



# SAR TEST REPORT

Product Name: bikefinder Gen2

Model Name: BFG2

FCC ID: 2ATRU-BFG2

Issued For : BikeFinder AS

Veritasveien 25, 4007 Stavanger, Postbox 4004, 4092  
Stavanger, Stavanger, Norway

Issued By : Shenzhen LGT Test Service Co., Ltd.

Room 205, Building 13, Zone B, Chen Hsong Industrial Park,  
No.177 Renmin West Road, Jinsha Community, Kengzi  
Street, Pingshan New District, Shenzhen, China

Report Number: LGT23E006HA01

Sample Received Date: May. 19, 2023

Date of Test: May 21, 2023 ~ May 22, 2023

Date of Issue: June 05, 2023

Max. SAR (10g): Limbs: 0.299 W/kg

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### **Revision History**

| Rev. | Issue Date    | Contents      |
|------|---------------|---------------|
| 00   | June 05, 2023 | Initial Issue |
|      |               |               |



## TEST REPORT CERTIFICATION

**Applicant** BikeFinder AS  
**Address** Veritasveien 25, 4007 Stavanger, Postbox 4004, 4092  
Stavanger, Stavanger, Norway  
**Manufacture** BikeFinder AS  
**Address** Veritasveien 25, 4007 Stavanger, Postbox 4004, 4092  
Stavanger, Stavanger, Norway  
**Product Name** BikeFinder AS  
**Trademark**  bikefinder ,  fahrradfinden  
**Model Name** BFG2  
**Sample Status:** Normal

| APPLICABLE STANDARDS                                                       |              |
|----------------------------------------------------------------------------|--------------|
| STANDARD                                                                   | TEST RESULTS |
| ANSI/IEEE Std. C95.1-1992<br>FCC 47 CFR Part 2 (2.1093)<br>IEEE 1528: 2013 | PASS         |

Prepared by:

Zane Shan

Zane Shan  
Engineer

Approved by:

Vita Li

Vita Li  
Manager





## 1. General Information

Environmental evaluation measurements of specific absorption rate (SAR) distributions in emulated human head and body tissues exposed to radio frequency (RF) radiation from wireless portable devices for compliance with the rules and regulations of the U.S. Federal Communications Commission (FCC).

### 1.1 EUT Description

|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |
|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Product Name                                                   | bikefinder Gen2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |
| Trademark                                                      |  bikefinder ,  fahrradfinden                                                                                                                                                                                                                                                                                                          |               |
| Model Name                                                     | BFG2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |
| Series Model                                                   | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |
| Model Difference                                               | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |
| Device Category                                                | Portable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |
| Product stage                                                  | Production unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |
| RF Exposure Environment                                        | General Population / Uncontrolled                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |
| Hardware Version                                               | 1.0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
| Software Version                                               | 10.3.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |
| Frequency Range                                                | LTE Cat-M1 TX Frequency:<br>Band 2:1850~1910MHz<br>Band 4:1710~1755MHz<br>Band 5:824~849MHz<br>Band 12:699~716MHz<br>Band 13:777~787MHz<br>Band 25:1850~1915MHz<br>Band 26:814~824/824~849MHz<br>Band 66:1710~1780MHz<br>LTE NB1 TX Frequency:<br>Band 2:1850~1910MHz<br>Band 4:1710~1755MHz<br>Band 5:824~849MHz<br>Band 12:699~716MHz<br>Band 17:704~716MHz<br>Band 25:1850~1915MHz<br>Band 26:814~824/824~849MHz<br>Band 66:1710~1780MHz<br>2.4G WIFI 802.11b/g/n: 2412~2462MHz<br>BLE: 2402~2480MHz |               |
| Max. Reported SAR(10g):<br>(Limit: 4W/kg)<br>Test distance:0mm | Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Limbs (W/kg)) |
|                                                                | Cat-M1 Band 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.092         |
|                                                                | Cat-M1 Band 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.108         |
|                                                                | Cat-M1 Band 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.084         |
|                                                                | Cat-M1 Band 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.101         |
|                                                                | Cat-M1 Band 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.071         |
|                                                                | Cat-M1 Band 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.061         |
|                                                                | Cat-M1 Band 66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.084         |
|                                                                | NB1 Band 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.299         |
|                                                                | NB1 Band 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.178         |
|                                                                | NB1 Band 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.242         |
|                                                                | NB1 Band 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.158         |
|                                                                | NB1 Band 66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.221         |



|                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                             |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|                                                                                                                                                                                                                                                                                                        | 2.4G WLAN                                                                                                                                                                                                   | 0.012 |
|                                                                                                                                                                                                                                                                                                        | BLE                                                                                                                                                                                                         | 0.010 |
| 10-g Sum SAR                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                             | 0.309 |
| Battery:                                                                                                                                                                                                                                                                                               | Capacity: 650mAh 2.47Wh<br>Rated Voltage: 3.8V                                                                                                                                                              |       |
| Operating Mode:                                                                                                                                                                                                                                                                                        | LTE Cat-M1: QPSK, 16QAM<br>LTE-NB1: $\pi/2$ -BPSK, $\pi/4$ -QPSK<br>2.4G WIFI: 802.11b(DSSS):CCK,DQPSK,DBPSK<br>802.11g(OFDM):BPSK,QPSK,16-QAM,64-QAM<br>802.11n(OFDM):BPSK,QPSK,16-QAM,64-QAM<br>BLE: GFSK |       |
| Antenna Specification                                                                                                                                                                                                                                                                                  | LTE: LDS Antenna<br>2.4G WIFI/BLE: PCB Antenna                                                                                                                                                              |       |
| Operating Mode                                                                                                                                                                                                                                                                                         | Maximum continuous output                                                                                                                                                                                   |       |
| SIM Card                                                                                                                                                                                                                                                                                               | Internal single SIM Card.                                                                                                                                                                                   |       |
| Hotspot Mode                                                                                                                                                                                                                                                                                           | Not Support                                                                                                                                                                                                 |       |
| DTM Mode                                                                                                                                                                                                                                                                                               | Not Support                                                                                                                                                                                                 |       |
| NOTE:                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                             |       |
| 1. Cat-M1 Band 2 is completely included in band 25, band 26(824-849) is completely included in band 5, so the channels of band 25 and band 5 were tested to give conformity to the assigned block.                                                                                                     |                                                                                                                                                                                                             |       |
| 2. NB1 Band 2 is completely included in band 25, Band 4 is completely included in band 66, band 17 is completely included in band 12, band 26(824-849) is completely included in band 5, so the channels of band 25, band 12, band 5 and band 66 were tested to give conformity to the assigned block. |                                                                                                                                                                                                             |       |
| 3. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power                                                                                                                                                                                           |                                                                                                                                                                                                             |       |



## 1.2 Test Environment

Ambient conditions in the SAR laboratory:

| Items            | Required |
|------------------|----------|
| Temperature (°C) | 18-25    |
| Humidity (%RH)   | 30-70    |

## 1.3 Test Factory

|                           |                                                                                                                                                             |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Company Name:             | Shenzhen LGT Test Service Co., Ltd.                                                                                                                         |
| Address:                  | Room 205, Building 13, Zone B, Chen Hsong Industrial Park, No.177 Renmin West Road, Jinsha Community, Kengzi Street, Pingshan New District, Shenzhen, China |
| Accreditation Certificate | FCC Registration No.: 746540                                                                                                                                |
|                           | A2LA Certificate No.: 6727.01                                                                                                                               |
|                           | IC Registration No.: CN0136                                                                                                                                 |



## 2. Test Standards and Limits

| No. | Identity                            | Document Title                                                                                                                                                              |
|-----|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | 47 CFR Part 2                       | Frequency Allocations and Radio Treaty Matters; General Rules and Regulations                                                                                               |
| 2   | ANSI/IEEE Std. C95.1-1992           | IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz                                                  |
| 3   | IEEE Std. 1528-2013                 | Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques |
| 4   | FCC KDB 447498 D04 v01              | RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices                                                                                 |
| 5   | FCC KDB 648474 D04 v01r03           | SAR Evaluation Considerations for Wireless Handsets                                                                                                                         |
| 6   | FCC KDB 865664 D01 v01r04           | SAR Measurement 100 MHz to 6 GHz                                                                                                                                            |
| 7   | FCC KDB 865664 D02 v01r02           | RF Exposure Reporting                                                                                                                                                       |
| 8   | FCC KDB 941225 D05 v02r05           | SAR for LTE Devices                                                                                                                                                         |
| 9   | FCC KDB 248227 D01 Wi-Fi SAR v02r02 | SAR Considerations for 802.11 Devices                                                                                                                                       |

(A). Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body      Partial-Body      Hands, Wrists, Feet and Ankles

0.4                      8.0                      20.0

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

Whole-Body      Partial-Body      Hands, Wrists, Feet and Ankles

0.08                      1.6                      4.0

NOTE: Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

**Population/Uncontrolled Environments:**

Are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

**Occupational/Controlled Environments:**

Are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

|                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;"><b>GENERAL POPULATION/UNCONTROLLED EXPOSURE</b></p> <p style="text-align: center;"><b>Limbs LIMIT</b></p> <p style="text-align: center;"><b>4 W/kg</b></p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



### 3. SAR Measurement System

#### 3.1 Definition of Specific Absorption Rate (SAR)

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.

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:

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

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

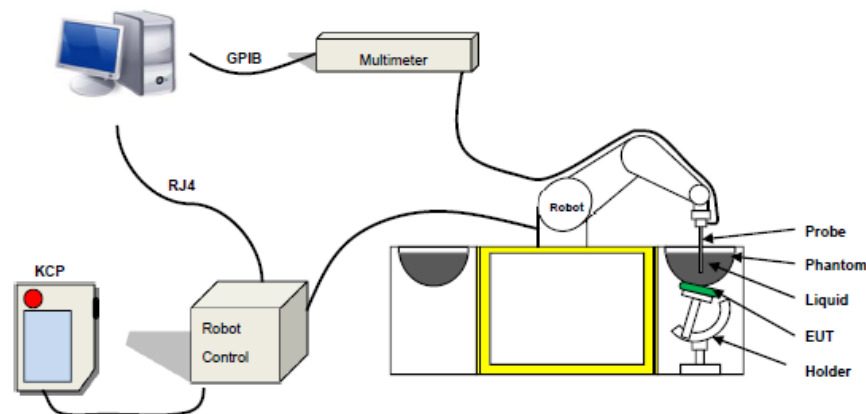
$$SAR = \frac{\sigma E^2}{\rho}$$

Where:  $\sigma$  is the conductivity of the tissue;

$\rho$  is the mass density of the tissue and E is the RMS electrical field strength.

#### 3.2 SAR System

MVG SAR System Diagram:



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 1g mass.

### 3.2.1 Probe

For the measurements the Specific Dosimetric E-Field Probe SN 04/22 EPG0364 with following specifications is used

- Probe Length: 330 mm
- Length of Individual Dipoles: 2mm
- Maximum external diameter: 8 mm
- Probe Tip External Diameter: 2.5 mm
- Distance between dipole/probe extremity: 1 mm
- Dynamic range: 0.01-100 W/kg
- Probe linearity: 3%
- Axial Isotropy: < 0.10 dB
- Spherical Isotropy: < 0.10 dB
- Calibration range: 600 MHz to 6 GHz for head & body simulating liquid.
- Angle between probe axis (evaluation axis) and surface normal line: less than 30°



Figure 1-MVG COMOSAR Dosimetric E field Probe



### 3.2.2 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.

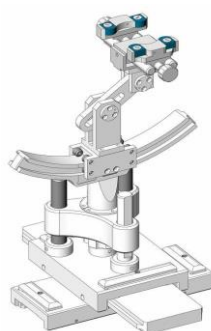


Figure-SN 06/22 SAM 148



Figure-SN 06/22 ELLI 51

### 3.2.3 Device Holder



The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of  $\pm 0.5$  mm would produce a SAR uncertainty of  $\pm 20$  %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.



## 4. Tissue Simulating Liquids

### 4.1 Simulating Liquids Parameter Check

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine if the dielectric parameters are within the tolerances of the specified target values

The uncertainty due to the liquid conductivity and permittivity arises from two different sources. The first source of error is the deviation of the liquid conductivity from its target value (max \_ 5 %) and the second source of error arises from the measurement procedures used to assess conductivity. The uncertainty shall be assessed using a rectangular probability For 1 g averaging, the maximum weighting coefficient for SAR is 0,5.

#### IEEE SCC-34/SC-2 RECOMMENDED TISSUE DIELECTRIC PARAMETERS

The head and body tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 have been incorporated in the following table.

| Frequency    | $\epsilon_r$ | $\sigma$ 10g<br>S/m |
|--------------|--------------|---------------------|
| 300          | 45.3         | 0.87                |
| 450          | 43.5         | 0.87                |
| 750          | 41.9         | 0.89                |
| 835          | 41.5         | 0.90                |
| 900          | 41.5         | 0.97                |
| 1450         | 40.5         | 1.20                |
| 1800 to 2000 | 40.0         | 1.40                |
| 2100         | 39.8         | 1.49                |
| 2450         | 39.2         | 1.80                |
| 2600         | 39.0         | 1.96                |
| 3000         | 38.5         | 2.40                |
| 3500         | 37.9         | 2.91                |
| 4000         | 37.4         | 3.43                |
| 4500         | 36.8         | 3.94                |
| 5000         | 36.2         | 4.45                |
| 5200         | 36.0         | 4.66                |
| 5400         | 35.8         | 4.86                |
| 5600         | 35.5         | 5.07                |
| 5800         | 35.3         | 5.27                |



### LIQUID MEASUREMENT RESULTS

| Date       | Ambient    |            | Simulating Liquid |            | Parameters   | Target | Measured | Deviation % | Limited % |
|------------|------------|------------|-------------------|------------|--------------|--------|----------|-------------|-----------|
|            | Temp. [°C] | Humidity % | Frequency (MHz)   | Temp. [°C] |              |        |          |             |           |
| 2023-05-21 | 22.6       | 46         | 750               | 22.3       | Permittivity | 41.90  | 42.66    | 1.81        | ±5        |
|            |            |            |                   |            | Conductivity | 0.89   | 0.86     | -3.37       | ±5        |
| 2023-05-21 | 22.7       | 46         | 835               | 22.4       | Permittivity | 41.50  | 41.00    | -1.20       | ±5        |
|            |            |            |                   |            | Conductivity | 0.90   | 0.89     | -1.11       | ±5        |
| 2023-05-22 | 23         | 40         | 1800              | 22.7       | Permittivity | 40.00  | 40.59    | 1.48        | ±5        |
|            |            |            |                   |            | Conductivity | 1.40   | 1.44     | 2.86        | ±5        |
| 2023-05-22 | 23.1       | 40         | 1900              | 22.8       | Permittivity | 40.00  | 40.41    | 1.02        | ±5        |
|            |            |            |                   |            | Conductivity | 1.40   | 1.37     | -2.14       | ±5        |
| 2023-05-22 | 23.1       | 41         | 2450              | 22.9       | Permittivity | 39.20  | 39.87    | 1.71        | ±5        |
|            |            |            |                   |            | Conductivity | 1.80   | 1.83     | 1.67        | ±5        |

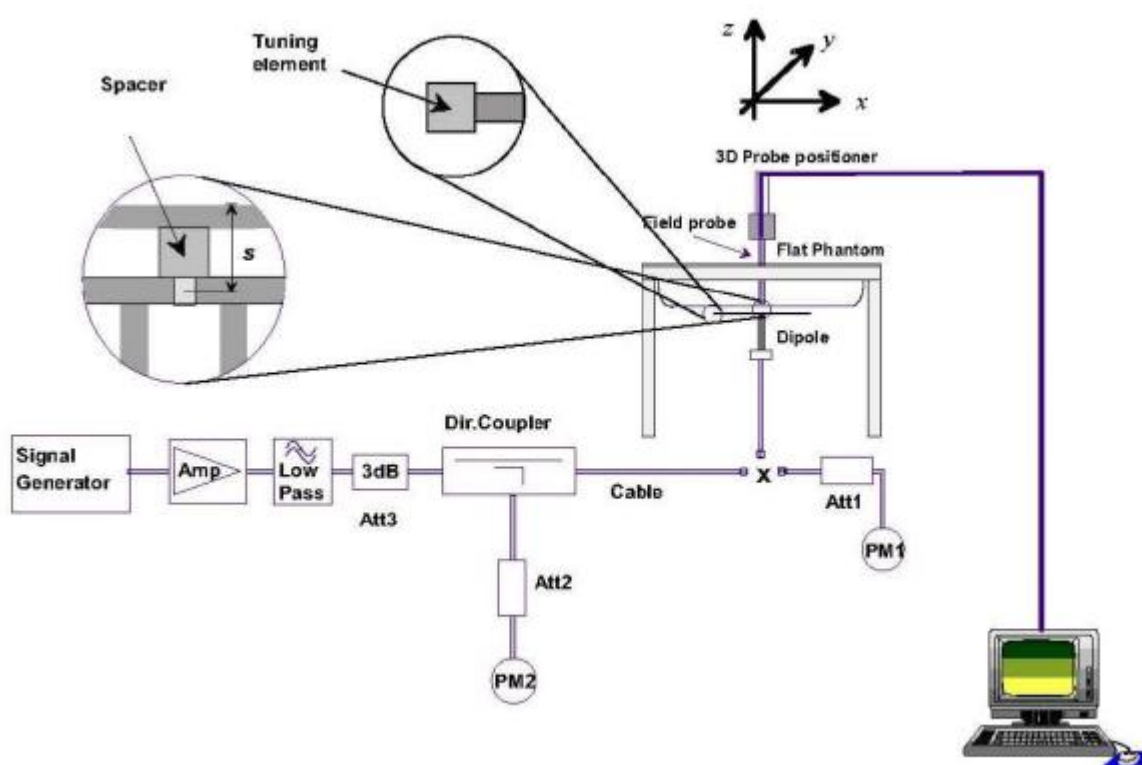


## 5. SAR System Validation

### 5.1 Validation System

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

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





## 5.2 Validation Result

Comparing to the original SAR value provided by MVG, the validation data should be within its specification of  $\pm 10\%$ .

| Date       | Freq. | Power | Tested Value | Normalized SAR | Target SAR | Tolerance | Limit |
|------------|-------|-------|--------------|----------------|------------|-----------|-------|
|            | (MHz) | (mW)  | (W/Kg)       | (W/kg)         | 1g(W/kg)   | (%)       | (%)   |
| 2023-05-21 | 750   | 100   | 0.863        | 8.63           | 8.27       | 4.35      | 10    |
| 2023-05-21 | 835   | 100   | 1.037        | 10.37          | 9.75       | 6.36      | 10    |
| 2023-05-22 | 1800  | 100   | 3.798        | 37.98          | 39.06      | -2.76     | 10    |
| 2023-05-22 | 1900  | 100   | 4.103        | 41.03          | 40.85      | 0.44      | 10    |
| 2023-05-22 | 2450  | 100   | 4.966        | 49.66          | 54.28      | -8.51     | 10    |

Note:

1. The tolerance limit of System validation  $\pm 10\%$ .
2. The dipole input power (forward power) was 100 mW.
3. The results are normalized to 1 W input power.



## 6. SAR Evaluation Procedures

The procedure for assessing the average SAR value consists of the following steps:

The following steps are used for each test position

- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface

- Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.

- Measurement of the SAR distribution with a grid of 8 to 16mm \* 8 to 16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.

- Around this point, a cube of 30 \* 30 \* 30 mm or 32 \* 32 \* 32 mm is assessed by measuring 5 or 8 \* 5 or 8\*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

### Area Scan& Zoom Scan

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 is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g. Area scan and zoom scan resolution setting follows KDB 865664 D01 quoted below.

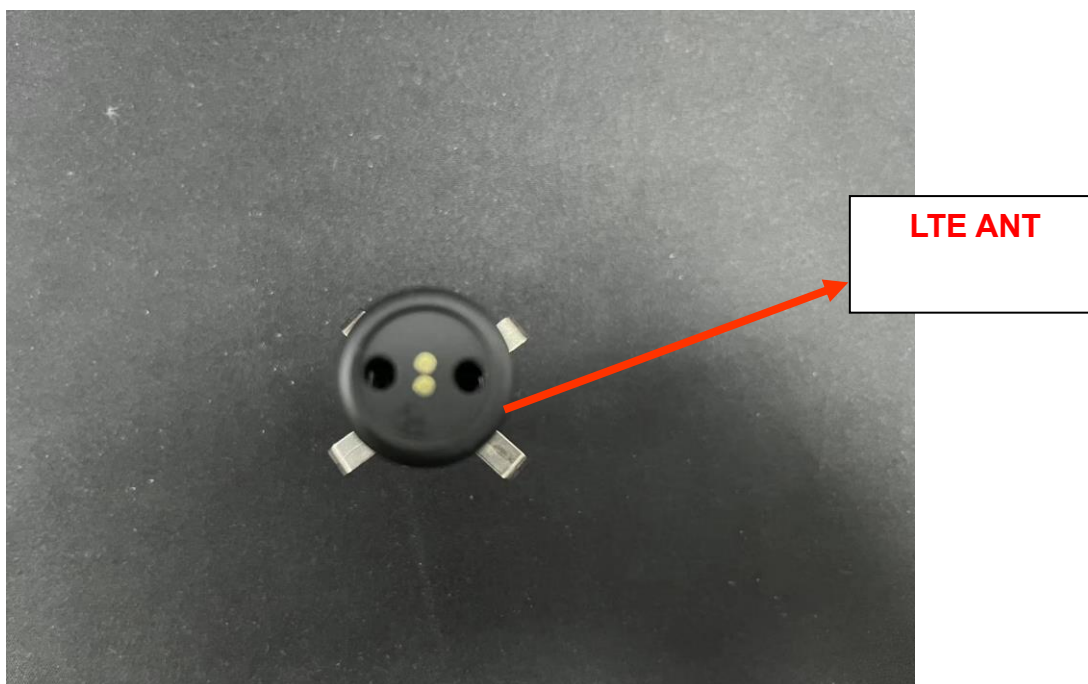
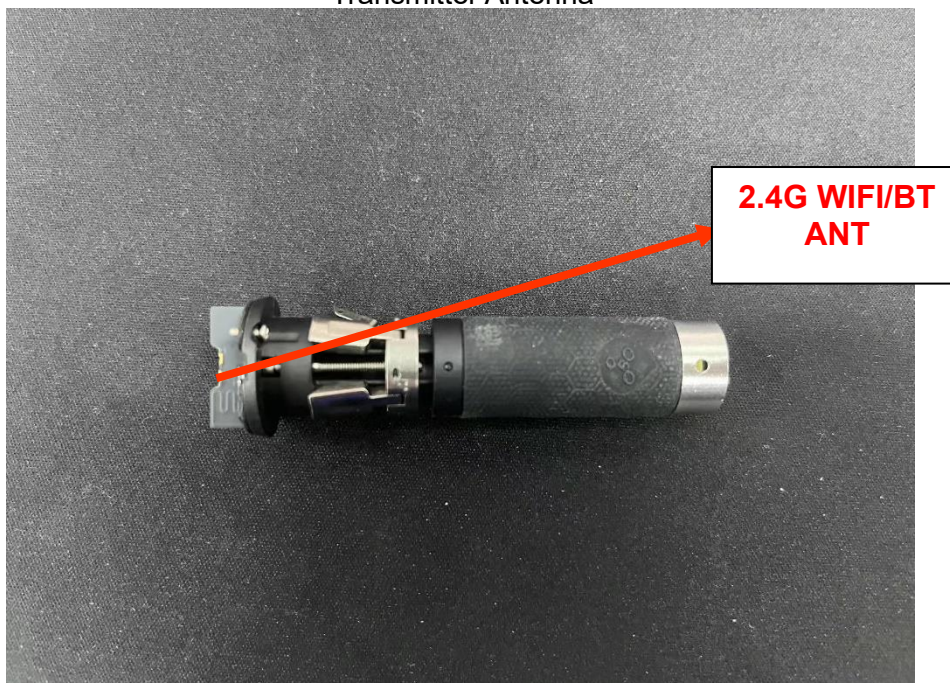
When the 1-g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

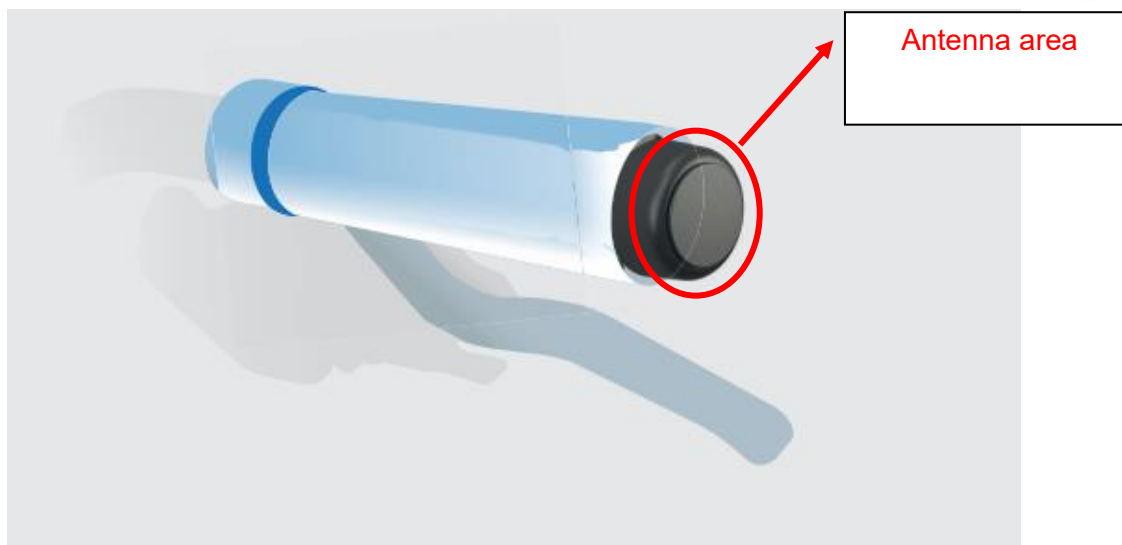


## 7. EUT Antenna Location Sketch

It is a bikefinder Gen2, support LTE CAT-M,NB1, WIFI and BT mode.

Transmitter Antenna





| Antenna Separation Distance(cm) |           |            |           |            |          |             |
|---------------------------------|-----------|------------|-----------|------------|----------|-------------|
| ANT                             | Back Side | Front Side | Left Side | Right Side | Top Side | Bottom Side |
| WWAN                            | ≤0.5      | ≤0.5       | >25       | ≤0.5       | ≤0.5     | ≤0.5        |
| WIFI<br>BT                      | ≤0.5      | ≤0.5       | >25       | ≤0.5       | ≤0.5     | ≤0.5        |

Note 1: The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report.

2. This device is fixed on the bicycle handlebars and the direction is fixed. Considering the power, antenna spacing and human contact, we test the side at the top of the antenna position corresponding to LTE and BT, WiFi functions.

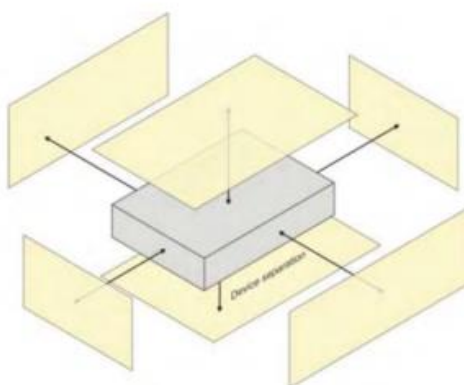


## 8. EUT Test Position

This EUT was tested in Top Side.

### 8.1 Body-worn Position Conditions

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing function, the relevant hand and body exposure condition are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surface and edges with a transmitting antenna located within 25 mm from that surface or edge. When form factor of a handset is smaller than 9cm x 5cm, a test separation distance of 5mm (instead of 10mm) is required for testing hotspot mode. When the separate distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface).





## 9. Uncertainty

### 9.1 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in IEEE 1528: 2013. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

| Symbol                                                       | Uncertainty Component                                                    | Prob. Dist.   | Unc. $a(x_i)$ | Div. $q_i$ | $u(x_i) = a(x_i)/q_i$ | $C_i$                | $u(y) = C_i * u(x_i)$ | $v_i$    |
|--------------------------------------------------------------|--------------------------------------------------------------------------|---------------|---------------|------------|-----------------------|----------------------|-----------------------|----------|
| <b>Measurement system errors</b>                             |                                                                          |               |               |            |                       |                      |                       |          |
| CF                                                           | Probe calibration                                                        | N ( $k = 2$ ) | 5.8           | 2          | 2.90                  | 1                    | 2.90                  | $\infty$ |
| CF <sub>drift</sub>                                          | Probe calibration drift                                                  | R             | 0.12          | $\sqrt{3}$ | 0.07                  | 1                    | 0.07                  | $\infty$ |
| LIN                                                          | Probe linearity and detection limit                                      | R             | 1.91          | $\sqrt{3}$ | 1.10                  | 1                    | 1.10                  | $\infty$ |
| BBS                                                          | Broadband signal                                                         | R             | 0.15          | $\sqrt{3}$ | 0.09                  | 1                    | 0.09                  | $\infty$ |
| ISO                                                          | Probe isotropy                                                           | R             | 0.18          | $\sqrt{3}$ | 0.10                  | 1                    | 0.10                  | $\infty$ |
| DAE                                                          | Other probe and data acquisition errors                                  | N             | 2.7           | 1          | 2.70                  | 1                    | 2.70                  | $\infty$ |
| AMB                                                          | RF ambient and noise                                                     | N             | 1.73          | 1          | 1.73                  | 1                    | 1.73                  | $\infty$ |
| $\Delta_{xyz}$                                               | Probe positioning errors                                                 | N             | 0.81          | 1          | 0.81                  | $2/\delta$           | 0.81                  |          |
| DAT                                                          | Data processing errors                                                   | N             | 2.5           | 1          | 2.50                  | 1                    | 2.50                  | $\infty$ |
| <b>Phantom and device (DUT or validation antenna) errors</b> |                                                                          |               |               |            |                       |                      |                       |          |
| LIQ( $\sigma$ )                                              | Measurement of phantom conductivity( $\sigma$ )                          | N             | 4.4           | 1          | 4.4                   | $c\epsilon, c\sigma$ | 4.40                  | $\infty$ |
| LIQ( $T_c$ )                                                 | Temperature effects (medium)                                             | R             | 2.9           | $\sqrt{3}$ | 1.67                  | $c\epsilon, c\sigma$ | 1.67                  | $\infty$ |
| EPS                                                          | Shell permittivity                                                       | R             | 3.4           | $\sqrt{3}$ | 1.96                  | See 8.4.2.3          | 0.49                  | $\infty$ |
| DIS                                                          | Distance between the radiating element of the DUT and the phantom medium | N             | 0.8           | 1          | 0.8                   | 2                    | 1.60                  | $\infty$ |
| D <sub>xyz</sub>                                             | Repeatability of positioning the DUT or source against the phantom       | N             | 1.5           | 1          | 1.5                   | 1                    | 1.50                  | 5        |
| H                                                            | Device holder effects                                                    | N             | 3             | 1          | 3                     | 1                    | 3.00                  |          |
| MOD                                                          | Effect of operating mode on probe sensitivity                            | R             | 3.59          | $\sqrt{3}$ | 2.07                  | 1                    | 2.07                  | $\infty$ |
| TAS                                                          | Time-average SAR                                                         | R             | 1.73          | $\sqrt{3}$ | 1.00                  | 1                    | 1.00                  | $\infty$ |
| RF <sub>drift</sub>                                          | Variation in SAR due to drift in output of DUT                           | N             | 2.89          | 1          | 2.89                  | 1                    | 2.89                  |          |
| VAL                                                          | Validation antenna uncertainty (validation measurement only)             | N             | 1.45          | 1          | 1.45                  | 1                    | 1.45                  |          |
| P <sub>in</sub>                                              | Uncertainty in accepted power (validation measurement only)              | N             | 2.5           | 1          | 2.5                   | 1                    | 2.50                  |          |
| <b>Corrections to the SAR result (if applied)</b>            |                                                                          |               |               |            |                       |                      |                       |          |
| C( $\epsilon', \sigma$ )                                     | Phantom deviation from target ( $\epsilon', \sigma$ )                    | N             | 2.31          | 1          | 2.31                  | 1                    | 2.31                  |          |
| C(R)                                                         | SAR scaling                                                              | R             | 1.15          | $\sqrt{3}$ | 0.66                  | 1                    | 0.66                  |          |
| u( $\Delta$ SAR)                                             | Combined uncertainty                                                     |               |               |            |                       |                      | 9.53                  |          |
| U                                                            | Expanded uncertainty and effective degrees of freedom                    |               |               |            |                       | U =                  | 19.06                 |          |



## 10. Conducted Power Measurement

### 10.1 Test Result:

#### 2.4G WLAN

| 2.4GWIFI      |                |                 |                    |                   |
|---------------|----------------|-----------------|--------------------|-------------------|
| Mode          | Channel Number | Frequency (MHz) | Output Power (dBm) | Output Power (mW) |
| 802.11b       | 1              | 2412            | 11.15              | 13.03             |
|               | 6              | 2437            | 10.30              | 10.72             |
|               | 11             | 2462            | 9.31               | 8.53              |
| 802.11g       | 1              | 2412            | 10.75              | 11.89             |
|               | 6              | 2437            | 9.50               | 8.91              |
|               | 11             | 2462            | 8.46               | 7.01              |
| 802.11 n-HT20 | 1              | 2412            | 9.46               | 8.83              |
|               | 6              | 2437            | 8.56               | 7.18              |
|               | 11             | 2462            | 7.47               | 5.58              |
| 802.11 n-HT40 | 3              | 2422            | 8.69               | 7.40              |
|               | 6              | 2437            | 7.93               | 6.21              |
|               | 9              | 2452            | 7.46               | 5.57              |

#### BLE

| BLE         |                |                 |                     |                   |
|-------------|----------------|-----------------|---------------------|-------------------|
| Mode        | Channel Number | Frequency (MHz) | Average Power (dBm) | Output Power (mW) |
| GFSK(1Mbps) | 0              | 2402            | 2.12                | 1.63              |
|             | 19             | 2440            | 1.04                | 1.27              |
|             | 39             | 2480            | -1.30               | 0.74              |
| GFSK(2Mbps) | 0              | 2402            | 2.99                | 1.99              |
|             | 19             | 2440            | 1.96                | 1.57              |
|             | 39             | 2480            | -0.19               | 0.96              |



## LTE Conducted Power

### General Note:

1. Anritsu CMW500 base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05, 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 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.
6. Per KDB 941225 D05, 16QAM output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is  $\leq 1.45$  W/kg; Per KDB 941225 D05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05, Smaller bandwidth output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is  $\leq 1.45$  W/kg; Per KDB 941225 D05, smaller bandwidth SAR testing is not required.



# CAT-M

## Band 4

| BW (MHz) | UL Channel | Frequency (MHz) | RB Size | RB offset | Modulation | Conduction AVG Power(dBm) |
|----------|------------|-----------------|---------|-----------|------------|---------------------------|
| 5        | 19975      | 1712.5          | 1       | 0         | QPSK       | 22.1                      |
|          |            |                 | 6       | 0         |            | 21.24                     |
|          |            |                 | 1       | 0         | 16-QAM     | 22.27                     |
|          |            |                 | 5       | 0         |            | 20.34                     |
|          | 20175      | 1732.5          | 1       | 0         | QPSK       | 22.27                     |
|          |            |                 | 6       | 0         |            | 21.25                     |
|          |            |                 | 1       | 0         | 16-QAM     | 22.32                     |
|          |            |                 | 5       | 0         |            | 20.3                      |
|          | 20375      | 1752.5          | 1       | 0         | QPSK       | 22.19                     |
|          |            |                 | 6       | 0         |            | 21.27                     |
|          |            |                 | 1       | 0         | 16-QAM     | 22.23                     |
|          |            |                 | 5       | 0         |            | 20.29                     |

## Band 5

| BW (MHz) | UL Channel | Frequency (MHz) | RB Size | RB offset | Modulation | Conduction AVG Power(dBm) |
|----------|------------|-----------------|---------|-----------|------------|---------------------------|
| 3        | 20415      | 825.5           | 1       | 0         | QPSK       | 22.97                     |
|          |            |                 | 6       | 0         |            | 20.75                     |
|          |            |                 | 1       | 0         | 16-QAM     | 21.89                     |
|          |            |                 | 5       | 0         |            | 21.08                     |
|          | 20525      | 836.5           | 1       | 0         | QPSK       | 22.99                     |
|          |            |                 | 6       | 0         |            | 21.07                     |
|          |            |                 | 1       | 0         | 16-QAM     | 21.86                     |
|          |            |                 | 5       | 0         |            | 20.99                     |
|          | 20635      | 847.5           | 1       | 0         | QPSK       | 22.99                     |
|          |            |                 | 6       | 0         |            | 21.08                     |
|          |            |                 | 1       | 0         | 16-QAM     | 21.73                     |
|          |            |                 | 5       | 0         |            | 20.33                     |



## Band 12

| BW (MHz) | UL Channel | Frequency (MHz) | RB Size | RB offset | Modulation | Conduction AVG Power(dBm) |
|----------|------------|-----------------|---------|-----------|------------|---------------------------|
| 10       | 23060      | 704             | 1       | 0         | QPSK       | 22.65                     |
|          |            |                 | 6       | 0         |            | 21.65                     |
|          |            |                 | 1       | 0         | 16-QAM     | 21.58                     |
|          |            |                 | 5       | 0         |            | 21.67                     |
|          | 23095      | 707.5           | 1       | 0         | QPSK       | 22.74                     |
|          |            |                 | 6       | 0         |            | 21.73                     |
|          |            |                 | 1       | 0         | 16-QAM     | 21.62                     |
|          |            |                 | 5       | 0         |            | 21.68                     |
|          | 23130      | 711             | 1       | 0         | QPSK       | 22.7                      |
|          |            |                 | 6       | 0         |            | 21.71                     |
|          |            |                 | 1       | 0         | 16-QAM     | 21.67                     |
|          |            |                 | 5       | 0         |            | 21.71                     |

## Band 13

| BW (MHz) | UL Channel | Frequency (MHz) | RB Size | RB offset | Modulation | Conduction AVG Power(dBm) |
|----------|------------|-----------------|---------|-----------|------------|---------------------------|
| 5        | 23205      | 779.5           | 1       | 0         | QPSK       | 22.53                     |
|          |            |                 | 6       | 0         |            | 21.6                      |
|          |            |                 | 1       | 0         | 16-QAM     | 22.61                     |
|          |            |                 | 5       | 0         |            | 20.68                     |
|          | 23230      | 782             | 1       | 0         | QPSK       | 22.54                     |
|          |            |                 | 6       | 0         |            | 21.67                     |
|          |            |                 | 1       | 0         | 16-QAM     | 22.62                     |
|          |            |                 | 5       | 0         |            | 20.57                     |
|          | 23255      | 784.5           | 1       | 0         | QPSK       | 22.49                     |
|          |            |                 | 6       | 0         |            | 21.62                     |
|          |            |                 | 1       | 0         | 16-QAM     | 22.6                      |
|          |            |                 | 5       | 0         |            | 20.65                     |



## Band 25

| BW (MHz) | UL Channel | Frequency (MHz) | RB Size | RB offset | Modulation | Conduction AVG Power(dBm) |
|----------|------------|-----------------|---------|-----------|------------|---------------------------|
| 3        | 26055      | 1851.5          | 1       | 0         | QPSK       | 22.86                     |
|          |            |                 | 6       | 0         |            | 20.91                     |
|          |            |                 | 1       | 0         | 16-QAM     | 21.52                     |
|          |            |                 | 5       | 0         |            | 20.91                     |
|          | 26365      | 1882.5          | 1       | 0         | QPSK       | 22.99                     |
|          |            |                 | 6       | 0         |            | 21.14                     |
|          |            |                 | 1       | 0         | 16-QAM     | 21.99                     |
|          |            |                 | 5       | 0         |            | 20.08                     |
|          | 26675      | 1913.5          | 1       | 0         | QPSK       | 22.98                     |
|          |            |                 | 6       | 0         |            | 21.28                     |
|          |            |                 | 1       | 0         | 16-QAM     | 21.94                     |
|          |            |                 | 5       | 0         |            | 21.22                     |

## Band 26(814-824)

| BW (MHz) | UL Channel | Frequency (MHz) | RB Size | RB offset | Modulation | Conduction AVG Power(dBm) |
|----------|------------|-----------------|---------|-----------|------------|---------------------------|
| 5        | 26715      | 816.5           | 1       | 0         | QPSK       | 22.84                     |
|          |            |                 | 6       | 0         |            | 22.06                     |
|          |            |                 | 1       | 0         | 16-QAM     | 21.83                     |
|          |            |                 | 5       | 0         |            | 21.05                     |
|          | 26765      | 821.5           | 1       | 0         | QPSK       | 22.84                     |
|          |            |                 | 6       | 0         |            | 21.93                     |
|          |            |                 | 1       | 0         | 16-QAM     | 21.85                     |
|          |            |                 | 5       | 0         |            | 20.87                     |

## Cross-rule channel 824MHz

| BW (MHz) | UL Channel | Frequency (MHz) | RB Size | RB offset | Modulation | Conduction AVG Power(dBm) |
|----------|------------|-----------------|---------|-----------|------------|---------------------------|
| 1.4      | 26790      | 824             | 1       | 0         | QPSK       | 22.98                     |
|          |            |                 | 6       | 0         |            | 21.06                     |
|          |            |                 | 1       | 0         | 16-QAM     | 21.87                     |
|          |            |                 | 5       | 0         |            | 21.14                     |



# **Band 66**

| BW<br>(MHz) | UL Channel | Frequency<br>(MHz) | RB Size | RB<br>offset | Modulation | Conduction<br>AVG<br>Power(dBm) |
|-------------|------------|--------------------|---------|--------------|------------|---------------------------------|
| 5           | 131997     | 1712.5             | 1       | 0            | QPSK       | 22.77                           |
|             |            |                    | 6       | 0            |            | 21.79                           |
|             |            |                    | 1       | 0            | 16-QAM     | 21.68                           |
|             |            |                    | 5       | 0            |            | 20.72                           |
|             | 132322     | 1745               | 1       | 0            | QPSK       | 22.88                           |
|             |            |                    | 6       | 0            |            | 21.93                           |
|             |            |                    | 1       | 0            | 16-QAM     | 21.83                           |
|             |            |                    | 5       | 0            |            | 20.87                           |
|             | 132647     | 1777.5             | 1       | 0            | QPSK       | 22.88                           |
|             |            |                    | 6       | 0            |            | 21.82                           |
|             |            |                    | 1       | 0            | 16-QAM     | 21.77                           |
|             |            |                    | 5       | 0            |            | 20.83                           |



**NB1**  
**Band 5**

| UL Channel | UL Channel | Modulation    | Subcarrier Space (KHz) | RB Configure | AVG Power(dBm) |
|------------|------------|---------------|------------------------|--------------|----------------|
| 20402      | 824.2      | $\pi/2$ -BPSK | 3.75                   | 1#0          | 23.12          |
|            |            |               |                        | 1#47         | 23.04          |
|            |            |               | 15                     | 1#0          | 23.12          |
|            |            |               |                        | 1#11         | 23.11          |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 23.14          |
|            |            |               |                        | 1#47         | 23.07          |
|            |            |               | 15                     | 1#0          | 23.17          |
|            |            |               |                        | 1#11         | 23.16          |
|            |            |               |                        | 3#0          | 22.99          |
|            |            |               |                        | 3#6          | 23.31          |
|            |            |               |                        | 6#0          | 22.31          |
|            |            |               |                        | 6#6          | 22.38          |
|            |            |               |                        | 12#0         | 21.37          |
| 20525      | 836.5      | $\pi/2$ -BPSK | 3.75                   | 1#0          | 23.05          |
|            |            |               |                        | 1#47         | 22.98          |
|            |            |               | 15                     | 1#0          | 23.04          |
|            |            |               |                        | 1#11         | 23             |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 23.04          |
|            |            |               |                        | 1#47         | 22.96          |
|            |            |               | 15                     | 1#0          | 23.03          |
|            |            |               |                        | 1#11         | 22.99          |
|            |            |               |                        | 3#0          | 22.71          |
|            |            |               |                        | 3#6          | 23.16          |
|            |            |               |                        | 6#0          | 21.8           |
|            |            |               |                        | 6#6          | 21.81          |
|            |            |               |                        | 12#0         | 20.78          |
| 20648      | 848.8      | $\pi/2$ -BPSK | 3.75                   | 1#0          | 23.01          |
|            |            |               |                        | 1#47         | 23.04          |
|            |            |               | 15                     | 1#0          | 23.15          |
|            |            |               |                        | 1#11         | 23.1           |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 23             |
|            |            |               |                        | 1#47         | 23.03          |
|            |            |               | 15                     | 1#0          | 23.18          |
|            |            |               |                        | 1#11         | 23.1           |
|            |            |               |                        | 3#0          | 22.98          |
|            |            |               |                        | 3#6          | 23.34          |
|            |            |               |                        | 6#0          | 22.23          |
|            |            |               |                        | 6#6          | 22.31          |
|            |            |               |                        | 12#0         | 21.27          |



## Band 12

| UL Channel | UL Channel | Modulation    | Subcarrier Space (KHz) | RB Configure | AVG Power(dBm) |
|------------|------------|---------------|------------------------|--------------|----------------|
| 23012      | 699.2      | $\pi/2$ -BPSK | 3.75                   | 1#0          | 22.84          |
|            |            |               |                        | 1#47         | 22.79          |
|            |            |               | 15                     | 1#0          | 22.95          |
|            |            |               |                        | 1#11         | 22.95          |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 22.9           |
|            |            |               |                        | 1#47         | 22.81          |
|            |            |               | 15                     | 1#0          | 22.86          |
|            |            |               |                        | 1#11         | 22.94          |
|            |            |               |                        | 3#0          | 22.83          |
|            |            |               |                        | 3#6          | 23.19          |
|            |            |               |                        | 6#0          | 22.03          |
|            |            |               |                        | 6#6          | 22.13          |
|            |            |               |                        | 12#0         | 21.14          |
| 23095      | 707.5      | $\pi/2$ -BPSK | 3.75                   | 1#0          | 23.01          |
|            |            |               |                        | 1#47         | 23.11          |
|            |            |               | 15                     | 1#0          | 23.16          |
|            |            |               |                        | 1#11         | 23.13          |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 23.01          |
|            |            |               |                        | 1#47         | 23.09          |
|            |            |               | 15                     | 1#0          | 23.15          |
|            |            |               |                        | 1#11         | 23.1           |
|            |            |               |                        | 3#0          | 22.97          |
|            |            |               |                        | 3#6          | 23.17          |
|            |            |               |                        | 6#0          | 21.97          |
|            |            |               |                        | 6#6          | 21.98          |
|            |            |               |                        | 12#0         | 20.95          |
| 23178      | 715.8      | $\pi/2$ -BPSK | 3.75                   | 1#0          | 22.85          |
|            |            |               |                        | 1#47         | 22.86          |
|            |            |               | 15                     | 1#0          | 22.83          |
|            |            |               |                        | 1#11         | 22.82          |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 22.81          |
|            |            |               |                        | 1#47         | 22.85          |
|            |            |               | 15                     | 1#0          | 22.9           |
|            |            |               |                        | 1#11         | 22.86          |
|            |            |               |                        | 3#0          | 22.71          |
|            |            |               |                        | 3#6          | 23.16          |
|            |            |               |                        | 6#0          | 22.03          |
|            |            |               |                        | 6#6          | 22.09          |
|            |            |               |                        | 12#0         | 21.18          |



## Band 25

| UL Channel | UL Channel | Modulation    | Subcarrier Space (KHz) | RB Configure | AVG Power(dBm) |
|------------|------------|---------------|------------------------|--------------|----------------|
| 264042     | 1850.2     | $\pi/2$ -BPSK | 3.75                   | 1#0          | 23.02          |
|            |            |               |                        | 1#47         | 22.96          |
|            |            |               | 15                     | 1#0          | 22.97          |
|            |            |               |                        | 1#11         | 22.95          |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 22.98          |
|            |            |               |                        | 1#47         | 22.91          |
|            |            |               | 15                     | 1#0          | 23.05          |
|            |            |               |                        | 1#11         | 22.96          |
|            |            |               |                        | 3#0          | 22.96          |
|            |            |               |                        | 3#6          | 23.31          |
|            |            |               |                        | 6#0          | 22.18          |
|            |            |               |                        | 6#6          | 22.31          |
|            |            |               |                        | 12#0         | 21.28          |
| 26365      | 1882.5     | $\pi/2$ -BPSK | 3.75                   | 1#0          | 22.48          |
|            |            |               |                        | 1#47         | 22.45          |
|            |            |               | 15                     | 1#0          | 22.42          |
|            |            |               |                        | 1#11         | 22.36          |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 22.45          |
|            |            |               |                        | 1#47         | 22.44          |
|            |            |               | 15                     | 1#0          | 22.4           |
|            |            |               |                        | 1#11         | 22.25          |
|            |            |               |                        | 3#0          | 21.3           |
|            |            |               |                        | 3#6          | 21.29          |
|            |            |               |                        | 6#0          | 21.37          |
|            |            |               |                        | 6#6          | 19.91          |
|            |            |               |                        | 12#0         | 19.91          |
| 26688      | 1914.8     | $\pi/2$ -BPSK | 3.75                   | 1#0          | 23.28          |
|            |            |               |                        | 1#47         | 23.32          |
|            |            |               | 15                     | 1#0          | 23.3           |
|            |            |               |                        | 1#11         | 23.3           |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 23.29          |
|            |            |               |                        | 1#47         | 23.34          |
|            |            |               | 15                     | 1#0          | 23.4           |
|            |            |               |                        | 1#11         | 23.33          |
|            |            |               |                        | 3#0          | 23.25          |
|            |            |               |                        | 3#6          | 23.89          |
|            |            |               |                        | 6#0          | 22.49          |
|            |            |               |                        | 6#6          | 22.61          |
|            |            |               |                        | 12#0         | 21.51          |



# Band 26(814-824)

| UL Channel | UL Channel | Modulation    | Subcarrier Space (KHz) | RB Configure | AVG Power(dBm) |
|------------|------------|---------------|------------------------|--------------|----------------|
| 26692      | 814.2      | $\pi/2$ -BPSK | 3.75                   | 1#0          | 23.02          |
|            |            |               |                        | 1#47         | 22.96          |
|            |            |               | 15                     | 1#0          | 22.99          |
|            |            |               |                        | 1#11         | 23.01          |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 22.95          |
|            |            |               |                        | 1#47         | 22.93          |
|            |            |               | 15                     | 1#0          | 22.98          |
|            |            |               |                        | 1#11         | 22.96          |
|            |            |               |                        | 3#0          | 22.88          |
|            |            |               |                        | 3#6          | 22.86          |
|            |            |               |                        | 6#0          | 22.20          |
|            |            |               |                        | 6#6          | 22.24          |
|            |            |               |                        | 12#0         | 21.21          |
|            |            |               |                        |              |                |
| 26788      | 823.8      | $\pi/2$ -BPSK | 3.75                   | 1#0          | 23.01          |
|            |            |               |                        | 1#47         | 22.69          |
|            |            |               | 15                     | 1#0          | 22.78          |
|            |            |               |                        | 1#11         | 22.79          |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 22.75          |
|            |            |               |                        | 1#47         | 22.69          |
|            |            |               | 15                     | 1#0          | 22.80          |
|            |            |               |                        | 1#11         | 22.96          |
|            |            |               |                        | 3#0          | 21.96          |
|            |            |               |                        | 3#6          | 22.01          |
|            |            |               |                        | 6#0          | 21.01          |
|            |            |               |                        | 6#6          | 20.91          |
|            |            |               |                        | 12#0         | 21.21          |
|            |            |               |                        |              |                |



# Cross-rule channel 824MHz

| UL Channel | UL Channel | Modulation    | Subcarrier Space (KHz) | RB Configure | AVG Power(dBm) |
|------------|------------|---------------|------------------------|--------------|----------------|
| 26790      | 824        | $\pi/2$ -BPSK | 3.75                   | 1#0          | 23.14          |
|            |            |               |                        | 1#47         | 23.12          |
|            |            |               | 15                     | 1#0          | 23.14          |
|            |            |               |                        | 1#11         | 23.11          |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 23.12          |
|            |            |               |                        | 1#47         | 23.15          |
|            |            |               | 15                     | 1#0          | 23.16          |
|            |            |               |                        | 1#11         | 23.17          |
|            |            |               |                        | 3#0          | 22.64          |
|            |            |               |                        | 3#6          | 23.16          |
|            |            |               |                        | 6#0          | 21.94          |
|            |            |               |                        | 6#6          | 21.97          |
|            |            |               |                        | 12#0         | 21.04          |



## Band 66

| UL Channel | UL Channel | Modulation    | Subcarrier Space (KHz) | RB Configure | AVG Power(dBm) |
|------------|------------|---------------|------------------------|--------------|----------------|
| 131974     | 1710.2     | $\pi/2$ -BPSK | 3.75                   | 1#0          | 22.96          |
|            |            |               |                        | 1#47         | 22.92          |
|            |            |               | 15                     | 1#0          | 22.98          |
|            |            |               |                        | 1#11         | 22.96          |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 22.99          |
|            |            |               |                        | 1#47         | 22.9           |
|            |            |               | 15                     | 1#0          | 22.99          |
|            |            |               |                        | 1#11         | 22.96          |
|            |            |               |                        | 3#0          | 22.83          |
|            |            |               |                        | 3#6          | 23.31          |
|            |            |               |                        | 6#0          | 22.2           |
|            |            |               |                        | 6#6          | 22.29          |
|            |            |               |                        | 12#0         | 21.19          |
| 132322     | 1745       | $\pi/2$ -BPSK | 3.75                   | 1#0          | 22.75          |
|            |            |               |                        | 1#47         | 22.69          |
|            |            |               | 15                     | 1#0          | 22.75          |
|            |            |               |                        | 1#11         | 22.73          |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 22.74          |
|            |            |               |                        | 1#47         | 22.66          |
|            |            |               | 15                     | 1#0          | 22.73          |
|            |            |               |                        | 1#11         | 22.72          |
|            |            |               |                        | 3#0          | 22.4           |
|            |            |               |                        | 3#6          | 22.46          |
|            |            |               |                        | 6#0          | 21.55          |
|            |            |               |                        | 6#6          | 21.54          |
|            |            |               |                        | 12#0         | 20.54          |
| 132670     | 1779.8     | $\pi/2$ -BPSK | 3.75                   | 1#0          | 23.11          |
|            |            |               |                        | 1#47         | 23.03          |
|            |            |               | 15                     | 1#0          | 23.12          |
|            |            |               |                        | 1#11         | 23.16          |
|            |            | $\pi/4$ -QPSK | 3.75                   | 1#0          | 23.12          |
|            |            |               |                        | 1#47         | 23.1           |
|            |            |               | 15                     | 1#0          | 23.13          |
|            |            |               |                        | 1#11         | 23.1           |
|            |            |               |                        | 3#0          | 22.98          |
|            |            |               |                        | 3#6          | 23.39          |
|            |            |               |                        | 6#0          | 22.21          |
|            |            |               |                        | 6#6          | 22.38          |
|            |            |               |                        | 12#0         | 21.26          |



## Tune up power

### Cat-M

| RB Size | RB offset | Modulation | Band 4    | Band 5    | Band 12 |
|---------|-----------|------------|-----------|-----------|---------|
| 1       | 0         | QPSK       | 21.5±1dBm | 22.5±1dBm | 22±1dBm |
| 6       | 0         |            | 20.5±1dBm | 20.5±1dBm | 21±1dBm |
| 1       | 0         | 16-QAM     | 21.4±1dBm | 21±1dBm   | 21±1dBm |
| 5       | 0         |            | 19.5±1dBm | 20.5±1dBm | 21±1dBm |

| RB Size | RB offset | Modulation | Band 13   | Band 25   | B26(814-824) |
|---------|-----------|------------|-----------|-----------|--------------|
| 1       | 0         | QPSK       | 22±1dBm   | 22.5±1dBm | 22±1dBm      |
| 6       | 0         |            | 21±1dBm   | 20.5±1dBm | 21.5±1dBm    |
| 1       | 0         | 16-QAM     | 21.7±1dBm | 21.5±1dBm | 21±1dBm      |
| 5       | 0         |            | 20±1dBm   | 20.5±1dBm | 20.5±1dBm    |

| RB Size | RB offset | Mode   | Cross-rule channel 824MHz | Band 66 |
|---------|-----------|--------|---------------------------|---------|
| 1       | 0         | QPSK   | 22.5±1dBm                 | 22±1dBm |
| 6       | 0         |        | 20.5±1dBm                 | 21±1dBm |
| 1       | 0         | 16-QAM | 21±1dBm                   | 21±1dBm |
| 5       | 0         |        | 20.5±1dBm                 | 20±1dBm |



## NB

| Subcarrier Space (KHz) | RB Configure | Modulation    | Band 5    | Band 12   | Band 25   |
|------------------------|--------------|---------------|-----------|-----------|-----------|
| 3.75                   | 1#0          | $\pi/2$ -BPSK | 22.5±1dBm | 22.5±1dBm | 22.5±1dBm |
|                        | 1#47         |               | 22.5±1dBm | 22.5±1dBm | 22.5±1dBm |
| 15                     | 1#0          |               | 22.5±1dBm | 22.5±1dBm | 22.5±1dBm |
|                        | 1#11         |               | 22.5±1dBm | 22.5±1dBm | 22.5±1dBm |
| 3.75                   | 1#0          | $\pi/4$ -QPSK | 22.5±1dBm | 22.5±1dBm | 22.5±1dBm |
|                        | 1#47         |               | 22.5±1dBm | 22.5±1dBm | 22.5±1dBm |
| 15                     | 1#0          |               | 22.5±1dBm | 22.5±1dBm | 23±1dBm   |
|                        | 1#11         |               | 22.5±1dBm | 22.5±1dBm | 22.5±1dBm |
|                        | 3#0          |               | 22.5±1dBm | 22±1dBm   | 22.5±1dBm |
|                        | 3#6          |               | 22.5±1dBm | 22.5±1dBm | 23±1dBm   |
|                        | 6#0          |               | 21.5±1dBm | 22.5±1dBm | 21.5±1dBm |
|                        | 6#6          |               | 21.5±1dBm | 21.5±1dBm | 22±1dBm   |
|                        | 12#0         |               | 20.5±1dBm | 20.5±1dBm | 21±1dBm   |

| Subcarrier Space (KHz) | RB Configure | Modulation    | B26(814-824) | Cross-rule channel 824MHz | Band 66   |
|------------------------|--------------|---------------|--------------|---------------------------|-----------|
| 3.75                   | 1#0          | $\pi/2$ -BPSK | 22.5±1dBm    | 22.5±1dBm                 | 22.5±1dBm |
|                        | 1#47         |               | 22±1dBm      | 22.5±1dBm                 | 22.5±1dBm |
| 15                     | 1#0          |               | 22.5±1dBm    | 22.5±1dBm                 | 22.5±1dBm |
|                        | 1#11         |               | 22.5±1dBm    | 22.5±1dBm                 | 22.5±1dBm |
| 3.75                   | 1#0          | $\pi/4$ -QPSK | 22±1dBm      | 22.5±1dBm                 | 22.5±1dBm |
|                        | 1#47         |               | 22±1dBm      | 22.5±1dBm                 | 22.5±1dBm |
| 15                     | 1#0          |               | 22±1dBm      | 22.5±1dBm                 | 22.5±1dBm |
|                        | 1#11         |               | 22±1dBm      | 22.5±1dBm                 | 22.5±1dBm |
|                        | 3#0          |               | 22±1dBm      | 22±1dBm                   | 22.5±1dBm |
|                        | 3#6          |               | 22±1dBm      | 22.5±1dBm                 | 22.5±1dBm |
|                        | 6#0          |               | 21.5±1dBm    | 21±1dBm                   | 21.5±1dBm |
|                        | 6#6          |               | 21.5±1dBm    | 21±1dBm                   | 21.5±1dBm |
|                        | 12#0         |               | 20.5±1dBm    | 20.5±1dBm                 | 20.5±1dBm |

## 2.4G WLAN

| Mode          | 2.4G WIFI |
|---------------|-----------|
| 802.11b       | 10.5±1dBm |
| 802.11g       | 10±1dBm   |
| 802.11 n-HT20 | 9±1dBm    |
| 802.11 n-HT40 | 8±1dBm    |

## BLE

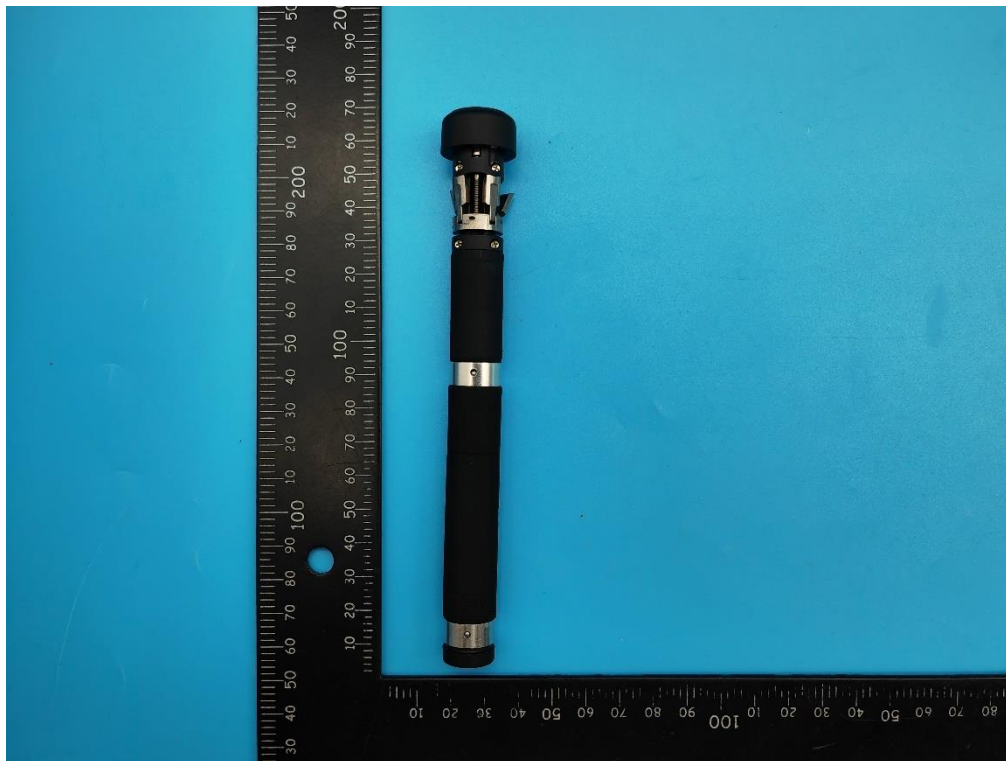
| Mode        | BLE      |
|-------------|----------|
| GFSK(1Mbps) | 1.5±1dBm |
| GFSK(2Mbps) | 2±1dBm   |



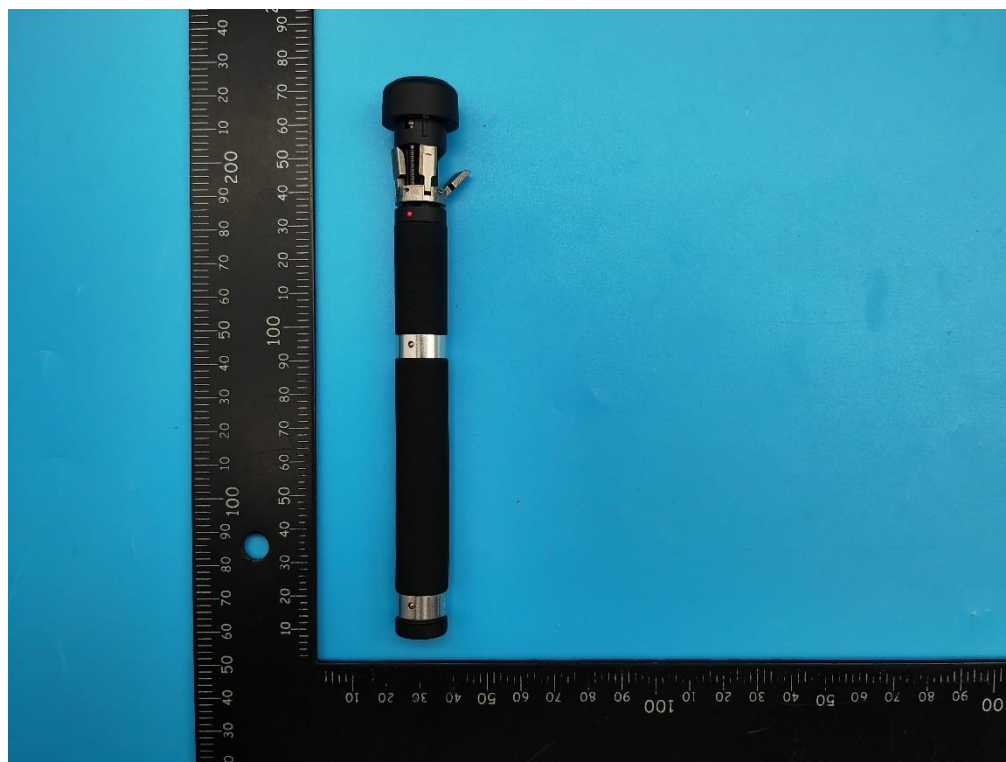
## 11. EUT and Test Setup Photo

### 11.1 EUT Photos

LTE Antenna Top side



BT/WIFI Antenna Top side

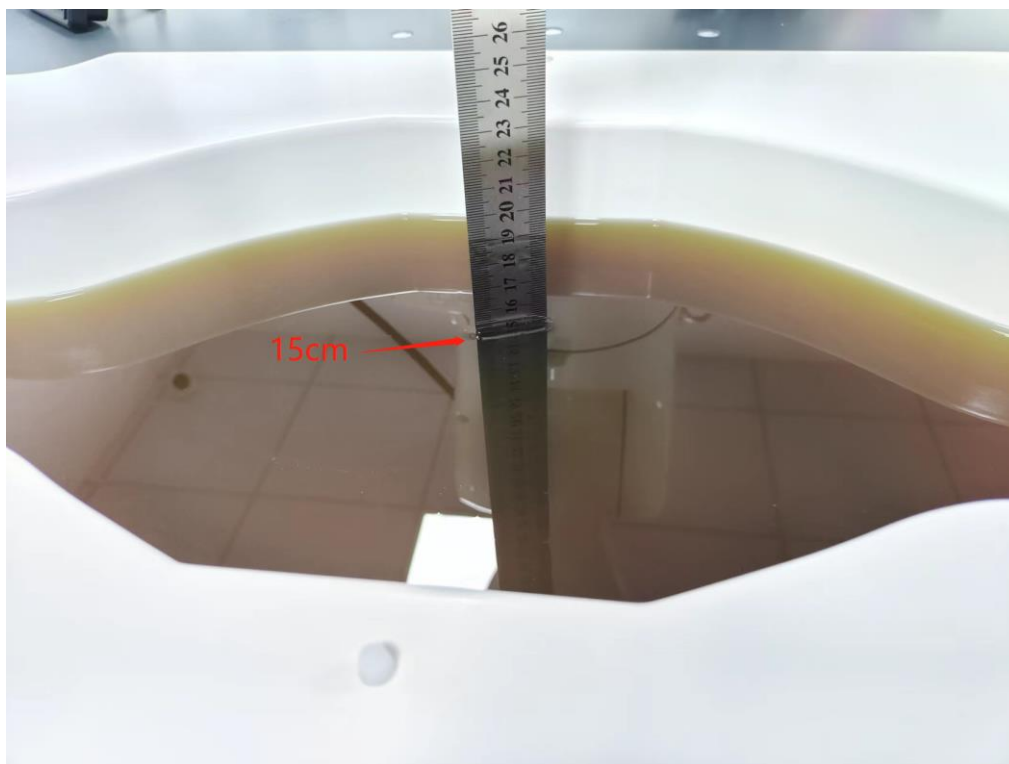


## 11.2 Setup Photos

Top side (separation distance is 0mm)



Liquid depth (15 cm)





## 12. SAR Result Summary

### 12.1 Limbs SAR

| Band          | Mode                               | Test Position | Freq.  | SAR (10g) (W/kg) | Power Drift(%) | Max.Turn-up Power(dBm) | Meas.Output Power(dBm) | Scaled SAR (W/Kg) | Meas.No. |
|---------------|------------------------------------|---------------|--------|------------------|----------------|------------------------|------------------------|-------------------|----------|
| CAT-M band 4  | QPSK, 5MHz BW, 1RB Offset 0        | Top Side      | 1732.5 | 0.087            | -0.22          | 22.50                  | 22.27                  | <b>0.092</b>      | <b>1</b> |
|               | QPSK, 5MHz BW, 6RB Offset 0        | Top Side      | 1752.5 | 0.065            | -1.16          | 21.50                  | 21.27                  | 0.069             | /        |
| CAT-M band 5  | QPSK, 3MHz BW, 1RB Offset 0        | Top Side      | 825.5  | 0.083            | 2.78           | 23.50                  | 22.97                  | 0.094             | /        |
|               |                                    |               | 836.5  | 0.096            | -1.96          | 23.50                  | 22.99                  | <b>0.108</b>      | <b>2</b> |
|               |                                    |               | 847.5  | 0.080            | -2.11          | 23.50                  | 22.99                  | 0.090             | /        |
|               | QPSK, 3MHz BW, 6RB Offset 0        | Top Side      | 847.5  | 0.073            | -0.87          | 21.50                  | 21.08                  | <b>0.080</b>      | /        |
| CAT-M band 12 | QPSK, 10MHz BW, 1RB Offset 0       | Top Side      | 707.5  | 0.079            | 3.81           | 23.00                  | 22.74                  | <b>0.084</b>      | <b>3</b> |
|               | QPSK, 10MHz BW, 6RB Offset 0       | Top Side      | 707.5  | 0.053            | 1.88           | 22.00                  | 21.73                  | 0.056             | /        |
| CAT-M band 13 | QPSK, 5MHz BW, 1RB Offset 0        | Top Side      | 782    | 0.091            | -0.40          | 23.00                  | 22.54                  | <b>0.101</b>      | <b>4</b> |
|               | QPSK, 5MHz BW, 6RB Offset 0        | Top Side      | 784.5  | 0.075            | 2.71           | 22.00                  | 21.67                  | 0.081             | /        |
| CAT-M band 25 | QPSK, 3MHz BW, 1RB Offset 0        | Top Side      | 1882.5 | 0.063            | -2.01          | 23.50                  | 22.99                  | <b>0.071</b>      | <b>5</b> |
|               | QPSK, 3MHz BW, 6RB Offset 0        | Top Side      | 1882.5 | 0.052            | 3.95           | 21.50                  | 21.14                  | 0.056             | /        |
| CAT-M band 26 | QPSK, 1.4MHz BW, 1RB Offset 0      | Top Side      | 824    | 0.054            | 0.39           | 23.50                  | 22.98                  | <b>0.061</b>      | <b>6</b> |
|               | QPSK, 1.4MHz BW, 6RB Offset 0      | Top Side      | 824    | 0.043            | -3.34          | 21.50                  | 21.06                  | 0.048             | /        |
| CAT-M band 66 | QPSK, 5MHz BW, 1RB Offset 0        | Top Side      | 1777.5 | 0.082            | 0.58           | 23.00                  | 22.88                  | <b>0.084</b>      | <b>7</b> |
|               | QPSK, 5MHz BW, 6RB Offset 0        | Top Side      | 1777.5 | 0.073            | -0.65          | 22.00                  | 21.93                  | 0.074             | /        |
| NB band 5     | $\pi/4$ -QPSK 15K sub carrier, 1#0 | Top Side      | 848.8  | 0.207            | 2.57           | 23.50                  | 23.18                  | 0.223             | /        |
|               | $\pi/4$ -QPSK 15K sub carrier, 3#6 | Top Side      | 824.2  | 0.279            | 3.00           | 23.50                  | 23.31                  | 0.291             | /        |
|               |                                    | Top Side      | 836.5  | 0.264            | -0.74          | 23.50                  | 23.16                  | 0.285             | /        |
|               |                                    | Top Side      | 848.8  | 0.288            | -3.91          | 23.50                  | 23.34                  | <b>0.299</b>      | <b>8</b> |
| NB band 12    | $\pi/4$ -QPSK 15K sub carrier, 1#0 | Top Side      | 707.5  | 0.151            | -2.28          | 23.50                  | 23.15                  | 0.164             | /        |
|               | $\pi/4$ -QPSK 15K sub carrier, 3#6 | Top Side      | 699.2  | 0.166            | 3.00           | 23.50                  | 23.19                  | <b>0.178</b>      | <b>9</b> |



|            |                                     |          |        |       |       |       |       |              |           |
|------------|-------------------------------------|----------|--------|-------|-------|-------|-------|--------------|-----------|
| NB band 25 | $\pi/4$ -QPSK 15K sub carrier, 1#0  | Top Side | 1914.8 | 0.204 | 0.21  | 23.50 | 23.40 | 0.209        | /         |
|            | $\pi/4$ -QPSK 15K sub carrier, 3#6  | Top Side | 1914.8 | 0.236 | 0.10  | 24.00 | 23.89 | <b>0.242</b> | <b>10</b> |
| NB band 26 | $\pi/4$ -QPSK 15K sub carrier, 1#0  | Top Side | 824    | 0.142 | 2.83  | 23.50 | 23.16 | 0.154        | /         |
|            | $\pi/4$ -QPSK 15K sub carrier, 1#11 | Top Side | 824    | 0.146 | -1.15 | 23.50 | 23.17 | <b>0.158</b> | <b>11</b> |
| NB band 66 | $\pi/4$ -QPSK 15K sub carrier, 1#0  | Top Side | 1779.8 | 0.197 | 1.49  | 23.50 | 23.13 | 0.215        | /         |
|            | $\pi/4$ -QPSK 15K sub carrier, 3#6  | Top Side | 1779.8 | 0.215 | -3.89 | 23.50 | 23.39 | <b>0.221</b> | <b>12</b> |
| 2.4G WLAN  | 802.11b                             | Top Side | 2412   | 0.011 | 2.22  | 11.50 | 11.15 | <b>0.012</b> | <b>13</b> |
| BLE        | GFSK                                | Top Side | 2402   | 0.01  | -1.03 | 3.00  | 2.99  | <b>0.010</b> | <b>14</b> |

Note:

1. The test separation of all above table is 0mm.
2. Per KDB 447498 D04, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
  - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
  - b. Scaled SAR(W/kg) = Measured SAR(W/kg) \*Tune-up Scaling Factor
3. Per KDB 248227- When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg. (The highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power was 0.011 W/Kg for Limbs)



## 12.2 Simultaneous Multi-band Transmission Evaluation

Application Simultaneous Transmission information:

| Position | Simultaneous State |
|----------|--------------------|
| Limbs    | 1. LTE + 2.4G WLAN |
|          | 2. LTE + Bluetooth |

NOTE:

1. Bluetooth and WLAN can't simultaneous transmission at the same time.
2. For simultaneous transmission at head and body exposure position, 2 transmitters simultaneous transmission was the worst state.
3. If the test separation distance is <5mm, 5mm is used for excluded SAR calculation.
4. KDB 447498 Appendix E, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:  
 $SAR_{est} = 1.6 \cdot Pant / Pth$  [W/kg].  
*Pant* is maximum time-averaged power or effective radiated power (ERP), whichever is greater, and *Pth* is defined in Formula KDB 447498 (B.2).

| Simultaneous Mode       | Position | Mode        | Max. 10-g SAR | 10-g Sum SAR |
|-------------------------|----------|-------------|---------------|--------------|
|                         |          |             | (W/kg)        | (W/kg)       |
| LTE Cat -M1 + 2.4G WLAN | Body     | LTE Cat -M1 | 0.108         | 0.120        |
|                         |          | 2.4G WLAN   | 0.012         |              |
| LTE Cat -M1 + Bluetooth | Body     | LTE Cat -M1 | 0.108         | 0.118        |
|                         |          | Bluetooth   | 0.010         |              |
| LTE NB1 + 2.4G WLAN     | Body     | LTE NB1     | 0.299         | 0.311        |
|                         |          | 2.4G WLAN   | 0.012         |              |
| LTE NB1 + Bluetooth     | Body     | LTE NB1     | 0.299         | 0.309        |
|                         |          | Bluetooth   | 0.010         |              |

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.

When the sum of SAR 10g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR-10g 4 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR 10g is greater than the SAR limit (SAR-10g 4 W/kg), SAR test exclusion is determined by the SPLSR.



### 13. Equipment List

| Kind of Equipment                     | Manufacturer | Type No. | Serial No.               | Last Calibration | Calibrated Until |
|---------------------------------------|--------------|----------|--------------------------|------------------|------------------|
| 750MHz Dipole                         | MVG          | DIP0G750 | SN 06/22<br>DIP0G750-638 | 2022.02.11       | 2025.02.10       |
| 835MHz Dipole                         | MVG          | DIP0G835 | SN 06/22<br>DIP0G835-639 | 2022.02.11       | 2025.02.10       |
| 1800MHz Dipole                        | MVG          | DIP1G800 | SN 06/22<br>DIP1G800-640 | 2022.02.11       | 2025.02.10       |
| 1900MHz Dipole                        | MVG          | DIP1G900 | SN 06/22<br>DIP1G900-641 | 2022.02.11       | 2025.02.10       |
| 2450MHz Dipole                        | MVG          | DIP2G450 | SN 06/22<br>DIP2G450-645 | 2022.02.11       | 2025.02.10       |
| E-Field Probe                         | MVG          | EPGO364  | SN 04/22<br>EPGO364      | 2023.02.10       | 2024.02.09       |
| Liquid Calibration Kit                | MVG          | OCPG 87  | SN 06/22<br>OCPG87       | 2023.02.10       | 2024.02.09       |
| Antenna                               | MVG          | ANTA 73  | SN 06/22 ANTA<br>73      | N/A              | N/A              |
| Ellipsoid Phantom                     | MVG          | ELLI 51  | SN 06/22 ELLI<br>51      | N/A              | N/A              |
| Phantom                               | MVG          | SAM 148  | SN 06/22<br>SAM148       | N/A              | N/A              |
| Phone holder                          | MVG          | MSH 117  | SN 06/22 MSH<br>117      | N/A              | N/A              |
| Laptop holder                         | MVG          | LSH 36   | SN 06/22 LSH<br>38       | N/A              | N/A              |
| Directional coupler                   | SHW          | SHWDCP   | 202203280013             | N/A              | N/A              |
| Network Analyzer                      | Agilent      | E5071C   | MY46418070               | 2023.03.27       | 2024.03.26       |
| Multi Meter                           | Keithley     | DMM6500  | DMM6500                  | 2023.03.27       | 2024.03.26       |
| Signal Generator                      | Keithley     | N5182B   | MY59100717               | 2023.04.07       | 2024.04.06       |
| Wireless<br>Communication Test<br>Set | R&S          | CMW500   | 137737                   | 2023.04.14       | 2024.04.13       |
| Power Sensor                          | R&S          | Z11      | 116184                   | 2023.03.27       | 2024.03.26       |
| Temperature<br>hygrometer             | N/A          | ST-W2318 | N/A                      | 2023.04.24       | 2024.04.23       |
| Thermograph                           | N/A          | TP101    | N/A                      | 2023.04.25       | 2024.04.24       |



## Appendix A. System Validation Plots

### System Performance Check Data (750MHz)

Type: Phone measurement (Complete)

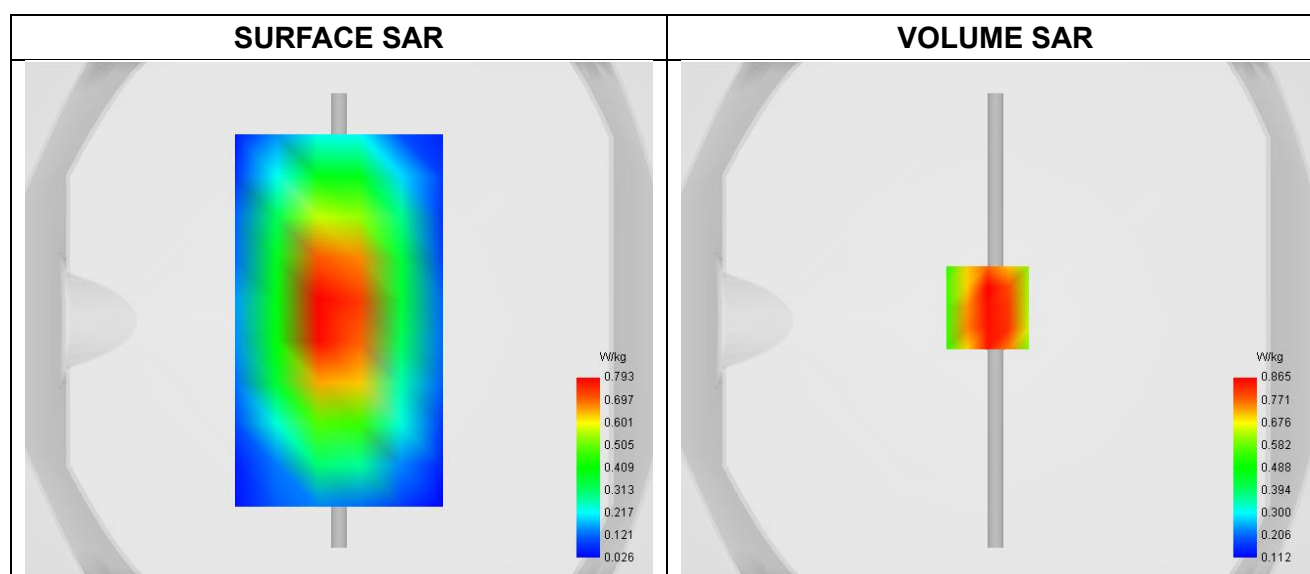
Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 2023-05-21

### Experimental conditions.

|                       |                  |
|-----------------------|------------------|
| Phantom               | Validation plane |
| Device Position       | Dipole           |
| Band                  | CW750            |
| Channels              | Middle           |
| Signal                | CW               |
| Frequency (MHz)       | 750.000          |
| Relative permittivity | 42.66            |
| Conductivity (S/m)    | 0.86             |
| Probe                 | SN 04/22 EPGO364 |
| ConvF                 | 1.69             |
| Crest factor:         | 1:1              |

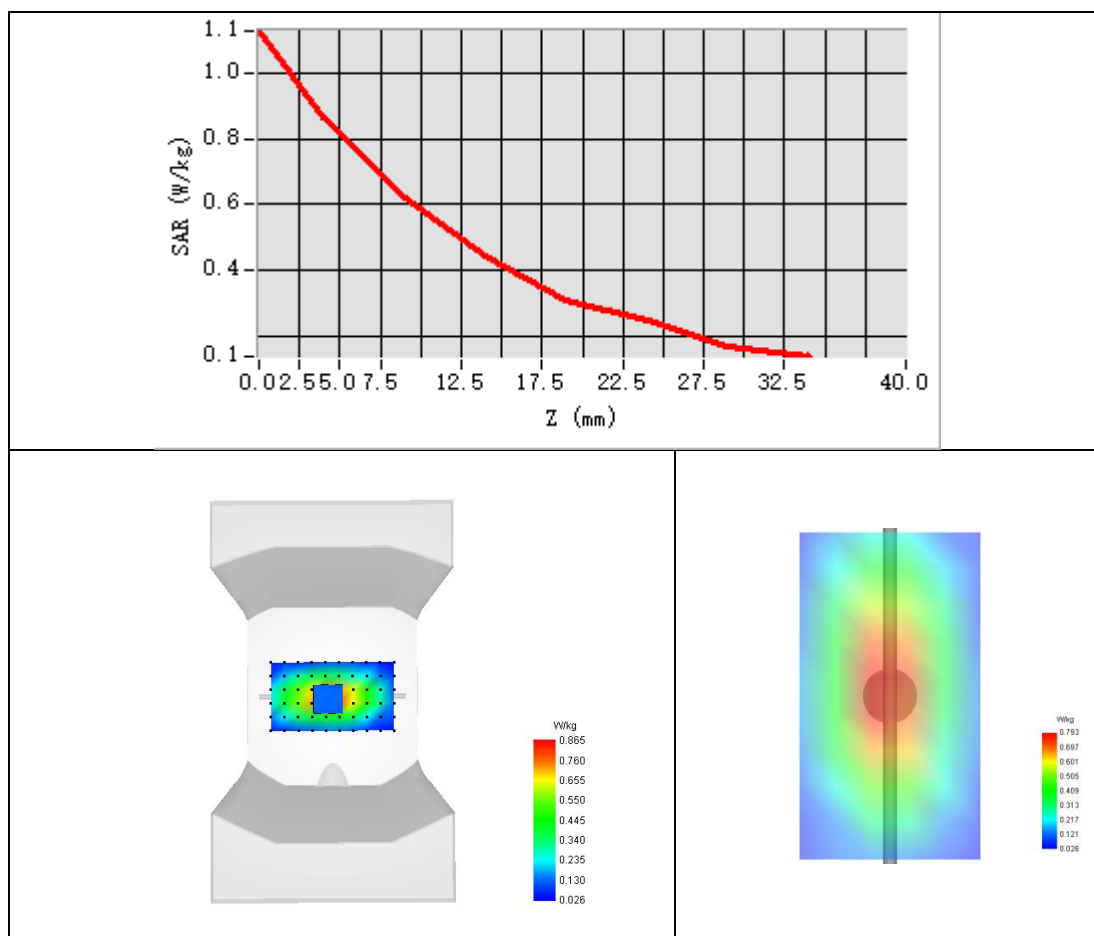


Maximum location: X=5.00, Y=9.00 ; SAR Peak: 1.52 W/kg

|                |       |
|----------------|-------|
| SAR 10g (W/Kg) | 0.574 |
| SAR 1g (W/Kg)  | 0.863 |



## Z Axis Scan





## System Performance Check Data (835MHz)

Type: Phone measurement (Complete)

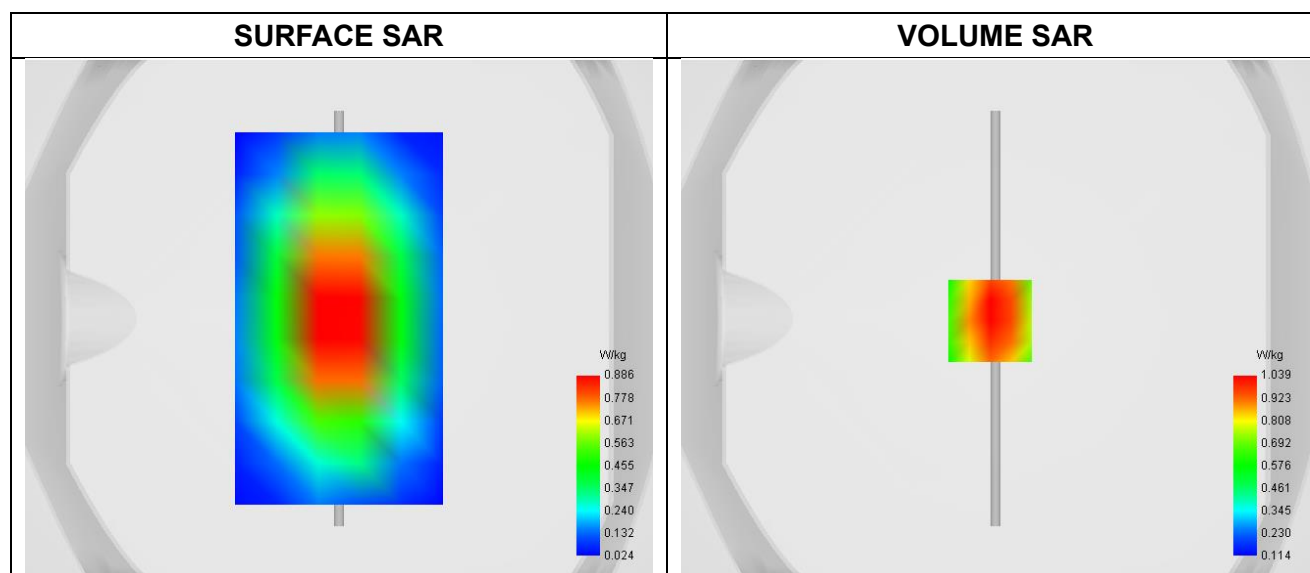
Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 2023-05-21

### Experimental conditions.

| Phantom               | Validation plane |
|-----------------------|------------------|
| Device Position       | Dipole           |
| Band                  | CW835            |
| Channels              | Middle           |
| Signal                | CW               |
| Frequency (MHz)       | 835.000          |
| Relative permittivity | 41.00            |
| Conductivity (S/m)    | 0.89             |
| Probe                 | SN 04/22 EPGO364 |
| ConvF                 | 1.72             |
| Crest factor:         | 1:1              |

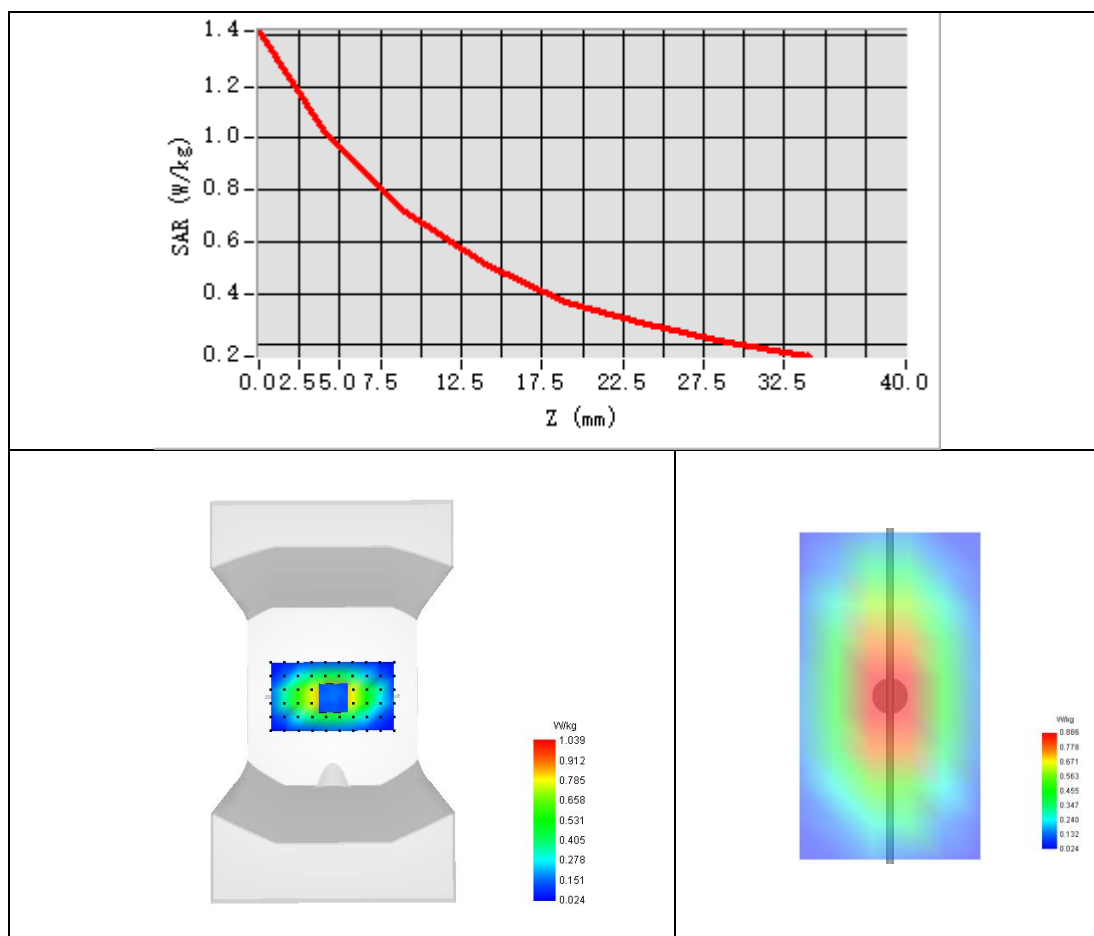


Maximum location: X=5.00, Y=5.00 ; SAR Peak: 1.45 W/kg

|                |       |
|----------------|-------|
| SAR 10g (W/Kg) | 0.623 |
| SAR 1g (W/Kg)  | 1.037 |



## Z Axis Scan





## System Performance Check Data (1800MHz)

Type: Phone measurement (Complete)

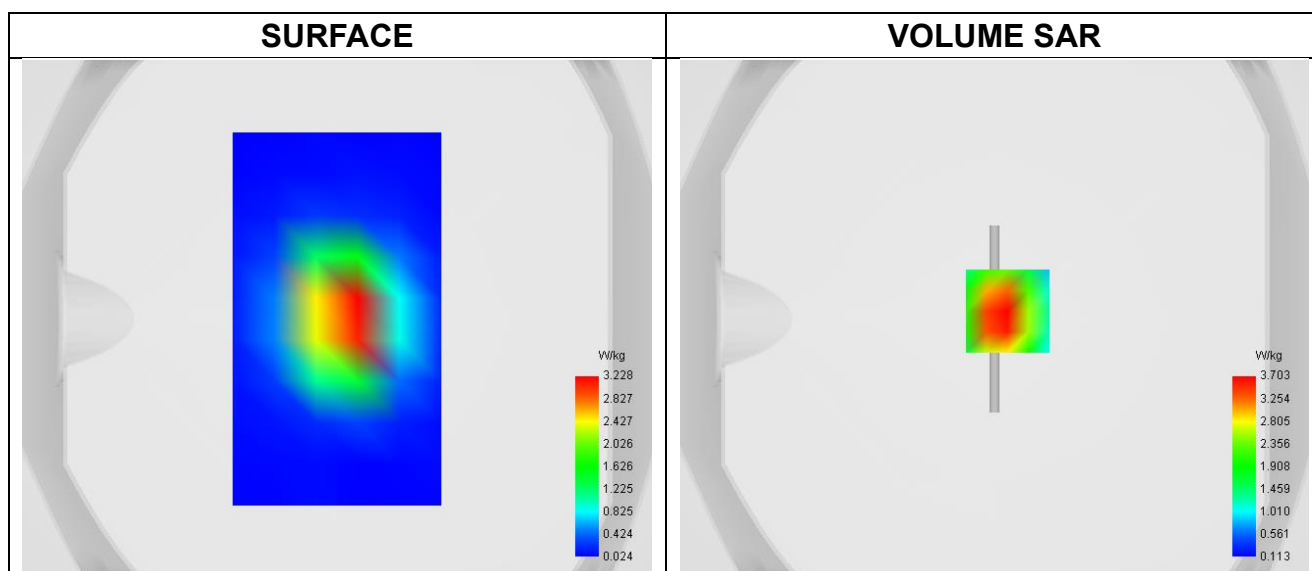
Area scan resolution: dx=8mm, dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 2023-05-22

### Experimental conditions.

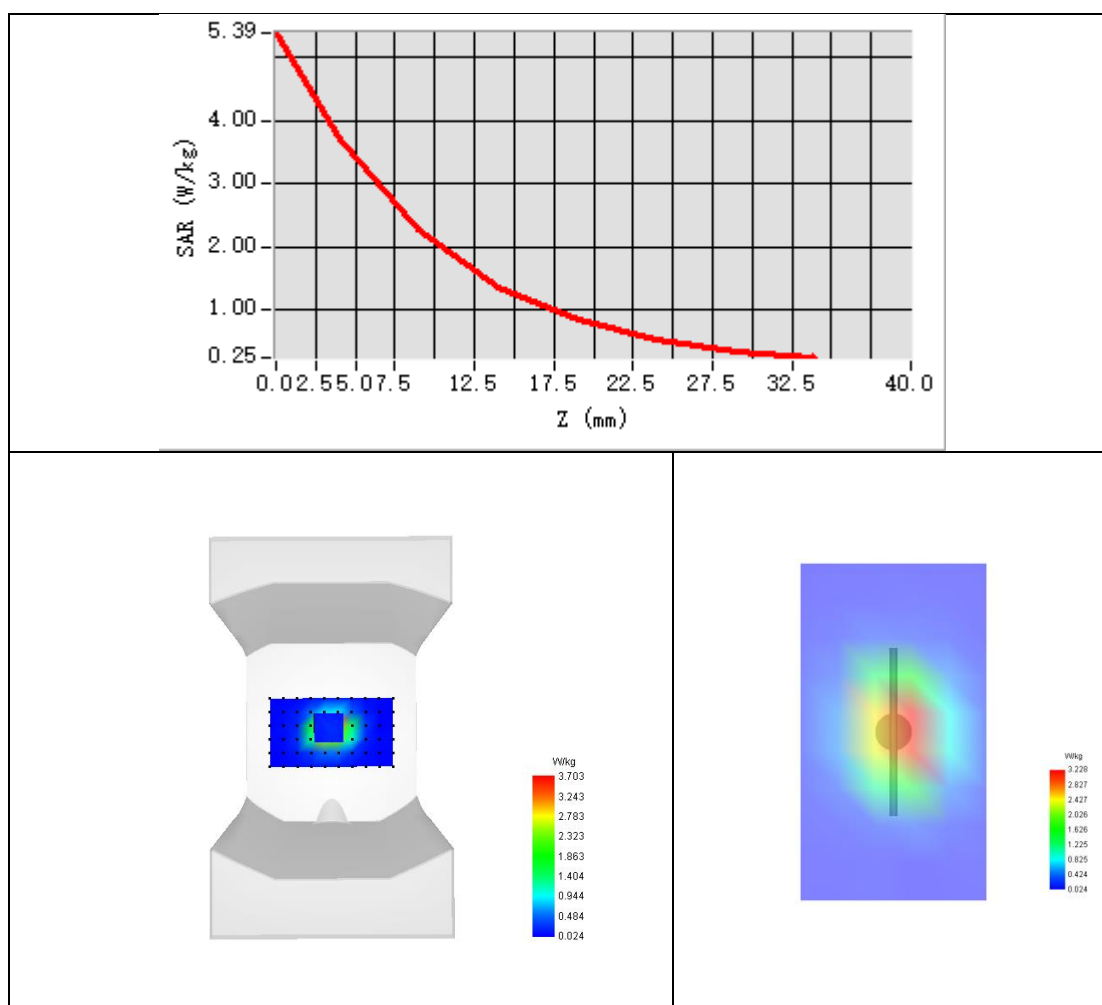
|                       |                  |
|-----------------------|------------------|
| Phantom               | Validation plane |
| Device Position       | Dipole           |
| Band                  | CW1800           |
| Channels              | Middle           |
| Signal                | CW               |
| Frequency (MHz)       | 1800.000         |
| Relative permittivity | 40.59            |
| Conductivity (S/m)    | 1.44             |
| Probe                 | SN 04/22 EPG0364 |
| ConvF                 | 1.95             |
| Crest factor:         | 1:1              |



Maximum location: X=3.00, Y=3.00 ; SAR Peak: 6.84 W/kg

|                |       |
|----------------|-------|
| SAR 10g (W/Kg) | 1.960 |
| SAR 1g (W/Kg)  | 3.798 |

## Z Axis Scan





## System Performance Check Data (1900MHz)

Type: Phone measurement (Complete)

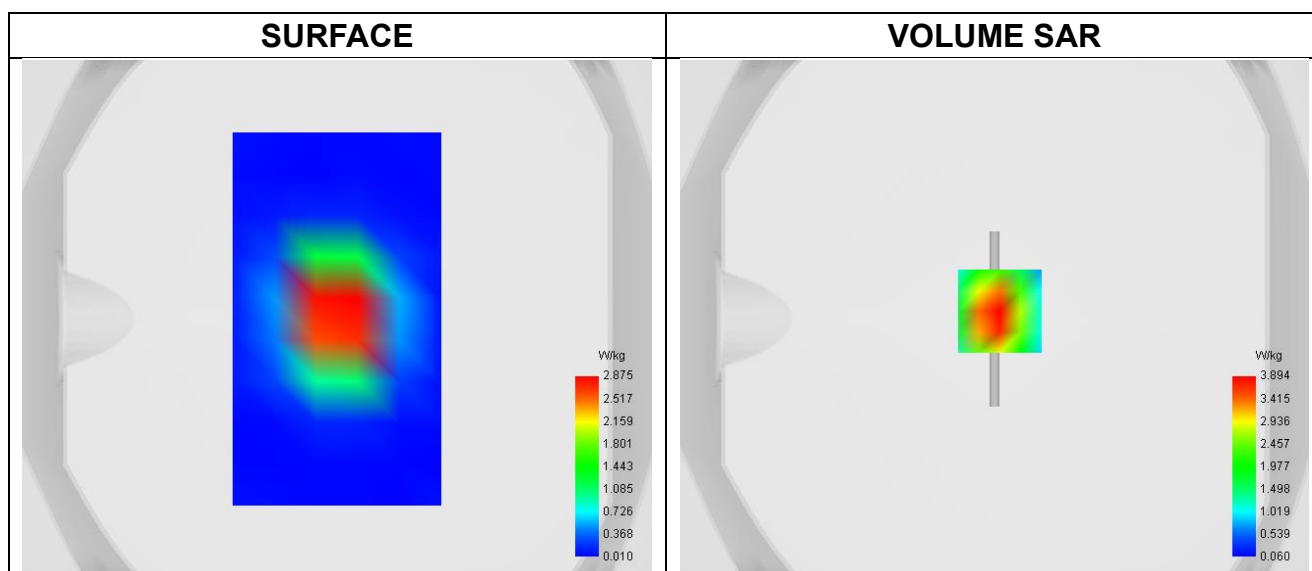
Area scan resolution: dx=8mm, dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 2023-05-22

### Experimental conditions.

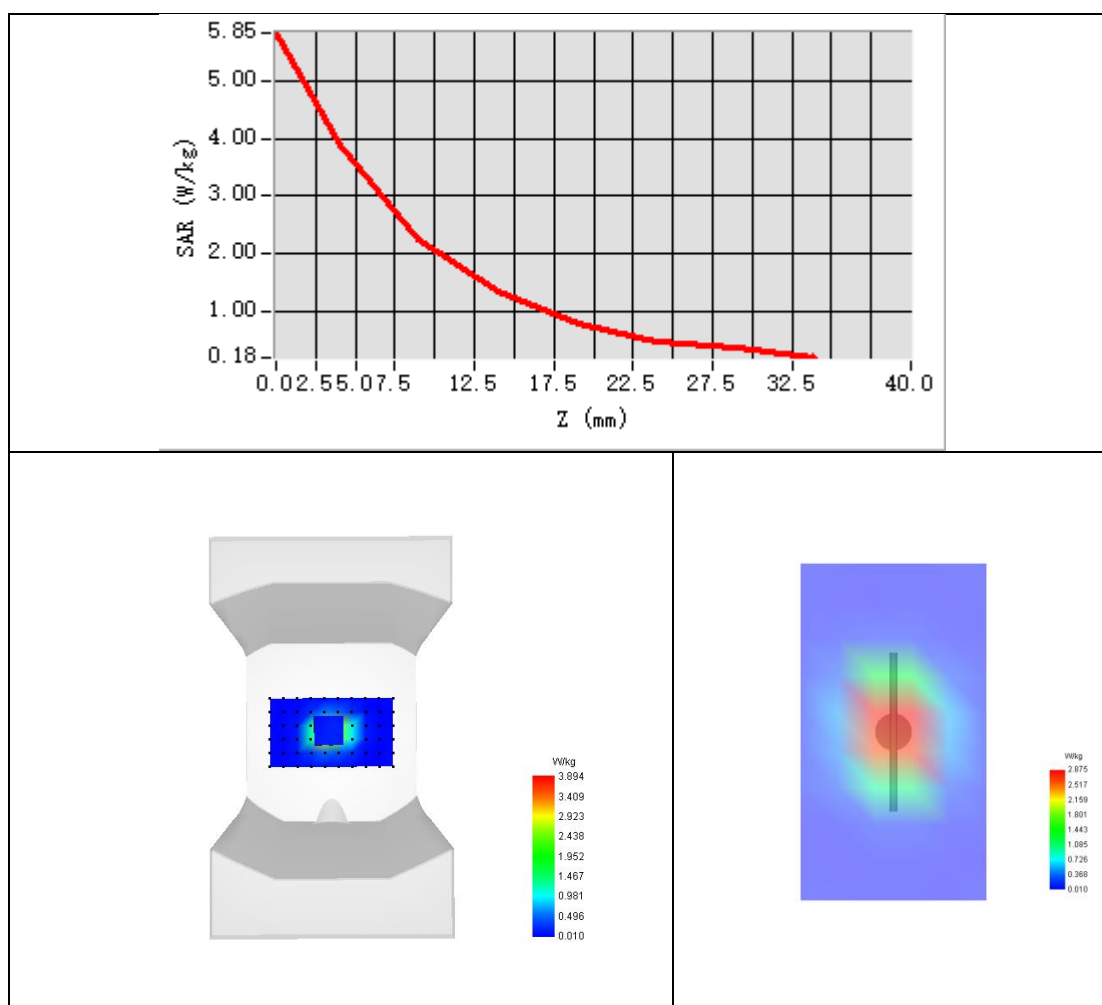
|                       |                  |
|-----------------------|------------------|
| Phantom               | Validation plane |
| Device Position       | Dipole           |
| Band                  | CW1900           |
| Channels              | Middle           |
| Signal                | CW               |
| Frequency (MHz)       | 1900.000         |
| Relative permittivity | 40.41            |
| Conductivity (S/m)    | 1.37             |
| Probe                 | SN 04/22 EPGO364 |
| ConvF                 | 2.25             |
| Crest factor:         | 1:1              |



Maximum location: X=5.00, Y=1.00 ; SAR Peak: 6.89 W/kg

|                |       |
|----------------|-------|
| SAR 10g (W/Kg) | 2.112 |
| SAR 1g (W/Kg)  | 4.103 |

## Z Axis Scan





## System Performance Check Data (2450MHz)

Type: Phone measurement (Complete)

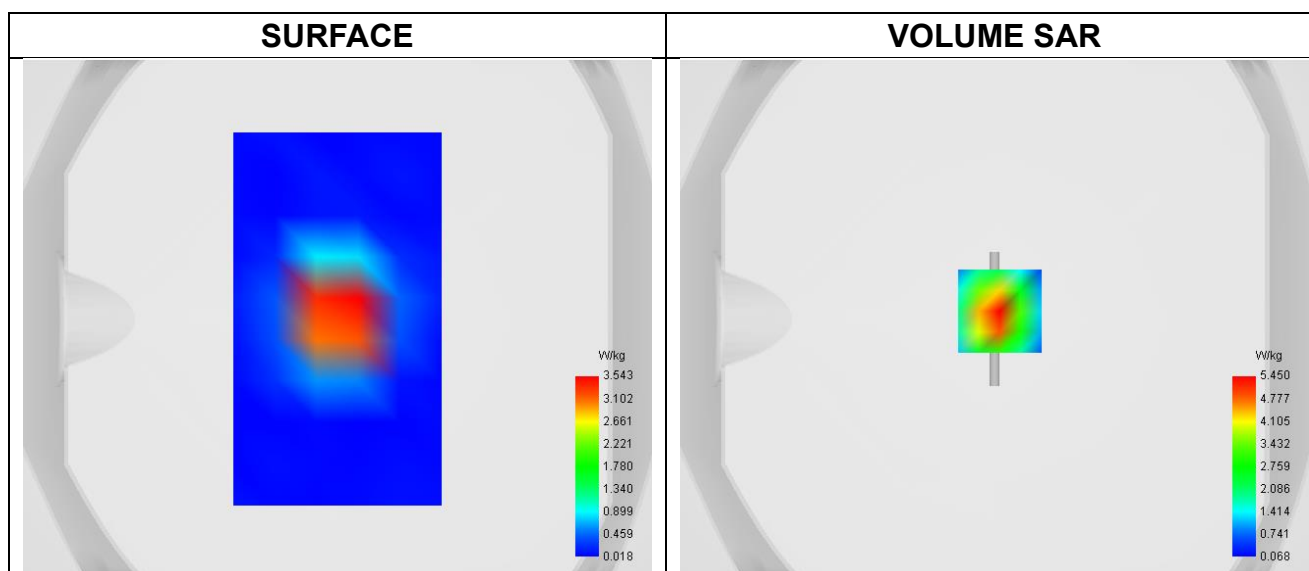
Area scan resolution: dx=8mm, dy=8mm

Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 2023-05-22

### Experimental conditions.

|                       |                  |
|-----------------------|------------------|
| Phantom               | Validation plane |
| Device Position       | Dipole           |
| Band                  | CW2450           |
| Channels              | Middle           |
| Signal                | CW               |
| Frequency (MHz)       | 2450.000         |
| Relative permittivity | 39.87            |
| Conductivity (S/m)    | 1.83             |
| Probe                 | SN 04/22 EPGO364 |
| ConvF                 | 2.33             |
| Crest factor:         | 1:1              |

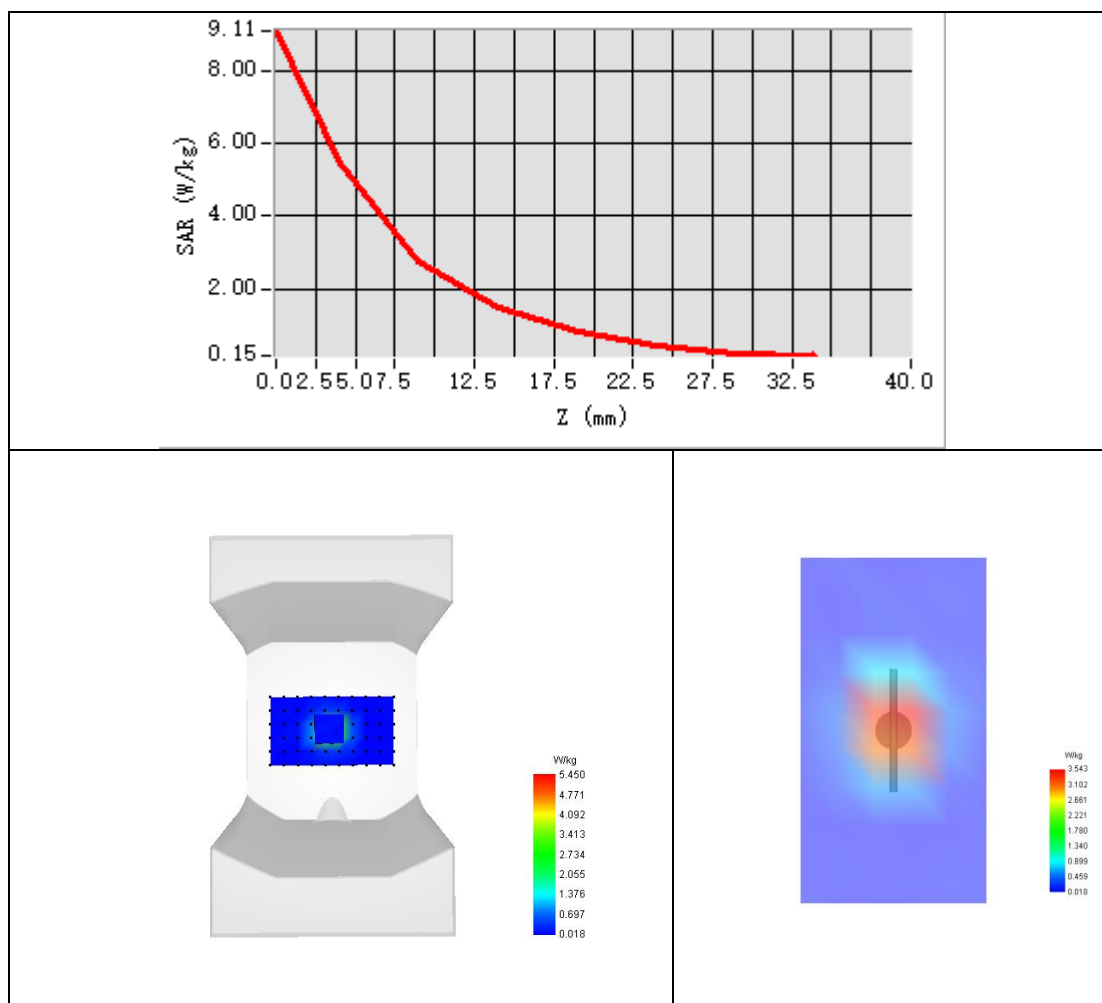


Maximum location: X=5.00, Y=3.00 ; SAR Peak: 8.39 W/kg

|                |       |
|----------------|-------|
| SAR 10g (W/Kg) | 2.375 |
| SAR 1g (W/Kg)  | 4.966 |



## Z Axis Scan



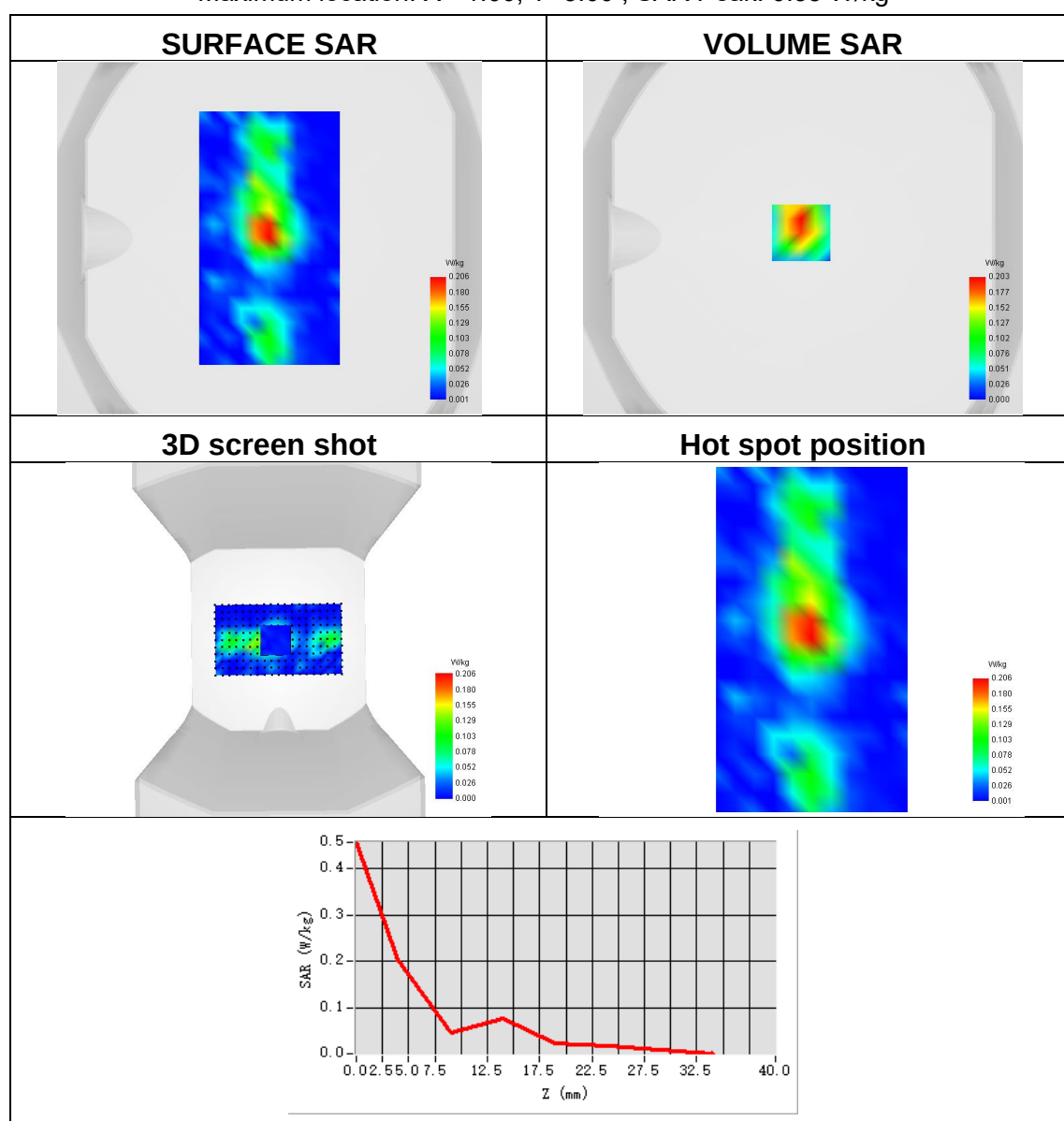


## Appendix B. SAR Test Plots

Plot 1:

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-22                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | CAT-M LTE band 4           |
| Signal          | LTE FDD                    |
| Frequency       | 1732.5                     |
| SAR 10g (W/Kg)  | 0.087                      |
| SAR 1g (W/Kg)   | 0.184                      |

Maximum location: X=-1.00, Y=3.00 ; SAR Peak: 0.35 W/kg

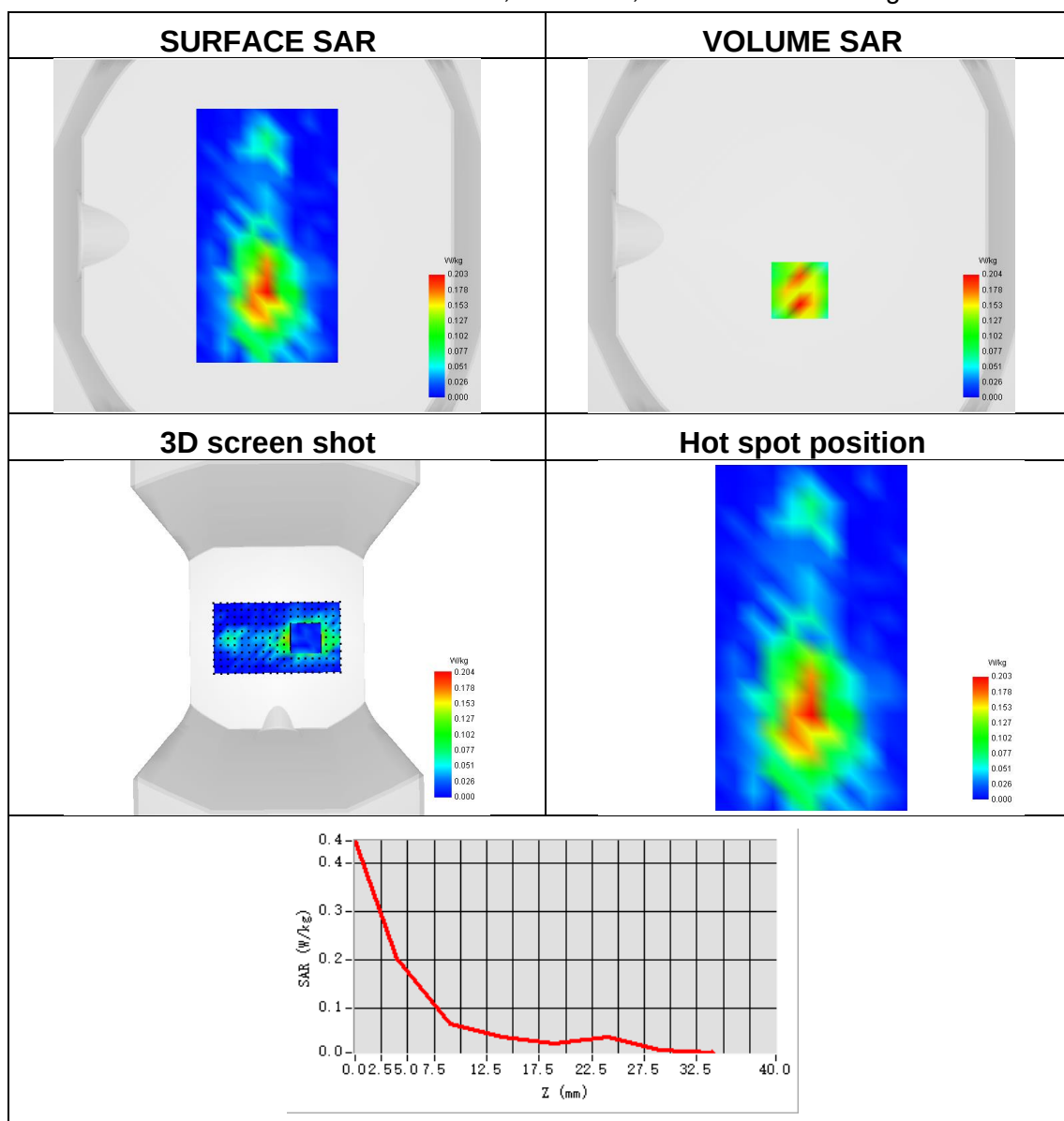




**Plot 2:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-21                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | CAT-M LTE band 5           |
| Signal          | LTE FDD                    |
| Frequency       | 836.5                      |
| SAR 10g (W/Kg)  | 0.096                      |
| SAR 1g (W/Kg)   | 0.186                      |

Maximum location: X=-1.00, Y=-31.00 ; SAR Peak: 0.39 W/kg

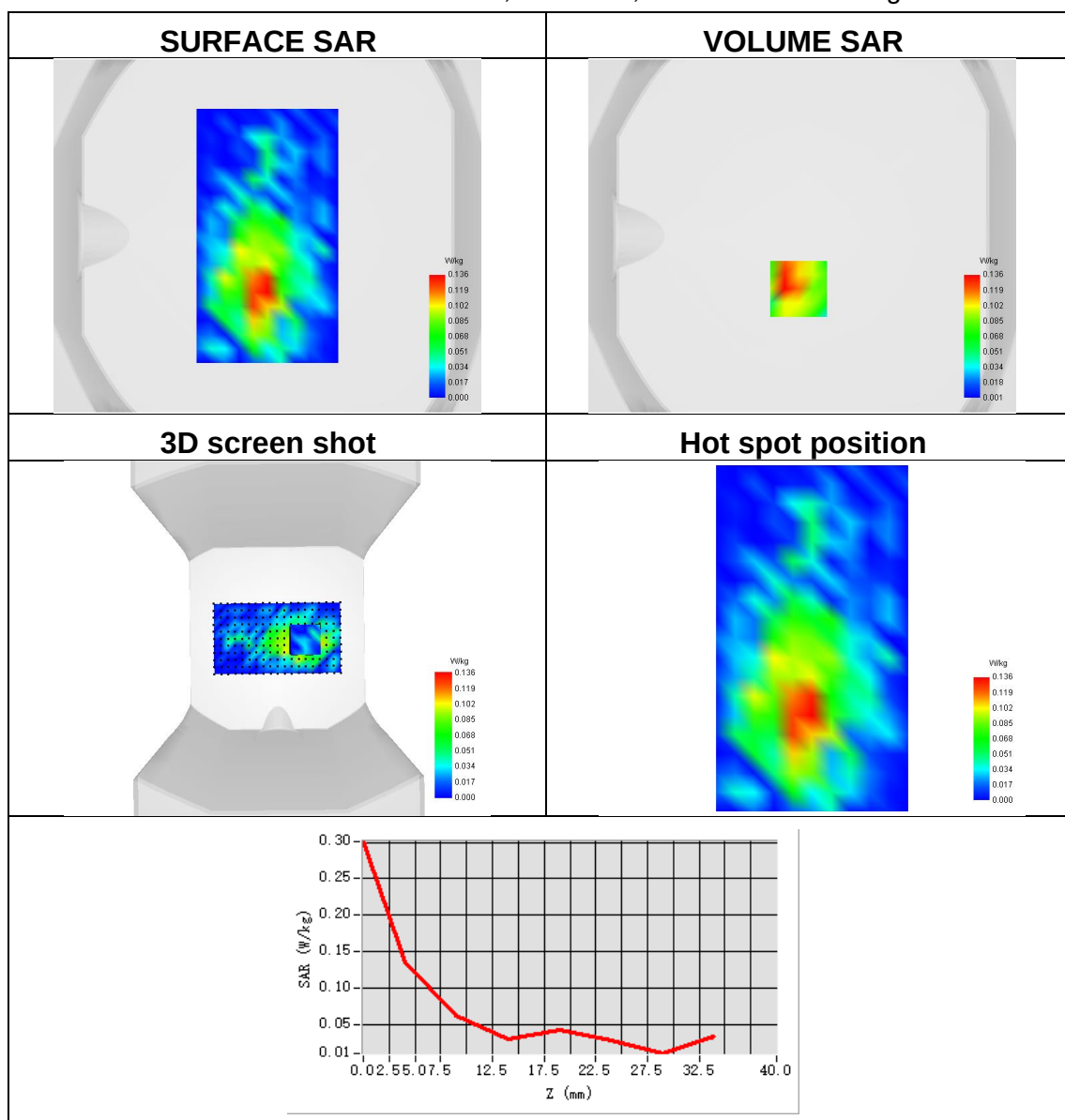




**Plot 3:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-21                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | CAT-M LTE band 12          |
| Signal          | LTE FDD                    |
| Frequency       | 707.5                      |
| SAR 10g (W/Kg)  | 0.079                      |
| SAR 1g (W/Kg)   | 0.133                      |

Maximum location: X=-2.00, Y=-30.00 ; SAR Peak: 0.24 W/kg

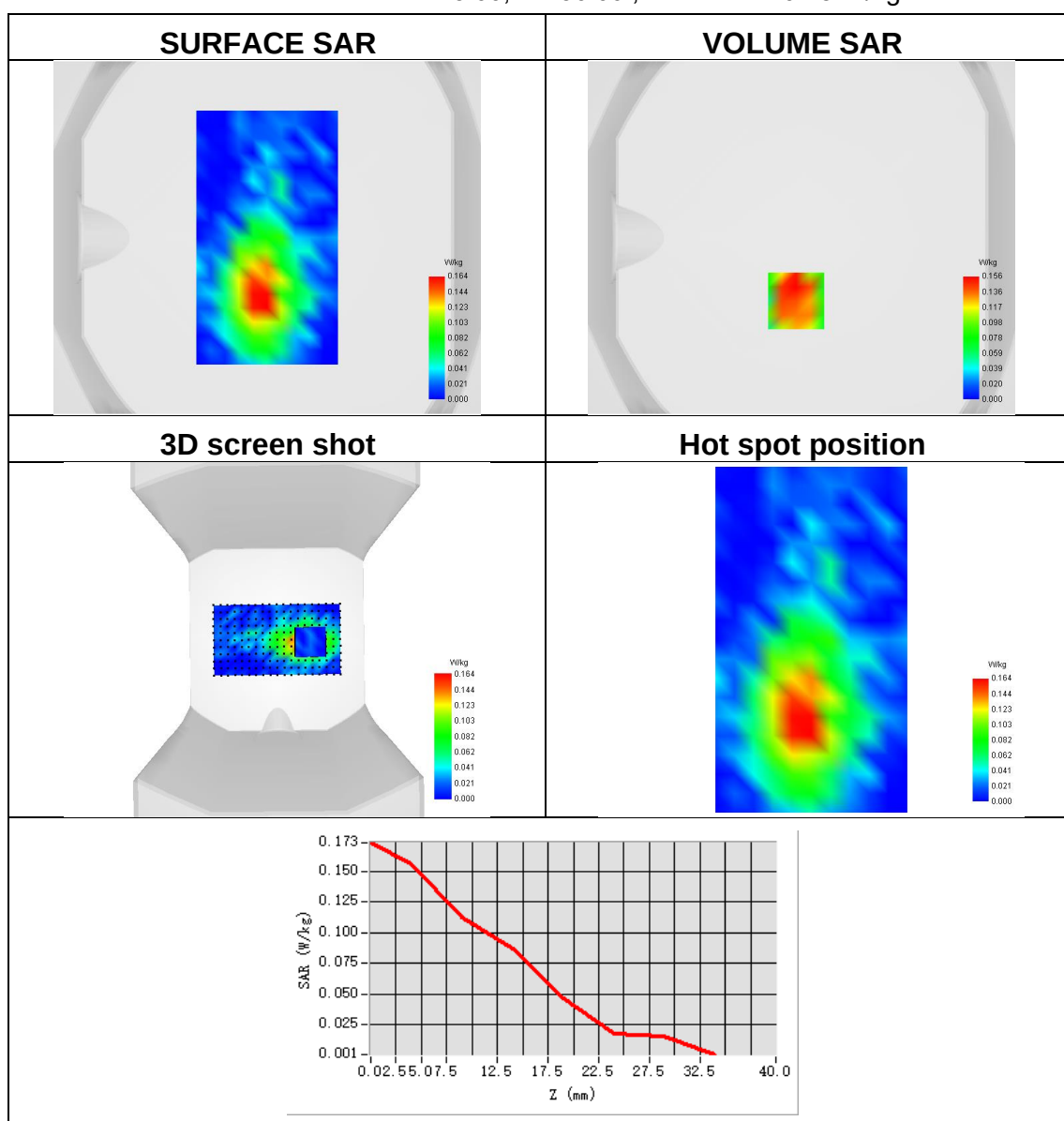




**Plot 4:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-21                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | CAT-M LTE band 13          |
| Signal          | LTE FDD                    |
| Frequency       | 782                        |
| SAR 10g (W/Kg)  | 0.091                      |
| SAR 1g (W/Kg)   | 0.154                      |

Maximum location: X=-3.00, Y=-36.00 ; SAR Peak: 0.25 W/kg

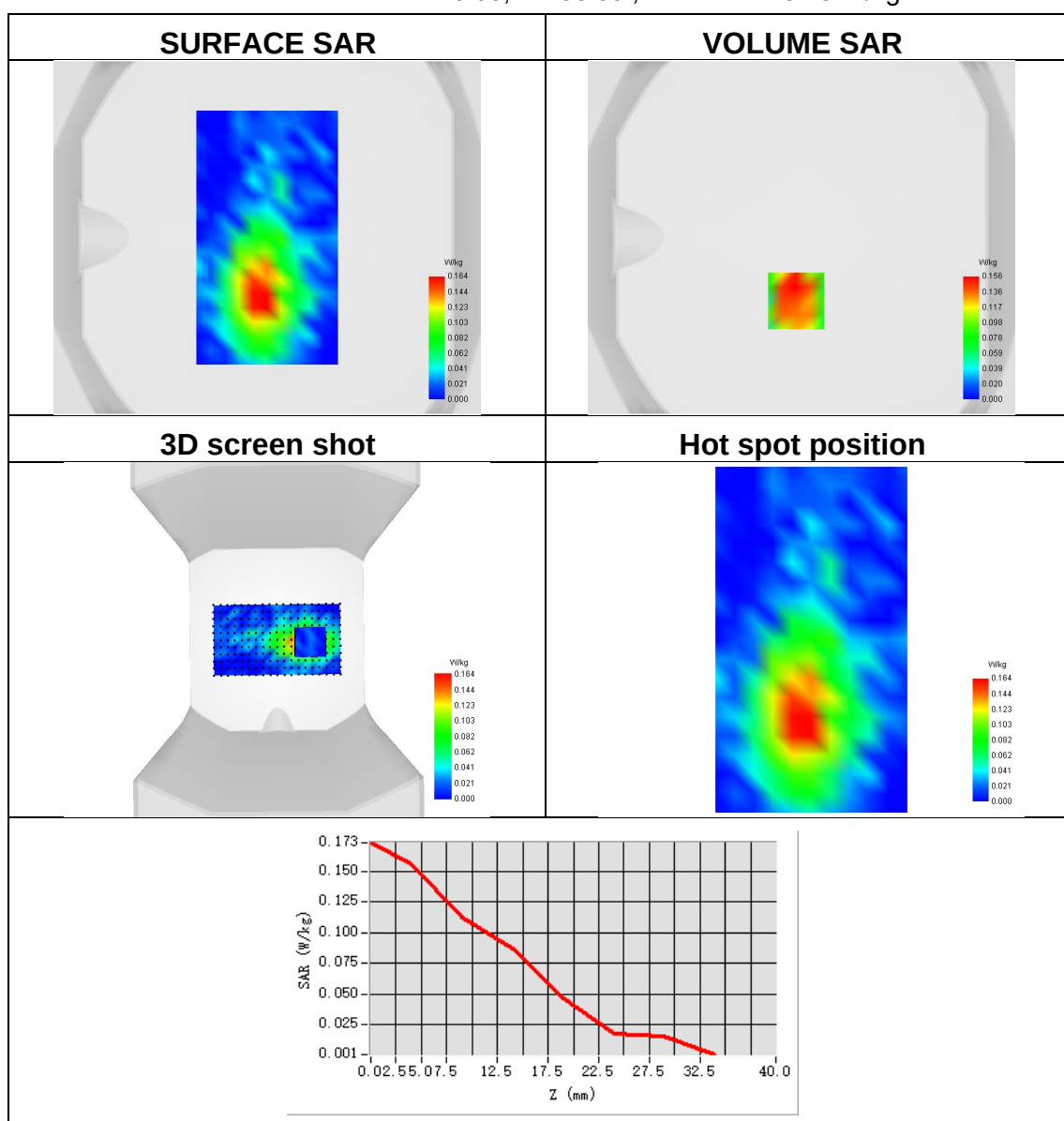




**Plot 5:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-21                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | CAT-M LTE band 13          |
| Signal          | LTE FDD                    |
| Frequency       | 782                        |
| SAR 10g (W/Kg)  | 0.091                      |
| SAR 1g (W/Kg)   | 0.154                      |

Maximum location: X=-3.00, Y=-36.00 ; SAR Peak: 0.25 W/kg

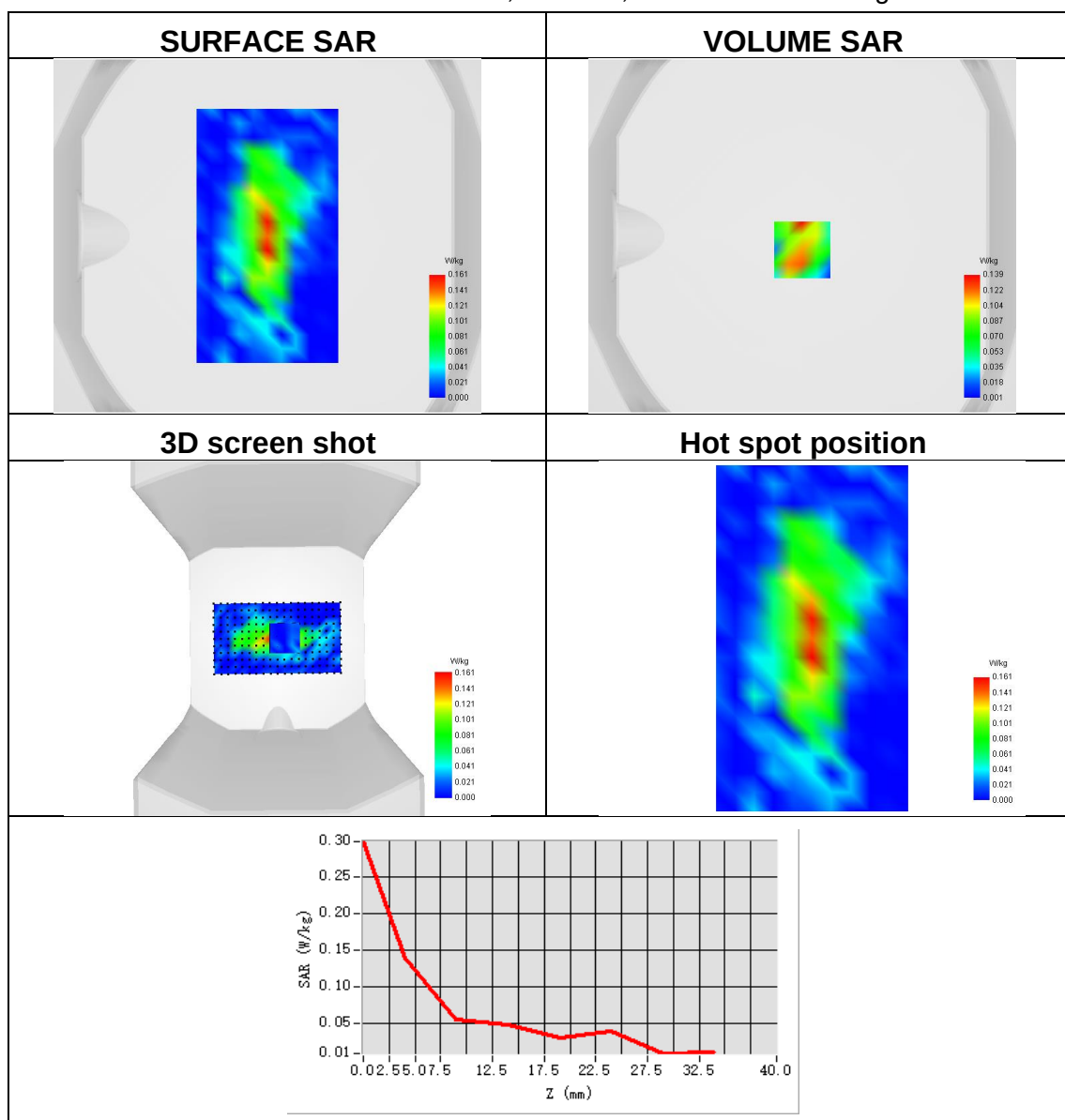




**Plot 6:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-22                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | CAT-M LTE band 25          |
| Signal          | LTE FDD                    |
| Frequency       | 1882.5                     |
| SAR 10g (W/Kg)  | 0.063                      |
| SAR 1g (W/Kg)   | 0.113                      |

Maximum location: X=0.00, Y=-8.00 ; SAR Peak: 0.23 W/kg

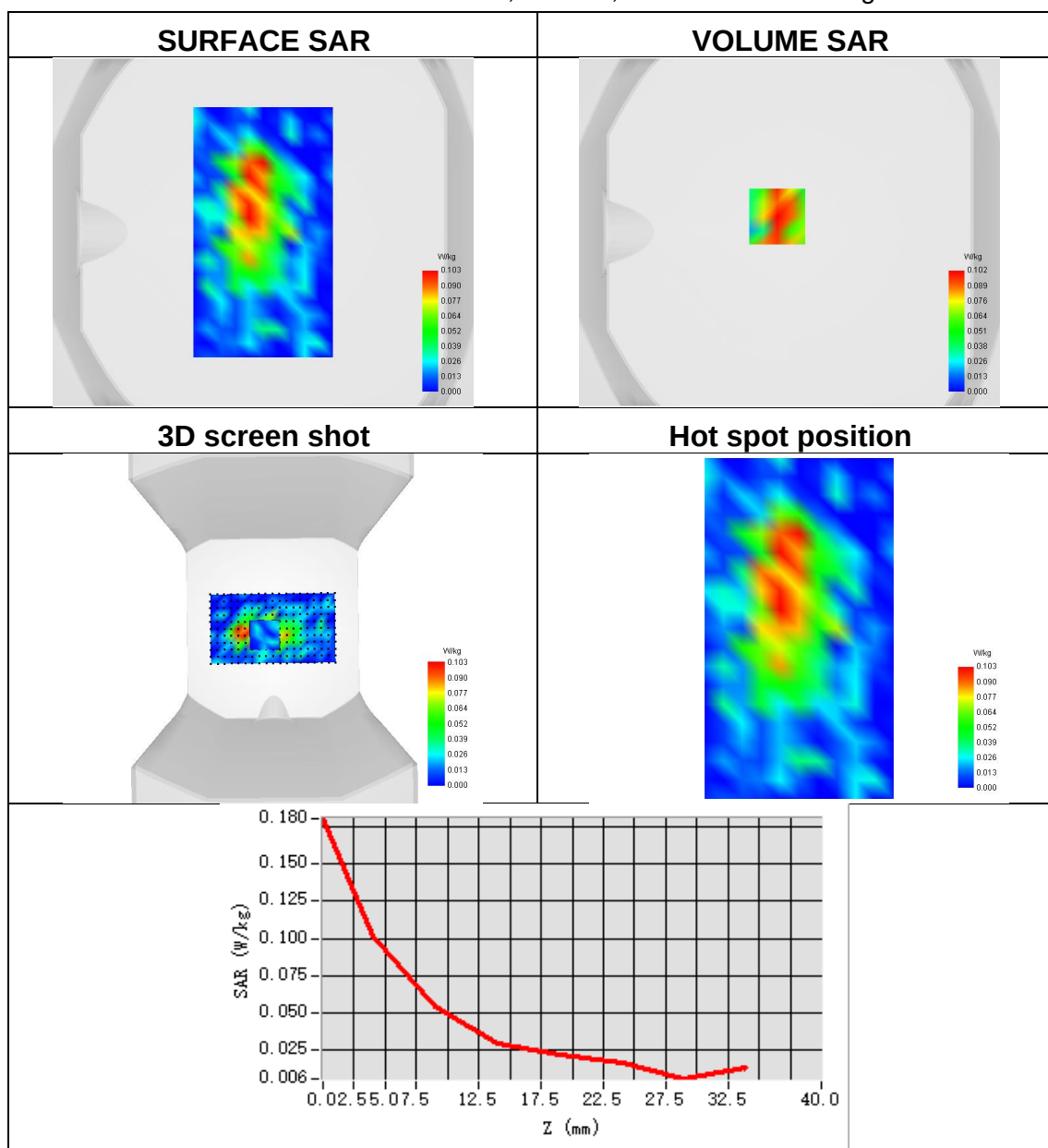




**Plot 7:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-21                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | CAT-M LTE band 26          |
| Signal          | LTE FDD                    |
| Frequency       | 824                        |
| SAR 10g (W/Kg)  | 0.054                      |
| SAR 1g (W/Kg)   | 0.097                      |

Maximum location: X=-7.00, Y=9.00 ; SAR Peak: 0.19 W/kg

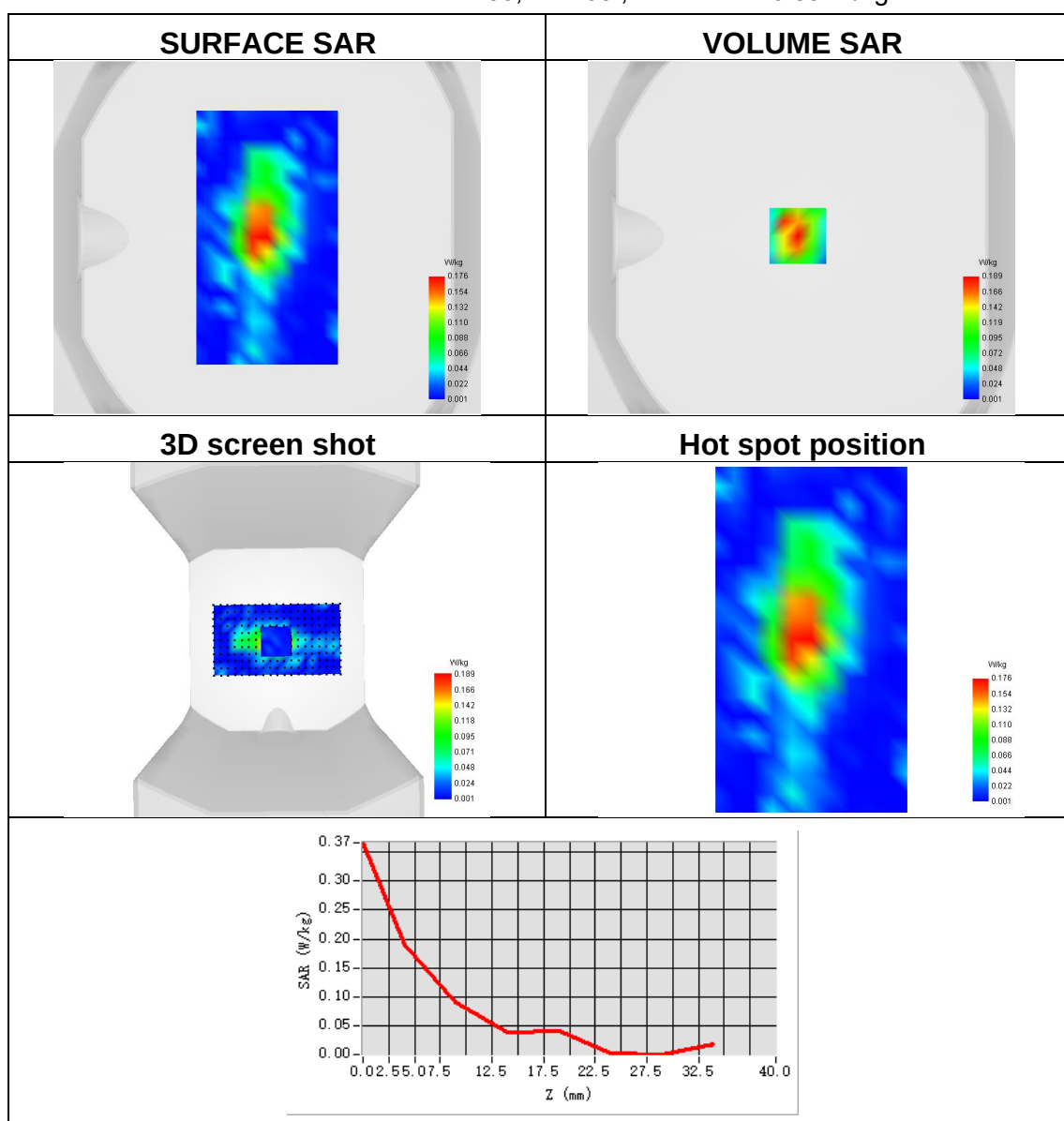




**Plot 8:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-22                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | CAT-M LTE band 66          |
| Signal          | LTE FDD                    |
| Frequency       | 1777.5                     |
| SAR 10g (W/Kg)  | 0.082                      |
| SAR 1g (W/Kg)   | 0.183                      |

Maximum location: X=-2.00, Y=1.00 ; SAR Peak: 0.39 W/kg

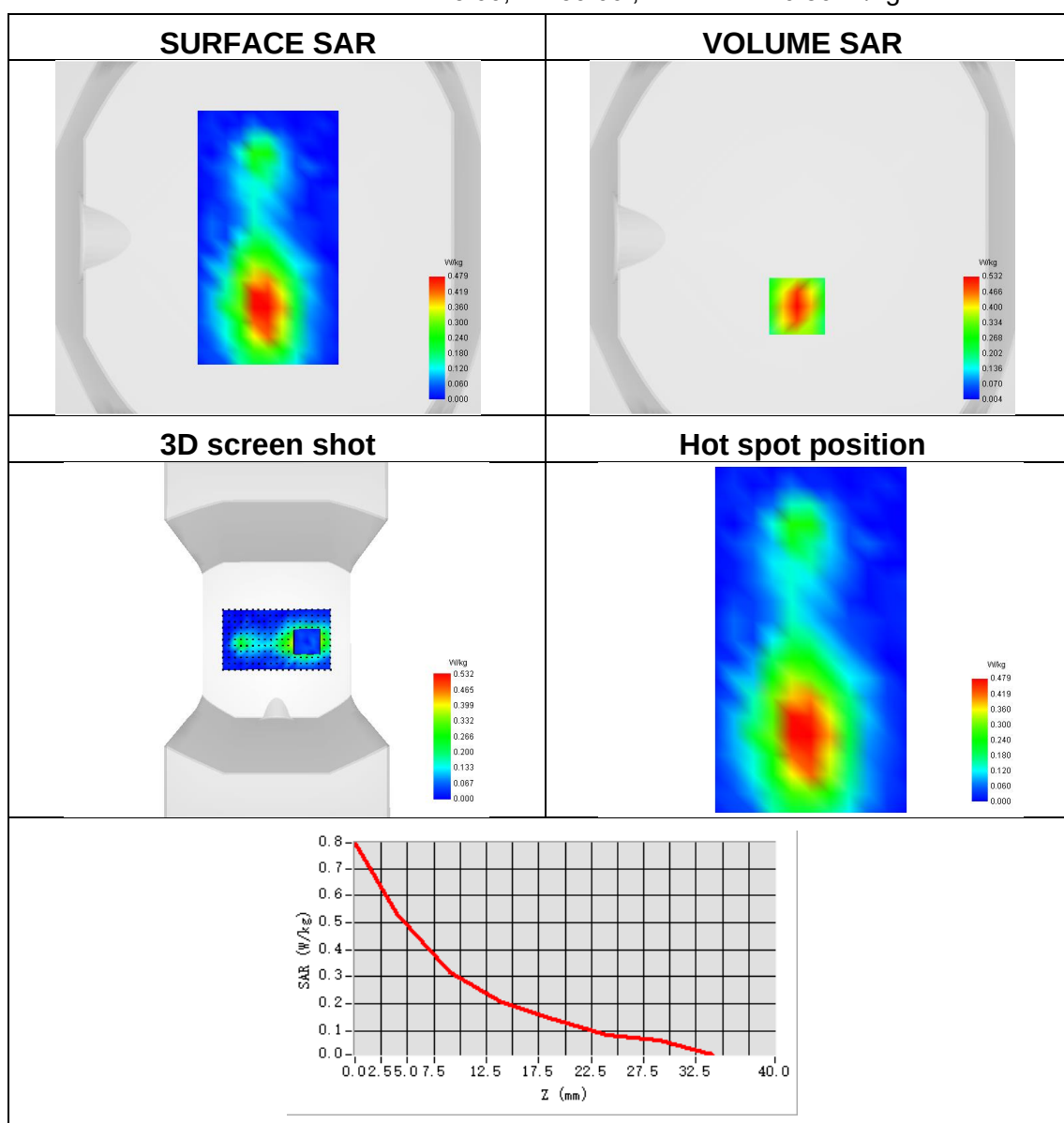




**Plot 9:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-21                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | NB LTE band 5              |
| Signal          | LTE FDD                    |
| Frequency       | 848.8                      |
| SAR 10g (W/Kg)  | 0.288                      |
| SAR 1g (W/Kg)   | 0.501                      |

Maximum location: X=-3.00, Y=-39.00 ; SAR Peak: 0.80 W/kg

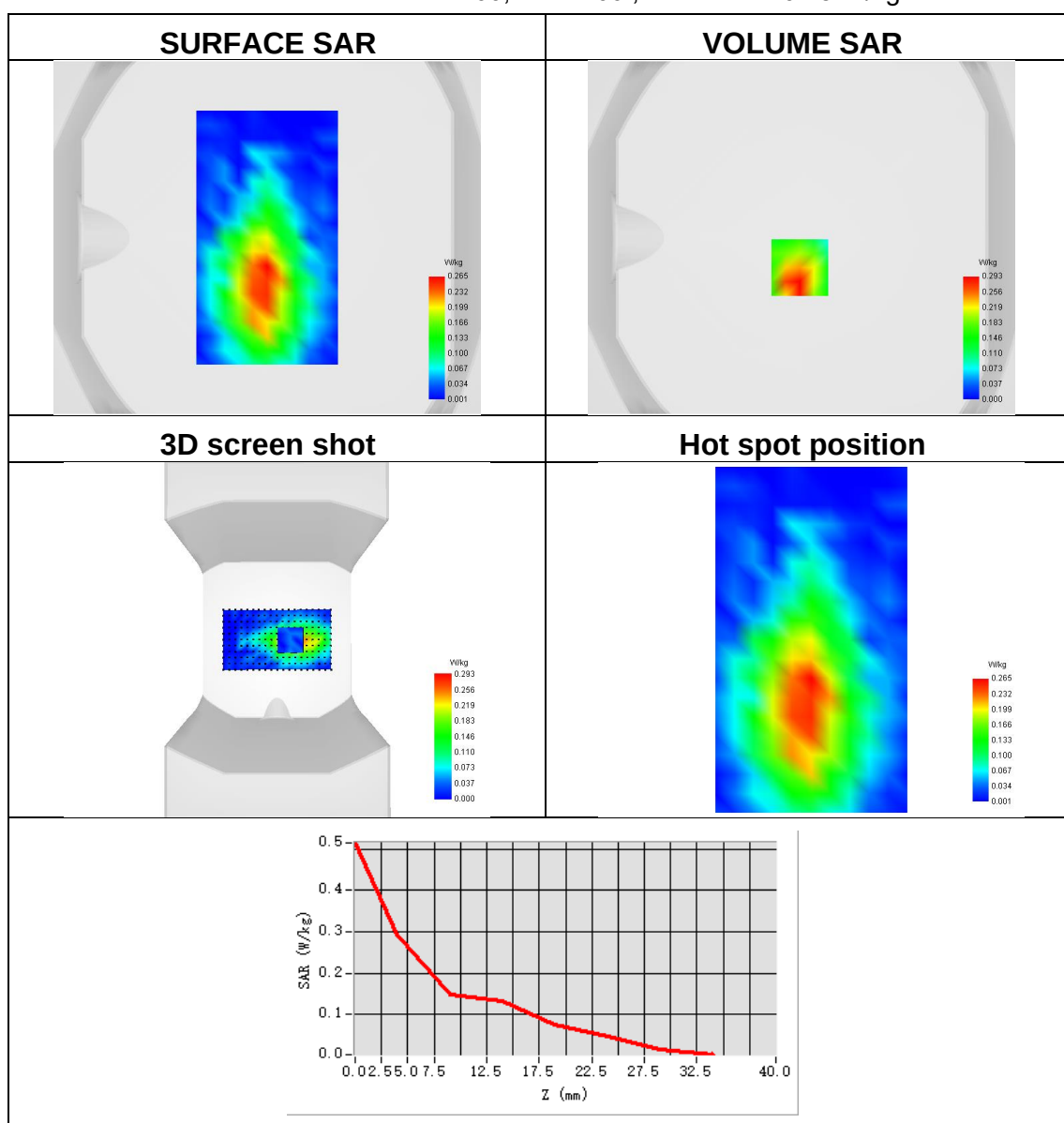




**Plot 10:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-21                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | NB LTE band 12             |
| Signal          | LTE FDD                    |
| Frequency       | 699.2                      |
| SAR 10g (W/Kg)  | 0.166                      |
| SAR 1g (W/Kg)   | 0.299                      |

Maximum location: X=-1.00, Y=-17.00 ; SAR Peak: 0.45 W/kg

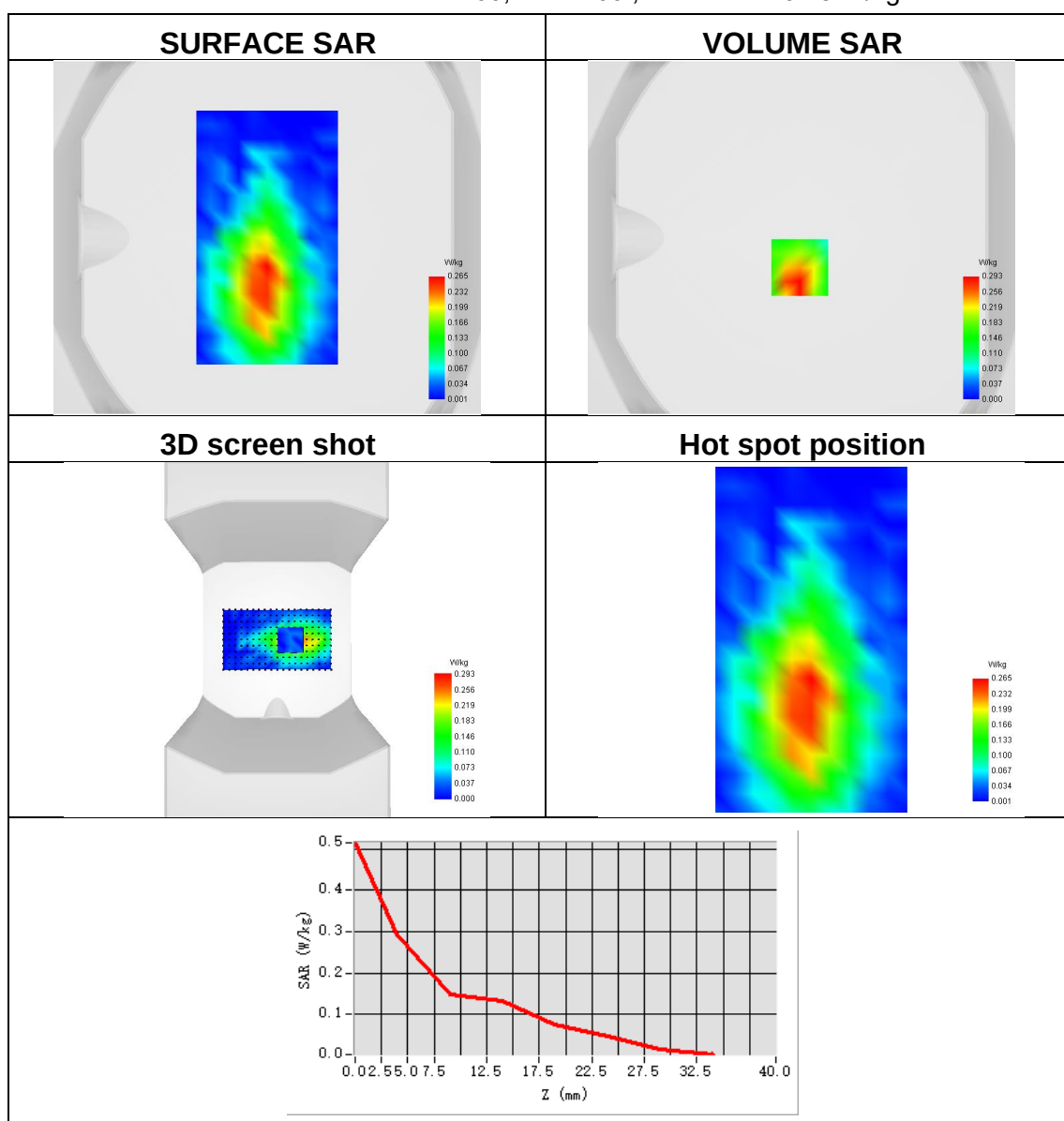




**Plot 11:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-21                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | NB LTE band 12             |
| Signal          | LTE FDD                    |
| Frequency       | 699.2                      |
| SAR 10g (W/Kg)  | 0.166                      |
| SAR 1g (W/Kg)   | 0.299                      |

Maximum location: X=-1.00, Y=-17.00 ; SAR Peak: 0.45 W/kg

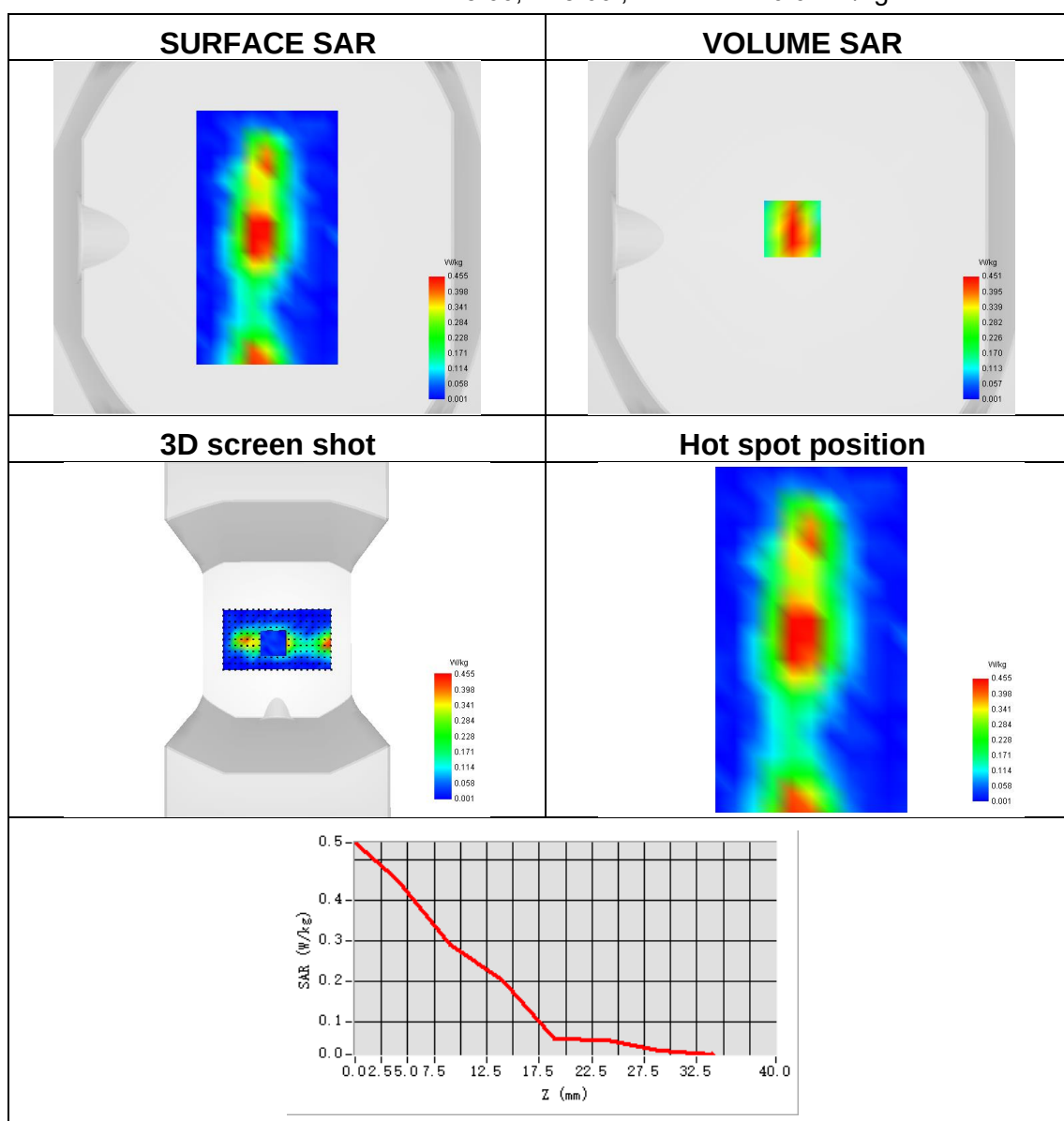




**Plot 12:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-22                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | NB LTE band 25             |
| Signal          | LTE FDD                    |
| Frequency       | 1914.8                     |
| SAR 10g (W/Kg)  | 0.236                      |
| SAR 1g (W/Kg)   | 0.419                      |

Maximum location: X=-5.00, Y=5.00 ; SAR Peak: 0.62 W/kg

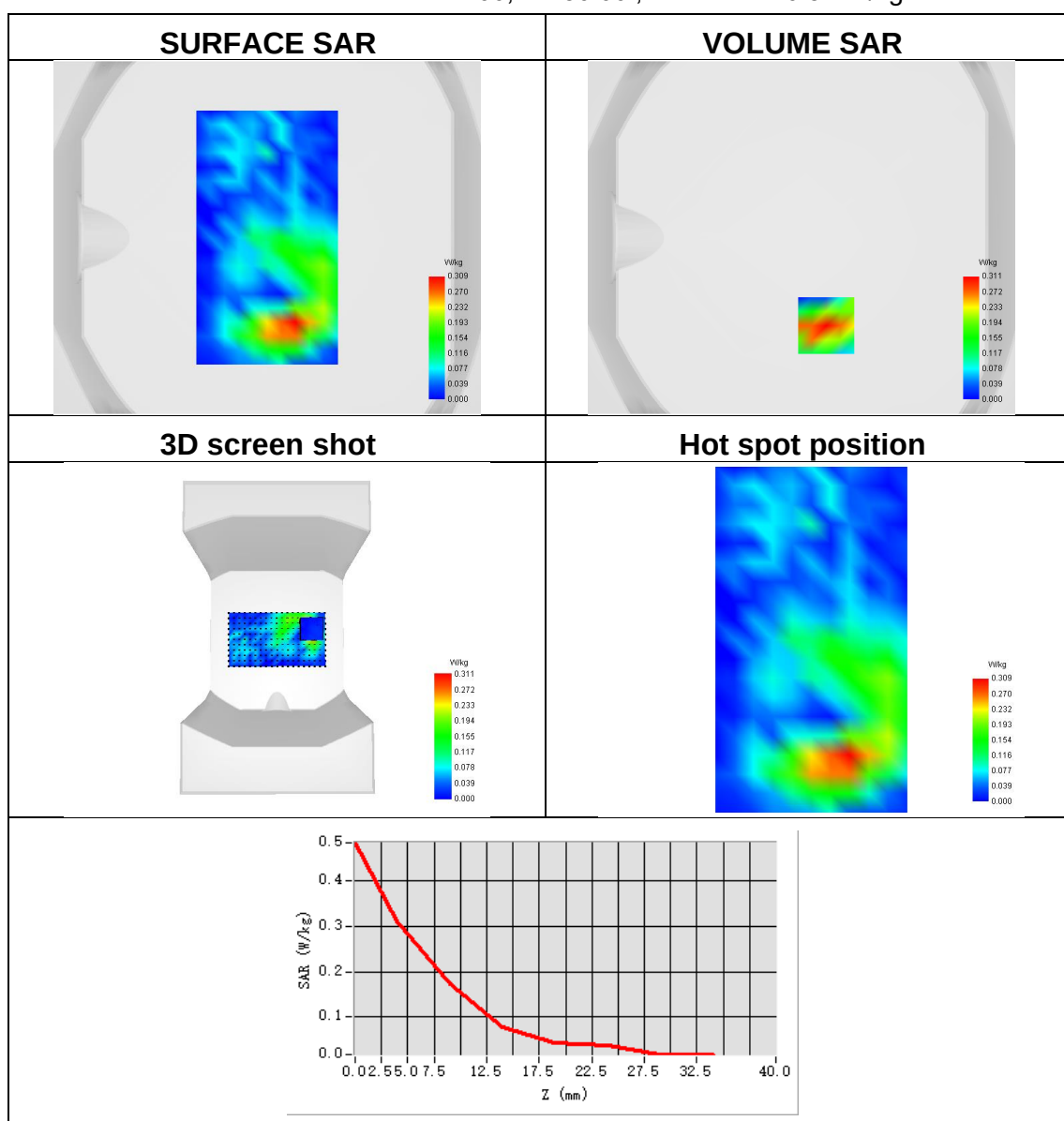




**Plot 13:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-21                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | NB LTE band 26             |
| Signal          | LTE FDD                    |
| Frequency       | 824                        |
| SAR 10g (W/Kg)  | 0.146                      |
| SAR 1g (W/Kg)   | 0.278                      |

Maximum location: X=14.00, Y=-50.00 ; SAR Peak: 0.51 W/kg

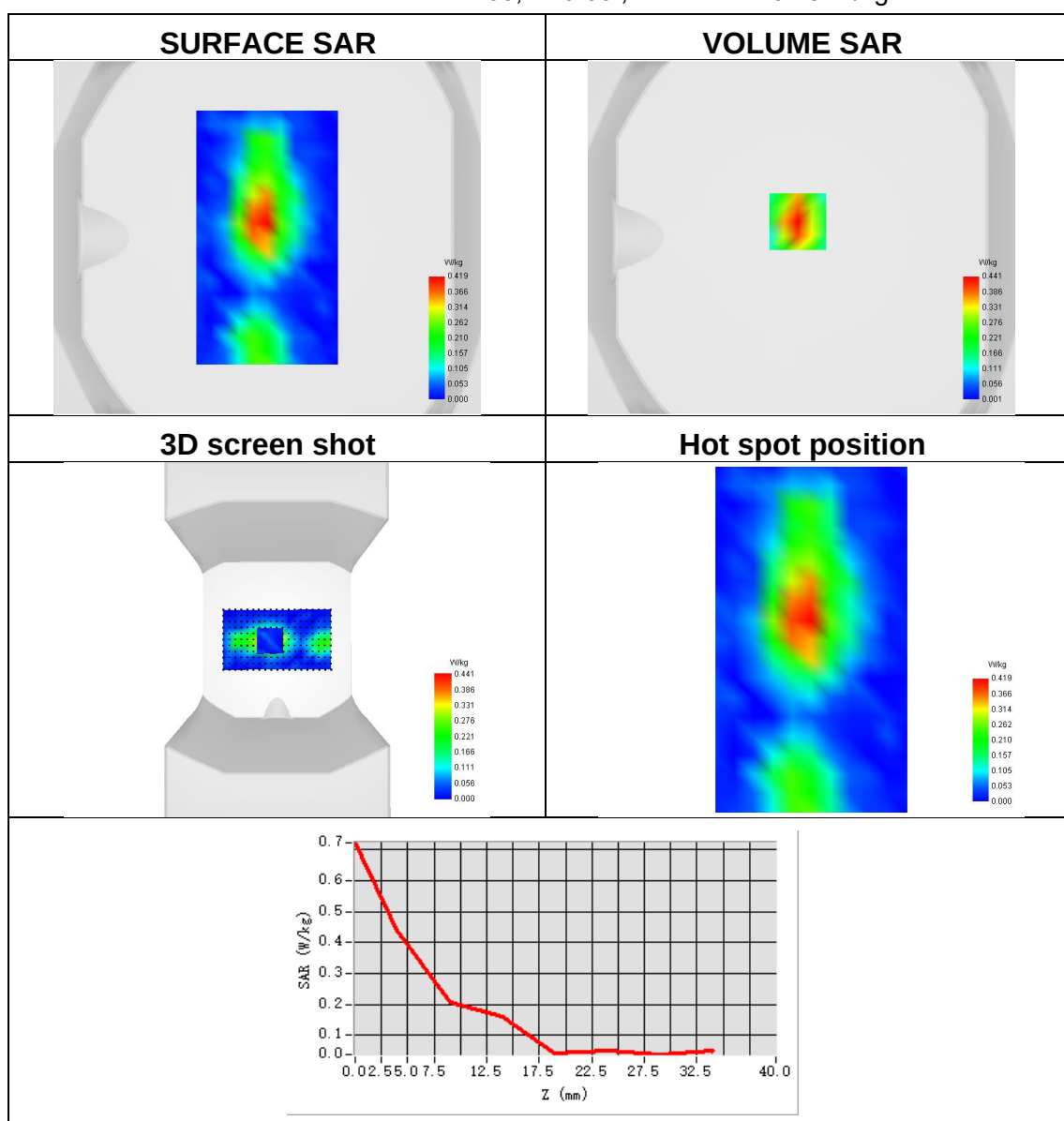




**Plot 14:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-23                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | NB LTE band 66             |
| Signal          | LTE FDD                    |
| Frequency       | 1779.8                     |
| SAR 10g (W/Kg)  | 0.215                      |
| SAR 1g (W/Kg)   | 0.423                      |

Maximum location: X=-2.00, Y=9.00 ; SAR Peak: 0.75 W/kg

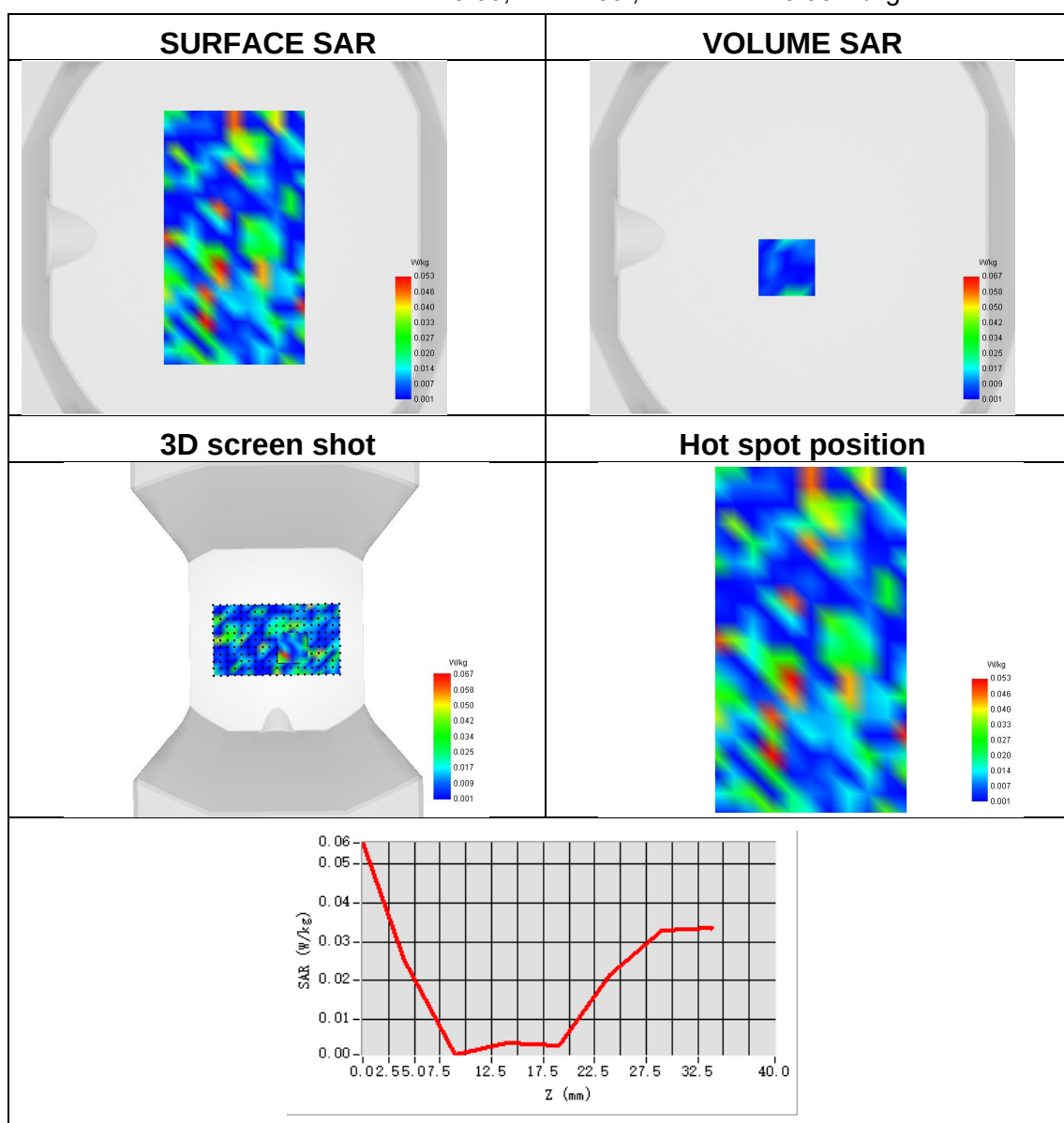




**Plot 15:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-22                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | 2.4G_WIFI                  |
| Signal          | IEEE 802.11b               |
| Frequency       | 2412                       |
| SAR 10g (W/Kg)  | 0.011                      |
| SAR 1g (W/Kg)   | 0.013                      |

Maximum location: X=-9.00, Y=-17.00 ; SAR Peak: 0.06 W/kg

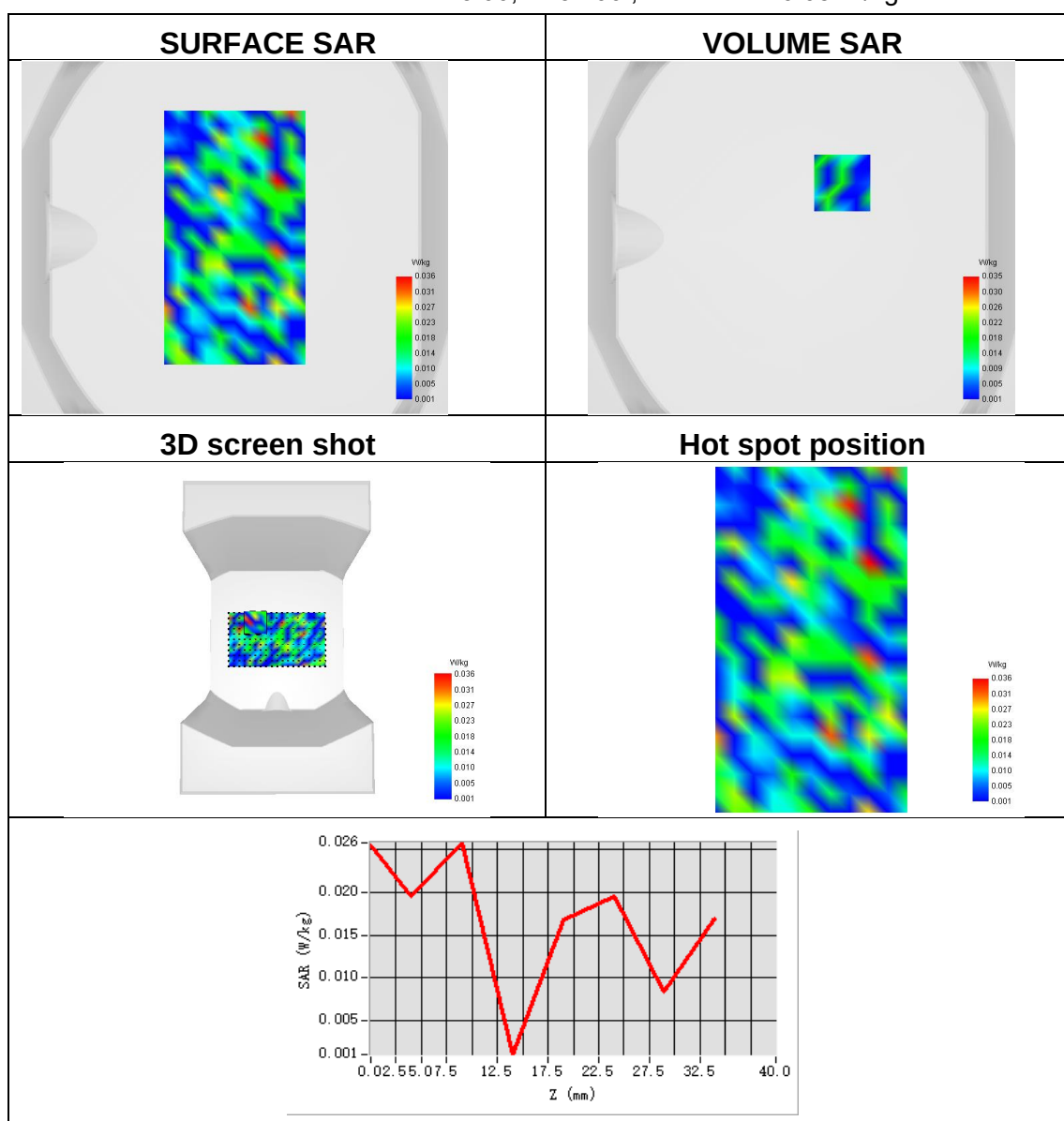




**Plot 16:**

|                 |                            |
|-----------------|----------------------------|
| Test Date       | 2023-05-22                 |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Top Side                   |
| Band            | BLE                        |
| Signal          | GFSK                       |
| Frequency       | 2402                       |
| SAR 10g (W/Kg)  | 0.010                      |
| SAR 1g (W/Kg)   | 0.013                      |

Maximum location: X=23.00, Y=31.00 ; SAR Peak: 0.05 W/kg





## **Appendix C. Probe Calibration and Dipole Calibration Report**

Refer the appendix Calibration Report.

※※※※※END OF THE REPORT※※※※※