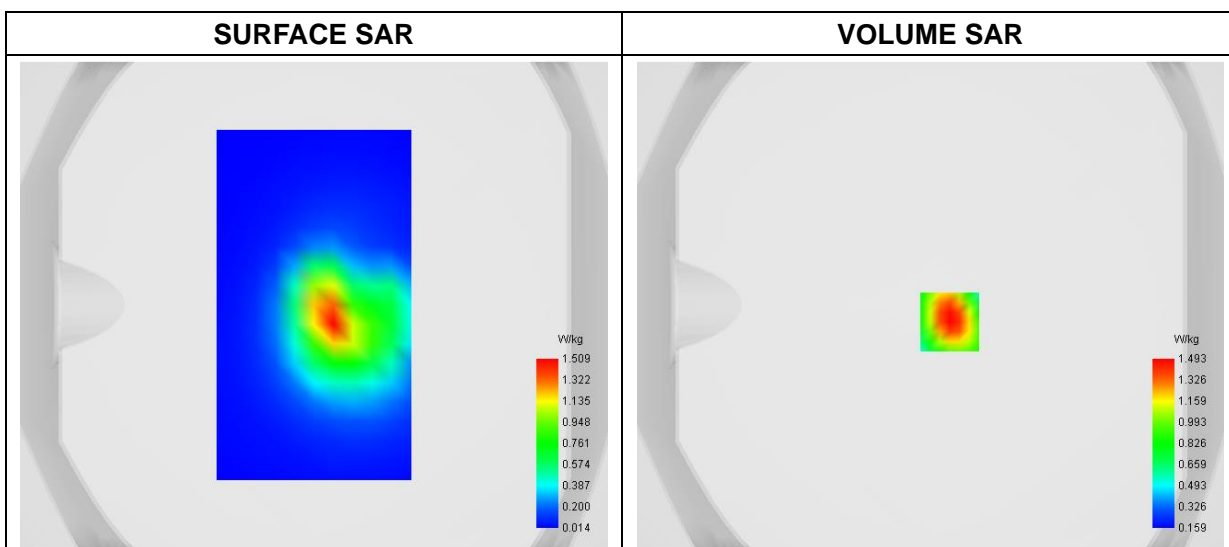
### A. Experimental conditions

Area Scan	dx=8mm dy=8mm
Zoom Scan	dx=4mm dy=4mm dz=2mm
Phantom	Flat Plane
Device Position	Front
Band	LTE CAT-M1 Band 25
Channels	QPSK, 1.4MHz, 1RB, Low
Signal	Duty Cycle 1:1

### B. SAR Measurement Results

Frequency (MHz)	1850.700000
Relative Permittivity (real part)	52.422866
Conductivity (S/m)	1.503696
Power Variation (%)	-1.550000
Ambient Temperature	22.2
Liquid Temperature	22.2

### C. SAR Surface and Volume



**Maximum location: X=8.00, Y=-7.00**

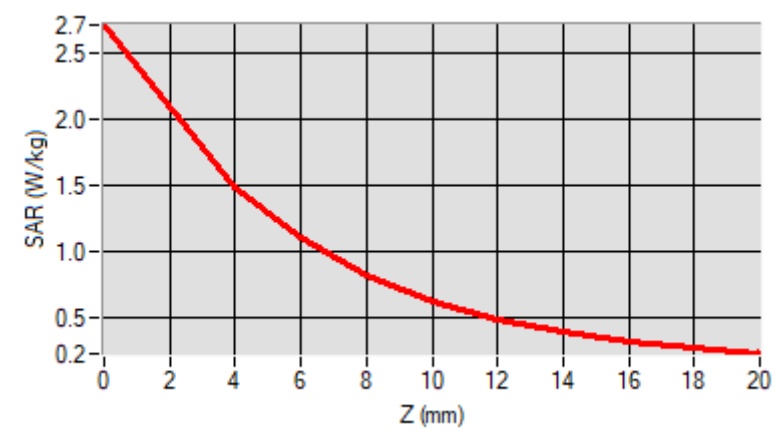


**D. SAR 1g & 10g**

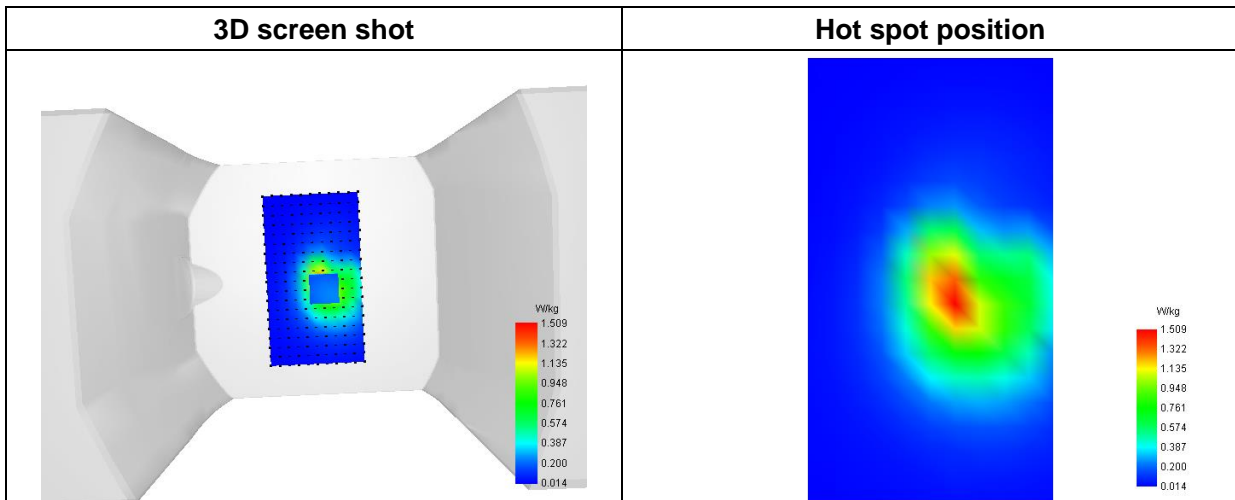
<b>SAR 10g (W/Kg)</b>	<b>0.717296</b>
<b>SAR 1g (W/Kg)</b>	<b>1.388459</b>

**E. Z Axis Scan**

Z (mm)	0.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00
<b>SAR (W/Kg)</b>	<b>2.7161</b>	<b>1.4925</b>	<b>1.1078</b>	<b>0.8282</b>	<b>0.6335</b>	<b>0.4976</b>	<b>0.4016</b>	<b>0.3320</b>	<b>0.2789</b>



**F. 3D Image**



# MEASUREMENT 7

Type: Phone measurement (Complete)  
 Date of measurement: 2022-08-19  
 Measurement duration: 12 minutes 3 seconds

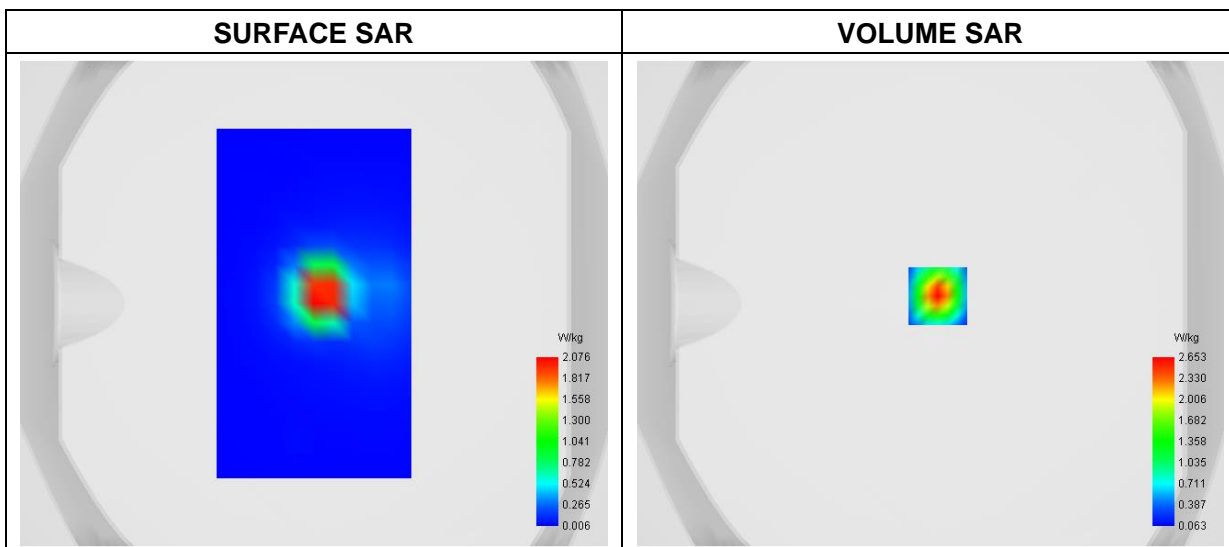
### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=4mm dy=4mm dz=2mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Front
<b>Band</b>	LTE Band CAT-M1 26(814-824MHz)
<b>Channels</b>	QPSK, 1.4MHz, 1RB, Middle
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	814.700000
<b>Relative Permittivity (real part)</b>	53.854866
<b>Conductivity (S/m)</b>	0.963626
<b>Power Variation (%)</b>	-1.550000
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2

### C. SAR Surface and Volume



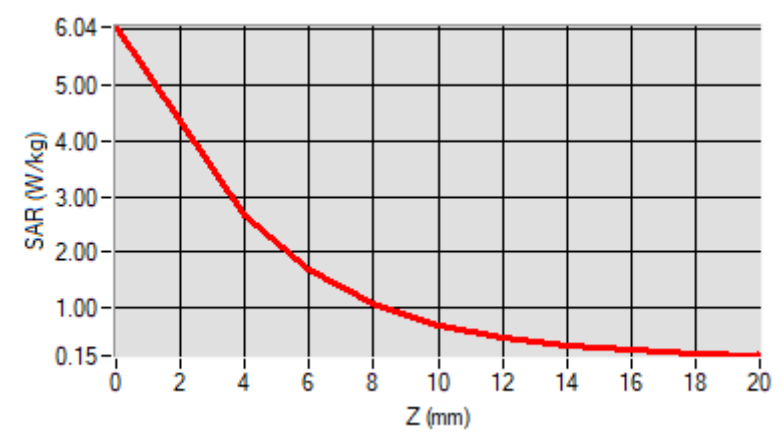
Maximum location: X=3.00, Y=3.00

D. SAR 1g & 10g

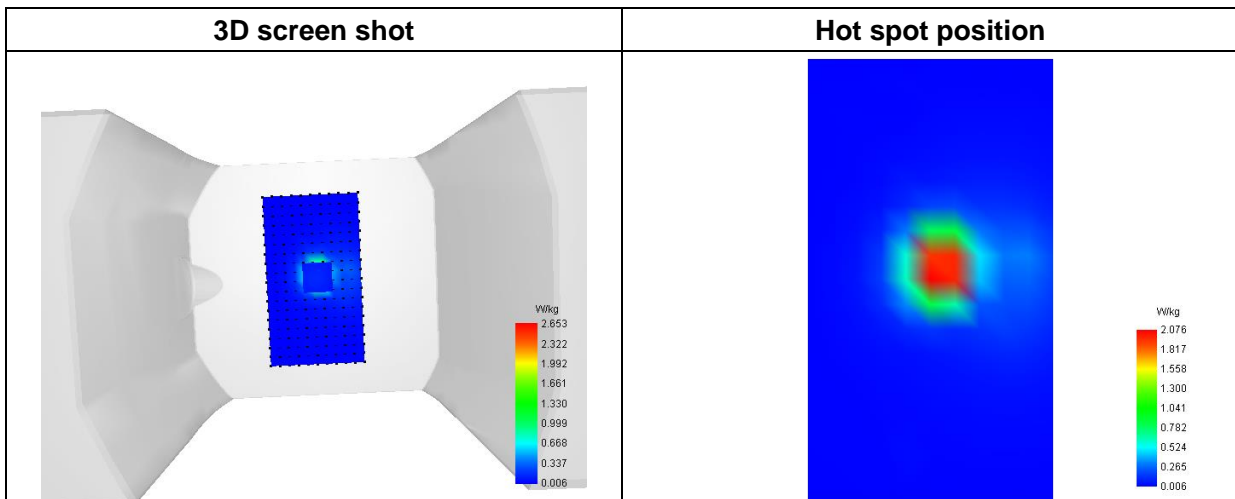
SAR 10g (W/Kg)	0.806921
SAR 1g (W/Kg)	2.327230

E. Z Axis Scan

Z (mm)	0.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00
SAR (W/Kg)	6.0379	2.6533	1.7011	1.0778	0.6957	0.4647	0.3255	0.2406	0.1858



F. 3D Image



# MEASUREMENT 8

Type: Phone measurement (Complete)  
 Date of measurement: 2022-08-19  
 Measurement duration: 12 minutes 3 seconds

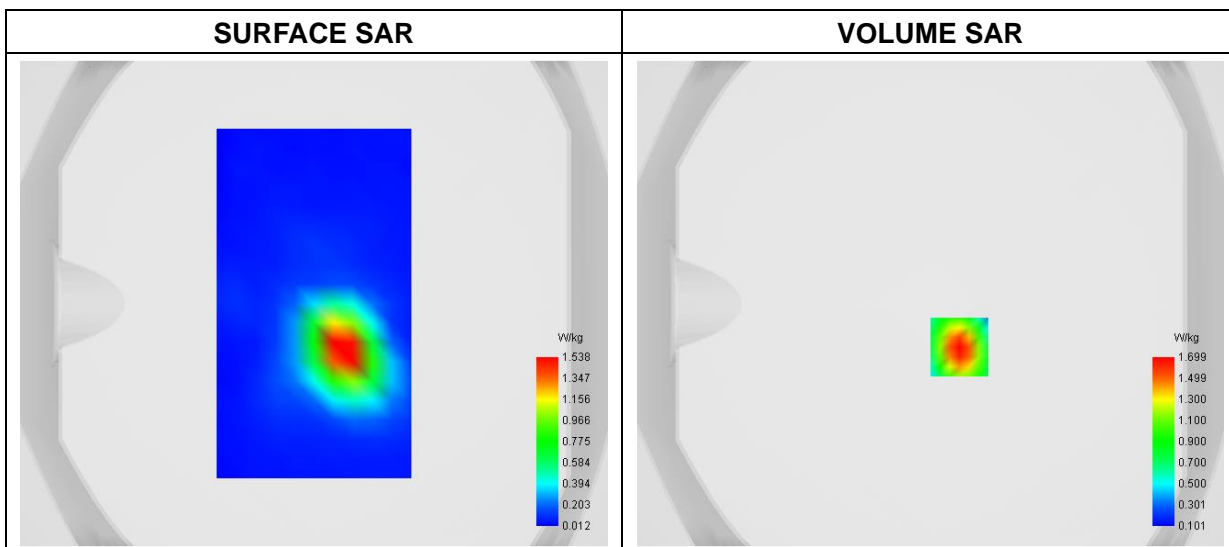
### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=4mm dy=4mm dz=2mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Front
<b>Band</b>	LTE Band CAT-M1 26(824-849MHz)
<b>Channels</b>	QPSK, 1.4MHz, 1RB, Low
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	836.500000
<b>Relative Permittivity (real part)</b>	53.851626
<b>Conductivity (S/m)</b>	0.963096
<b>Power Variation (%)</b>	-1.010000
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2

### C. SAR Surface and Volume



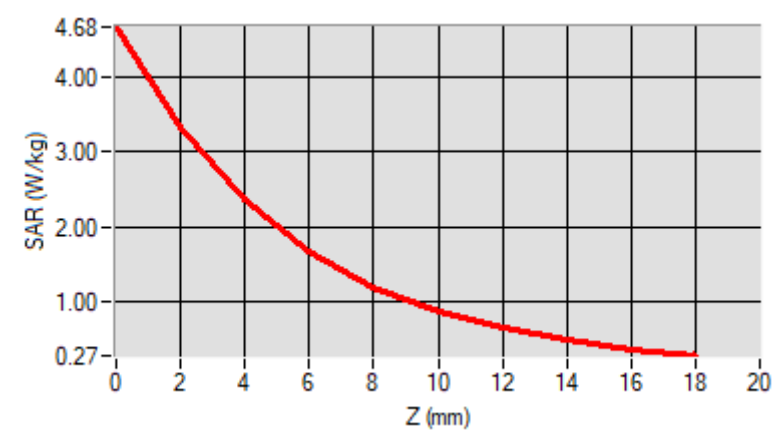
Maximum location: X=12.00, Y=-18.00

D. SAR 1g & 10g

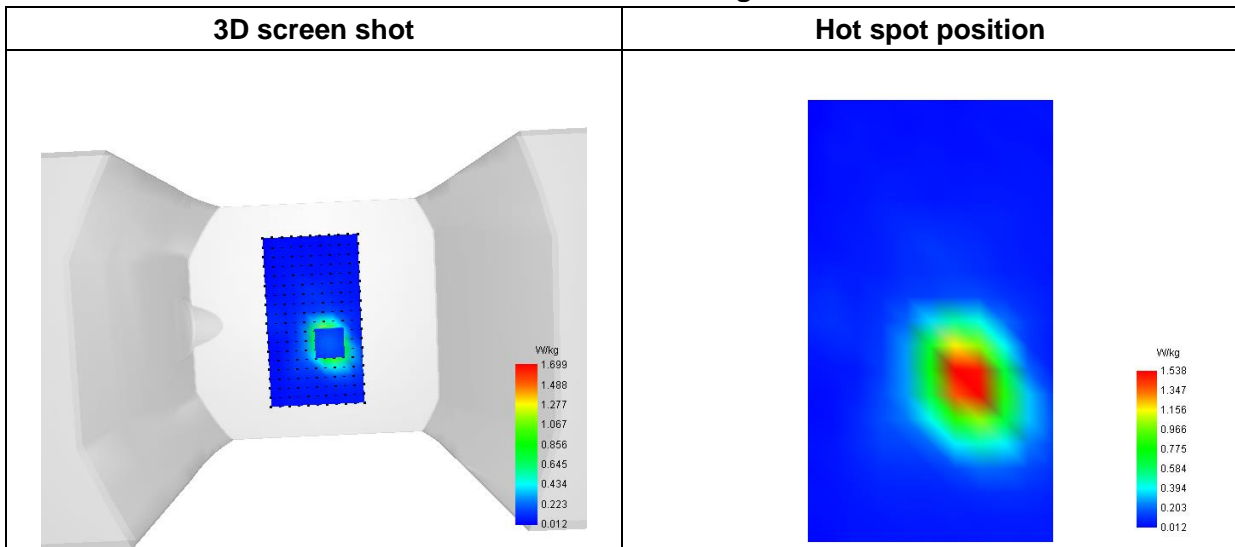
SAR 10g (W/Kg)	0.881329
SAR 1g (W/Kg)	1.147009

E. Z Axis Scan

Z (mm)	0.00	2.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00
SAR (W/Kg)	4.6771	3.3290	2.3557	1.6618	1.1881	0.8644	0.6408	0.4824	0.3650	0.27



F. 3D Image



# MEASUREMENT 9

Type: Phone measurement (Complete)  
 Date of measurement: 2022-08-19  
 Measurement duration: 12 minutes 3 seconds

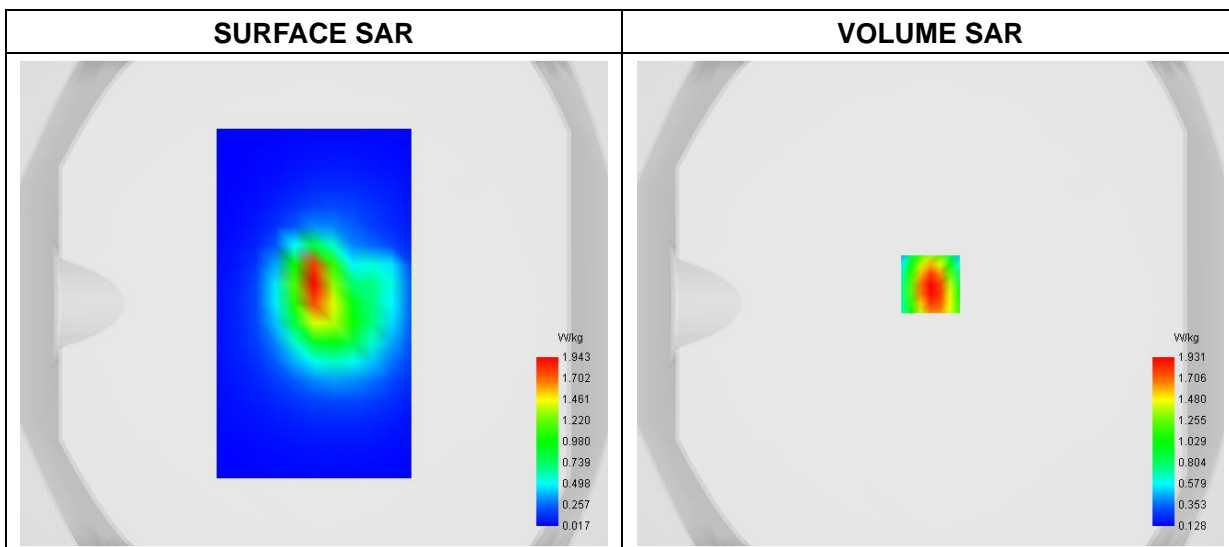
## A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Zoom Scan</b>	dx=4mm dy=4mm dz=2mm
<b>Phantom</b>	Flat Plane
<b>Device Position</b>	Front
<b>Band</b>	LTE CAT-M1 Band 66
<b>Channels</b>	QPSK, 1.4MHz, 1RB, Middle
<b>Signal</b>	Duty Cycle 1:1

## B. SAR Measurement Results

<b>Frequency (MHz)</b>	1745.000000
<b>Relative Permittivity (real part)</b>	53.3618108
<b>Conductivity (S/m)</b>	1.531236
<b>Power Variation (%)</b>	1.150000
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2

## C. SAR Surface and Volume



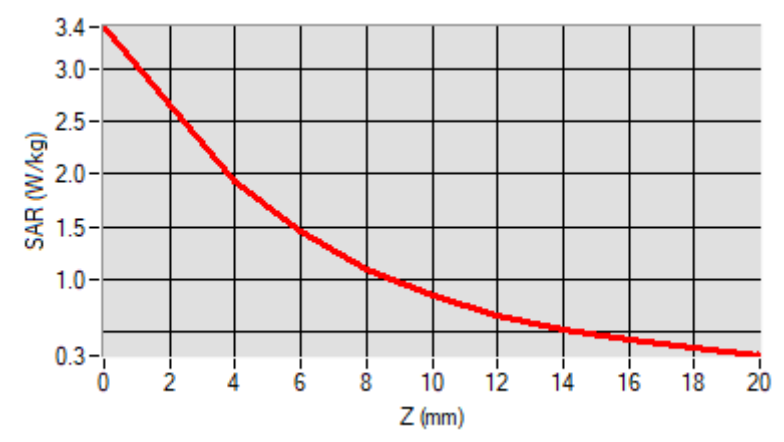
Maximum location: X=0.00, Y=8.00

D. SAR 1g & 10g

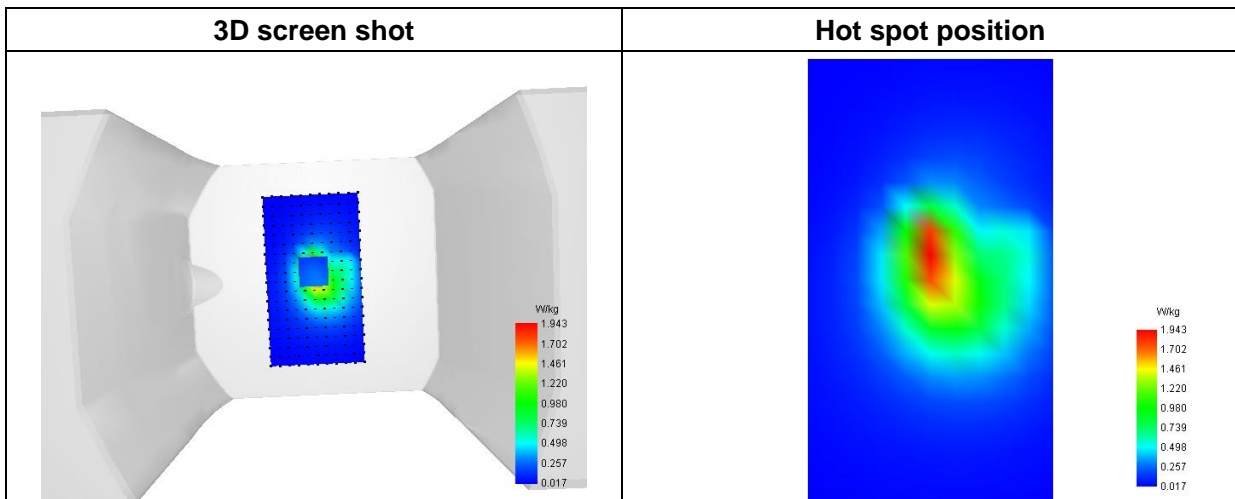
SAR 10g (W/Kg)	0.890987
SAR 1g (W/Kg)	1.813620

E. Z Axis Scan

Z (mm)	0.00	4.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00
SAR (W/Kg)	3.3988	1.9310	1.4552	1.1003	0.8446	0.6593	0.5230	0.4201	0.3390



F. 3D Image



# MEASUREMENT 10

Type: Phone measurement (Complete)  
 Date of measurement: 2022-08-19  
 Measurement duration: 12 minutes 21 seconds

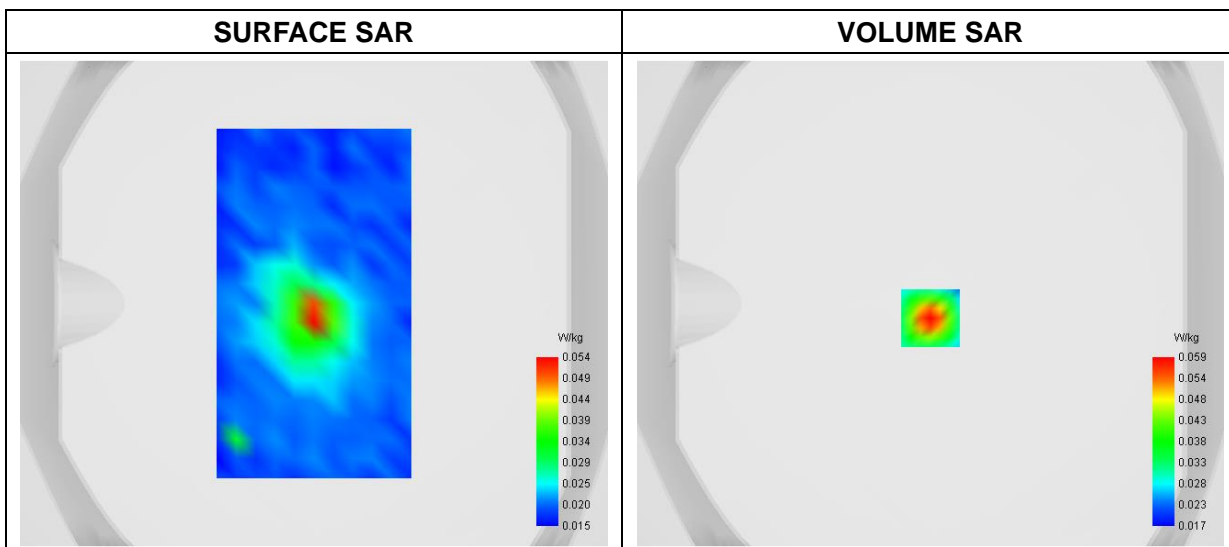
### A. Experimental conditions

<b>Area Scan</b>	dx=8mm dy=8mm
<b>Phantom</b>	Flat plane
<b>Device Position</b>	Front
<b>Band</b>	Bluetooth
<b>Channels</b>	Middle
<b>Signal</b>	Duty Cycle 1:1

### B. SAR Measurement Results

<b>Frequency (MHz)</b>	2440.000000
<b>Relative Permittivity (real part)</b>	51.242128
<b>Conductivity (S/m)</b>	1.961248
<b>Power Variation (%)</b>	-1.980000
<b>Ambient Temperature</b>	22.2
<b>Liquid Temperature</b>	22.2

### C. SAR Surface and Volume



**Maximum location: X=0.00, Y=-6.00**

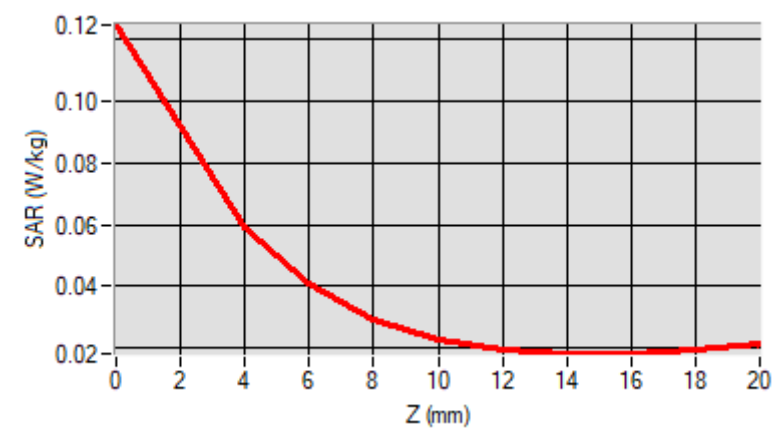


**D. SAR 1g & 10g**

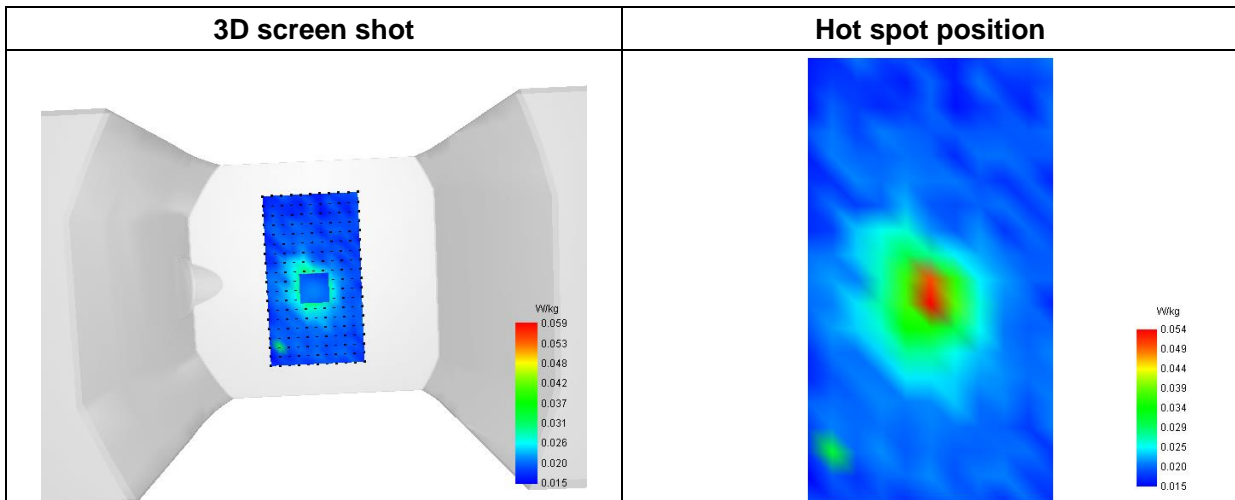
<b>SAR 10g (W/Kg)</b>	<b>0.031380</b>
<b>SAR 1g (W/Kg)</b>	<b>0.055086</b>

**E. Z Axis Scan**

<b>Z (mm)</b>	<b>0.00</b>	<b>4.00</b>	<b>6.00</b>	<b>8.00</b>	<b>10.00</b>	<b>12.00</b>	<b>14.00</b>	<b>16.00</b>	<b>18.00</b>
<b>SAR (W/Kg)</b>	<b>0.1246</b>	<b>0.0588</b>	<b>0.0406</b>	<b>0.0291</b>	<b>0.0226</b>	<b>0.0193</b>	<b>0.0182</b>	<b>0.0185</b>	<b>0.0198</b>



**F. 3D Image**



## **Annex E. Calibration Certificate**

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*Please refer to the exhibit for the calibration certificate*

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