

# SAR TEST REPORT

Report No.: BCTC2301220661-14E

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Applicant: SHENZHEN YUNJI INTELLIGENT TECHNOLOGY  
CO.,LTD

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Product Name: Smart Phone

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Model/Type Ref.: WP23

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Tested Date: 2023-01-11 to 2023-02-07

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Issued Date: 2023-03-03

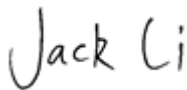
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**Shenzhen BCTC Testing Co., Ltd.**



Product Name: Smart Phone  
Trademark: OUKITEL  
Model/Type Ref.: WP23  
WP23 S, WP23 Pro, WP23 Ultra  
Prepared For: SHENZHEN YUNJI INTELLIGENT TECHNOLOGY CO.,LTD  
Address: 202, Building A2, Silicon Valley Power Intelligent Terminal Industrial Park, No. 20, Dafu Industrial Zone, Kukeng Community, Guanlan Street, Longhua District, Shenzhen  
Manufacturer: SHENZHEN YUNJI INTELLIGENT TECHNOLOGY CO.,LTD  
Address: 202, Building A2, Silicon Valley Power Intelligent Terminal Industrial Park, No. 20, Dafu Industrial Zone, Kukeng Community, Guanlan Street, Longhua District, Shenzhen  
Prepared By: Shenzhen BCTC Testing Co., Ltd.  
Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China  
Sample Received Date: 2023-01-11  
Sample tested Date: 2023-01-11 to 2023-02-07  
Issue Date: 2023-03-03  
Report No.: BCTC2301220661-14E  
SAR Max. Values is: 0.540W/kg (10g) for Head and 0.549 W/kg (10g) for Body. 0.779 W/kg (10g) for Limb worn.  
Test Standards: EN50663:2017&EN50566:2017&EN62209-1:2016&EN62209-2:2010+A1:2019&EN 62479:2010&EN 50360:2017  
Test Results: PASS  
Remark: This is SAR test report

Tested by:



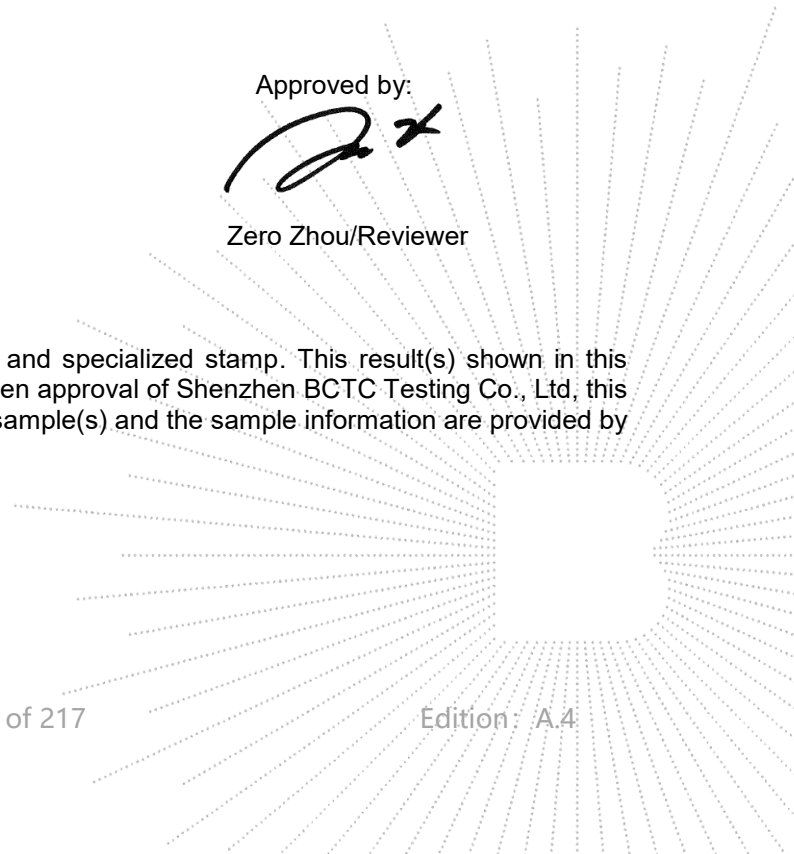
Jack Li/Project Handler

Approved by:



Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.



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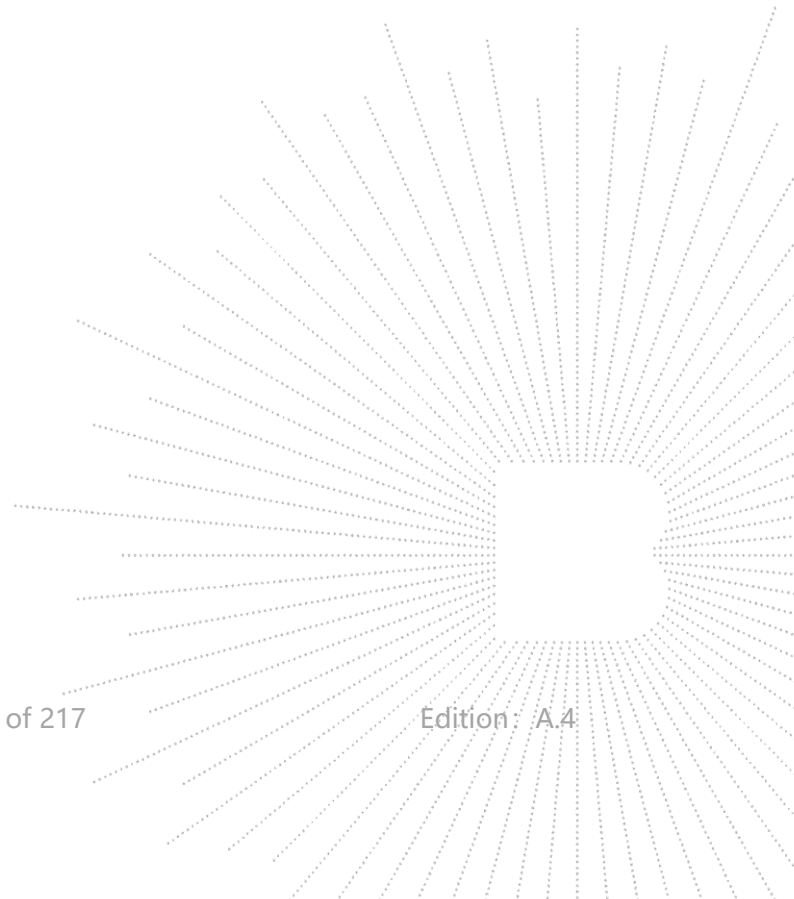
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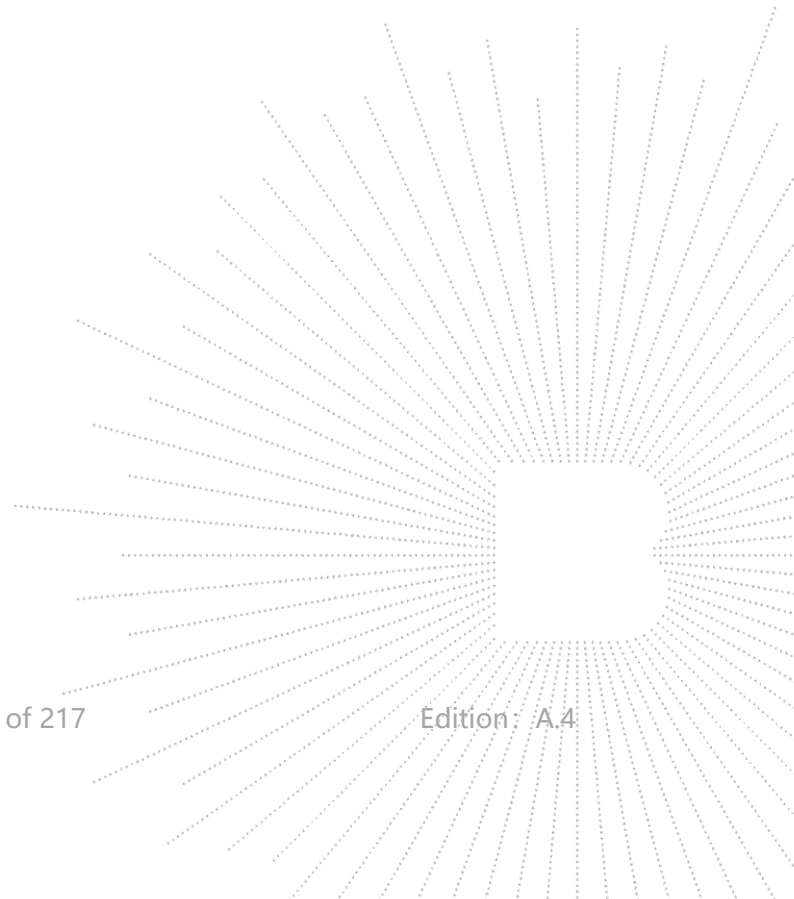
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(Note: N/A Means Not Applicable)



**1. Version**

| <b>Report No.</b>  | <b>Issue Date</b> | <b>Description</b> | <b>Approved</b> |
|--------------------|-------------------|--------------------|-----------------|
| BCTC2301220661-14E | 2023-03-03        | Original           | Valid           |
|                    |                   |                    |                 |



## 2. Test Standards

The tests were performed according to following standards:

EN 50360:2017:Product standard to demonstrate the compliance of wireless communication devices, with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 300 MHz to 6 GHz: devices used next to the ear

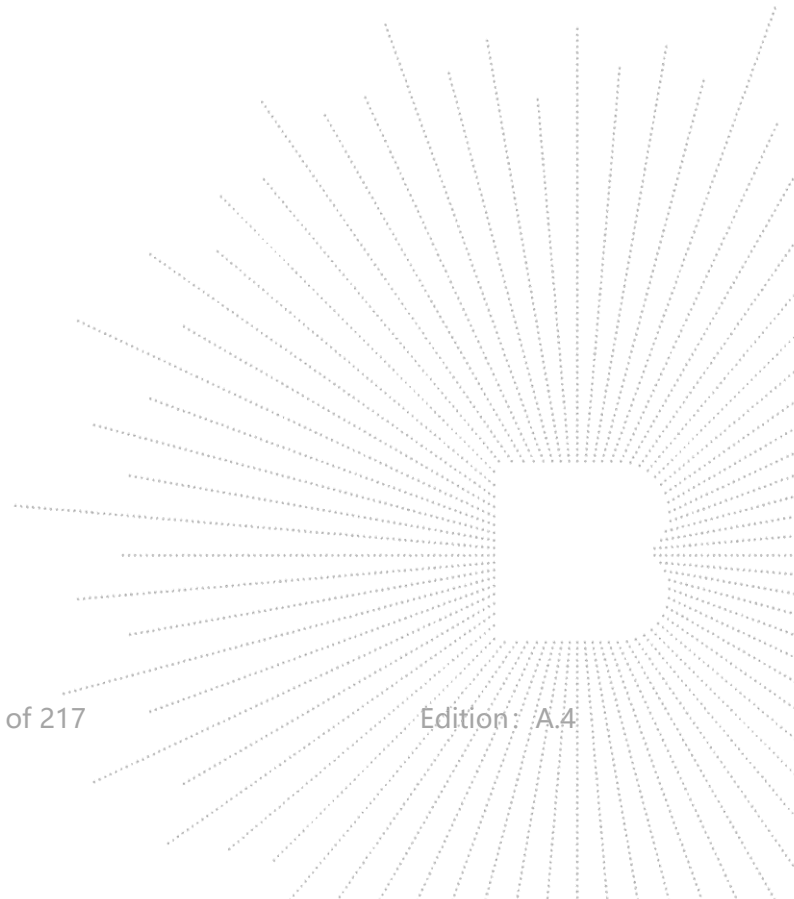
EN 62209-1:2016: Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Part 1: Devices used next to the ear (Frequency range of 300 MHz to 6 GHz)

EN 62209-2:2010+A1:2019:Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices. Human models, instrumentation, and procedures. Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)

EN 50663:2017:Generic standard for assessment of low power electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (10 MHz - 300 GHz)

EN 50566:2017:Product standard to demonstrate the compliance of wireless communication devices with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 30 MHz to 6 GHz: hand-held and body-mounted devices in close proximity to the human body

EN 62479:2010:Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)



### 3. Test Summary

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

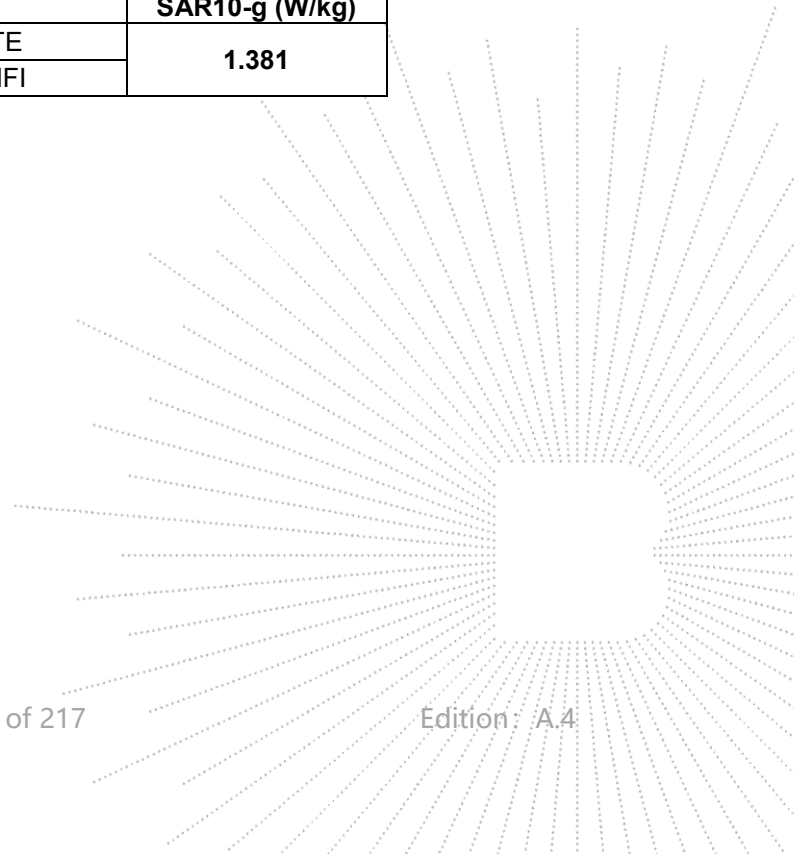
| Frequency Band | Head SAR                          | Body (5mm Gap)                    | Limb worn(0mm Gap)                | SAR <sub>10g</sub> Limit (W/kg) |
|----------------|-----------------------------------|-----------------------------------|-----------------------------------|---------------------------------|
|                | Maximum SAR <sub>10g</sub> (W/kg) | Maximum SAR <sub>10g</sub> (W/kg) | Maximum SAR <sub>10g</sub> (W/kg) |                                 |
| GSM            | <b>0.540</b>                      | <b>0.233</b>                      | 0.412                             | 2.0/4.0                         |
| WCDMA          | 0.372                             | 0.222                             | 0.394                             | 2.0/4.0                         |
| LTE            | 0.323                             | 0.228                             | <b>0.779</b>                      | 2.0/4.0                         |
| WIFI           | <b>0.336</b>                      | <b>0.549</b>                      | <b>0.602</b>                      | 2.0/4.0                         |

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (2.0 W/kg) specified in Annex II of Council Recommendation 1999/519/EC, and had been tested in accordance with the measurement methods and procedure specified in IEEE 1528-2013 and EN 62209-2. Limb worn SAR limits (4.0 W/kg)

Highest simultaneous SAR

| Exposure Position | Classment Class | Highest Simultaneous Transmission SAR <sub>10-g</sub> (W/kg) |
|-------------------|-----------------|--|
| Head              | GSM             | <b>0.876</b>   |
|                   | WIFI            |  |

| Exposure Position | Classment Class | Highest Simultaneous Transmission SAR <sub>10-g</sub> (W/kg) |
|-------------------|-----------------|--|
| Limb worn         | LTE             | <b>1.381</b>   |
|                   | WIFI            |  |



#### 4. Measurement Uncertainty

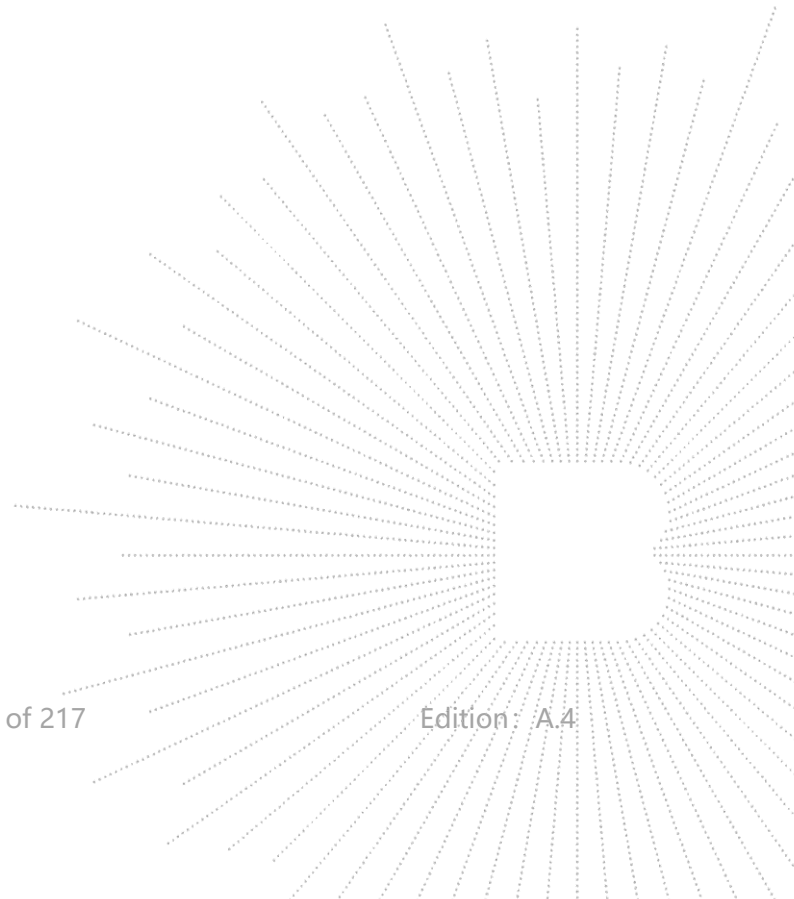
Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in IEEE 1528, IEC/IEEE 62209-1528/ EN IEC/IEEE 62209-1528, IEC/EN 62209-1, IEC/EN 62209-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| Uncertainty Component                           | Tol (+-%) | Prob. Dist. | Div. | Ci (1g)                                 | Ci (10g)         | 1g Ui (+-%) | 10g Ui (+-%) | Veff |
|---|-----------|-------------|------|---|------------------|-------------|--------------|------|
| <b>Measurement System</b>                       |           |             |      |   |                  |             |              |      |
| Probe calibration                               | 5.8       | N           | 1    | 1                                       | 1                | 5.80        | 5.80         | ∞    |
| Axial Isotropy                                  | 3.5       | R           | √3   | $\sqrt{1 - c_p}$                        | $\sqrt{1 - c_p}$ | 1.43        | 1.43         | ∞    |
| Hemispherical Isotropy                          | 5.9       | R           | √3   | $\sqrt{c_p}$                            | $\sqrt{c_p}$     | 2.41        | 2.41         | ∞    |
| Boundary effect                                 | 1.0       | R           | √3   | 1                                       | 1                | 0.58        | 0.58         | ∞    |
| Linearity                                       | 4.7       | R           | √3   | 1                                       | 1                | 2.71        | 2.71         | ∞    |
| System detection limits                         | 1.0       | R           | √3   | 1                                       | 1                | 0.58        | 0.58         | ∞    |
| Readout Electronics                             | 0.5       | N           | 1    | 1                                       | 1                | 0.50        | 0.50         | ∞    |
| Response Time                                   | 0.0       | R           | √3   | 1                                       | 1                | 0.00        | 0.00         | ∞    |
| Integration Time                                | 1.4       | R           | √3   | 1                                       | 1                | 0.81        | 0.81         | ∞    |
| RF ambient Conditions - Noise                   | 3.0       | R           | √3   | 1                                       | 1                | 1.73        | 1.73         | ∞    |
| RF ambient Conditions - Reflections             | 3.0       | R           | √3   | 1                                       | 1                | 1.73        | 1.73         | ∞    |
| Probe positioner Mechanical Tolerance           | 1.4       | R           | √3   | 1                                       | 1                | 0.81        | 0.81         | ∞    |
| Probe positioning with respect to Phantom Shell | 1.4       | R           | √3   | 1                                       | 1                | 0.81        | 0.81         | ∞    |
| Max. SAR Evaluation                             | 1.0       | R           | √3   | 1                                       | 1                | 0.6         | 0.6          | ∞    |
| <b>Test sample Related</b>                      |           |             |      |   |                  |             |              |      |
| Device positioning                              | 2.6       | N           | 1    | 1                                       | 1                | 2.6         | 2.6          | 11   |
| Device holder                                   | 3.0       | N           | 1    | 1                                       | 1                | 3.0         | 3.0          | 7    |
| Drift of output power                           | 5.0       | N           | √3   | 1                                       | 1                | 2.89        | 2.89         | ∞    |
| <b>Phantom and Tissue Parameters</b>            |           |             |      |   |                  |             |              |      |
| Phantom uncertainty                             | 4.00      | R           | √3   | 1                                       | 1                | 2.31        | 2.31         | ∞    |
| Liquid conductivity (target)                    | 2.50      | N           | 1    | 0.78                                    | 0.71             | 1.95        | 1.78         | 5    |
| Liquid conductivity (meas)                      | 4.00      | N           | 1    | 0.23                                    | 0.26             | 0.92        | 1.04         | 5    |
| Liquid Permittivity (target)                    | 2.50      | N           | 1    | 0.78                                    | 0.71             | 1.95        | 1.78         | ∞    |
| Liquid Permittivity (meas)                      | 5.00      | N           | 1    | 0.23                                    | 0.26             | 1.15        | 1.30         | ∞    |
| Combined Standard                               |           | RSS         |      | $u_c = \sqrt{\sum_{i=1}^n c_i^2 U_i^2}$ |                  | 10.63 %     | 10.54%       |      |



|   |                 |            |        |  |
|---|-----------------|------------|--------|--|
| Expanded Uncertainty<br>(95% Confidence interval) | $U = k UC, k=2$ | 21.26<br>% | 21.08% |  |
|---|-----------------|------------|--------|--|

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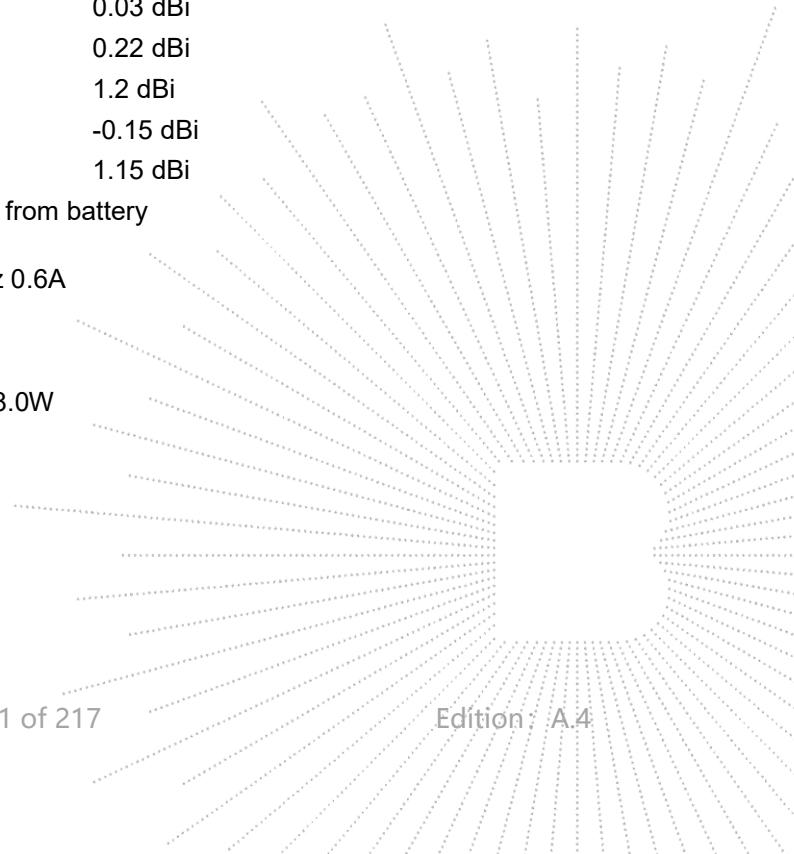


## 5. Product Information And Test Setup

### 5.1 Product Information

|                       |   |
|-----------------------|---|
| Model/Type Ref.:      | WP23<br>WP23 S, WP23 Pro, WP23 Ultra  |
| Model differences:    | All the model are the same circuit and RF module, except model names.   |
| Bluetooth Version:    | 5.0   |
| GSM Band(s):          | GSM/GPRS/EGPRS 900/1800MHz  |
| GPRS Class:           | 12  |
| WCDMA Band(s):        | FDD Band I/VIII   |
| LTE Band(s):          | FDD Band 1, Band 3, Band 7, Band 8, Band 20   |
| Technologies:         | Tagging systems   |
| FM:                   | Support   |
| GPS:                  | Support   |
| Hardware Version:     | HCT-M605MB-A1   |
| Software Version:     | OUKITEL_WP23_EEA_V01  |
|                       | Bluetooth(EDR+BLE): 2402-2480MHz  |
|                       | WIFI(2.4GHz): IEEE 802.11b/g/n HT20: 2412MHz-2472MHz<br>IEEE 802.11n HT40: 2422MHz-2462MHz                                  |
|                       | WIFI(5.1GHz): IEEE 802.11a/n/ac HT20:5180MHz-5240MHz<br>IEEE 802.11n/ac HT40:5190MHz-5230MHz                                |
|                       | WIFI(5.8GHz): IEEE 802.11a/n/ac HT20:5745MHz-5825MHz<br>IEEE 802.11n/ac HT40:5755 MHz-5795MHz<br>IEEE 802.11ac HT80:5775MHz |
|                       | GSM/GPRS/EGPRS 900: Tx: 880-915MHz, Rx: 925-960MHz  |
|                       | GSM/GPRS/EGPRS 1800: Tx: 1710-1785MHz, Rx: 1805-1880MHz   |
|                       | WCDMA Band I: Tx: 1920-1980MHz, Rx: 2110-2170MHz  |
|                       | WCDMA Band VIII: Tx: 880-915MHz, Rx: 925-960MHz   |
| Operation Frequency:  | LTE Band 1:<br>(UL)1920MHz~1980MHz<br>(DL)2110MHz~2170MHz   |
|                       | LTE Band 3:<br>(UL)1710MHz~1785MHz<br>(UL)1805MHz~1880MHz   |
|                       | LTE Band 7:<br>(UL)2500MHz~2570MHz<br>(DL)2620MHz~2690MHz   |
|                       | LTE Band 8:<br>(UL)880MHz~915MHz<br>(DL)925MHz~960MHz   |
|                       | LTE Band 20:<br>(UL)832MHz~862MHz<br>(DL)791MHz~821MHz  |
|                       | NFC: 13.56MHz   |
|                       | FM (Receiver): 87.5-108MHz  |
|                       | GPS: 1.57542GHz   |
| Max. RF output power: | Bluetooth(EDR): 2.5 dBm   |
|                       | Bluetooth(BLE): 0.24 dBm  |

|                       |                                    |                            |
|-----------------------|------------------------------------|----------------------------|
|                       | WIFI(2.4GHz) :                     | 14.3 dBm                   |
|                       | WIFI(5.1GHz):                      | 12.76 dBm                  |
|                       | WIFI(5.8GHz):                      | 9.69 dBm                   |
|                       | GSM/GPRS/EGPRS 900:                | 33.71 dBm                  |
|                       | GSM/GPRS/EGPRS 1800:               | 30.62 dBm                  |
|                       | WCDMA Band I:                      | 22.25 dBm                  |
|                       | WCDMA Band VIII:                   | 23.84 dBm                  |
|                       | LTE Band 1:                        | 21.78 dBm                  |
|                       | LTE Band 3:                        | 22.65 dBm                  |
|                       | LTE Band 7:                        | 21.78 dBm                  |
|                       | LTE Band 8:                        | 23.44 dBm                  |
|                       | LTE Band 20:                       | 22.37 dBm                  |
|                       | Bluetooth(EDR):                    | GFSK, $\pi/4$ DQPSK, 8DPSK |
|                       | Bluetooth(BLE):                    | GFSK                       |
| Type of Modulation:   | WIFI(2.4GHz+5.1GHz+5.8GHz):        | DSSS, OFDM                 |
|                       | GSM/GPRS/EGPRS:                    | GMSK                       |
|                       | WCDMA:                             | QPSK, 16QAM, 64QAM, BPSK   |
|                       | LTE:                               | QPSK, 16-QAM               |
| Antenna installation: | Internal antenna                   |                            |
| Product Class:        | 1                                  |                            |
|                       | Bluetooth(EDR+BLE+2.4GHz):         | 0.33 dBi                   |
|                       | WIFI(5.1GHz+5.8GHz):               | 0.24 dBi                   |
|                       | GSM/GPRS/EGPRS 900:                | 1.2 dBi                    |
|                       | GSM/GPRS/EGPRS 1800:               | 0.03 dBi                   |
|                       | WCDMA Band I:                      | 1.2 dBi                    |
| Antenna Gain:         | WCDMA Band VIII:                   | 0.52 dBi                   |
|                       | LTE band 1:                        | 0.52 dBi                   |
|                       | LTE Band 3:                        | 0.03 dBi                   |
|                       | LTE Band 7:                        | 0.22 dBi                   |
|                       | LTE Band 8:                        | 1.2 dBi                    |
|                       | LTE Band 20:                       | -0.15 dBi                  |
|                       | GPS                                | 1.15 dBi                   |
| Ratings:              | AC 230V/50Hz/DC 3.87V from battery |                            |
|                       | Model: HJ-FC017K7-EU               |                            |
|                       | Input: 100-240V~50/60Hz 0.6A       |                            |
| Adapter Information:  | Output: DC 5.0V 2.0A               |                            |
|                       | OR: DC 7.0V 2.0A                   |                            |
|                       | OR: DC 9.0V 2.0A                   |                            |
|                       | OR: DC 12.0V 1.5A 18.0W            |                            |



## 5.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

## 5.3 Support Equipment

Cable of Product

| No. | Cable Type | Quantity | Provider  | Length (m) | Shielded | Note |
|-----|------------|----------|-----------|------------|----------|------|
| 1   | --         | --       | Applicant | ---        | Yes/No   | --   |
| 2   | --         | --       | BCTC      | --         | Yes/No   | --   |

| No. | Device Type | Brand | Model | Series No. | Note |
|-----|-------------|-------|-------|------------|------|
| 1.  | ---         | ---   | ---   | ---        | ---  |
| 2.  | --          | --    | --    | --         | --   |

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 5.4 Test Environment

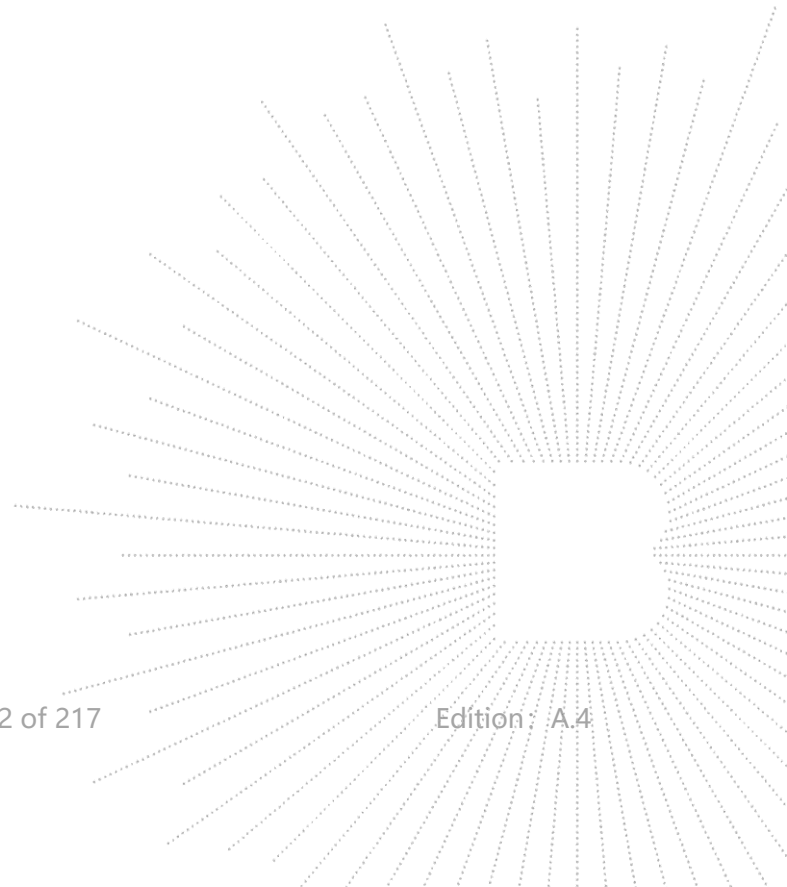
1. Normal Test Conditions:

|                            |     |
|----------------------------|-----|
| Humidity(%):               | 54  |
| Atmospheric Pressure(kPa): | 101 |
| Temperature(°C):           | 22  |

2. Extreme Test Conditions:

N/A

CO., LTD



## 6. Test Facility And Test Instrument Used

### 6.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

### 6.2 Test Instrument Used

| Equipment                           | Manufacturer  | Model#   | Serial#                | Last Cal.     | Next Cal.     |
|-------------------------------------|---------------|----------|------------------------|---------------|---------------|
| PC                                  | DELL          | \        | \                      | N/A           | N/A           |
| SAR Measurement system              | SATIMO        | \        | \                      | N/A           | N/A           |
| Signal Generator                    | Agilent       | 83712A   | \                      | May 24, 2022  | May 23, 2023  |
| Multimeter                          | Keithley      | 1160271  | \                      | Nov. 10, 2022 | Nov 09, 2023  |
| S-parameter Network Analyzer        | R&S           | ZVB 8    | 101353                 | Dec. 07, 2022 | Dec. 06, 2023 |
| Wideband Radio Communication Tester | R&S           | CMW500   | \                      | Nov. 10, 2022 | Nov 09, 2023  |
| E SAR PROBE 6GHz                    | MVG           | SSE2     | SN EPGO373             | June 29, 2022 | June 28, 2023 |
| DIPOLE 900                          | SATIMO        | SID 900  | SN 47/21 DIP 0G900-622 | Nov. 20, 2021 | Nov. 19, 2024 |
| DIPOLE 1800                         | SATIMO        | SID 1800 | SN 47/21 DIP 1G800-623 | Nov. 20, 2021 | Nov. 19, 2024 |
| DIPOLE 2100                         | SATIMO        | SID 2100 | SN 47/21 DIP 2G100-625 | Nov. 20, 2021 | Nov. 19, 2024 |
| DIPOLE 2450                         | SATIMO        | SID 2450 | SN 47/21 DIP 2G450-627 | Nov. 20, 2021 | Nov. 19, 2024 |
| DIPOLE 5000                         | SATIMO        | SID5000  | SN 47/21 DIP 5G000-629 | Nov. 20, 2021 | Nov. 19, 2024 |
| COMOSAR OPENCoaxial Probe           | SATIMO        | \        | \                      | Nov. 18, 2022 | Nov. 17, 2023 |
| SAR Locator                         | SATIMO        | \        | \                      | Nov. 18, 2022 | Nov. 17, 2023 |
| Communication Antenna               | SATIMO        | \        | \                      | Nov. 18, 2022 | Nov. 17, 2023 |
| FEATURE PHONEPOSITIONING DEVICE     | SATIMO        | \        | \                      | N/A           | N/A           |
| DUMMY PROBE                         | SATIMO        | \        | \                      | N/A           | N/A           |
| SAM Phantom                         | MVG           | \        | SN 13/09 SAM68         | N/A           | N/A           |
| Liquid measurement Kit              | HP            | 85033D   | 3423A08186             | Nov. 20, 2021 | Nov. 19, 2022 |
| Power meter                         | Agilent       | E4419    | \                      | May 24, 2022  | May 23, 2023  |
| Power meter                         | Agilent       | E4419    | \                      | May 24, 2022  | May 23, 2023  |
| Power sensor                        | Agilent       | E9300A   | \                      | May 24, 2022  | May 23, 2023  |
| Power sensor                        | Agilent       | E9300A   | \                      | May 24, 2022  | May 23, 2023  |
| Directional Coupler                 | Krytar 158020 | 131467   | \                      | Nov. 10, 2022 | Nov 09, 2023  |

## 7. Specific Absorption Rate (SAR)

### 7.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

### 7.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density ( $\rho$ ). The equation description is as below:

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

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

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

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

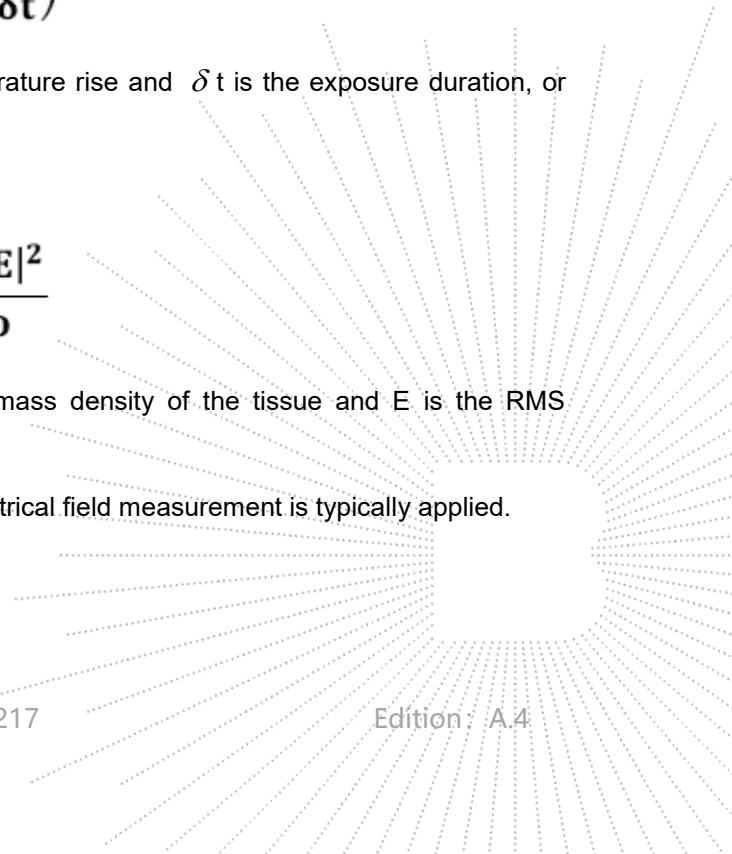
Where: C is the specific heat capacity,  $\delta T$  is the temperature rise and  $\delta t$  is the exposure duration, or related to the

electrical field in the tissue by

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

Where:  $\sigma$  is the conductivity of the tissue,  $\rho$  is the mass density of the tissue and E is the RMS electrical field strength.

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



## 8. SAR Measurement System

### 8.1 The Measurement System

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

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

The following figure shows the system.



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

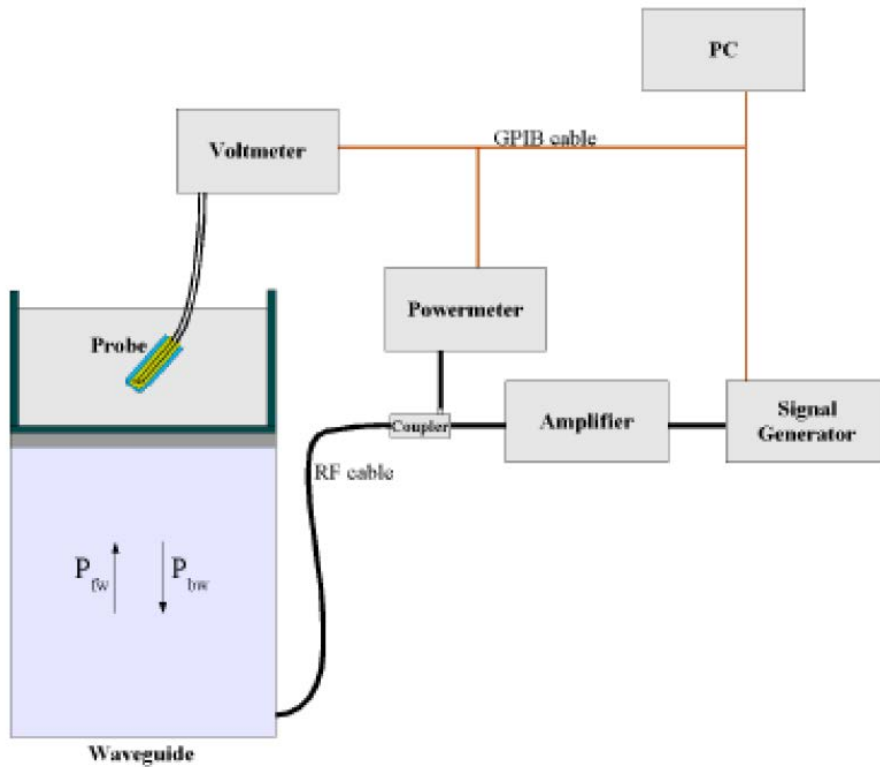
### 8.2 Probe

For the measurements the Specific Dosimetric E-Field Probe SN 46/21 EPGO362 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 5 mm
- Distance between probe tip and sensor center: 2.10mm
- Distance between sensor center and the inner phantom surface: 4 mm (repeatability better than +/- 1mm)
- Probe linearity: <0.25 dB
- Axial Isotropy: <0.25 dB
- Spherical Isotropy: <0.50 dB
- Calibration range: 835 to 2500MHz for head & body simulating liquid.

Angle between probe axis (evaluation axis) and surface normal line: less than 30°

Probe calibration is realized, in compliance with EN 62209-1 and IEEE 1528 STD, with CALISAR, Antenna proprietary calibration system. The calibration is performed with the EN 62209-1 annex technique using reference guide at the five frequencies.



$$SAR = \frac{4(p_{f_w} - p_{p_{bw}})}{ab\delta} \cos^2 \left( \pi \frac{y}{a} \right) e^{(2\pi/\delta)}$$

Where :

$P_{fw}$  = Forward Power

$P_{bw}$  = Backward Power

a and b = Waveguide dimensions

$\delta$  = Skin depth

Keithley configuration:

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

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

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

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

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

where DCP is the diode compression point in mV.



### 8.3 Test Procedure

#### Dosimetric Assessment Procedure

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

#### Free Space Assessment Procedure

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1mW/cm<sup>2</sup>.

#### Temperature Assessment Procedure

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

Where:

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

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

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

$\Delta T$  = temperature increase due to RF exposure.

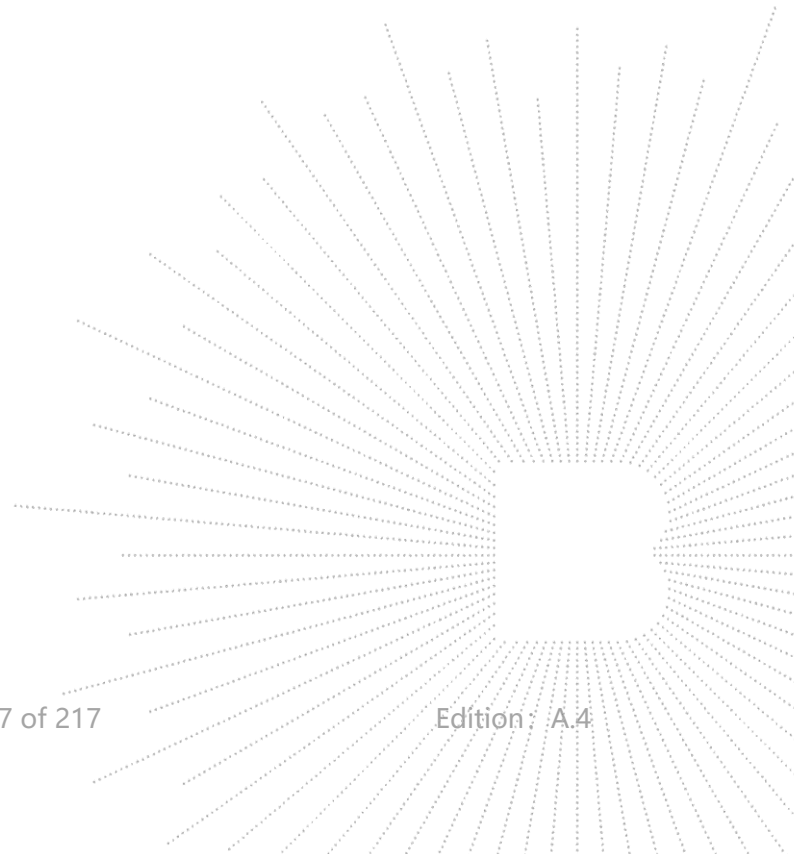
SAR is proportional to  $\Delta T/\Delta t$ , the initial rate of tissue heating, before thermal diffusion takes place. The electric field in the simulated tissue can be used to estimate SAR by equating the thermally derived SAR to that with the E- field component.

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

Where:

$\sigma$  = simulated tissue conductivity,

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

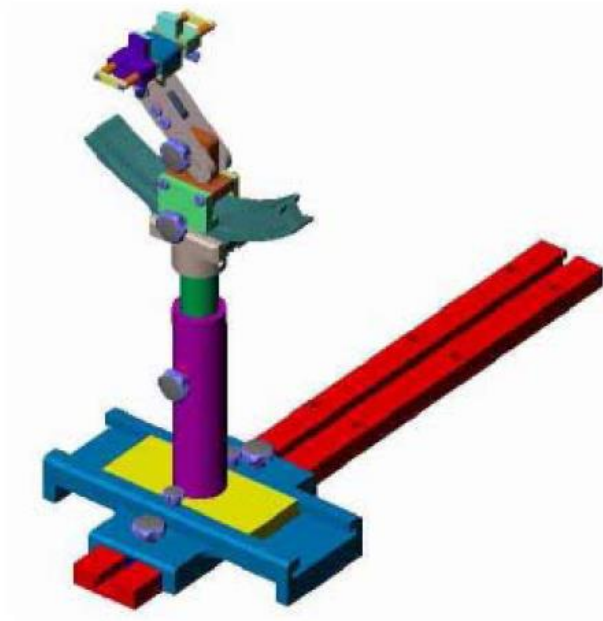


## 8.4 Phantom

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

## 8.5 Phantom

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



| System Material | Permittivity | Loss Tangent |
|-----------------|--------------|--------------|
| Delrin          | 3.7          | 0.005        |

## 9. Tissue Simulating Liquids

### 9.1 Composition of Tissue Simulating Liquid

For the measurement of the field distribution inside the SAM phantom with SMTIMO, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. Please see the following photos for the liquid height.



Liquid Height for Body SAR

The Composition of Tissue Simulating Liquid

| Frequency (MHz)  | Water (%) | Salt (%) | 1,2-Propane diol (%) | HEC (%) | Preventol (%) | DGBE (%) |
|------------------|-----------|----------|----------------------|---------|---------------|----------|
| <b>Head/Body</b> |           |          |                      |         |               |          |
| 835              | 40.3      | 1.4      | 57.9                 | 0.2     | 0.2           | 0        |
| 900              | 40.3      | 1.4      | 57.9                 | 0.2     | 0.2           | 0        |
| 1800-2000        | 55.2      | 0.3      | 0                    | 0       | 0             | 44.5     |
| 2450             | 55.0      | 0.1      | 0                    | 0       | 0             | 44.9     |
| 2600             | 54.9      | 0.1      | 0                    | 0       | 0             | 45.0     |

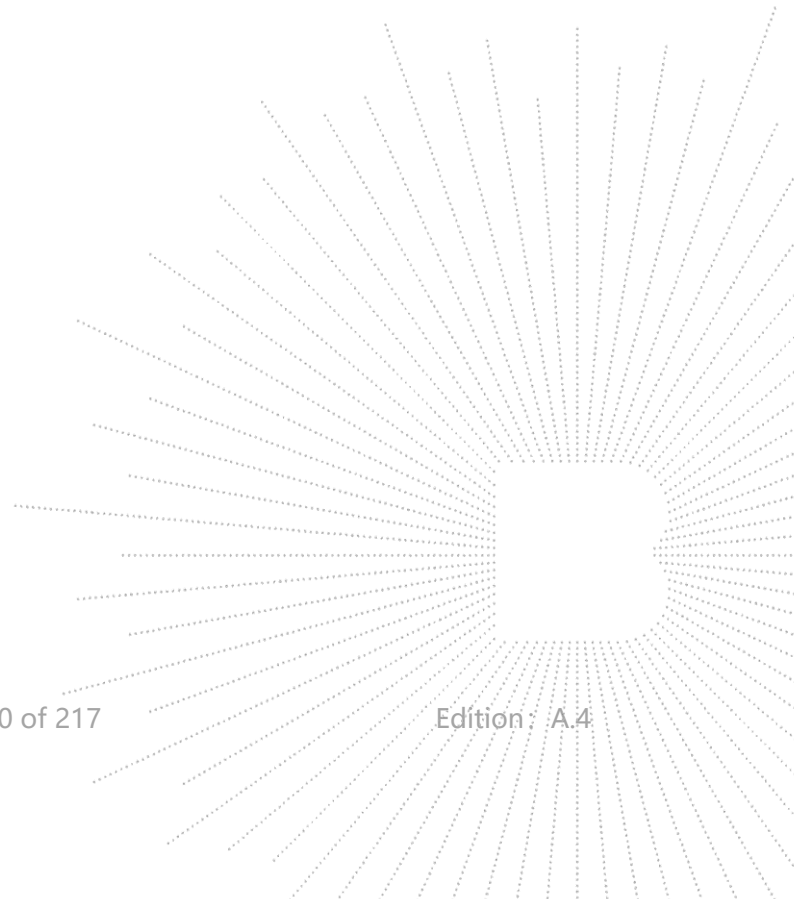
| Frequency (MHz)  | Water (%) | Hexyl Carbitol (%) | Triton X-100 (%) |
|------------------|-----------|--------------------|------------------|
| <b>Head/Body</b> |           |                    |                  |
| 5000-6000        | 65.52     | 17.24              | 17.24            |

## 9.2 Limit

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters

computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

| Target Frequency (MHz) | Head/Body                 |                               |
|------------------------|---------------------------|-------------------------------|
|                        | Conductivity ( $\sigma$ ) | Permittivity ( $\epsilon_r$ ) |
| 150                    | 0.76                      | 52.3                          |
| 300                    | 0.87                      | 45.3                          |
| 450                    | 0.87                      | 43.5                          |
| 750                    | 0.89                      | 41.9                          |
| <b>835</b>             | <b>0.90</b>               | <b>41.5</b>                   |
| <b>900</b>             | <b>0.97</b>               | <b>41.5</b>                   |
| 915                    | 0.98                      | 41.5                          |
| 1450                   | 1.20                      | 40.5                          |
| 1610                   | 1.29                      | 40.3                          |
| <b>1800-2000</b>       | <b>1.40</b>               | <b>40.0</b>                   |
| <b>2450</b>            | <b>1.80</b>               | <b>39.2</b>                   |
| <b>2600</b>            | <b>1.96</b>               | <b>39.0</b>                   |
| 3000                   | 2.40                      | 38.5                          |
| 5200                   | 4.66                      | 36.0                          |
| 5400                   | 4.86                      | 35.8                          |
| 5600                   | 5.07                      | 35.5                          |
| 5800                   | 5.27                      | 35.3                          |



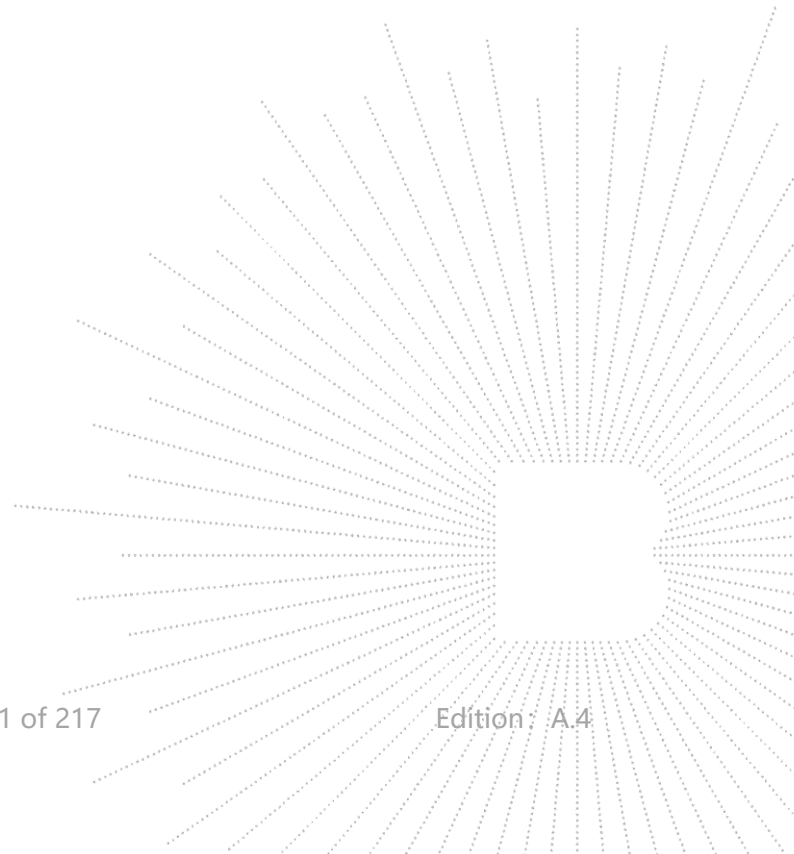
### 9.3 Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an R&S ZVB 8. Dielectric Probe Kit and an Agilent Network Analyzer.

Calibration Result for Dielectric Parameters of Tissue Simulating Liquid

| Frequency (MHz) | Liquid | Target Permittivity (F/m) | Target Conductivity (S/m) | Measured Permittivity (F/m) | Measured Conductivity (S/m) | Deviation Perm. Cond.(%) | Date       | Temp. Ambient TSL (°C) |
|-----------------|--------|---------------------------|---------------------------|-----------------------------|-----------------------------|--------------------------|------------|------------------------|
| 900             | Head   | 41.5                      | 0.97                      | 40.9                        | 1.05                        | -1.45% 8.25%             | 01/11/2023 | 20.0                   |
| 1800            | Head   | 40.0                      | 1.40                      | 39.2                        | 1.52                        | -2.00% 8.57%             | 01/13/2023 | 20.0                   |
| 2100            | Head   | 39.8                      | 1.49                      | 38.5                        | 1.61                        | -3.27% 8.05%             | 01/16/2023 | 20.0                   |
| 2450            | Head   | 39.2                      | 1.80                      | 38.6                        | 1.95                        | -1.53% 8.33%             | 01/30/2023 | 20.0                   |
| 5200            | Head   | 36.0                      | 4.66                      | 35.7                        | 4.52                        | -0.83% -3.00%            | 02/02/2023 | 20.0                   |
| 5800            | Head   | 35.3                      | 5.27                      | 34.9                        | 5.17                        | -1.13% -1.90%            | 02/07/2023 | 20.0                   |

BCTC  
 3C  
 PPR  
 检测



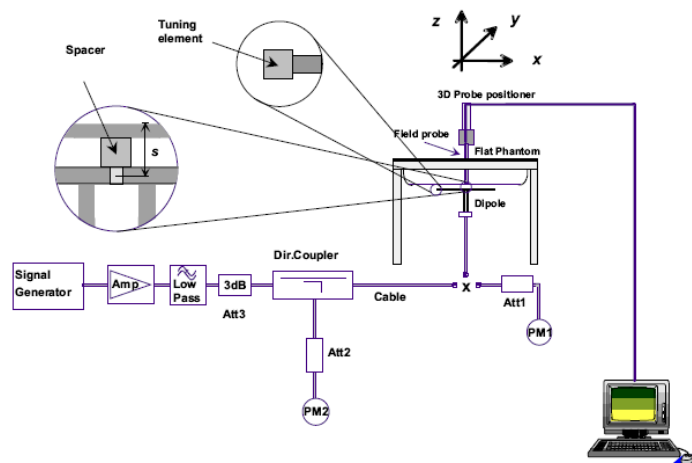
## 10. SAR Measurement Evaluation

### 10.1 Purpose of System Performance Check

At the device test frequencies. System check verifies the measurement repeatability of a SAR system before compliance testing and is not a validation of all system specifications. The latter is not required for testing a device but is mandatory before the system is deployed. The system check detects possible short-term drift and unacceptable measurement errors or uncertainties in the system.

### 10.2 System Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator at frequency 850MHz,900 MHz,1800MHz,2000MHz, 2450MHz,2600MHz. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The output power on dipole port must be calibrated to 24 dBm (250 mW) before dipole is connected.



### 10.3 Validation Results

Comparing to the original SAR value provided by SATIMO, the validation data should be within its specification of 10 %. The following table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion.

| Mixture Type | Frequency (MHz) | Power               | SAR1g (W/Kg) | SAR10g (W/Kg) | Drift (%) | 1W Target    |               | Difference percentage |        | Liquid Temp | Date       |
|--------------|-----------------|---------------------|--------------|---------------|-----------|--------------|---------------|-----------------------|--------|-------------|------------|
|              |                 |                     |              |               |           | SAR1g (W/Kg) | SAR10g (W/Kg) | 1g                    | 10g    |             |            |
| Head         | 900             | 100 mW              | 1.124        | 0.719         | -0.36     | 10.9         | 6.99          | 3.12%                 | -2.86% | 20.0        | 01/11/2023 |
|              |                 | Normalize to 1 Watt | 11.24        | 7.19          |           |              |               |                       |        |             |            |
| Head         | 1800            | 100 mW              | 3.940        | 1.995         | 0.07      | 38.4         | 20.1          | 2.60%                 | -0.50% | 20.0        | 01/13/2023 |
|              |                 | Normalize to 1 Watt | 39.4         | 20.0          |           |              |               |                       |        |             |            |
| Head         | 2100            | 100 mW              | 4.458        | 2.155         | 0.10      | 43.6         | 21.9          | 2.29%                 | -1.37% | 20.0        | 01/16/2023 |

|      |      |                     |       |       |      |      |      |        |        |      |            |
|------|------|---------------------|-------|-------|------|------|------|--------|--------|------|------------|
|      |      | Normalize to 1 Watt | 44.6  | 21.6  |      |      |      |        |        |      |            |
| Head | 2450 | 100 mW              | 5.085 | 2.457 | 0.36 | 52.4 | 24   | -2.86% | 2.50%  | 20.0 | 01/30/2023 |
|      |      | Normalize to 1 Watt | 50.9  | 24.6  |      |      |      |        |        |      |            |
| Head | 5200 | 100 mW              | 6.953 | 2.041 | 0.43 | 76.5 | 21.6 | -9.15% | -5.56% | 20.0 | 02/02/2023 |
|      |      | Normalize to 1 Watt | 69.5  | 20.4  |      |      |      |        |        |      |            |
| Head | 5800 | 100 mW              | 7.125 | 2.063 | 0.43 | 78.0 | 21.9 | -8.59% | -5.94% | 20.0 | 02/07/2023 |
|      |      | Normalize to 1 Watt | 71.3  | 20.6  |      |      |      |        |        |      |            |

## 11. EUT Testing Position

### 11.1 Define Two Imaginary Lines on The Handset

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

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

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

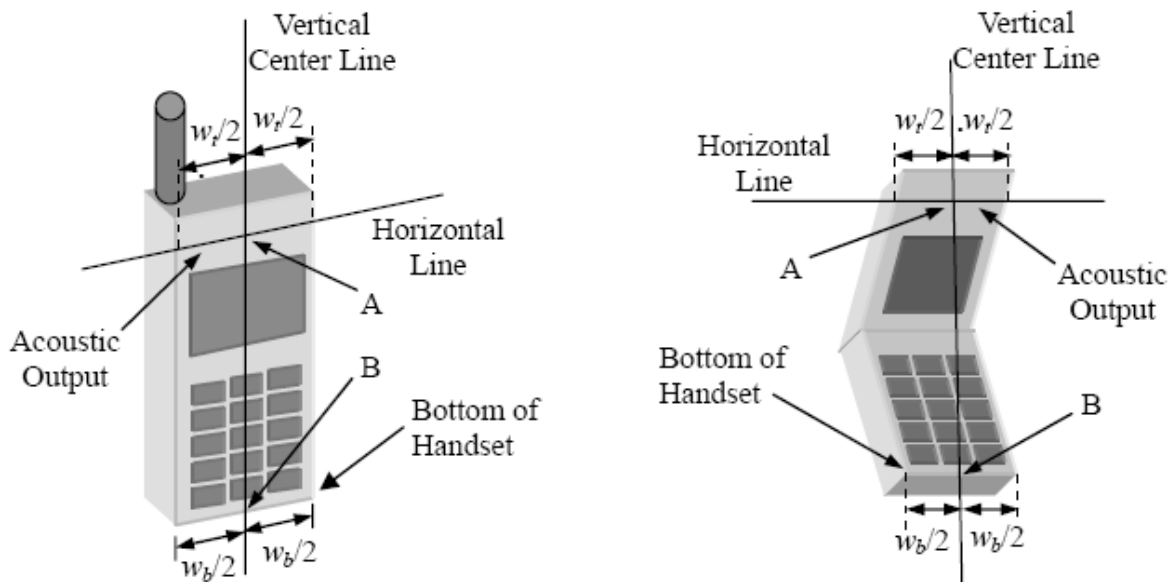


Illustration for Handset Vertical and Horizontal Reference Lines

## 11.2 Cheek Position

(a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

(b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see below).

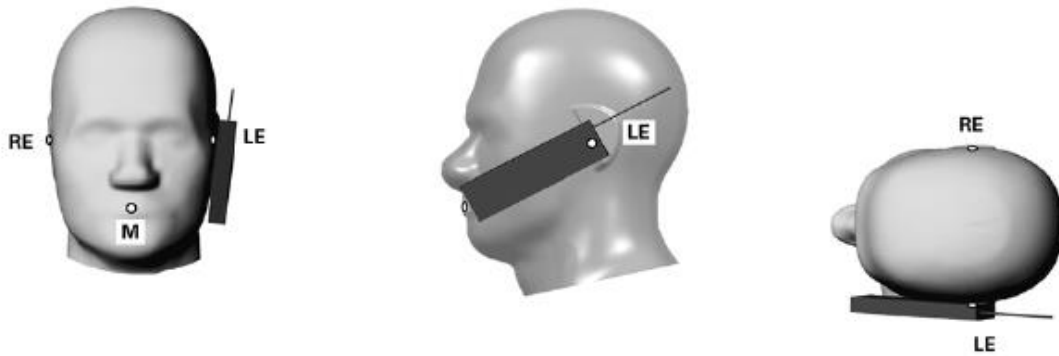


Illustration for Cheek Position

## 11.3 Tilted Position

(a) To position the device in the “cheek” position described above.

(b) While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see below).

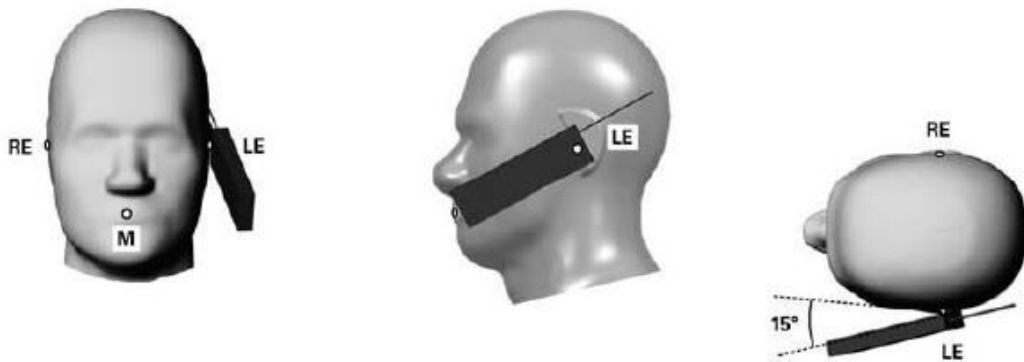
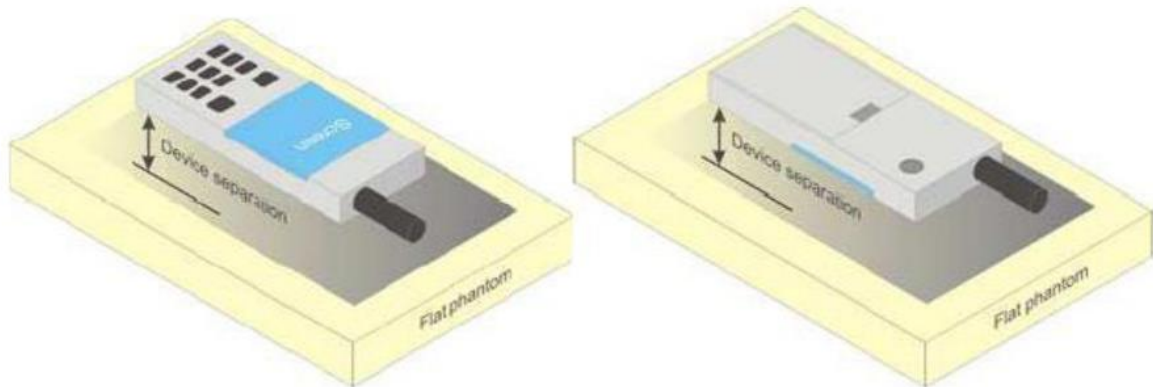


Illustration for Tilted Position



## 11.4 Body Position

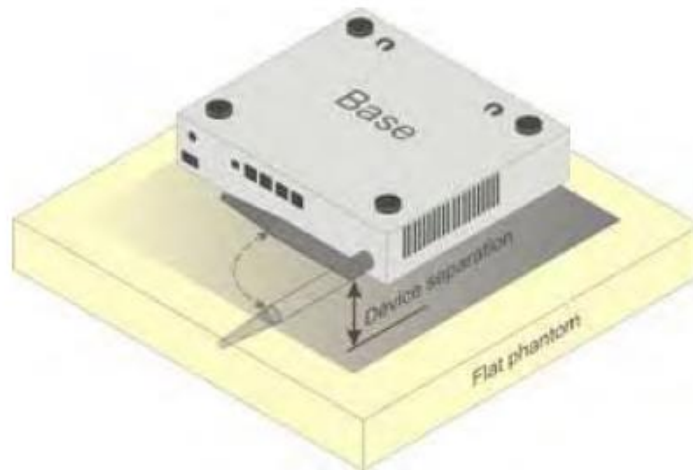
A typical example of a body-worn device is a Mobile Phone , wireless enabled PDA or other battery operated wireless device with the ability to transmit while mounted on a person's body using a carry accessory approved by the wireless device manufacturer.



Test positions for body-worn devices

### Devices with hinged or swivel antenna(s)

For devices that employ one or more external antennas with variable positions (e.g. antenna extended, retracted, rotated), these shall be positioned in accordance with the user instructions provided by the manufacturer. For a device with only one antenna, if no intended antenna position is specified, tests shall be performed if applicable in both the horizontal and vertical positions relative to the phantom, and with the antenna oriented away from the body of the DUT and/or with the antenna extended and retracted such as to obtain the highest exposure condition. For antennas that may be rotated through one or two planes, an evaluation should be made and documented in the measurement report to the highest exposure scenario and only that position(s) need(s) to be tested. For devices with multiple detachable antennas see provisions of 6.2.2.



Device with swivel antenna (example of desktop device)

### Body-supported device

A typical example of a body supported device is a wireless enabled laptop device that among other orientations may be supported on the thighs of a sitting user. To represent this orientation, the device shall be positioned with its base against the flat phantom. Other orientations may be specified by the manufacturer in the user instructions. If the intended use is not specified, the device shall be tested directly against the flat phantom in all usable orientations.

The screen portion of the device shall be in an open position at a 90° angle as seen in Figure 6a (left side), or at an operating angle specified for intended use by the manufacturer in the operating instructions. Where a body supported device has an integral screen required for normal operation,

then the screen-side will not need to be tested if the antenna(s) integrated in it ordinarily remain(s) 200 mm from the body. Where a screen mounted antenna is present, the measurement shall be performed with the screen against the flat phantom as shown in right side), if operating the screen against the body is consistent with the intended use.

Other devices that fall into this category include tablet type portable computers and credit card transaction authorisation terminals, point-of-sale and/or inventory terminals. Where these devices may be torso or limb-supported, the same principles for body-supported devices are applied.

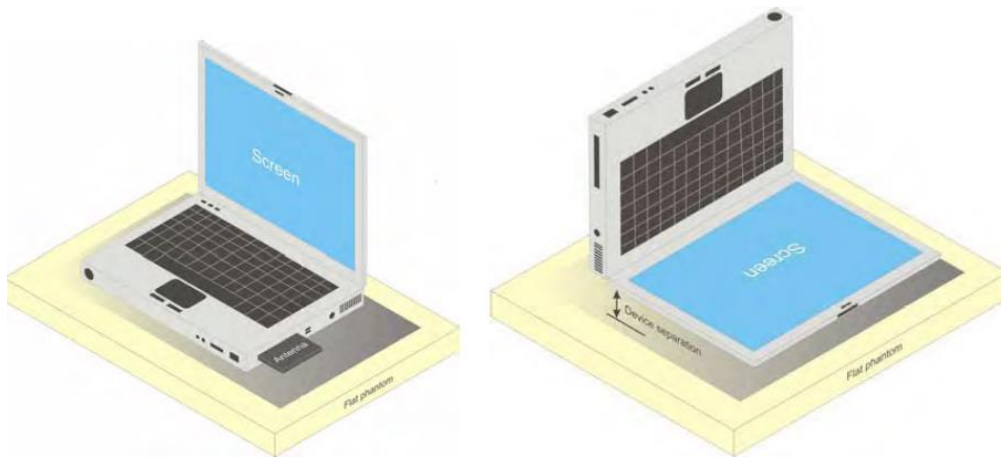
The example shows a tablet form factor portable computer for which SAR should be separately assessed with

- c). each surface and
- d). the separation distances

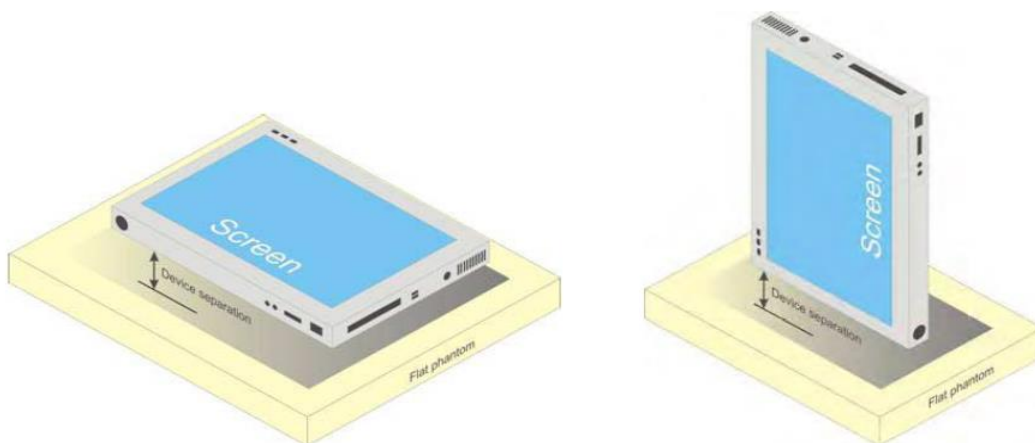
positioned against the flat phantom that correspond to the intended use as specified by the manufacturer. If the intended use is not specified in the user instructions, the device shall be tested directly against the flat phantom in all usable orientations.

Some body-supported devices may allow testing with an external power supply (e.g. a.c. adapter) supplemental to the battery, but it shall be verified and documented in the measurement report that SAR is still conservative.

For devices that employ an external antenna with variable positions (e.g. swivel antenna), see 6.1.4.5.

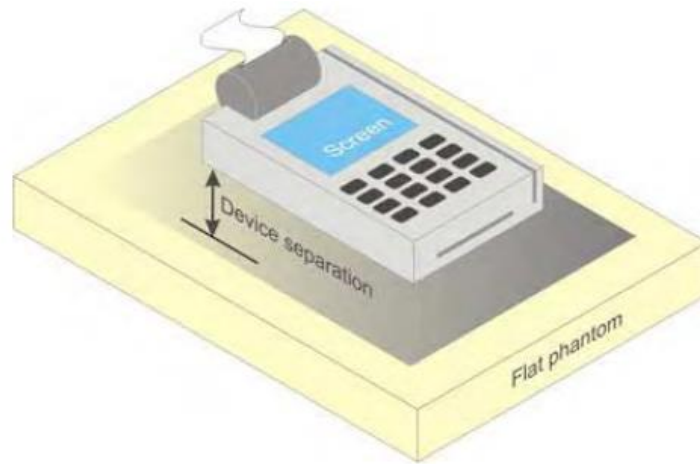


a) Portable computer with external antenna plug-in-radio-card (left side) or with internal antenna located in screen section (right side)



b) TABLET form factor portable computer

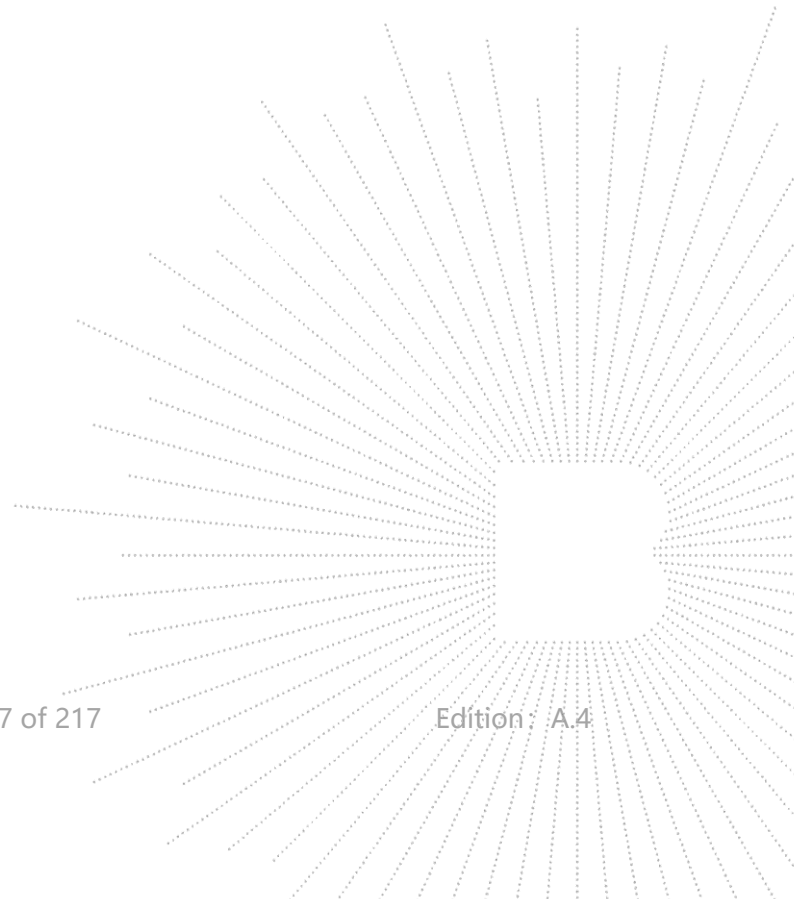




c) Wireless credit card transaction authorisation terminal

Test positions for body supported devices

TC  
3C  
PPR  
測

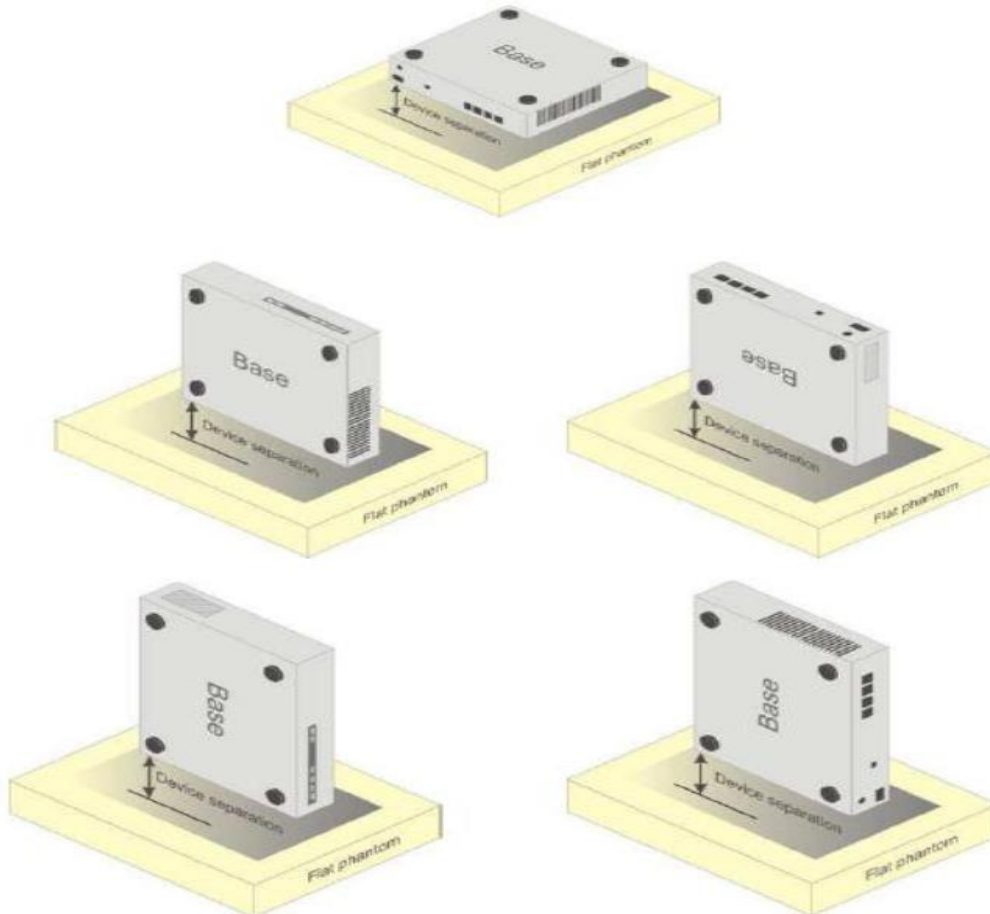


**Desktop device**

A typical example of a desktop device is a wireless enabled desktop computer placed on a table or desk when used.

The DUT shall be positioned at the distance and in the orientation to the phantom that corresponds to the intended use as specified by the manufacturer in the user instructions. For devices that employ an external antenna with variable positions, tests shall be performed for all antenna positions specified.

Picture 14 shows positions for desktop device SAR tests. If the intended use is not specified, the device shall be tested directly against the flat phantom.



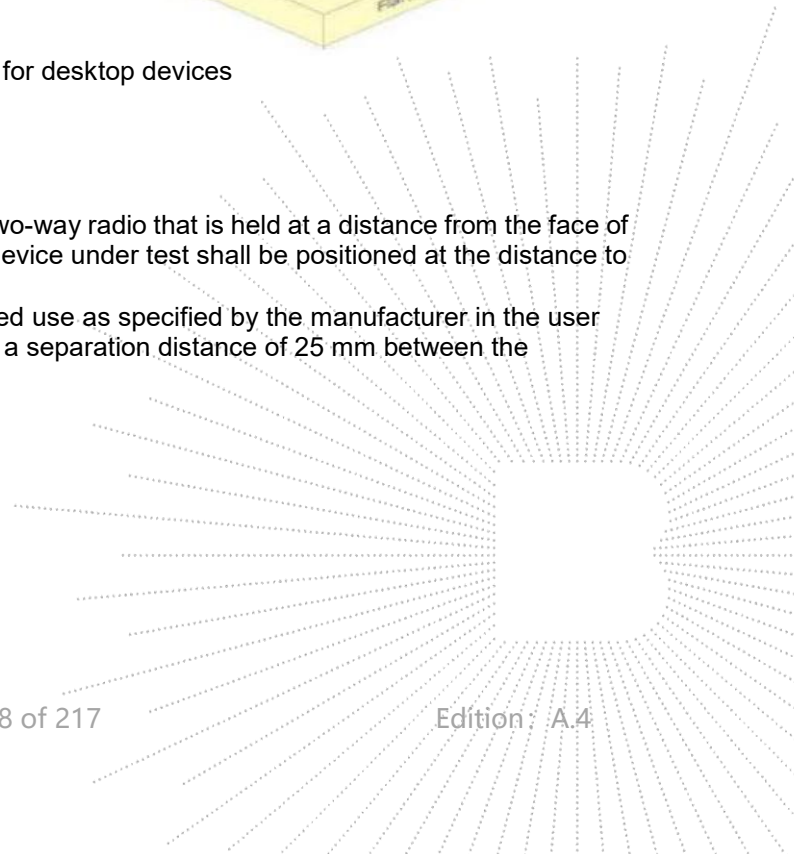
Test positions for desktop devices

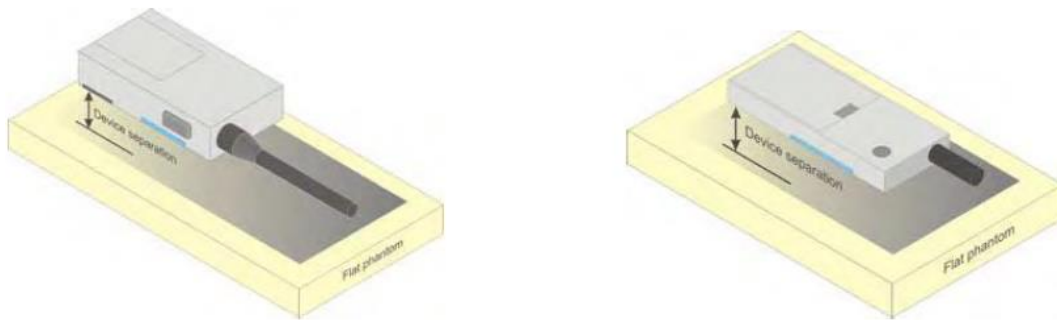
**Front-of-face device**

A typical example of a front-of-face device is a two-way radio that is held at a distance from the face of the user when transmitting. In these cases the device under test shall be positioned at the distance to the

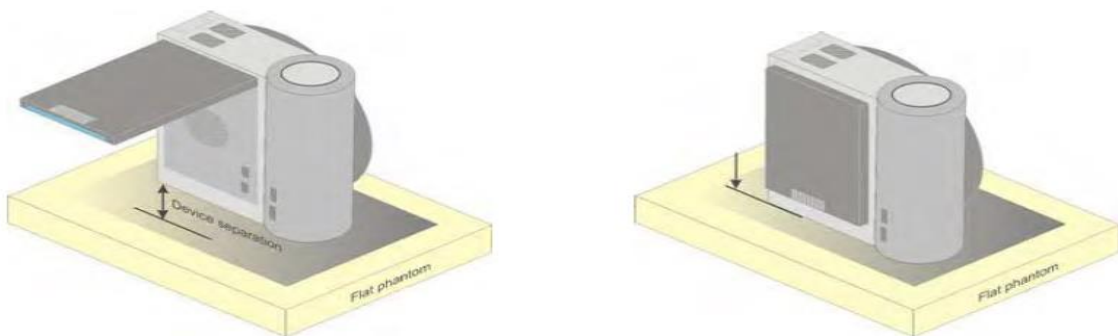
phantom surface that corresponds to the intended use as specified by the manufacturer in the user instructions. If the intended use is not specified, a separation distance of 25 mm between the phantom surface and the device shall be used.

TEST  
 TO  
 OVER  
 検査





a) Two-way radios



b) Still cameras and video cameras

#### Test positions for front-of-face devices

Other devices that fall into this category include wireless-enabled still cameras and video cameras that can send data to a network or other device. In the case of a device whose intended use requires a separation distance from the user (e.g., device with a viewing screen), this shall be positioned at the distance to the phantom surface that corresponds to the intended use as specified by the manufacturer in the user instructions (left side). If the intended use is not specified, a separation distance of 25 mm between the phantom surface and the device shall be used.

For a device whose intended use requires the user's face to be in contact with the device (e.g., device with an optical viewfinder), this shall be placed directly against the phantom (right side).

#### Hand-held usage of the device, not at the head or torso

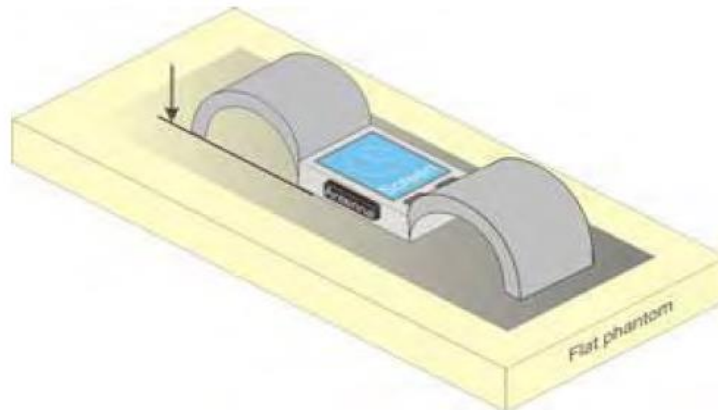
Additional studies remain needed for devising a representative method for evaluating SAR in the hand of hand-held devices. Future versions of this standard are intended to contain a test method based on scientific data and rationale. Annex J presents the currently available test procedure.

#### Limb-worn device

A limb-worn device is a unit whose intended use includes being strapped to the arm or leg of the user while transmitting (except in idle mode). It is similar to a body-worn device. Therefore, the test positions of 6.1.4.4 also apply. The strap shall be opened so that it is divided into two parts as shown in Figure 9. The device shall be positioned directly against the phantom surface with the strap straightened as much as possible and the back of the device towards the phantom.



If the strap cannot normally be opened to allow placing in direct contact with the phantom surface, it may be necessary to break the strap of the device but ensuring to not damage the antenna.

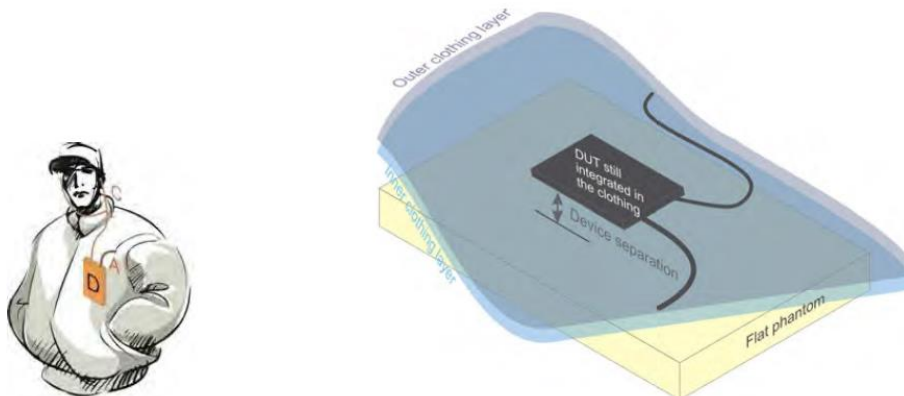


Test position for limb-worn devices

#### Clothing-integrated device

A typical example of a clothing-integrated device is a wireless device (Mobile Phone ) integrated into a jacket to provide voice communications through an embedded speaker and microphone. This category also includes headgear with integrated wireless devices.

All wireless or RF transmitting components shall be placed in the orientation and at the separation distance to the phantom surface that correspond to intended use of the device when it is integrated into the clothing.



Test position for clothing-integrated wireless devices

## 12. SAR Measurement Procedures

### 12.1 Measurement Procedures

The measurement procedures are as follows:

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

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

### 12.2 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The SATIMO software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine. The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

### 12.3 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan measures 5x5x7 points with step size 8, 8 and 5 mm for 300 MHz to 3 GHz, and 8x8x8 points with step size 4, 4 and 2.5 mm for 3 GHz to 6 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

### 12.4 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing (step-size is 4, 4 and 2.5 mm). When all volume scan were completed, the software can combine and subsequently superpose these measurement data to calculating the multiband SAR.

### 12.5 SAR Averaged Methods

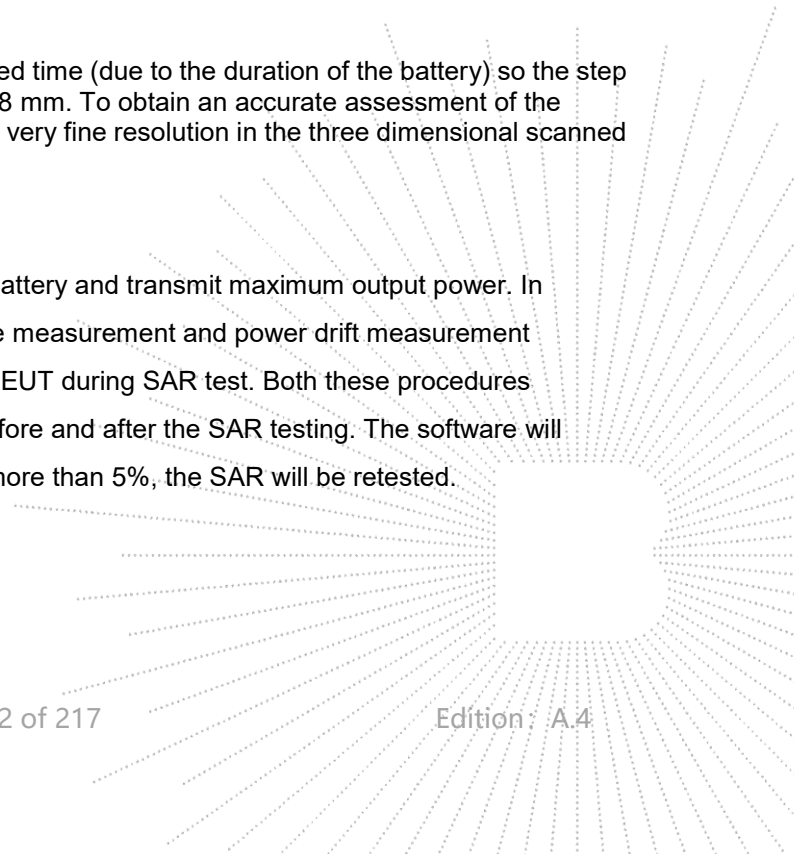
The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10g and 1 g requires a very fine resolution in the three dimensional scanned data array.

### 12.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In SATIMO measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drift more than 5%, the SAR will be retested.





### 13. SAR Test Result

#### 13.1 Conducted RF Output Power

| GSM - Burst Average Power (dBm) |        |       |       |         |        |        |
|---------------------------------|--------|-------|-------|---------|--------|--------|
| Band                            | GSM900 |       |       | GSM1800 |        |        |
| Channel                         | 975    | 62    | 124   | 512     | 698    | 885    |
| Frequency (MHz)                 | 880.2  | 902.4 | 914.8 | 1710.2  | 1747.4 | 1784.8 |
| GSM                             | 33.71  | 32.61 | 32.28 | 29.18   | 30.62  | 29.95  |
| GPRS (1 slot)                   | 31.41  | 31.36 | 31.34 | 28.44   | 29.15  | 28.84  |
| GPRS (2 slots)                  | 30.58  | 30.22 | 30.55 | 27.56   | 27.71  | 27.84  |
| GPRS (3 slots)                  | 28.32  | 28.14 | 28.85 | 25.61   | 24.66  | 25.66  |
| GPRS (4 slots)                  | 26.61  | 25.89 | 25.66 | 22.27   | 20.27  | 23.31  |
| EGPRS (1 slot)                  | 23.47  | 23.45 | 23.48 | 20.22   | 20.00  | 20.92  |
| EGPRS (2 slots)                 | 22.76  | 22.07 | 22.31 | 18.46   | 19.42  | 19.53  |
| EGPRS (3 slots)                 | 20.62  | 19.64 | 19.52 | 16.64   | 15.84  | 17.06  |
| EGPRS (4 slots)                 | 17.28  | 17.28 | 17.75 | 14.75   | 13.32  | 14.78  |

| GSM - Source-Based Time-Average Power (dBm) |              |              |              |              |              |              |
|---|--------------|--------------|--------------|--------------|--------------|--------------|
| Band  | GSM900       |              |              | GSM1800      |              |              |
| Channel                                     | 975          | 62           | 124          | 512          | 698          | 885          |
| Frequency (MHz)                             | 880.2        | 902.4        | 914.8        | 1710.2       | 1747.4       | 1783.8       |
| GSM   | 24.68        | 23.58        | 23.25        | 20.15        | 21.59        | 20.92        |
| GPRS (1 slot)                               | 22.38        | 22.33        | 22.31        | 19.41        | 20.12        | 19.81        |
| <b>GPRS (2 slots)</b>                       | <b>24.56</b> | <b>24.20</b> | <b>24.53</b> | <b>21.54</b> | <b>21.69</b> | <b>21.82</b> |
| GPRS (3 slots)                              | 24.06        | 23.88        | 24.59        | 21.35        | 20.40        | 21.40        |
| GPRS (4 slots)                              | 23.60        | 22.88        | 22.65        | 19.26        | 17.26        | 20.30        |
| EGPRS (1 slot)                              | 14.44        | 14.42        | 14.45        | 11.19        | 10.97        | 11.89        |
| EGPRS (2 slots)                             | 16.74        | 16.05        | 16.29        | 12.44        | 13.40        | 13.51        |
| EGPRS (3 slots)                             | 16.36        | 15.38        | 15.26        | 12.38        | 11.58        | 12.80        |
| EGPRS (4 slots)                             | 14.27        | 14.27        | 14.74        | 11.74        | 10.31        | 11.77        |

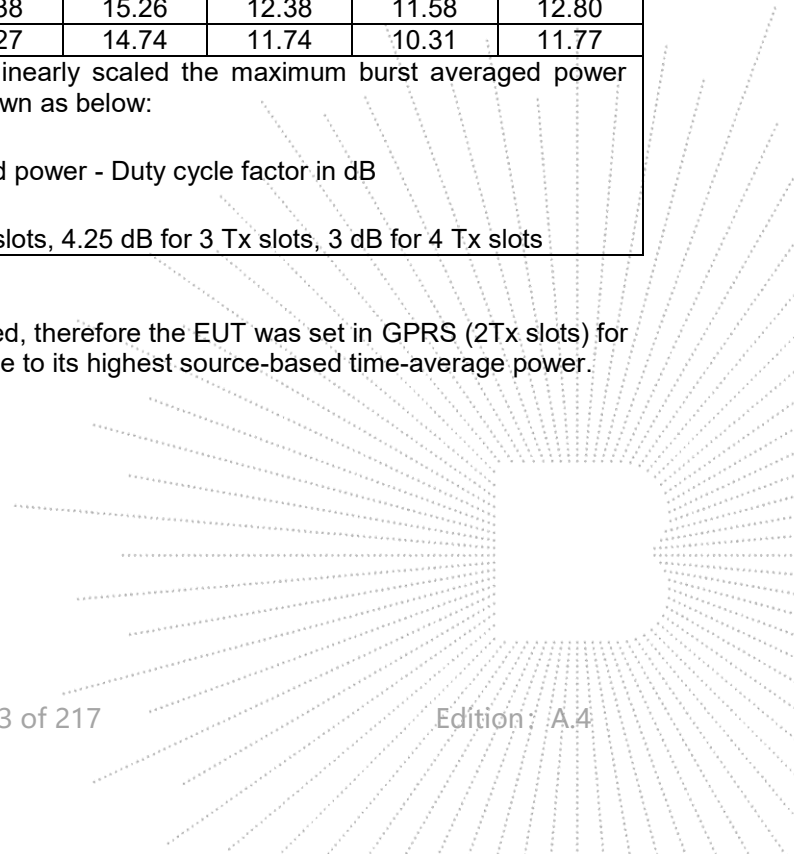
Note: The source-based time-averaged power is linearly scaled the maximum burst averaged power based on time slots. The calculated method are shown as below:

Source based time-average power = Burst averaged power - Duty cycle factor in dB

Duty cycle factor = 9 dB for 1 Tx slot, 6 dB for 2 Tx slots, 4.25 dB for 3 Tx slots, 3 dB for 4 Tx slots

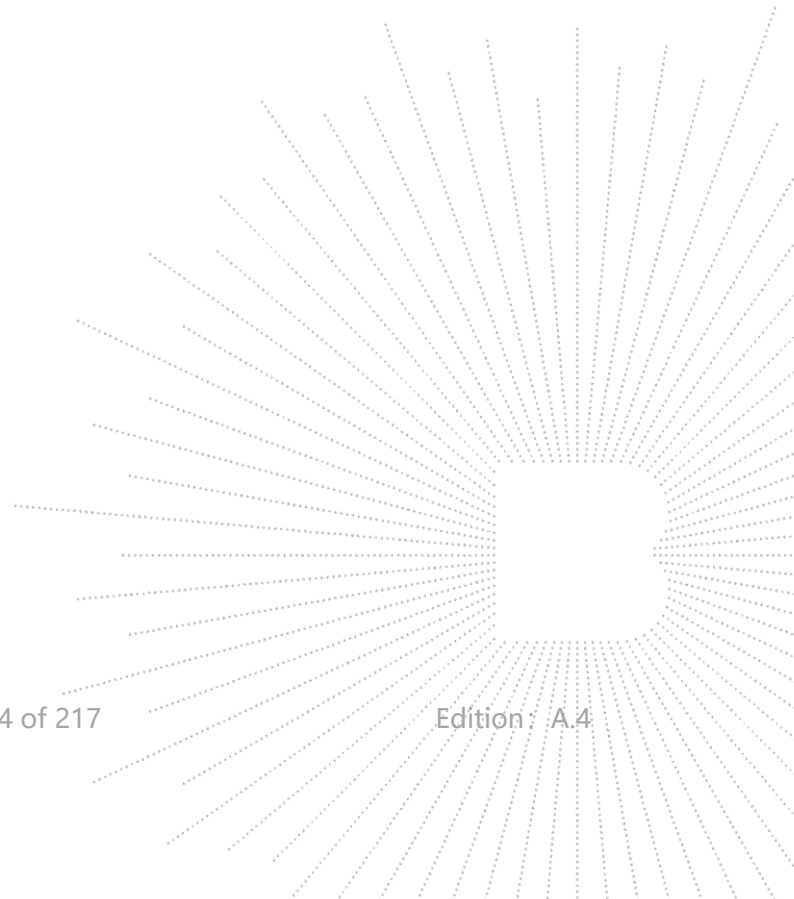
Remark:

1. For Body SAR testing, GPRS should be evaluated, therefore the EUT was set in GPRS (2Tx slots) for GSM900 and GPRS (2Tx slots) for GSM1800 due to its highest source-based time-average power.
2. The DUT do not support DTM function.

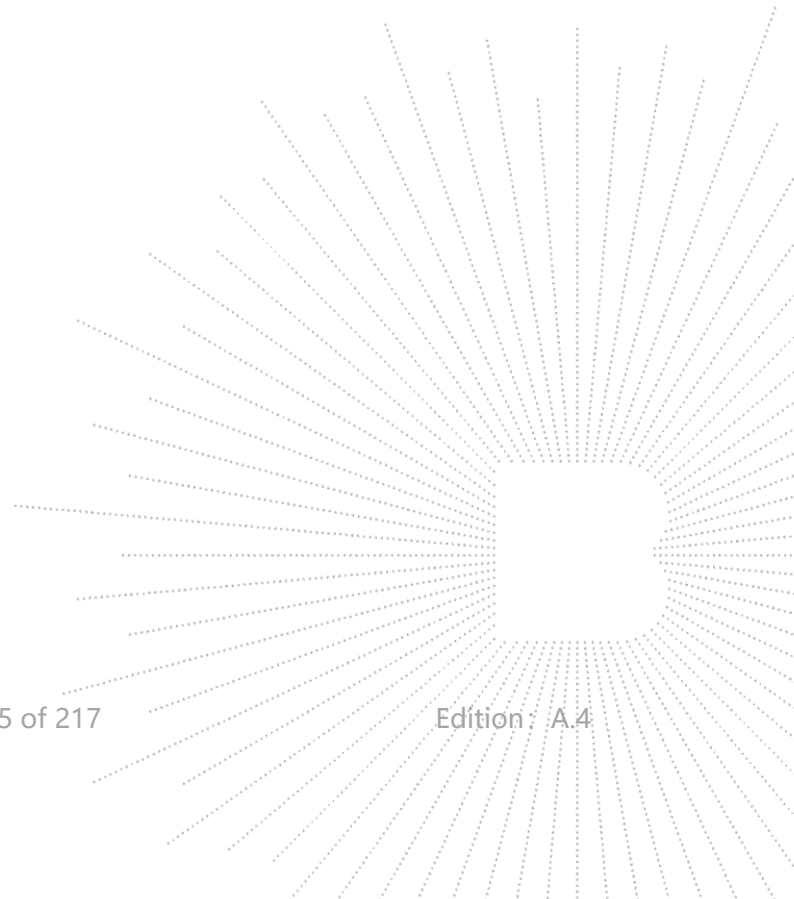


| WCDMA - Average Power (dBm) |              |       |        |                 |       |              |
|-----------------------------|--------------|-------|--------|-----------------|-------|--------------|
| Band                        | WCDMA Band I |       |        | WCDMA Band VIII |       |              |
| Channel                     | 9612         | 9750  | 9888   | 2712            | 2788  | 2863         |
| Frequency (MHz)             | 1922.4       | 1950  | 1977.6 | 882.4           | 897.6 | 912.6        |
| RMC                         | <b>22.25</b> | 22.06 | 22.03  | 23.60           | 23.47 | <b>23.84</b> |
| HSDPA Subtest-1             | 22.19        | 22.02 | 21.92  | 23.37           | 23.32 | 23.74        |
| HSDPA Subtest-2             | 22.02        | 21.80 | 21.91  | 23.15           | 23.25 | 23.63        |
| HSDPA Subtest-3             | 21.97        | 21.72 | 21.69  | 22.95           | 23.09 | 23.50        |
| HSDPA Subtest-4             | 21.95        | 21.48 | 21.49  | 22.67           | 23.07 | 23.44        |
| HSUPA Subtest-1             | 21.94        | 21.21 | 21.16  | 22.40           | 22.93 | 23.38        |
| HSUPA Subtest-2             | 21.80        | 21.19 | 20.84  | 22.09           | 22.90 | 23.24        |
| HSUPA Subtest-3             | 21.65        | 20.99 | 20.75  | 21.74           | 22.74 | 23.20        |
| HSUPA Subtest-4             | 21.57        | 20.83 | 20.52  | 21.42           | 22.72 | 23.09        |
| HSUPA Subtest-5             | 21.44        | 20.77 | 20.44  | 21.42           | 22.61 | 22.96        |

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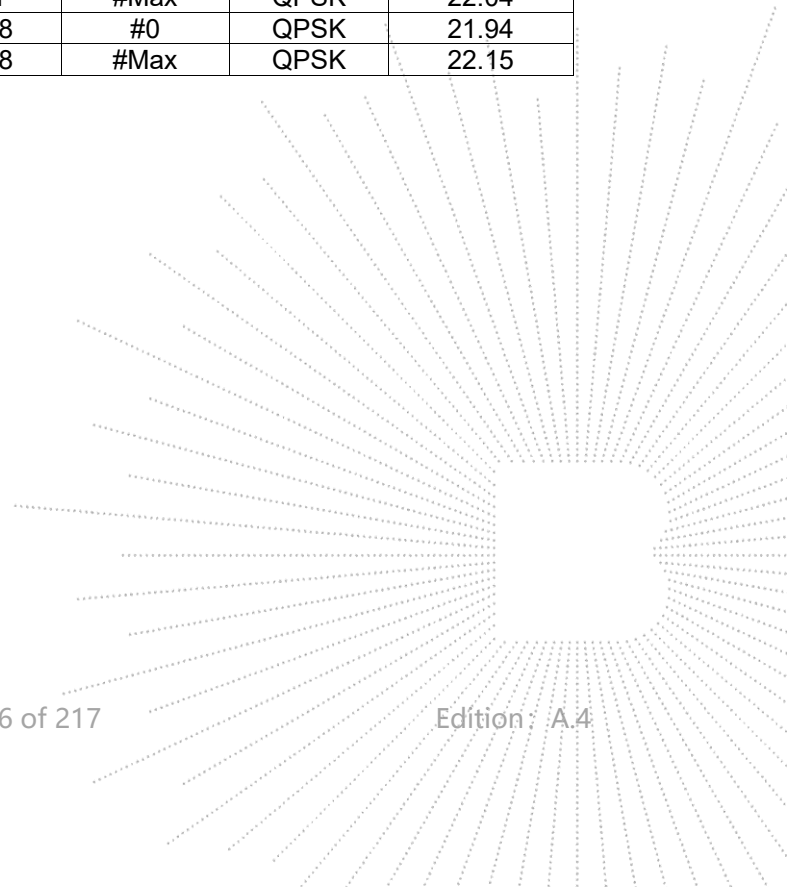


| Band  | Bandwidth (MHz) | UL Channel | RB Size | RB Position | Modulation | Power (dBm) |
|-------|-----------------|------------|---------|-------------|------------|-------------|
| Band1 | 5               | 18025      | 1       | #0          | QPSK       | 21.72       |
| Band1 | 5               | 18025      | 1       | #Max        | QPSK       | 21.65       |
| Band1 | 5               | 18025      | 8       | #0          | QPSK       | 21.78       |
| Band1 | 5               | 18025      | 8       | #Max        | QPSK       | 21.70       |
| Band1 | 5               | 18300      | 1       | #0          | QPSK       | 21.32       |
| Band1 | 5               | 18300      | 1       | #Max        | QPSK       | 21.42       |
| Band1 | 5               | 18300      | 8       | #0          | QPSK       | 21.38       |
| Band1 | 5               | 18300      | 8       | #Max        | QPSK       | 21.47       |
| Band1 | 5               | 18575      | 1       | #0          | QPSK       | 21.42       |
| Band1 | 5               | 18575      | 1       | #Max        | QPSK       | 21.38       |
| Band1 | 5               | 18575      | 8       | #0          | QPSK       | 21.46       |
| Band1 | 5               | 18575      | 8       | #Max        | QPSK       | 21.44       |
| Band1 | 20              | 18100      | 1       | #0          | QPSK       | 21.53       |
| Band1 | 20              | 18100      | 1       | #Max        | QPSK       | 21.08       |
| Band1 | 20              | 18100      | 18      | #0          | QPSK       | 21.66       |
| Band1 | 20              | 18100      | 18      | #Max        | QPSK       | 21.22       |
| Band1 | 20              | 18300      | 1       | #0          | QPSK       | 21.21       |
| Band1 | 20              | 18300      | 1       | #Max        | QPSK       | 21.50       |
| Band1 | 20              | 18300      | 18      | #0          | QPSK       | 21.25       |
| Band1 | 20              | 18300      | 18      | #Max        | QPSK       | 21.47       |
| Band1 | 20              | 18500      | 1       | #0          | QPSK       | 21.43       |
| Band1 | 20              | 18500      | 1       | #Max        | QPSK       | 21.24       |
| Band1 | 20              | 18500      | 18      | #0          | QPSK       | 21.58       |
| Band1 | 20              | 18500      | 18      | #Max        | QPSK       | 21.37       |

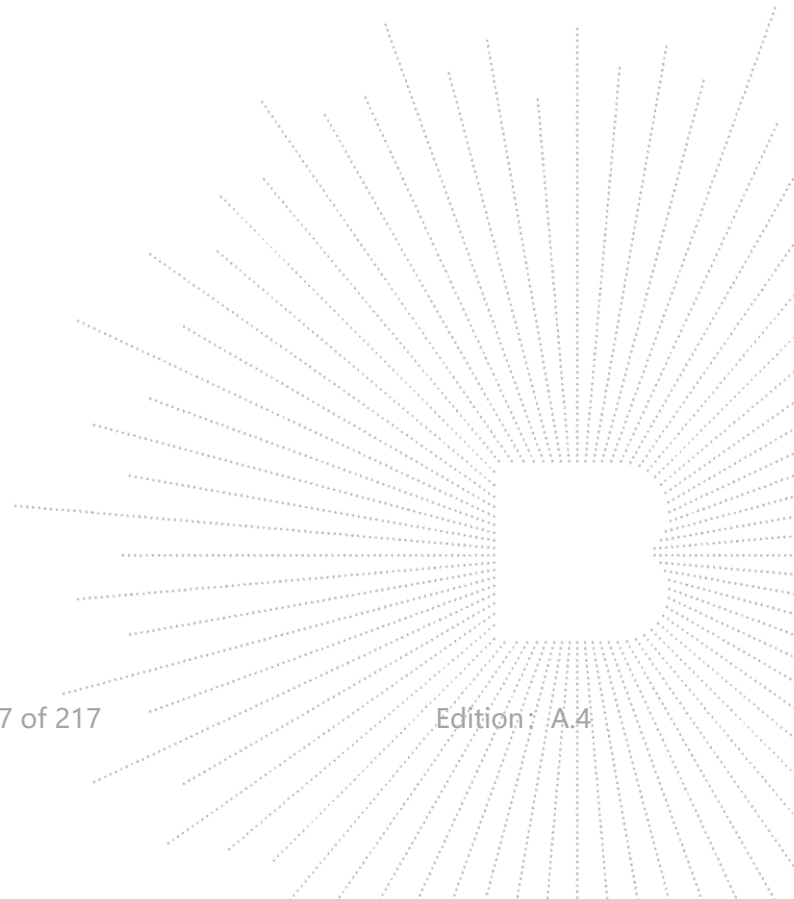


| Band  | Bandwidth (MHz) | UL Channel | RB Size | RB Position | Modulation | Power (dBm) |
|-------|-----------------|------------|---------|-------------|------------|-------------|
| Band3 | 1.4             | 19207      | 1       | #0          | QPSK       | 22.63       |
| Band3 | 1.4             | 19207      | 1       | #Max        | QPSK       | 22.61       |
| Band3 | 1.4             | 19207      | 5       | #0          | QPSK       | 22.65       |
| Band3 | 1.4             | 19207      | 5       | #Max        | QPSK       | 22.64       |
| Band3 | 1.4             | 19575      | 1       | #0          | QPSK       | 22.43       |
| Band3 | 1.4             | 19575      | 1       | #Max        | QPSK       | 22.43       |
| Band3 | 1.4             | 19575      | 5       | #0          | QPSK       | 22.47       |
| Band3 | 1.4             | 19575      | 5       | #Max        | QPSK       | 22.47       |
| Band3 | 1.4             | 19943      | 1       | #0          | QPSK       | 22.23       |
| Band3 | 1.4             | 19943      | 1       | #Max        | QPSK       | 22.25       |
| Band3 | 1.4             | 19943      | 5       | #0          | QPSK       | 22.25       |
| Band3 | 1.4             | 19943      | 5       | #Max        | QPSK       | 22.25       |
| Band3 | 5               | 19225      | 1       | #0          | QPSK       | 22.47       |
| Band3 | 5               | 19225      | 1       | #Max        | QPSK       | 22.36       |
| Band3 | 5               | 19225      | 8       | #0          | QPSK       | 22.52       |
| Band3 | 5               | 19225      | 8       | #Max        | QPSK       | 22.51       |
| Band3 | 5               | 19575      | 1       | #0          | QPSK       | 22.36       |
| Band3 | 5               | 19575      | 1       | #Max        | QPSK       | 22.40       |
| Band3 | 5               | 19575      | 8       | #0          | QPSK       | 22.42       |
| Band3 | 5               | 19575      | 8       | #Max        | QPSK       | 22.38       |
| Band3 | 5               | 19925      | 1       | #0          | QPSK       | 22.02       |
| Band3 | 5               | 19925      | 1       | #Max        | QPSK       | 22.03       |
| Band3 | 5               | 19925      | 8       | #0          | QPSK       | 22.13       |
| Band3 | 5               | 19925      | 8       | #Max        | QPSK       | 22.20       |
| Band3 | 20              | 19300      | 1       | #0          | QPSK       | 22.28       |
| Band3 | 20              | 19300      | 1       | #Max        | QPSK       | 22.10       |
| Band3 | 20              | 19300      | 18      | #0          | QPSK       | 22.31       |
| Band3 | 20              | 19300      | 18      | #Max        | QPSK       | 22.20       |
| Band3 | 20              | 19575      | 1       | #0          | QPSK       | 22.22       |
| Band3 | 20              | 19575      | 1       | #Max        | QPSK       | 22.10       |
| Band3 | 20              | 19575      | 18      | #0          | QPSK       | 22.31       |
| Band3 | 20              | 19575      | 18      | #Max        | QPSK       | 22.28       |
| Band3 | 20              | 19850      | 1       | #0          | QPSK       | 21.76       |
| Band3 | 20              | 19850      | 1       | #Max        | QPSK       | 22.04       |
| Band3 | 20              | 19850      | 18      | #0          | QPSK       | 21.94       |
| Band3 | 20              | 19850      | 18      | #Max        | QPSK       | 22.15       |

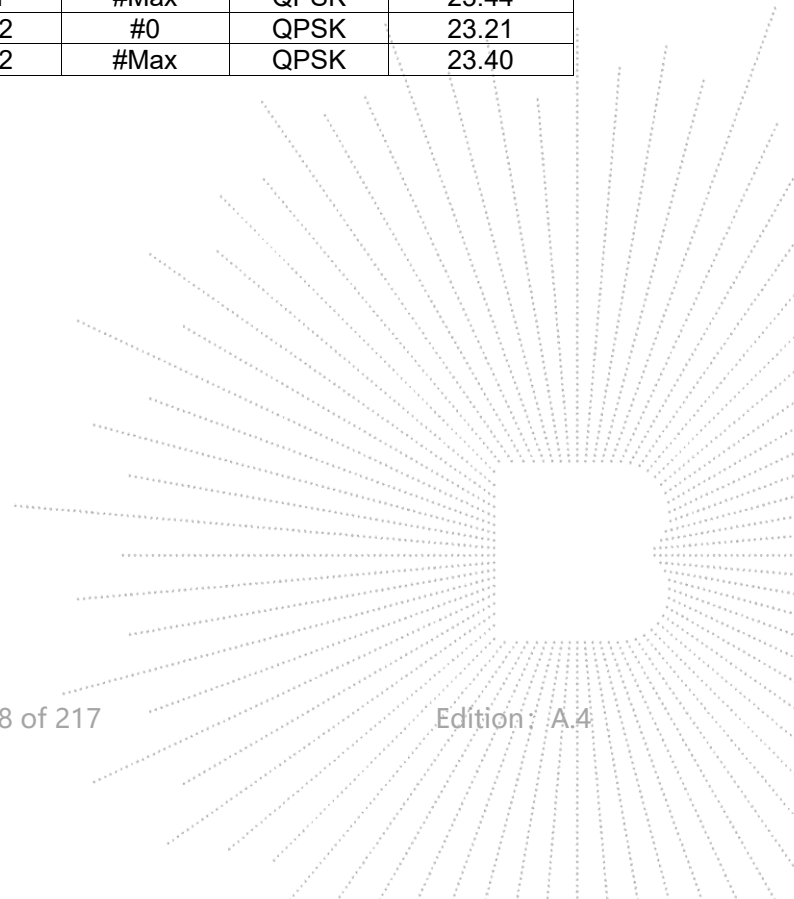
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| Band  | Bandwidth (MHz) | UL Channel | RB Size | RB Position | Modulation | Power (dBm) |
|-------|-----------------|------------|---------|-------------|------------|-------------|
| Band7 | 5               | 20775      | 1       | #0          | QPSK       | 21.40       |
| Band7 | 5               | 20775      | 1       | #Max        | QPSK       | 21.39       |
| Band7 | 5               | 20775      | 8       | #0          | QPSK       | 21.57       |
| Band7 | 5               | 20775      | 8       | #Max        | QPSK       | 21.50       |
| Band7 | 5               | 21100      | 1       | #0          | QPSK       | 21.67       |
| Band7 | 5               | 21100      | 1       | #Max        | QPSK       | 21.66       |
| Band7 | 5               | 21100      | 8       | #0          | QPSK       | 21.76       |
| Band7 | 5               | 21100      | 8       | #Max        | QPSK       | 21.78       |
| Band7 | 5               | 21425      | 1       | #0          | QPSK       | 21.57       |
| Band7 | 5               | 21425      | 1       | #Max        | QPSK       | 21.66       |
| Band7 | 5               | 21425      | 8       | #0          | QPSK       | 21.58       |
| Band7 | 5               | 21425      | 8       | #Max        | QPSK       | 21.73       |
| Band7 | 20              | 20850      | 1       | #0          | QPSK       | 21.38       |
| Band7 | 20              | 20850      | 1       | #Max        | QPSK       | 21.35       |
| Band7 | 20              | 20850      | 18      | #0          | QPSK       | 21.47       |
| Band7 | 20              | 20850      | 18      | #Max        | QPSK       | 21.45       |
| Band7 | 20              | 21100      | 1       | #0          | QPSK       | 21.43       |
| Band7 | 20              | 21100      | 1       | #Max        | QPSK       | 21.64       |
| Band7 | 20              | 21100      | 18      | #0          | QPSK       | 21.50       |
| Band7 | 20              | 21100      | 18      | #Max        | QPSK       | 21.59       |
| Band7 | 20              | 21350      | 1       | #0          | QPSK       | 21.29       |
| Band7 | 20              | 21350      | 1       | #Max        | QPSK       | 21.50       |
| Band7 | 20              | 21350      | 18      | #0          | QPSK       | 21.29       |
| Band7 | 20              | 21350      | 18      | #Max        | QPSK       | 21.55       |

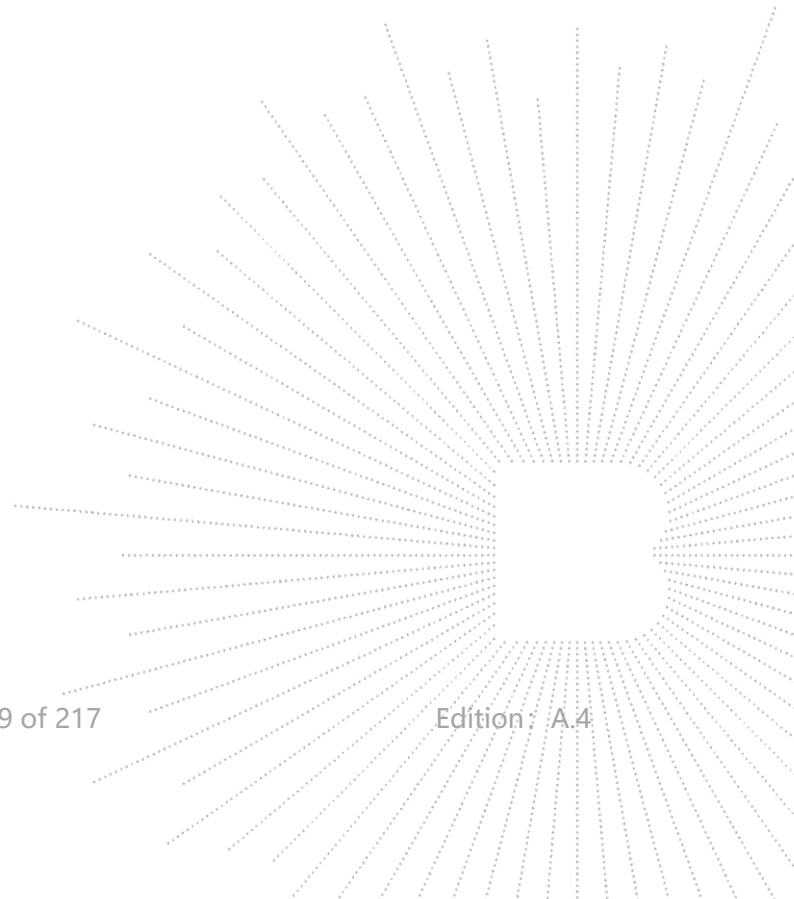


| Band  | Bandwidth (MHz) | UL Channel | RB Size | RB Position | Modulation | Power (dBm) |
|-------|-----------------|------------|---------|-------------|------------|-------------|
| Band8 | 1.4             | 21457      | 1       | #0          | QPSK       | 23.21       |
| Band8 | 1.4             | 21457      | 1       | #Max        | QPSK       | 23.22       |
| Band8 | 1.4             | 21457      | 5       | #0          | QPSK       | 23.22       |
| Band8 | 1.4             | 21457      | 5       | #Max        | QPSK       | 23.21       |
| Band8 | 1.4             | 21625      | 1       | #0          | QPSK       | 23.00       |
| Band8 | 1.4             | 21625      | 1       | #Max        | QPSK       | 22.97       |
| Band8 | 1.4             | 21625      | 5       | #0          | QPSK       | 22.99       |
| Band8 | 1.4             | 21625      | 5       | #Max        | QPSK       | 23.01       |
| Band8 | 1.4             | 21793      | 1       | #0          | QPSK       | 23.39       |
| Band8 | 1.4             | 21793      | 1       | #Max        | QPSK       | 23.42       |
| Band8 | 1.4             | 21793      | 5       | #0          | QPSK       | 23.38       |
| Band8 | 1.4             | 21793      | 5       | #Max        | QPSK       | 23.40       |
| Band8 | 5               | 21475      | 1       | #0          | QPSK       | 23.04       |
| Band8 | 5               | 21475      | 1       | #Max        | QPSK       | 23.11       |
| Band8 | 5               | 21475      | 8       | #0          | QPSK       | 23.15       |
| Band8 | 5               | 21475      | 8       | #Max        | QPSK       | 23.13       |
| Band8 | 5               | 21625      | 1       | #0          | QPSK       | 22.90       |
| Band8 | 5               | 21625      | 1       | #Max        | QPSK       | 22.92       |
| Band8 | 5               | 21625      | 8       | #0          | QPSK       | 22.92       |
| Band8 | 5               | 21625      | 8       | #Max        | QPSK       | 23.01       |
| Band8 | 5               | 21775      | 1       | #0          | QPSK       | 23.11       |
| Band8 | 5               | 21775      | 1       | #Max        | QPSK       | 23.24       |
| Band8 | 5               | 21775      | 8       | #0          | QPSK       | 23.31       |
| Band8 | 5               | 21775      | 8       | #Max        | QPSK       | 23.38       |
| Band8 | 10              | 21500      | 1       | #0          | QPSK       | 23.10       |
| Band8 | 10              | 21500      | 1       | #Max        | QPSK       | 23.09       |
| Band8 | 10              | 21500      | 12      | #0          | QPSK       | 23.13       |
| Band8 | 10              | 21500      | 12      | #Max        | QPSK       | 23.13       |
| Band8 | 10              | 21625      | 1       | #0          | QPSK       | 22.98       |
| Band8 | 10              | 21625      | 1       | #Max        | QPSK       | 23.06       |
| Band8 | 10              | 21625      | 12      | #0          | QPSK       | 23.01       |
| Band8 | 10              | 21625      | 12      | #Max        | QPSK       | 23.07       |
| Band8 | 10              | 21750      | 1       | #0          | QPSK       | 23.19       |
| Band8 | 10              | 21750      | 1       | #Max        | QPSK       | 23.44       |
| Band8 | 10              | 21750      | 12      | #0          | QPSK       | 23.21       |
| Band8 | 10              | 21750      | 12      | #Max        | QPSK       | 23.40       |



| Band   | Bandwidth (MHz) | UL Channel | RB Size | RB Position | Modulation | Power (dBm) |
|--------|-----------------|------------|---------|-------------|------------|-------------|
| Band20 | 5               | 24175      | 1       | #0          | QPSK       | 22.36       |
| Band20 | 5               | 24175      | 1       | #Max        | QPSK       | 22.26       |
| Band20 | 5               | 24175      | 8       | #0          | QPSK       | 22.24       |
| Band20 | 5               | 24175      | 8       | #Max        | QPSK       | 22.37       |
| Band20 | 5               | 24300      | 1       | #0          | QPSK       | 22.14       |
| Band20 | 5               | 24300      | 1       | #Max        | QPSK       | 22.03       |
| Band20 | 5               | 24300      | 8       | #0          | QPSK       | 22.20       |
| Band20 | 5               | 24300      | 8       | #Max        | QPSK       | 22.09       |
| Band20 | 5               | 24425      | 1       | #0          | QPSK       | 21.87       |
| Band20 | 5               | 24425      | 1       | #Max        | QPSK       | 21.94       |
| Band20 | 5               | 24425      | 8       | #0          | QPSK       | 22.03       |
| Band20 | 5               | 24425      | 8       | #Max        | QPSK       | 22.01       |
| Band20 | 20              | 24250      | 1       | #0          | QPSK       | 21.97       |
| Band20 | 20              | 24250      | 1       | #Max        | QPSK       | 21.87       |
| Band20 | 20              | 24250      | 18      | #0          | QPSK       | 22.08       |
| Band20 | 20              | 24250      | 18      | #Max        | QPSK       | 22.00       |
| Band20 | 20              | 24300      | 1       | #0          | QPSK       | 22.09       |
| Band20 | 20              | 24300      | 1       | #Max        | QPSK       | 21.91       |
| Band20 | 20              | 24300      | 18      | #0          | QPSK       | 22.16       |
| Band20 | 20              | 24300      | 18      | #Max        | QPSK       | 21.99       |
| Band20 | 20              | 24350      | 1       | #0          | QPSK       | 21.97       |
| Band20 | 20              | 24350      | 1       | #Max        | QPSK       | 21.82       |
| Band20 | 20              | 24350      | 18      | #0          | QPSK       | 22.04       |
| Band20 | 20              | 24350      | 18      | #Max        | QPSK       | 21.82       |

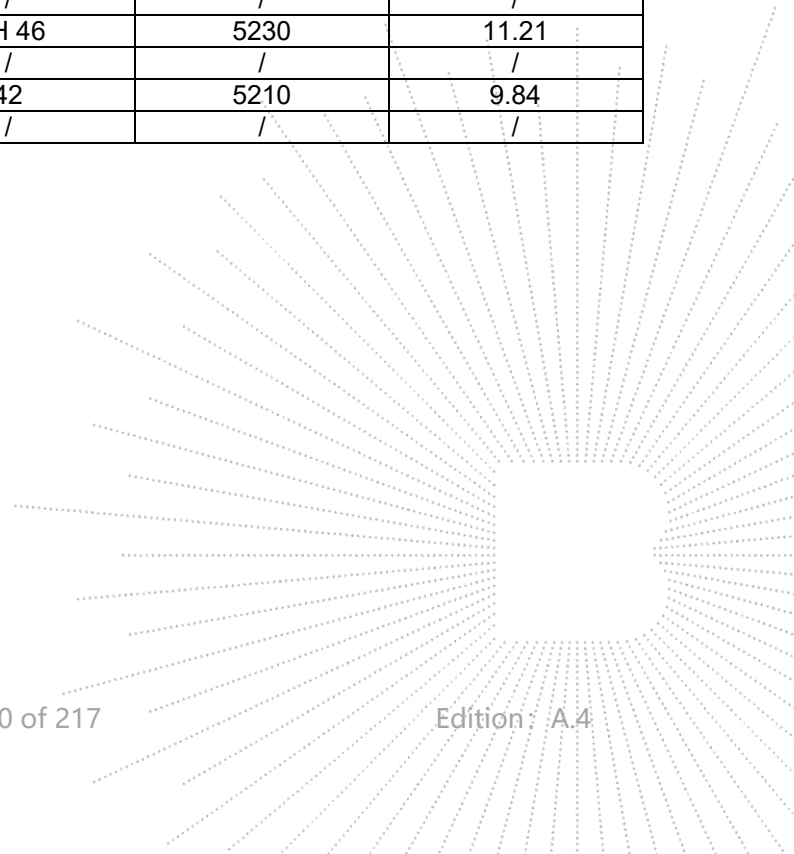
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| WLAN(2.4G) - Conducted Power |           |         |                 |                     |
|------------------------------|-----------|---------|-----------------|---------------------|
| Test Mode                    | Data Rate | Channel | Frequency (MHz) | Average Power (dBm) |
| 802.11b                      | 1Mbps     | CH 01   | 2412            | <b>14.3</b>         |
|                              |           | CH 07   | 2442            | 13.83               |
|                              |           | CH 13   | 2472            | 14.26               |
| 802.11g                      | 6Mbps     | CH 01   | 2412            | 12.07               |
|                              |           | CH 07   | 2442            | 11.71               |
|                              |           | CH 13   | 2472            | 11.49               |
| 802.11n (20MHz)              | 6.5Mbps   | CH 01   | 2412            | 11.15               |
|                              |           | CH 07   | 2442            | 10.71               |
|                              |           | CH 13   | 2472            | 10.47               |
| 802.11n (40MHz)              | 13.5Mbps  | CH 01   | 2412            | 10.27               |
|                              |           | CH 07   | 2442            | 11.02               |
|                              |           | CH 13   | 2472            | 10.88               |

| WLAN(5.1G) - Conducted Power |           |         |                 |                     |
|------------------------------|-----------|---------|-----------------|---------------------|
| Test Mode                    | Data Rate | Channel | Frequency (MHz) | Average Power (dBm) |
| 802.11a                      | 6Mbps     | CH 36   | 5180            | 11.83               |
|                              |           | CH 40   | 5200            | 12.12               |
|                              |           | CH 48   | 5240            | <b>12.76</b>        |
| 802.11n HT20                 | 6.5Mbps   | CH 36   | 5180            | 10.6                |
|                              |           | CH 40   | 5200            | 11                  |
|                              |           | CH 48   | 5240            | 11.83               |
| 802.11n HT40                 | 13.5Mbps  | CH 38   | 5190            | 9.73                |
|                              |           | /       | /               | /                   |
|                              |           | CH 46   | 5230            | 10.56               |
| 802.11ac ac20                | 6.5Mbps   | CH 36   | 5180            | 10.46               |
|                              |           | CH 40   | 5200            | 11.02               |
|                              |           | CH 48   | 5240            | 11.74               |
| 802.11ac HT40                | 13.5Mbps  | CH 38   | 5190            | 10.35               |
|                              |           | /       | /               | /                   |
|                              |           | CH 46   | 5230            | 11.21               |
| 802.11ac HT80                | 29.3Mbps  | /       | /               | /                   |
|                              |           | 42      | 5210            | 9.84                |
|                              |           | /       | /               | /                   |

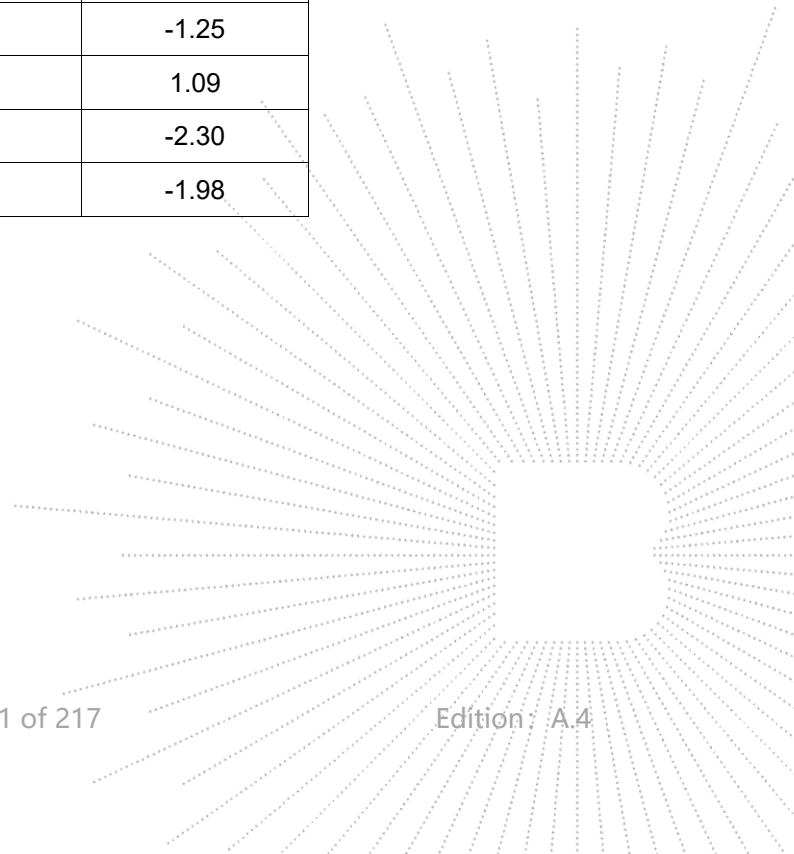
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| WLAN(5.8G) - Conducted Power |           |         |                 |                     |
|------------------------------|-----------|---------|-----------------|---------------------|
| Test Mode                    | Data Rate | Channel | Frequency (MHz) | Average Power (dBm) |
| 802.11a                      | 6Mbps     | CH 149  | 5745            | <b>9.69</b>         |
|                              |           | CH 157  | 5785            | 9.28                |
|                              |           | CH 165  | 5825            | 8.40                |
| 802.11n(HT20)                | 6.5Mbps   | CH 149  | 5745            | 8.86                |
|                              |           | CH 157  | 5785            | 8.43                |
|                              |           | CH 165  | 5825            | 7.62                |
| 802.11n(HT40)                | 13.5Mbps  | CH 151  | 5755            | 7.64                |
|                              |           | /       | /               | /                   |
|                              |           | CH 159  | 5795            | 7.03                |
| 802.11ac(HT20)               | 6.5Mbps   | CH 149  | 5745            | 8.84                |
|                              |           | CH 157  | 5785            | 8.38                |
|                              |           | CH 165  | 5825            | 7.52                |
| 802.11ac(HT40)               | 13.5Mbps  | CH 151  | 5755            | 7.44                |
|                              |           | /       | /               | /                   |
|                              |           | CH 159  | 5795            | 7.14                |
| 802.11ac(HT80)               | 29.3Mbps  | /       | /               | /                   |
|                              |           | CH 155  | 5775            | 7.26                |
|                              |           | /       | /               | /                   |

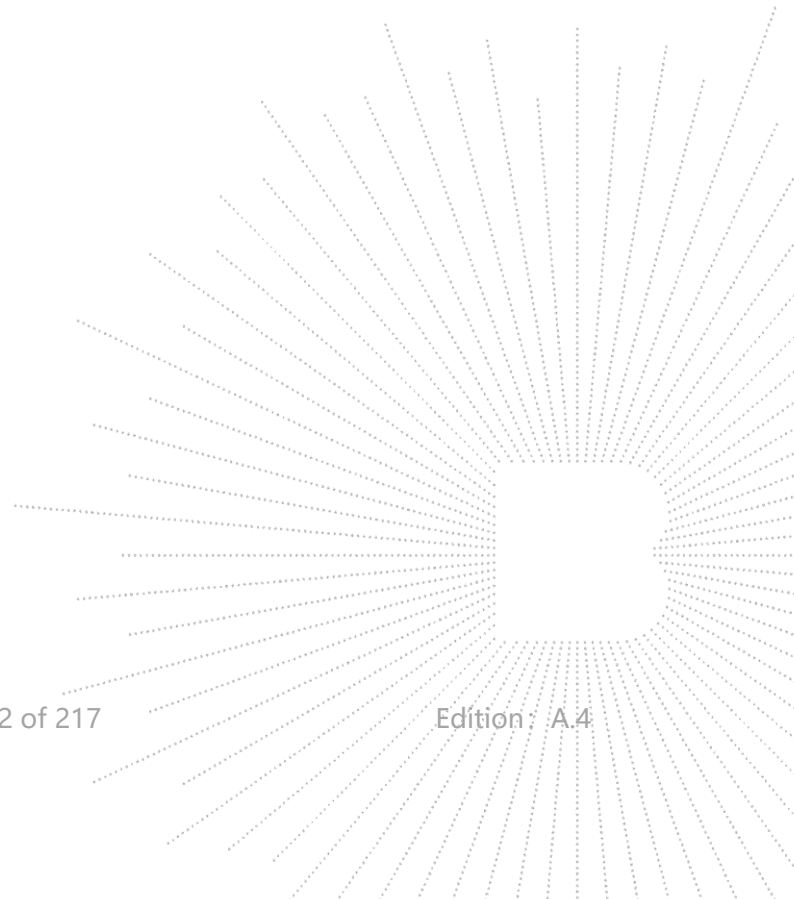
| Mode  | Frequency (MHz) | Conducted Power (dBm) |
|-------|-----------------|-----------------------|
| 1-DH1 | 2402            | <b>2.5</b>            |
| 1-DH1 | 2441            | -0.52                 |
| 1-DH1 | 2480            | -0.5                  |
| 2-DH1 | 2402            | 2.04                  |
| 2-DH1 | 2441            | -1.40                 |
| 2-DH1 | 2480            | -1.25                 |
| 3-DH1 | 2402            | 1.09                  |
| 3-DH1 | 2441            | -2.30                 |
| 3-DH1 | 2480            | -1.98                 |



|            | Frequency | Maximum Conducted Output Power(PK) |
|------------|-----------|------------------------------------|
|            | (MHz)     | (dBm)                              |
| GFSK 1Mbps | 2402      | 0.21                               |
|            | 2440      | 0.06                               |
|            | 2480      | -0.07                              |
| GFSK 2Mbps | 2402      | <b>0.24</b>                        |
|            | 2440      | 0.07                               |
|            | 2480      | -0.07                              |

**Remark:**

1. Since EIRP power of WIF/BT at worse case is: 2.5dBm(1.78mW) which not exceed the exempt condition, 20mW specified in EN 62479. It is deemed to full fit the requirement of RF exposure basic restriction specified in EC Council Recommendation (1999/519/EC).

## 13.2 Test Results for Standalone SAR Test

| GSM900 –Head SAR Test |      |                    |           |       |                    |                   |                |               |                      |
|-----------------------|------|--------------------|-----------|-------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.              | Mode | Test Position Body | Frequency |       | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|                       |      |                    | CH.       | MHz   |                    |                   |                |               |                      |
| 1                     | GSM  | Left Touch         | 62        | 902.4 | 32.61              | 33.00             | 1.094          | <b>0.540</b>  | 0.591                |
|                       | GSM  | Left Tilt          | 62        | 902.4 | 32.61              | 33.00             | 1.094          | 0.245         | 0.268                |
|                       | GSM  | Right Touch        | 62        | 902.4 | 32.61              | 33.00             | 1.094          | 0.512         | 0.560                |
|                       | GSM  | Right t Tilt       | 62        | 902.4 | 32.61              | 33.00             | 1.094          | 0.203         | 0.222                |

| GSM900 –Body SAR Test(5mm, Limb worn 0mm) |      |                    |           |       |                    |                   |                |               |                      |
|---|------|--------------------|-----------|-------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.                                  | Mode | Test Position Body | Frequency |       | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|   |      |                    | CH.       | MHz   |                    |                   |                |               |                      |
| 2   | GSM  | Back Face          | 62        | 902.4 | 30.22              | 30.50             | 1.067          | 0.233         | 0.249                |
|   | GSM  | Front Face         | 62        | 902.4 | 30.22              | 30.50             | 1.067          | 0.200         | 0.213                |
| 3   | GSM  | Limb worn          | 62        | 902.4 | 30.22              | 30.50             | 1.067          | <b>0.412</b>  | 0.439                |

| GSM1800 – Head SAR Test |      |                    |           |        |                    |                   |                |               |                      |
|-------------------------|------|--------------------|-----------|--------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.                | Mode | Test Position Body | Frequency |        | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|                         |      |                    | CH.       | MHz    |                    |                   |                |               |                      |
| 4                       | GSM  | Left Touch         | 698       | 1747.4 | 30.62              | 31.00             | 1.091          | <b>0.240</b>  | 0.262                |
|                         | GSM  | Left Tilt          | 698       | 1747.4 | 30.62              | 31.00             | 1.091          | 0.156         | 0.170                |
|                         | GSM  | Right Touch        | 698       | 1747.4 | 30.62              | 31.00             | 1.091          | 0.211         | 0.230                |
|                         | GSM  | Right t Tilt       | 698       | 1747.4 | 30.62              | 31.00             | 1.091          | 0.123         | 0.134                |

| GSM1800 –Body SAR Test(5mm, Limb worn 0mm) |      |                    |           |        |                    |                   |                |               |                      |
|--|------|--------------------|-----------|--------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.                                   | Mode | Test Position Body | Frequency |        | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|  |      |                    | CH.       | MHz    |                    |                   |                |               |                      |
| 5  | GSM  | Back Face          | 698       | 1747.4 | 27.71              | 28.00             | 1.091          | <b>0.120</b>  | 0.131                |
|  | GSM  | Front Face         | 698       | 1747.4 | 27.71              | 28.00             | 1.091          | 0.105         | 0.115                |
| 6  | GSM  | Limb worn          | 698       | 1747.4 | 27.71              | 28.00             | 1.091          | 0.232         | 0.253                |

| WCDMA Band I – Head SAR Test |      |                    |           |        |                    |                   |                |               |                      |
|------------------------------|------|--------------------|-----------|--------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.                     | Mode | Test Position Body | Frequency |        | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|                              |      |                    | CH.       | MHz    |                    |                   |                |               |                      |
| 7                            | RMC  | Left Touch         | 9750      | 1956.0 | 22.06              | 22.50             | 1.107          | <b>0.257</b>  | 0.284                |
|                              | RMC  | Left Tilt          | 9750      | 1956.0 | 22.06              | 22.50             | 1.107          | 0.158         | 0.175                |
|                              | RMC  | Right Touch        | 9750      | 1956.0 | 22.06              | 22.50             | 1.107          | 0.221         | 0.245                |
|                              | RMC  | Right t Tilt       | 9750      | 1956.0 | 22.06              | 22.50             | 1.107          | 0.137         | 0.152                |

| WCDMA Band I– Body SAR Test(5mm, Limb worn 0mm) |      |               |           |     |                    |                   |                |               |               |
|---|------|---------------|-----------|-----|--------------------|-------------------|----------------|---------------|---------------|
| Plot No.  | Mode | Test Position | Frequency |     | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g |
|   |      |               | CH.       | MHz |                    |                   |                |               |               |

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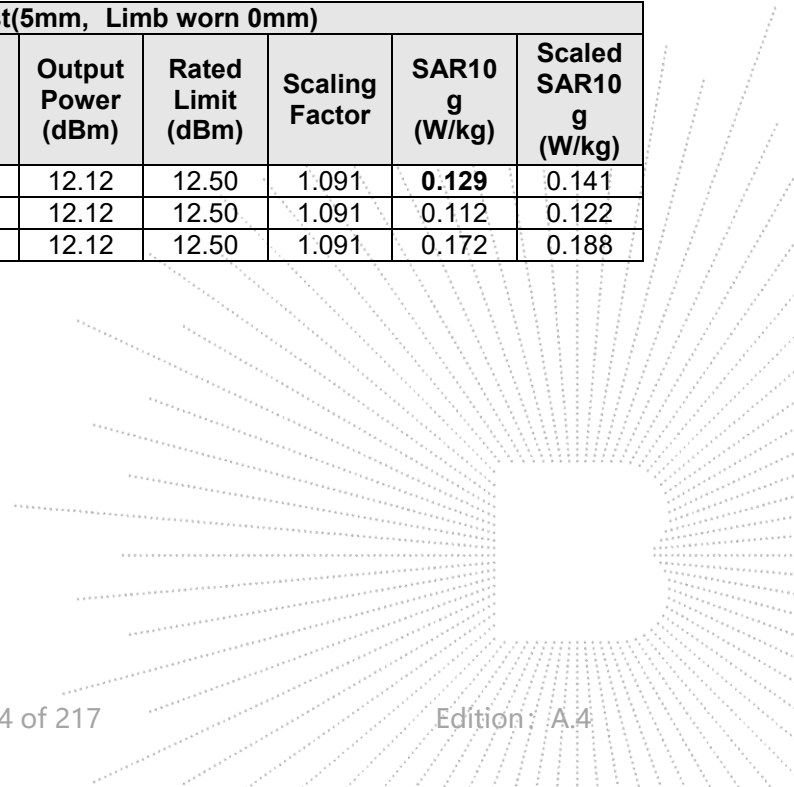
|   |     | Body       |      |        |       |       |       |              | (W/kg) |
|---|-----|------------|------|--------|-------|-------|-------|--------------|--------|
| 8 | RMC | Back Face  | 9750 | 1956.0 | 22.06 | 22.50 | 1.107 | <b>0.208</b> | 0.230  |
|   | RMC | Front Face | 9750 | 1956.0 | 22.06 | 22.50 | 1.107 | 0.178        | 0.197  |
| 9 | RMC | Limb worn  | 9750 | 1956.0 | 22.06 | 22.50 | 1.107 | 0.330        | 0.365  |

| WCDMA Band VIII – Head SAR Test |      |                       |           |       |                    |                   |                |               |                      |
|---------------------------------|------|-----------------------|-----------|-------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.                        | Mode | Test Position<br>Body | Frequency |       | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|                                 |      |                       | CH.       | MHz   |                    |                   |                |               |                      |
| 10                              | RMC  | Left Touch            | 2788      | 897.6 | 23.47              | 23.50             | 1.007          | <b>0.372</b>  | 0.375                |
|                                 | RMC  | Left Tilt             | 2788      | 897.6 | 23.47              | 23.50             | 1.007          | 0.189         | 0.190                |
|                                 | RMC  | Right Touch           | 2788      | 897.6 | 23.47              | 23.50             | 1.007          | 0.346         | 0.348                |
|                                 | RMC  | Right t Tilt          | 2788      | 897.6 | 23.47              | 23.50             | 1.007          | 0.150         | 0.151                |

| WCDMA Band VIII– Body SAR Test(5mm, Limb worn 0mm) |      |                       |           |       |                    |                   |                |               |                      |
|--|------|-----------------------|-----------|-------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.   | Mode | Test Position<br>Body | Frequency |       | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|  |      |                       | CH.       | MHz   |                    |                   |                |               |                      |
| 11   | RMC  | Back Face             | 2788      | 897.6 | 23.47              | 23.50             | 1.007          | <b>0.222</b>  | 0.224                |
|  | RMC  | Front Face            | 2788      | 897.6 | 23.47              | 23.50             | 1.007          | 0.177         | 0.178                |
| 12   | RMC  | Limb worn             | 2788      | 897.6 | 23.47              | 23.50             | 1.007          | 0.394         | 0.397                |

| WIFI5.1G – Head SAR Test |         |                       |           |      |                    |                   |                |               |                      |
|--------------------------|---------|-----------------------|-----------|------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.                 | Mode    | Test Position<br>Body | Frequency |      | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|                          |         |                       | CH.       | MHz  |                    |                   |                |               |                      |
| 13                       | 802.11a | Left Touch            | 40        | 5200 | 12.12              | 12.50             | 1.091          | <b>0.336</b>  | 0.367                |
|                          | 802.11a | Left Tilt             | 40        | 5200 | 12.12              | 12.50             | 1.091          | 0.162         | 0.177                |
|                          | 802.11a | Right Touch           | 40        | 5200 | 12.12              | 12.50             | 1.091          | 0.310         | 0.338                |
|                          | 802.11a | Right t Tilt          | 40        | 5200 | 12.12              | 12.50             | 1.091          | 0.147         | 0.160                |

| WIFI5.1G– Body SAR Test(5mm, Limb worn 0mm) |                       |                       |                 |                    |                   |                |               |                      |  |
|---|-----------------------|-----------------------|-----------------|--------------------|-------------------|----------------|---------------|----------------------|--|
| Plot No.                                    | Mode                  | Test Position<br>Body | Frequency (MHz) | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |  |
|   | Modulation, Bandwidth |                       |                 |                    |                   |                |               |                      |  |
| 14  | 802.11a               | Back Face             | 5200            | 12.12              | 12.50             | 1.091          | <b>0.129</b>  | 0.141                |  |
|   | 802.11a               | Front Face            | 5200            | 12.12              | 12.50             | 1.091          | 0.112         | 0.122                |  |
| 15  | 802.11a               | Limb worn             | 5200            | 12.12              | 12.50             | 1.091          | 0.172         | 0.188                |  |



| WIFI5.8G – Head SAR Test |         |                    |           |      |                    |                   |                |               |                      |
|--------------------------|---------|--------------------|-----------|------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.                 | Mode    | Test Position Body | Frequency |      | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|                          |         |                    | CH.       | MHz  |                    |                   |                |               |                      |
| 16                       | 802.11a | Left Touch         | 157       | 5785 | 9.28               | 9.50              | 1.052          | <b>0.273</b>  | 0.287                |
|                          | 802.11a | Left Tilt          | 157       | 5785 | 9.28               | 9.50              | 1.052          | 0.156         | 0.164                |
|                          | 802.11a | Right Touch        | 157       | 5785 | 9.28               | 9.50              | 1.052          | 0.241         | 0.254                |
|                          | 802.11a | Right t Tilt       | 157       | 5785 | 9.28               | 9.50              | 1.052          | 0.120         | 0.126                |

| WIFI5.8G– Body SAR Test(5mm, Limb worn 0mm) |                       |                    |                 |                    |                   |                |               |                      |  |
|---|-----------------------|--------------------|-----------------|--------------------|-------------------|----------------|---------------|----------------------|--|
| Plot No.                                    | Mode                  | Test Position Body | Frequency (MHz) | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |  |
|   | Modulation, Bandwidth |                    |                 |                    |                   |                |               |                      |  |
| 17  | 802.11a               | Back Face          | 5785            | 9.28               | 9.50              | 1.052          | <b>0.225</b>  | 0.237                |  |
|   | 802.11a               | Front Face         | 5785            | 9.28               | 9.50              | 1.052          | 0.214         | 0.225                |  |
| 18  | 802.11a               | Limb worn          | 5785            | 9.28               | 9.50              | 1.052          | 0.279         | 0.293                |  |

| WIFI2.4G – Head SAR Test |         |                    |           |      |                    |                   |                |               |                      |
|--------------------------|---------|--------------------|-----------|------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.                 | Mode    | Test Position Body | Frequency |      | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|                          |         |                    | CH.       | MHz  |                    |                   |                |               |                      |
| 19                       | 802.11b | Left Touch         | 7         | 2442 | 13.83              | 14.00             | 1.040          | <b>0.083</b>  | 0.086                |
|                          | 802.11b | Left Tilt          | 7         | 2442 | 13.83              | 14.00             | 1.040          | 0.045         | 0.047                |
|                          | 802.11b | Right Touch        | 7         | 2442 | 13.83              | 14.00             | 1.040          | 0.071         | 0.074                |
|                          | 802.11b | Right t Tilt       | 7         | 2442 | 13.83              | 14.00             | 1.040          | 0.038         | 0.040                |

| WIFI2.4G– Body SAR Test(5mm, Limb worn 0mm) |                       |                    |                 |                    |                   |                |               |                      |  |
|---|-----------------------|--------------------|-----------------|--------------------|-------------------|----------------|---------------|----------------------|--|
| Plot No.                                    | Mode                  | Test Position Body | Frequency (MHz) | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |  |
|   | Modulation, Bandwidth |                    |                 |                    |                   |                |               |                      |  |
| 20  | 802.11b               | Back Face          | 2442            | 13.83              | 14.00             | 1.040          | <b>0.549</b>  | 0.571                |  |
|   | 802.11b               | Front Face         | 2442            | 13.83              | 14.00             | 1.040          | 0.512         | 0.532                |  |
| 21  | 802.11b               | Limb worn          | 2442            | 13.83              | 14.00             | 1.040          | 0.602         | 0.626                |  |

| FDD-LTE Band 1– Head SAR Test |            |                    |           |      |                    |                   |                |               |                      |
|-------------------------------|------------|--------------------|-----------|------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.                      | Mode       | Test Position Body | Frequency |      | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|                               |            |                    | CH.       | MHz  |                    |                   |                |               |                      |
| 22                            | QPSK,20MHz | Left Touch         | 18300     | 1950 | 21.50              | 21.50             | 1.000          | <b>0.323</b>  | <b>0.323</b>         |
|                               | QPSK,20MHz | Left Tilt          | 18300     | 1950 | 21.50              | 21.50             | 1.000          | 0.165         | 0.165                |
|                               | QPSK,20MHz | Right Touch        | 18300     | 1950 | 21.50              | 21.50             | 1.000          | 0.306         | 0.306                |
|                               | QPSK,20MHz | Right t Tilt       | 18300     | 1950 | 21.50              | 21.50             | 1.000          | 0.127         | 0.127                |

| FDD-LTE Band 1– Body SAR Test(5mm, Limb worn 0mm) |                       |                    |                 |                    |                   |                |               |                      |  |
|---|-----------------------|--------------------|-----------------|--------------------|-------------------|----------------|---------------|----------------------|--|
| Plot No.  | Mode                  | Test Position Body | Frequency (MHz) | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |  |
|   | Modulation, Bandwidth |                    |                 |                    |                   |                |               |                      |  |

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|    |            | Body       |      |       |       |       |              | (W/kg)       |
|----|------------|------------|------|-------|-------|-------|--------------|--------------|
| 23 | QPSK,20MHz | Back Face  | 1950 | 21.50 | 21.50 | 1.000 | <b>0.228</b> | <b>0.228</b> |
|    | QPSK,20MHz | Front Face | 1950 | 21.50 | 21.50 | 1.000 | 0.185        | 0.185        |
| 24 | QPSK,20MHz | Limb worn  | 1950 | 21.50 | 21.50 | 1.000 | 0.492        | 0.492        |

| FDD-LTE Band 3– Head SAR Test |            |                       |           |        |                    |                   |                |               |                      |
|-------------------------------|------------|-----------------------|-----------|--------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.                      | Mode       | Test Position<br>Body | Frequency |        | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|                               |            |                       | CH.       | MHz    |                    |                   |                |               |                      |
| 25                            | QPSK,20MHz | Left Touch            | 19575     | 1747.5 | 22.31              | 22.50             | 1.045          | <b>0.170</b>  | 0.178                |
|                               | QPSK,20MHz | Left Tilt             | 19575     | 1747.5 | 22.31              | 22.50             | 1.045          | 0.095         | 0.099                |
|                               | QPSK,20MHz | Right Touch           | 19575     | 1747.5 | 22.31              | 22.50             | 1.045          | 0.142         | 0.148                |
|                               | QPSK,20MHz | Right t Tilt          | 19575     | 1747.5 | 22.31              | 22.50             | 1.045          | 0.074         | 0.077                |

| FDD-LTE Band 3– Body SAR Test(5mm, Limb worn 0mm) |                       |                       |                 |                    |                   |                |               |                      |  |
|---|-----------------------|-----------------------|-----------------|--------------------|-------------------|----------------|---------------|----------------------|--|
| Plot No.  | Mode                  | Test Position<br>Body | Frequency (MHz) | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |  |
|   | Modulation, Bandwidth |                       |                 |                    |                   |                |               |                      |  |
| 26  | QPSK,20MHz            | Back Face             | 1747.5          | 22.31              | 22.50             | 1.045          | <b>0.105</b>  | 0.110                |  |
|   | QPSK,20MHz            | Front Face            | 1747.5          | 22.31              | 22.50             | 1.045          | 0.078         | 0.081                |  |
| 27  | QPSK,20MHz            | Limb worn             | 1747.5          | 22.31              | 22.50             | 1.045          | 0.299         | 0.312                |  |

| FDD-LTE Band 7– Head SAR Test |            |                       |           |      |                    |                   |                |               |                      |
|-------------------------------|------------|-----------------------|-----------|------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.                      | Mode       | Test Position<br>Body | Frequency |      | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|                               |            |                       | CH.       | MHz  |                    |                   |                |               |                      |
| 28                            | QPSK,20MHz | Left Touch            | 21100     | 2535 | 21.64              | 22.00             | 1.086          | <b>0.168</b>  | 0.183                |
|                               | QPSK,20MHz | Left Tilt             | 21100     | 2535 | 21.64              | 22.00             | 1.086          | 0.098         | 0.106                |
|                               | QPSK,20MHz | Right Touch           | 21100     | 2535 | 21.64              | 22.00             | 1.086          | 0.141         | 0.153                |
|                               | QPSK,20MHz | Right t Tilt          | 21100     | 2535 | 21.64              | 22.00             | 1.086          | 0.081         | 0.088                |

| FDD-LTE Band 7– Body SAR Test(5mm, Limb worn 0mm) |                       |                       |                 |                    |                   |                |               |                      |  |
|---|-----------------------|-----------------------|-----------------|--------------------|-------------------|----------------|---------------|----------------------|--|
| Plot No.  | Mode                  | Test Position<br>Body | Frequency (MHz) | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |  |
|   | Modulation, Bandwidth |                       |                 |                    |                   |                |               |                      |  |
| 29  | QPSK,20MHz            | Back Face             | 2535            | 21.64              | 22.00             | 1.086          | <b>0.075</b>  | 0.081                |  |
|   | QPSK,20MHz            | Front Face            | 2535            | 21.64              | 22.00             | 1.086          | 0.070         | 0.076                |  |
| 30  | QPSK,20MHz            | Limb worn             | 2535            | 21.64              | 22.00             | 1.086          | 0.779         | 0.846                |  |

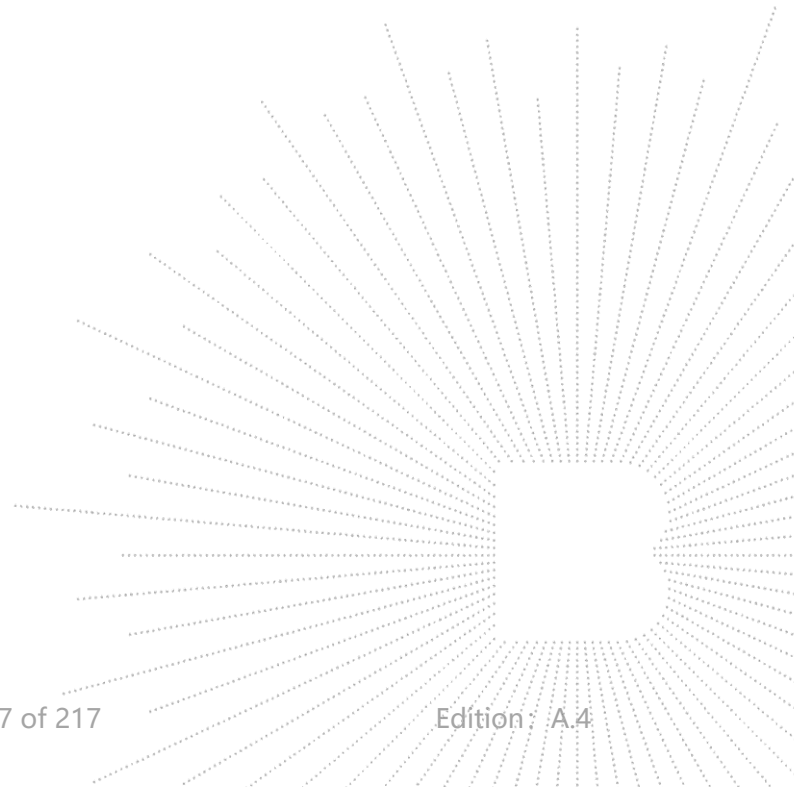
| FDD-LTE Band 8 – Head SAR Test |            |                       |           |       |                    |                   |                |               |                      |
|--------------------------------|------------|-----------------------|-----------|-------|--------------------|-------------------|----------------|---------------|----------------------|
| Plot No.                       | Mode       | Test Position<br>Body | Frequency |       | Output Power (dBm) | Rated Limit (dBm) | Scaling Factor | SAR10g (W/kg) | Scaled SAR10g (W/kg) |
|                                |            |                       | CH.       | MHz   |                    |                   |                |               |                      |
| 31                             | QPSK,10MHz | Left Touch            | 21625     | 897.5 | 23.07              | 23.50             | 1.104          | <b>0.250</b>  | 0.276                |
|                                | QPSK,10MHz | Left Tilt             | 21625     | 897.5 | 23.07              | 23.50             | 1.104          | 0.162         | 0.179                |
|                                | QPSK,10MHz | Right Touch           | 21625     | 897.5 | 23.07              | 23.50             | 1.104          | 0.213         | 0.235                |
|                                | QPSK,10MHz | Right t Tilt          | 21625     | 897.5 | 23.07              | 23.50             | 1.104          | 0.135         | 0.149                |

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| FDD-LTE Band 8– Body SAR Test(5mm, Limb worn 0mm) |                          |                       |                    |                       |                      |                |                      |                             |
|---|--------------------------|-----------------------|--------------------|-----------------------|----------------------|----------------|----------------------|-----------------------------|
| Plot No.  | Mode                     | Test Position<br>Body | Frequency<br>(MHz) | Output Power<br>(dBm) | Rated Limit<br>(dBm) | Scaling Factor | SAR10<br>g<br>(W/kg) | Scaled SAR10<br>g<br>(W/kg) |
|   | Modulation,<br>Bandwidth |                       |                    |                       |                      |                |                      |                             |
| 32  | QPSK,10MHz               | Back Face             | 897.5              | 23.07                 | 23.50                | 1.104          | <b>0.200</b>         | 0.221                       |
|   | QPSK,10MHz               | Front Face            | 897.5              | 23.07                 | 23.50                | 1.104          | 0.165                | 0.182                       |
| 33  | QPSK,10MHz               | Limb worn             | 897.5              | 23.07                 | 23.50                | 1.104          | 0.271                | 0.299                       |

| FDD-LTE Band 20– Head SAR Test |            |                       |           |     |                       |                      |                |                  |                         |
|--------------------------------|------------|-----------------------|-----------|-----|-----------------------|----------------------|----------------|------------------|-------------------------|
| Plot No.                       | Mode       | Test Position<br>Body | Frequency |     | Output Power<br>(dBm) | Rated Limit<br>(dBm) | Scaling Factor | SAR10g<br>(W/kg) | Scaled SAR10g<br>(W/kg) |
|                                |            |                       | CH.       | MHz |                       |                      |                |                  |                         |
| 34                             | QPSK,20MHz | Left Touch            | 24300     | 847 | 22.16                 | 22.50                | 1.081          | <b>0.248</b>     | 0.268                   |
|                                | QPSK,20MHz | Left Tilt             | 24300     | 847 | 22.16                 | 22.50                | 1.081          | 0.182            | 0.197                   |
|                                | QPSK,20MHz | Right Touch           | 24300     | 847 | 22.16                 | 22.50                | 1.081          | 0.211            | 0.228                   |
|                                | QPSK,20MHz | Right t Tilt          | 24300     | 847 | 22.16                 | 22.50                | 1.081          | 0.142            | 0.154                   |

| FDD-LTE Band 20– Body SAR Test(5mm, Limb worn 0mm) |                          |                       |                    |                       |                      |                |                      |                             |
|--|--------------------------|-----------------------|--------------------|-----------------------|----------------------|----------------|----------------------|-----------------------------|
| Plot No.   | Mode                     | Test Position<br>Body | Frequency<br>(MHz) | Output Power<br>(dBm) | Rated Limit<br>(dBm) | Scaling Factor | SAR10<br>g<br>(W/kg) | Scaled SAR10<br>g<br>(W/kg) |
|  | Modulation,<br>Bandwidth |                       |                    |                       |                      |                |                      |                             |
| 35   | QPSK,20MHz               | Back Face             | 847                | 22.16                 | 22.50                | 1.081          | <b>0.185</b>         | 0.200                       |
|  | QPSK,20MHz               | Front Face            | 847                | 22.16                 | 22.50                | 1.081          | 0.148                | 0.160                       |
| 36   | QPSK,20MHz               | Limb worn             | 847                | 22.16                 | 22.50                | 1.081          | 0.316                | 0.342                       |



### 13.3 Simultaneous Multi-band Transmission SAR Analysis

List of Mode for Simultaneous Multi-band Transmission

| No. | Configurations                        | Head SAR | Body SAR | Limb SAR |
|-----|---------------------------------------|----------|----------|----------|
| 1   | GSM(Voice/Data) + WLAN(2.4G)(Data)    | Yes      | Yes      | Yes      |
| 2   | WCDMA (Voice/Data)+ WLAN (2.4G)(Data) | Yes      | Yes      | Yes      |
| 3   | LTE(Data) + WLAN (2.4G)(Data)         | Yes      | Yes      | Yes      |
| 4   | GSM(Voice/Data) + WLAN(5G)(Data)      | Yes      | Yes      | Yes      |
| 5   | WCDMA (Voice/Data)+ WLAN (5G)(Data)   | Yes      | Yes      | Yes      |
| 6   | LTE(Data) + WLAN (5G)(Data)           | Yes      | Yes      | Yes      |
| 7   | GSM(Voice/Data) + Bluetooth(Data)     | Yes      | Yes      | Yes      |
| 8   | WCDMA (Voice/Data) + Bluetooth(Data)  | Yes      | Yes      | Yes      |
| 9   | LTE(Data) + Bluetooth(Data)           | Yes      | Yes      | Yes      |

**Remark:**

1. GSM, WCDMA and LTE share the same antenna, and cannot transmit simultaneously.
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. The maximum SAR summation is calculated based on the same configuration and test position.
4. If 10g-SAR scalar summation < 2.0W/kg, simultaneous SAR measurement is not necessary.
5. One way of determining the threshold power level available to the secondary transmitter ( $P_{available}$ ) is to calculate it from the measured peak spatial-average SAR of the primary transmitter ( $SAR_1$ ) according to the equation:

$$P_{available} = P_{th,m} \times (SAR_{lim} - SAR_1) / SAR_{lim}$$

where  $P_{th,m}$  is the threshold exclusion power level taken from Annex B of IEC 62479<sup>7</sup> for the frequency of the secondary transmitter at the separation distance used in the testing.

For simultaneous transmission analysis, Bluetooth/5.2G WLAN/5.8G SRD SAR is below:

**Bluetooth:**

| Average Power (dBm) | Output Power (mW) | $P_{th,m}$ (mw) | $SAR_{lim}$ (W/kg) | $SAR_1$ (W/kg) | $P_{available}$ (mw) |
|---------------------|-------------------|-----------------|--------------------|----------------|----------------------|
| 2.5                 | 1.78              | 20              | 2                  | 0.571          | 14.29                |

**WLAN 2.4G:**

| Average Power (dBm) | Output Power (mW) | $P_{th,m}$ (mw) | $SAR_{lim}$ (W/kg) | $SAR_1$ (W/kg) | $P_{available}$ (mw) |
|---------------------|-------------------|-----------------|--------------------|----------------|----------------------|
| N/A                 | N/A               | 20              | 2                  | N/A            | N/A                  |

**WLAN 5G:**

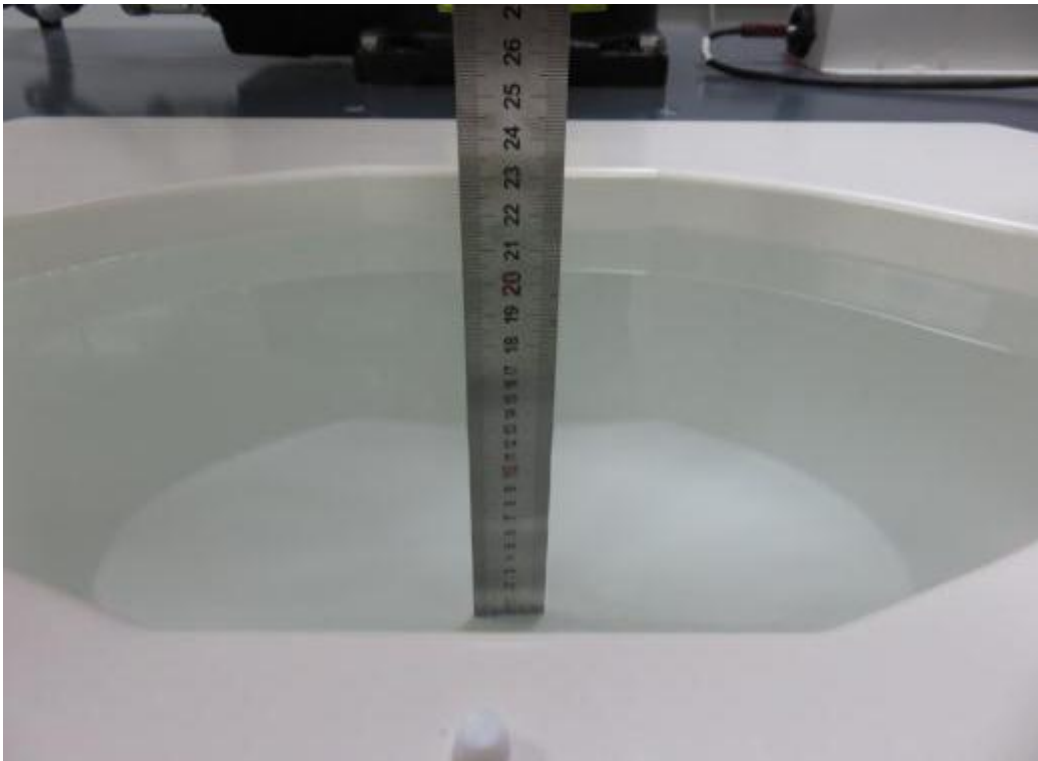
| Average Power (dBm) | Output Power (mW) | $P_{th,m}$ (mw) | $SAR_{lim}$ (W/kg) | $SAR_1$ (W/kg) | $P_{available}$ (mw) |
|---------------------|-------------------|-----------------|--------------------|----------------|----------------------|
| N/A                 | N/A               | 20              | 2                  | N/A            | N/A                  |

The Bluetooth/WIFI output power of the secondary transmitter is less than  $P_{available}$ , So SAR measurement for the secondary transmitter is not necessary.

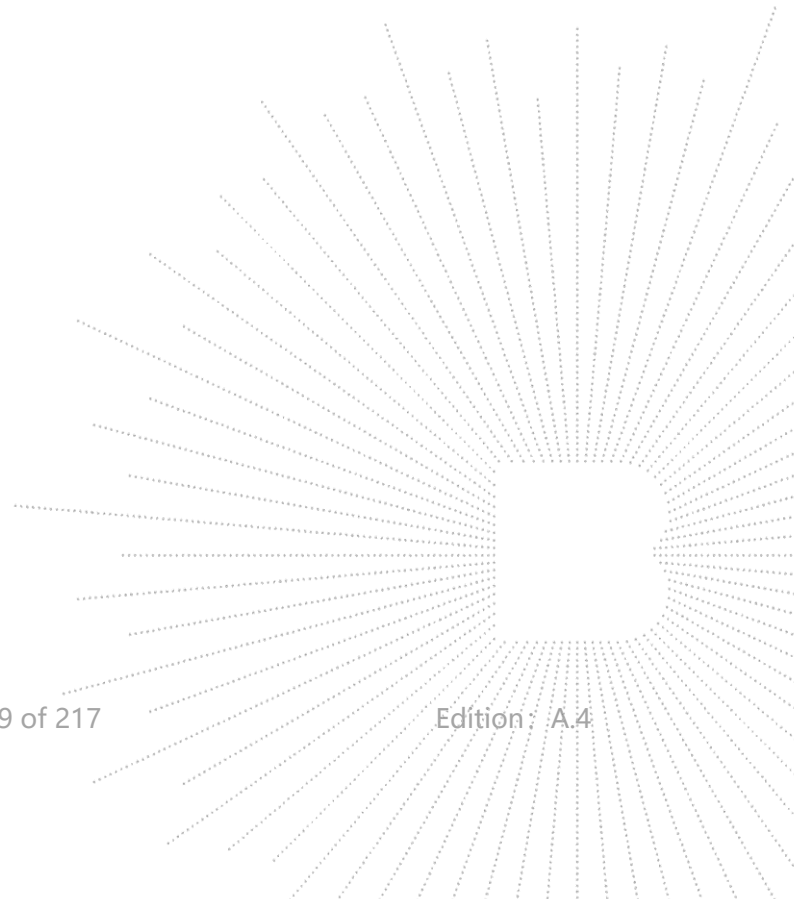
The maximum SAR overlay value is 0.571W/kg. The maximum SAR overlay value is 0.846W/kg For Limb worn.



**14. Photographs Of The Liquid**



**Photograph of the depth in the Body Phantom (600-10000MHz, 16.2cm depth)**



## 15. Test Plots

### 15.1 System Performance Check

System check at 900 MHz

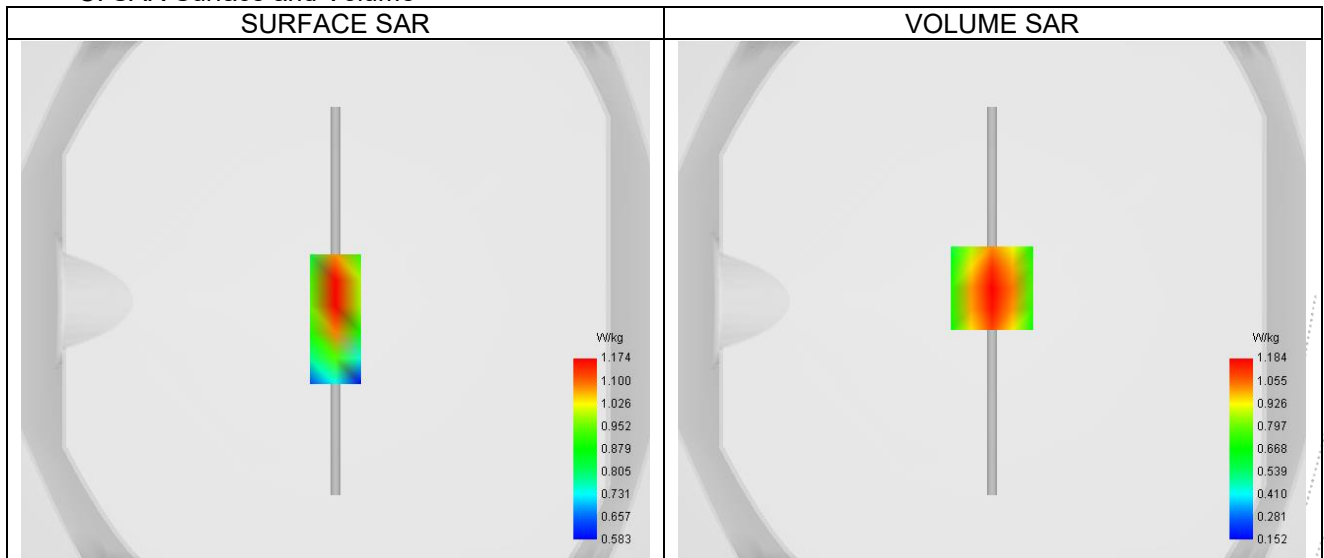
#### A. Experimental conditions.

|                 |  |
|-----------------|--|
| Probe           | SN EPGO373                             |
| ConvF           | 23.97                                  |
| Area Scan       | dx=10mm dy=10mm, Adaptive 2 max        |
| Zoom Scan       | 5x5x7, dx=8mm dy=8mm dz=5mm, Very fast |
| Phantom         | Validation plane                       |
| Device Position | Dipole                                 |
| Band            | CW900                                  |
| Channels        | Middle                                 |
| Signal          | CW (Crest factor: 1.0)                 |

#### B. Permittivity

|  |         |
|--|---------|
| Frequency (MHz)                        | 900.000 |
| Relative permittivity (real part)      | 40.900  |
| Relative permittivity (imaginary part) | 21.000  |
| Conductivity (S/m)                     | 1.050   |

#### C. SAR Surface and Volume



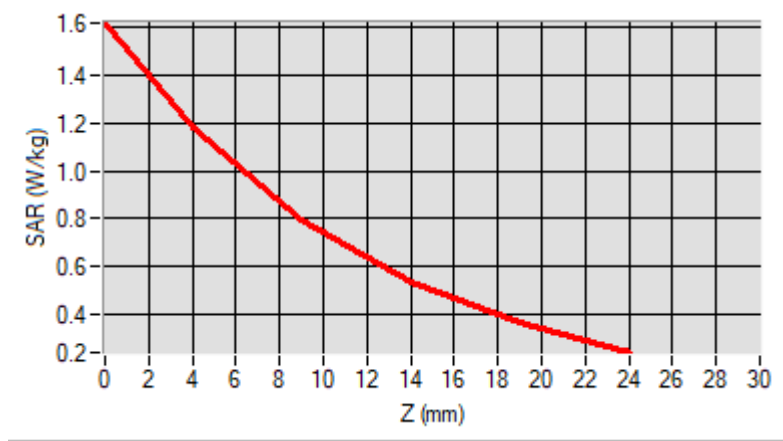
Maximum location: X=0.00, Y=5.00 ; SAR Peak: 1.62 W/kg

#### D. SAR 1g & 10g

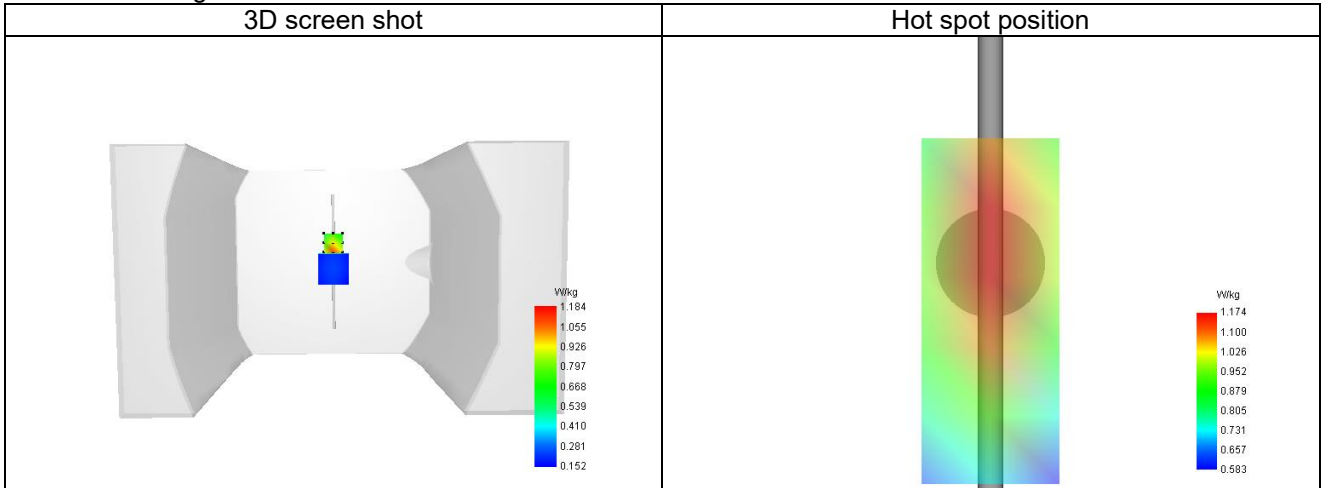
|   |          |
|---|----------|
| SAR 10g (W/Kg)  | 0.719    |
| SAR 1g (W/Kg)   | 1.124    |
| Variation (%)   | -0.360   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

#### E. Z Axis Scan

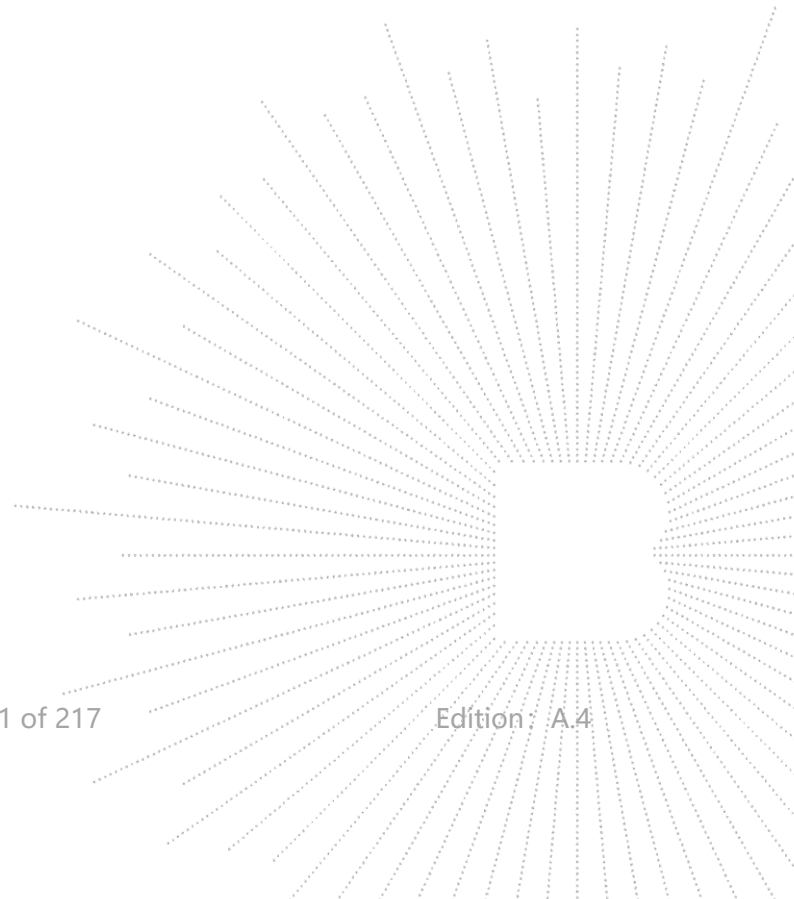
|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 1.616 | 1.184 | 0.796 | 0.537 | 0.366 |



## F. 3D Image



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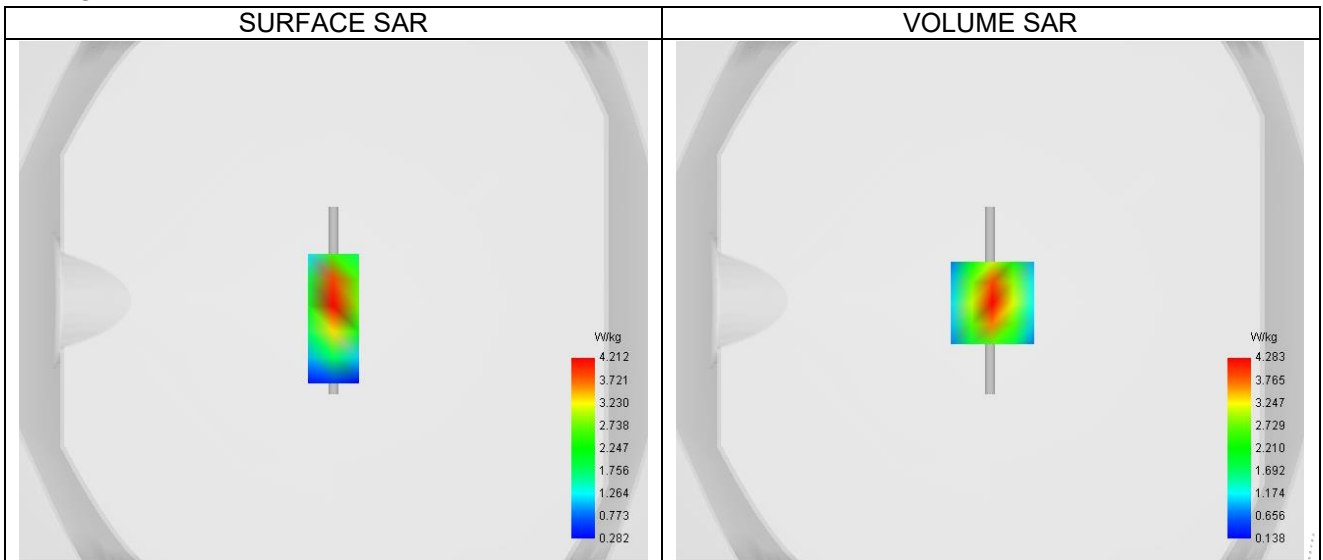
System check at 1800 MHz

**A. Experimental conditions.**

|                 |                                      |
|-----------------|--------------------------------------|
| Probe           | SN EPGO373                           |
| ConvF           | 24.68                                |
| Area Scan       | dx=10mm dy=10mm, Adaptative 2 max    |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Very fast |
| Phantom         | Validation plane                     |
| Device Position | Dipole                               |
| Band            | CW1800                               |
| Channels        | Middle                               |
| Signal          | CW (Crest factor: 1.0)               |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 1800.000 |
| Relative permittivity (real part)      | 39.200   |
| Relative permittivity (imaginary part) | 15.200   |
| Conductivity (S/m)                     | 1.520    |

**C. SAR Surface and Volume**


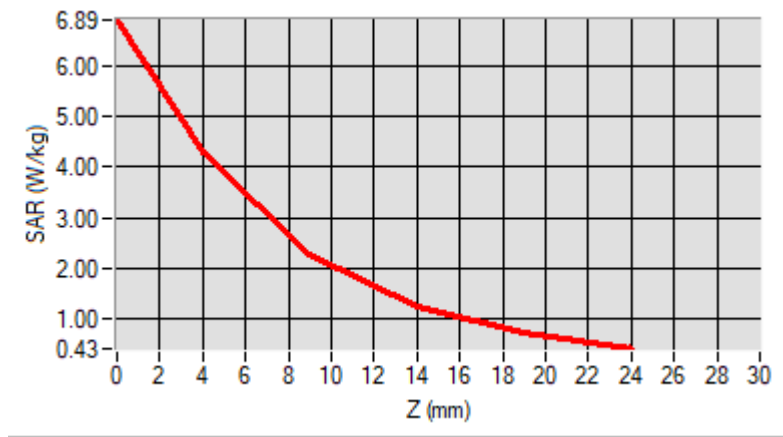
Maximum location: X=1.00, Y=-1.00 ; SAR Peak: 6.89 W/kg

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

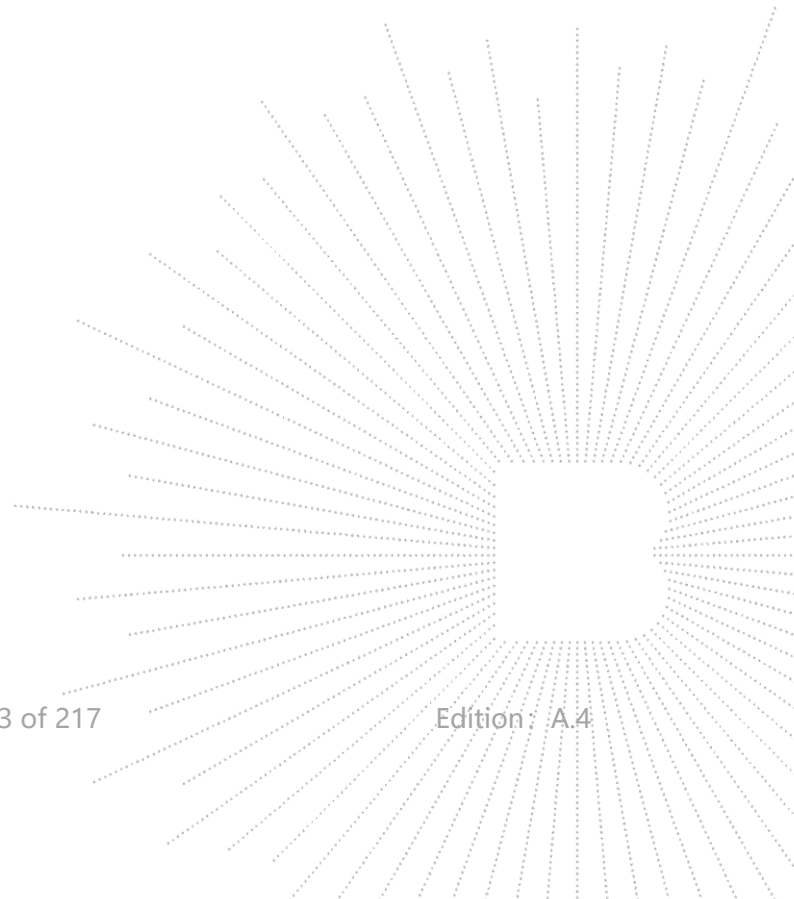
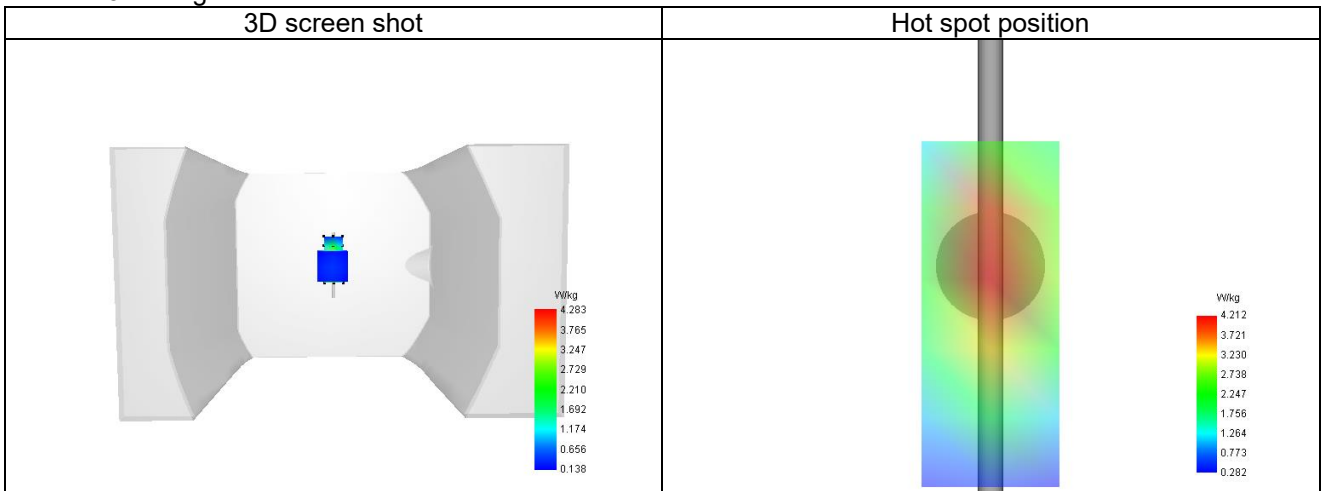
|   |          |
|---|----------|
| SAR 10g (W/Kg)  | 1.995    |
| SAR 1g (W/Kg)   | 3.940    |
| Variation (%)   | 0.070    |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 6.889 | 4.283 | 2.298 | 1.249 | 0.726 |



## F. 3D Image



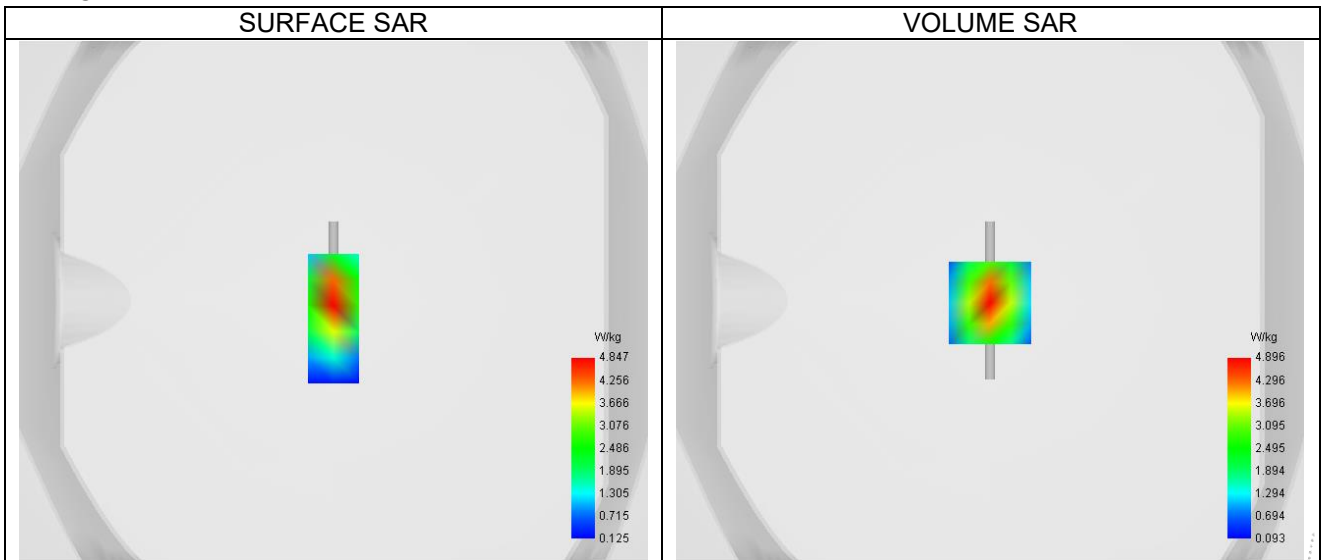
System check at 2100 MHz

**A. Experimental conditions.**

|                 |                                      |
|-----------------|--------------------------------------|
| Probe           | SN EPGO373                           |
| ConvF           | 26.52                                |
| Area Scan       | dx=10mm dy=10mm, Adaptative 2 max    |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Very fast |
| Phantom         | Validation plane                     |
| Device Position | Dipole                               |
| Band            | CW2100                               |
| Channels        | Middle                               |
| Signal          | CW (Crest factor: 1.0)               |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 2100.000 |
| Relative permittivity (real part)      | 38.521   |
| Relative permittivity (imaginary part) | 13.824   |
| Conductivity (S/m)                     | 1.613    |

**C. SAR Surface and Volume**


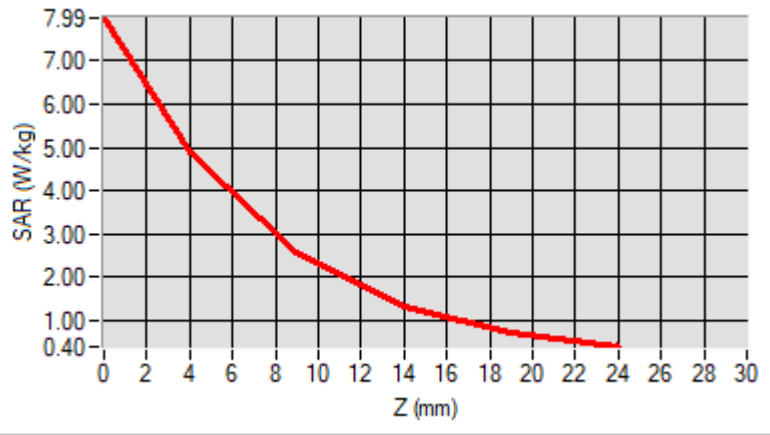
Maximum location: X=0.00, Y=-1.00 ; SAR Peak: 7.98 W/kg

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

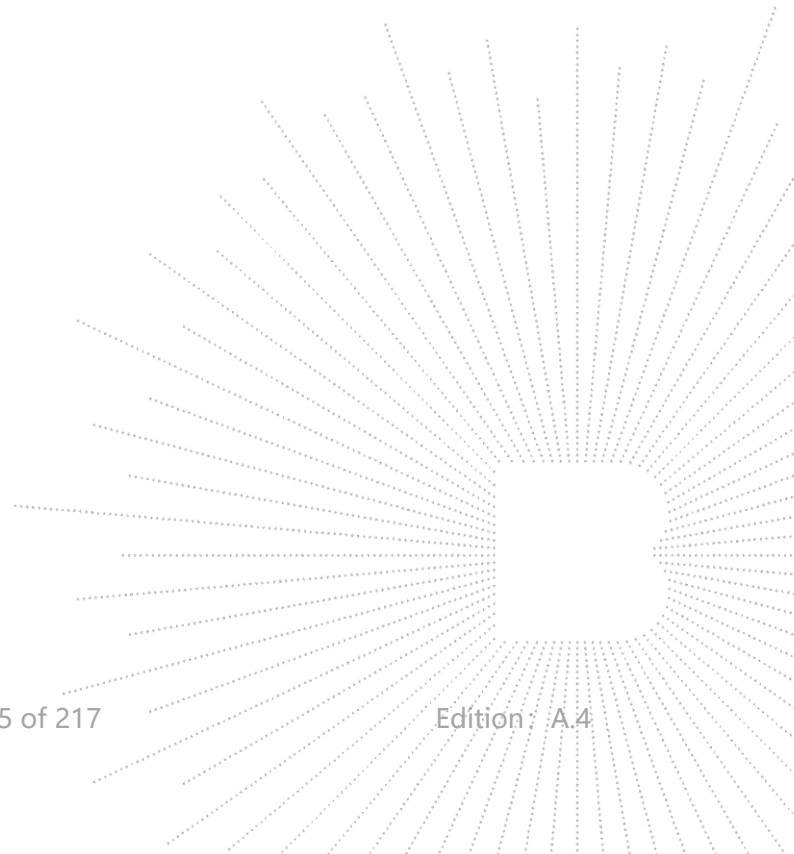
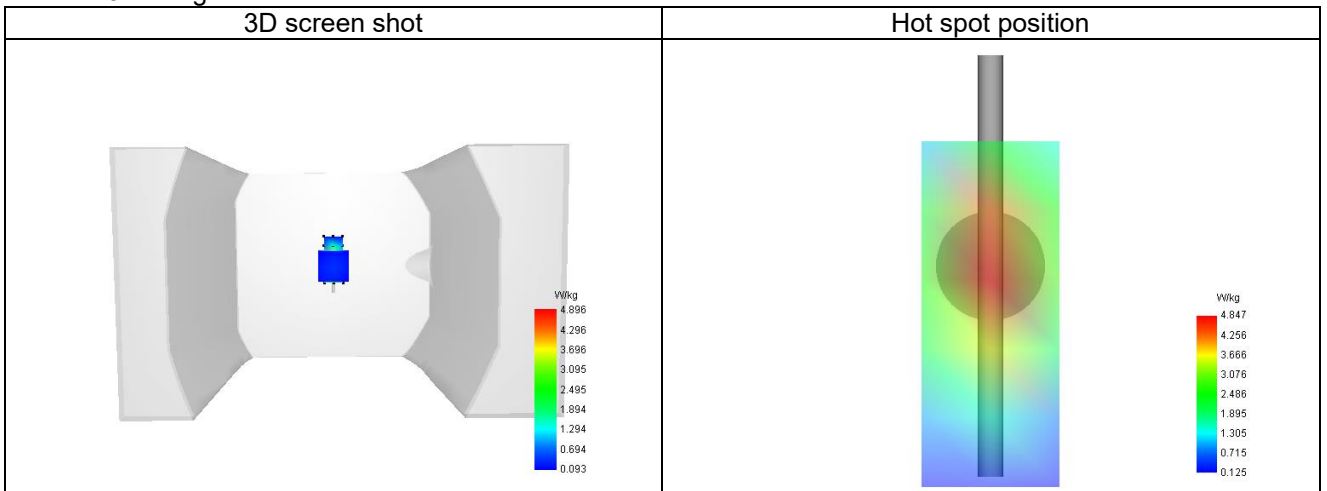
|   |          |
|---|----------|
| SAR 10g (W/Kg)  | 2.155    |
| SAR 1g (W/Kg)   | 4.458    |
| Variation (%)   | 0.100    |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 7.987 | 4.896 | 2.558 | 1.335 | 0.733 |



## F. 3D Image



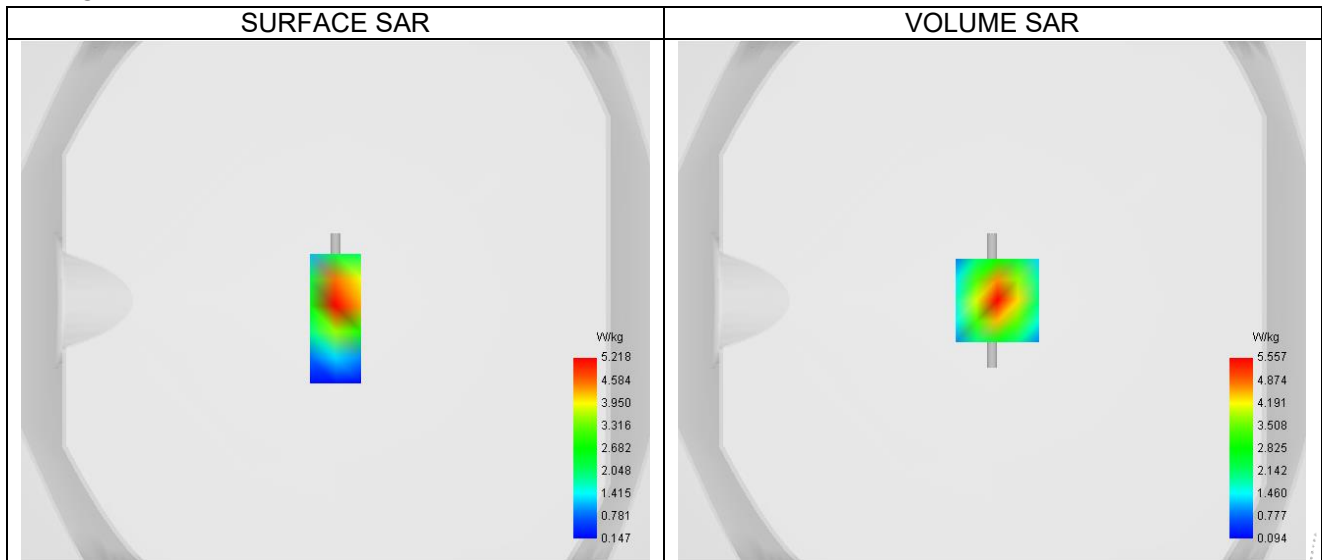
System check at 2450 MHz

**A. Experimental conditions.**

|                 |                                      |
|-----------------|--------------------------------------|
| Probe           | SN EPGO373                           |
| ConvF           | 26.43                                |
| Area Scan       | dx=10mm dy=10mm, Adaptative 2 max    |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Very fast |
| Phantom         | Validation plane                     |
| Device Position | Dipole                               |
| Band            | CW2450                               |
| Channels        | Middle                               |
| Signal          | CW (Crest factor: 1.0)               |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 2450.000 |
| Relative permittivity (real part)      | 38.600   |
| Relative permittivity (imaginary part) | 14.330   |
| Conductivity (S/m)                     | 1.950    |

**C. SAR Surface and Volume**


Maximum location: X=2.00, Y=0.00 ; SAR Peak: 9.11 W/kg

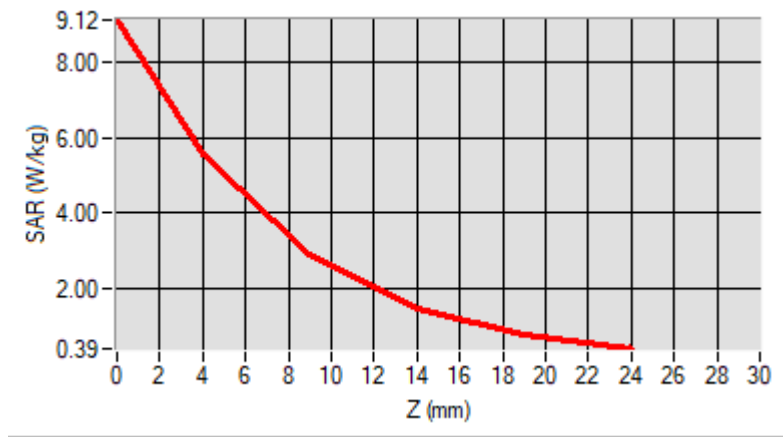
**D. SAR 1g & 10g**

|   |          |
|---|----------|
| SAR 10g (W/Kg)  | 2.457    |
| SAR 1g (W/Kg)   | 5.085    |
| Variation (%)   | 0.360    |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

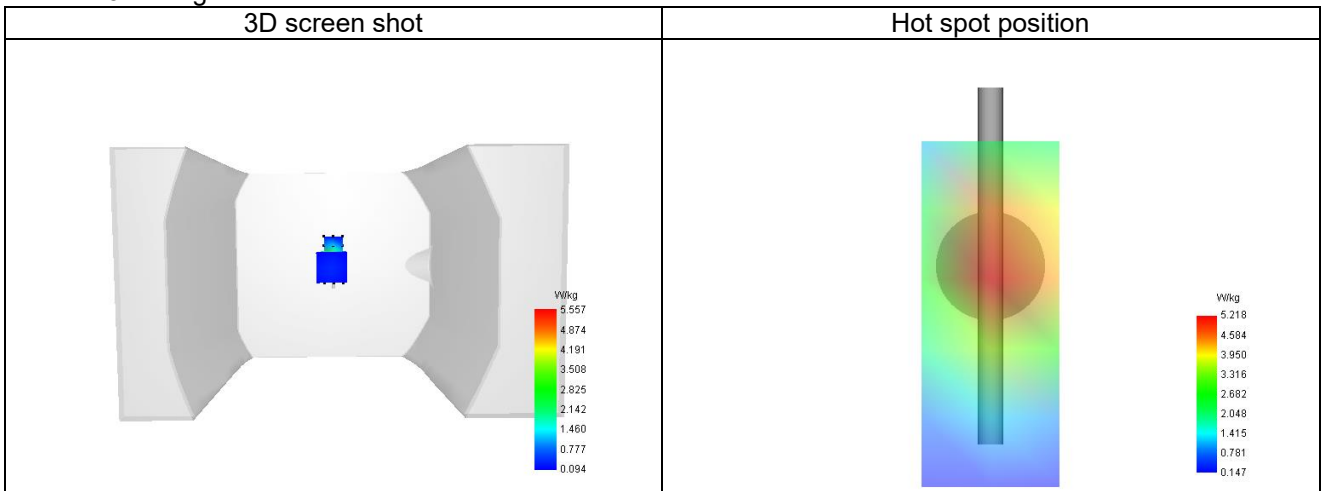
**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 9.121 | 5.557 | 2.866 | 1.459 | 0.770 |

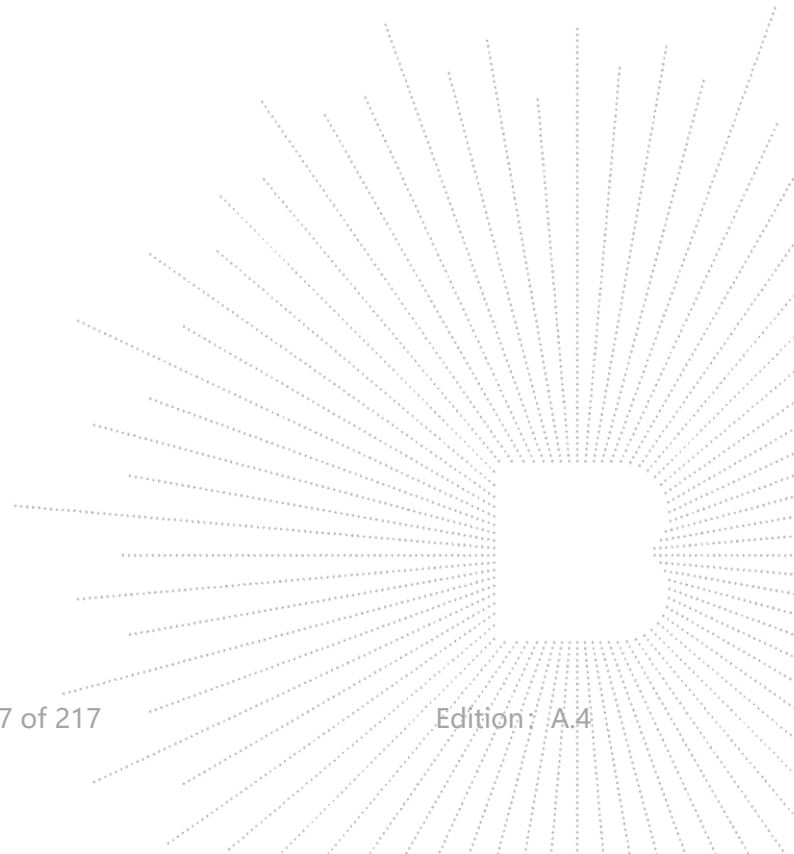




## F. 3D Image



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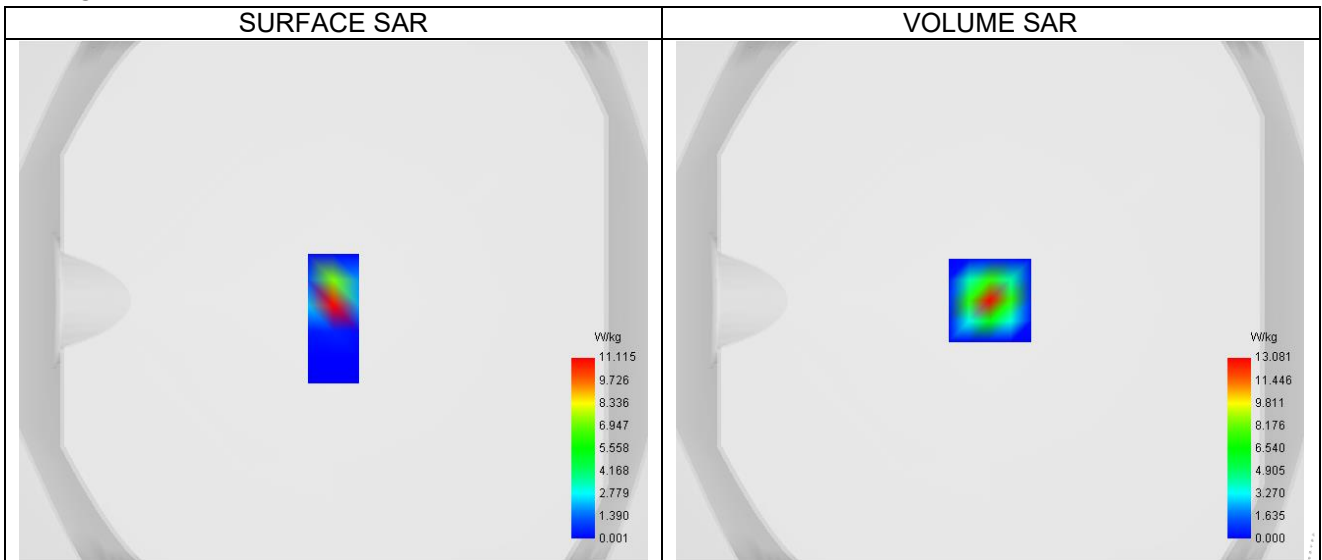
System check at 5200 MHz

**A. Experimental conditions.**

|                 |                                      |
|-----------------|--------------------------------------|
| Probe           | SN EPGO373                           |
| ConvF           | 21.98                                |
| Area Scan       | dx=10mm dy=10mm, Adaptative 2 max    |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Very fast |
| Phantom         | Validation plane                     |
| Device Position | Dipole                               |
| Band            | CW5200                               |
| Channels        | Middle                               |
| Signal          | CW (Crest factor: 1.0)               |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 5200.000 |
| Relative permittivity (real part)      | 35.726   |
| Relative permittivity (imaginary part) | 18.140   |
| Conductivity (S/m)                     | 4.521    |

**C. SAR Surface and Volume**


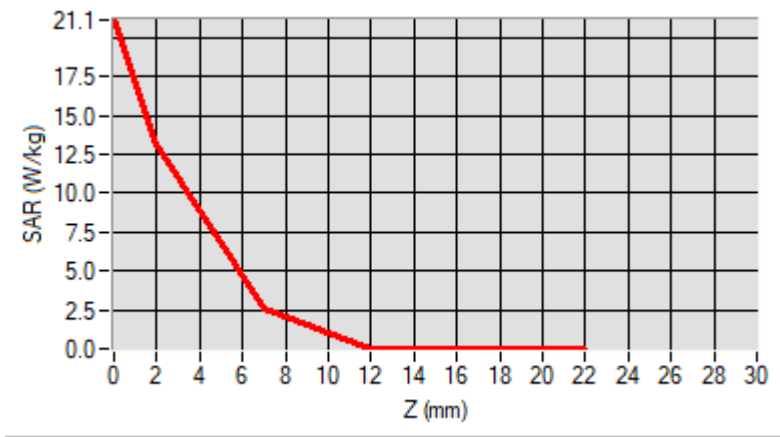
Maximum location: X=0.00, Y=0.00 ; SAR Peak: 22.28 W/kg

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

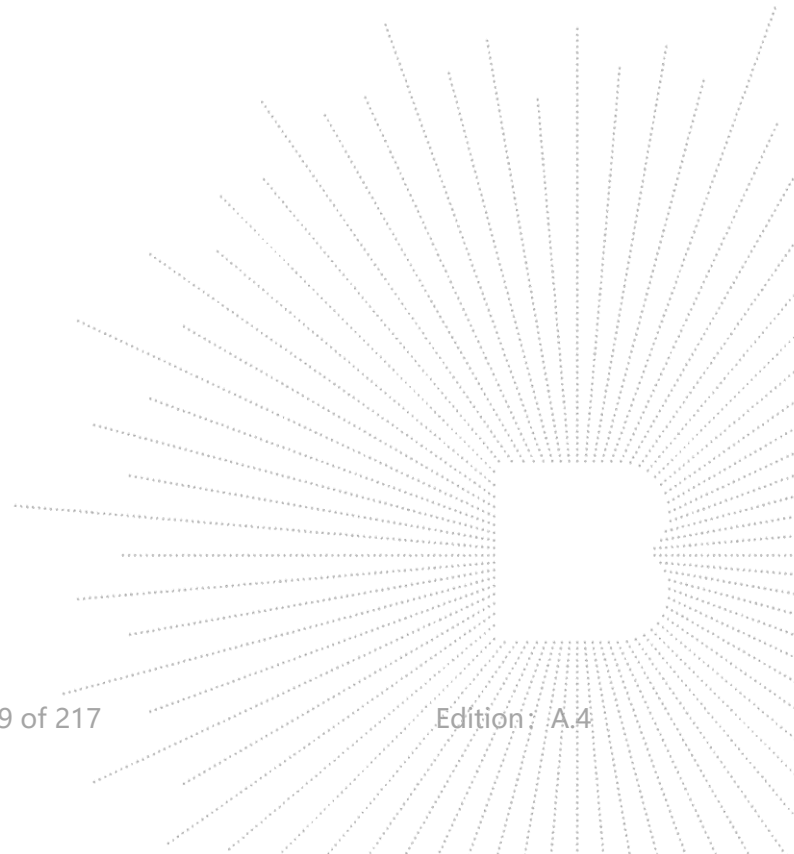
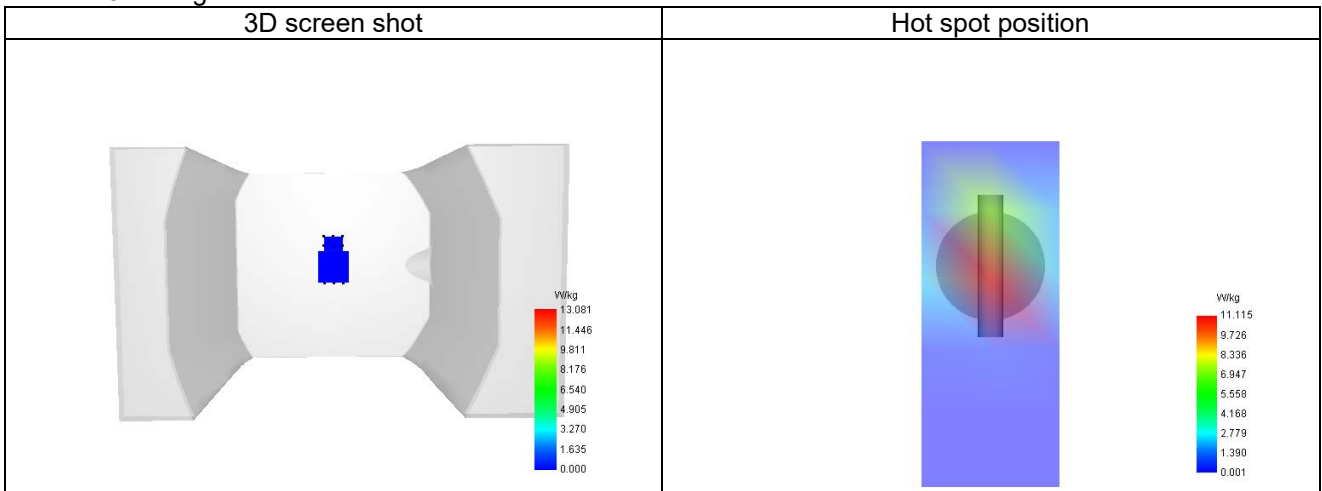
|   |          |
|---|----------|
| SAR 10g (W/Kg)  | 2.041    |
| SAR 1g (W/Kg)   | 6.953    |
| Variation (%)   | 0.430    |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |        |        |       |       |       |
|------------|--------|--------|-------|-------|-------|
| Z (mm)     | 0.00   | 2.00   | 7.00  | 12.00 | 17.00 |
| SAR (W/Kg) | 21.117 | 13.081 | 2.622 | 0.000 | 0.003 |



## F. 3D Image



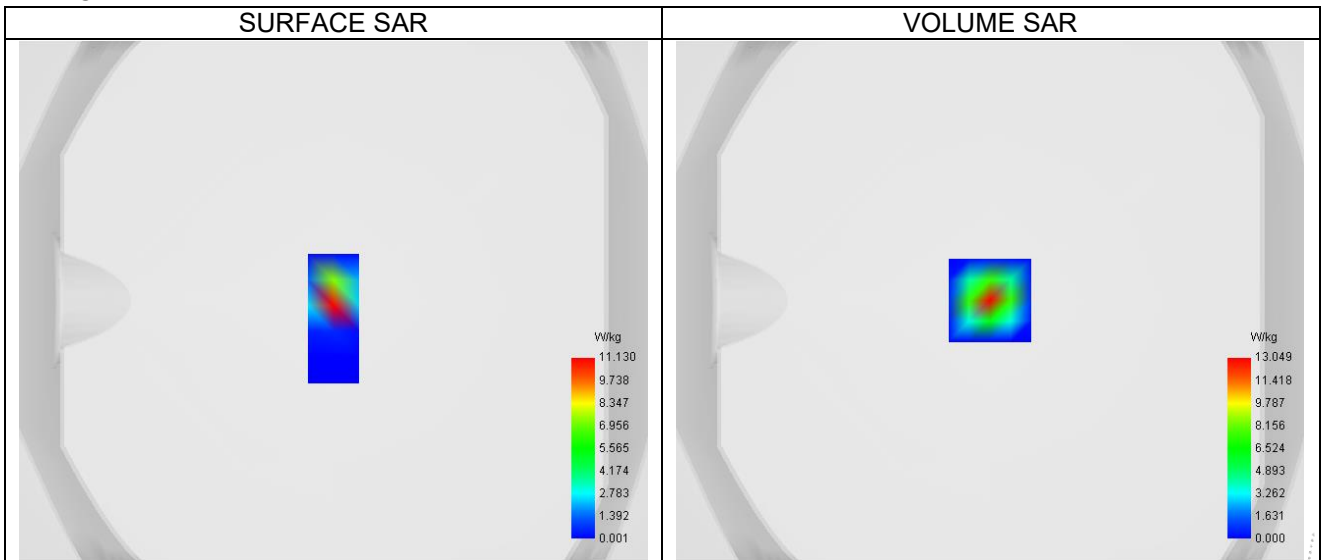
System check at 5800 MHz

**A. Experimental conditions.**

|                 |                                      |
|-----------------|--------------------------------------|
| Probe           | SN EPGO373                           |
| ConvF           | 21.00                                |
| Area Scan       | dx=10mm dy=10mm, Adaptative 2 max    |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Very fast |
| Phantom         | Validation plane                     |
| Device Position | Dipole                               |
| Band            | CW5800                               |
| Channels        | Middle                               |
| Signal          | CW (Crest factor: 1.0)               |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 5800.000 |
| Relative permittivity (real part)      | 34.900   |
| Relative permittivity (imaginary part) | 18.620   |
| Conductivity (S/m)                     | 5.170    |

**C. SAR Surface and Volume**


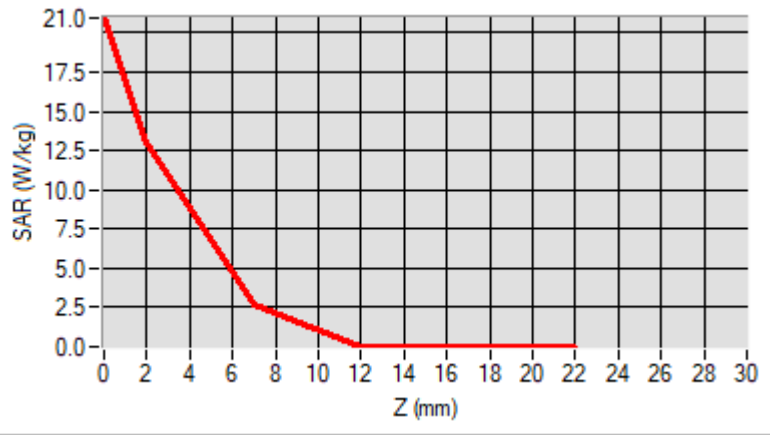
Maximum location: X=0.00, Y=0.00 ; SAR Peak: 22.11 W/kg

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

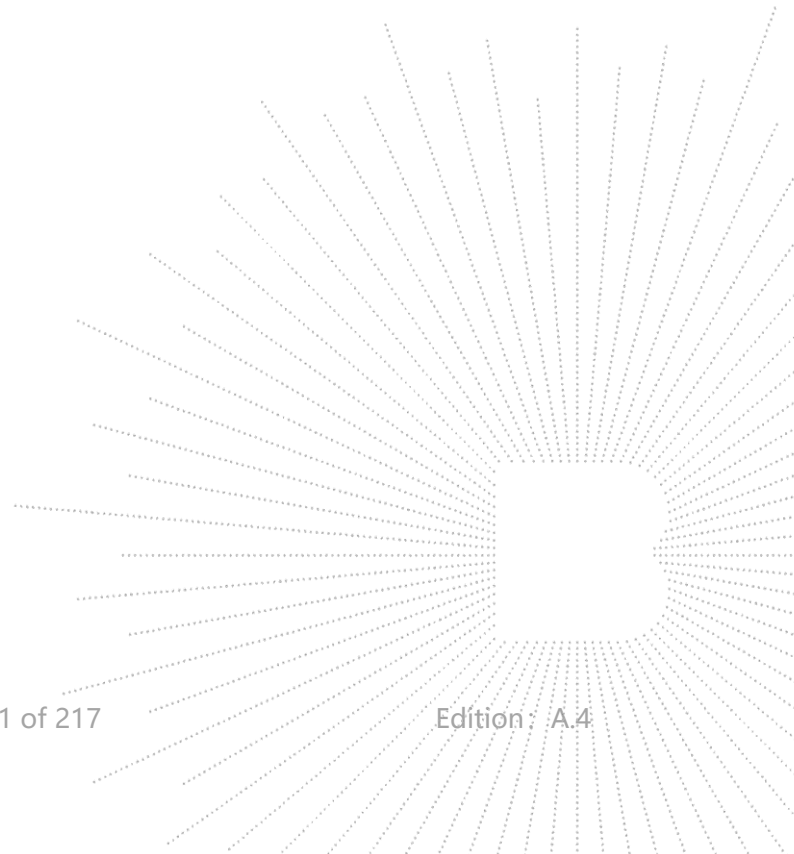
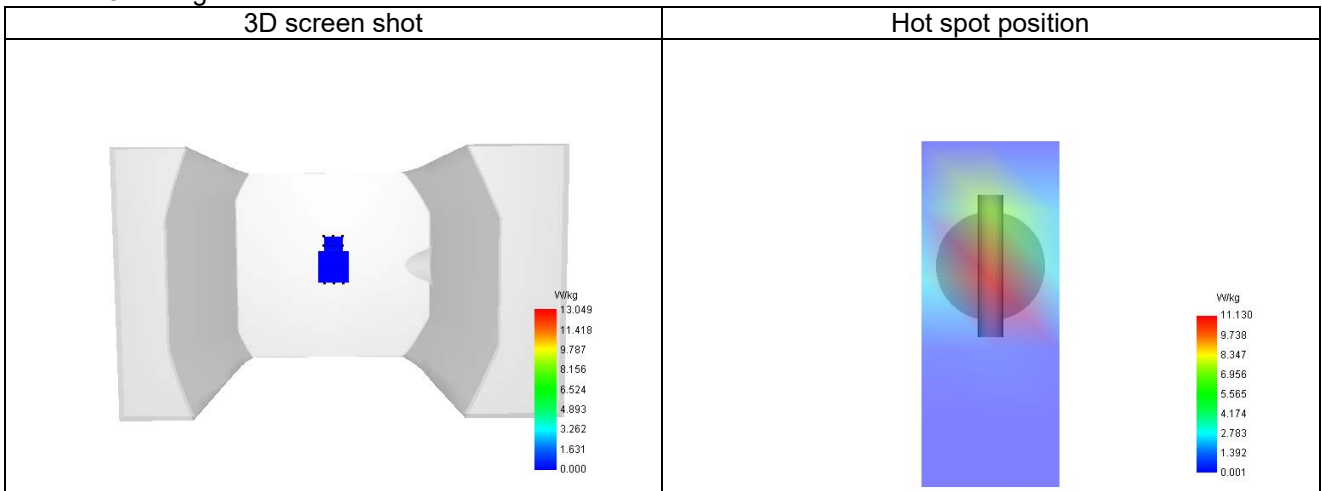
|   |          |
|---|----------|
| SAR 10g (W/Kg)  | 2.063    |
| SAR 1g (W/Kg)   | 7.125    |
| Variation (%)   | 0.430    |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |        |        |       |       |       |
|------------|--------|--------|-------|-------|-------|
| Z (mm)     | 0.00   | 2.00   | 7.00  | 12.00 | 17.00 |
| SAR (W/Kg) | 20.951 | 13.049 | 2.674 | 0.012 | 0.003 |



## F. 3D Image



## 15.2 SAR Test Graph Results

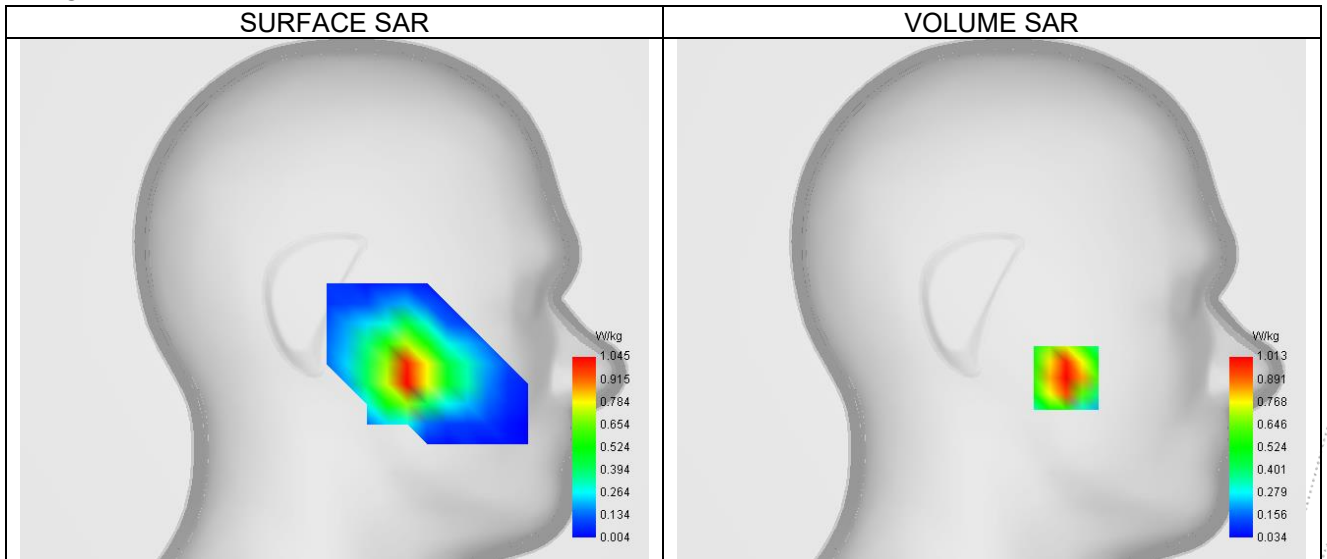
## Plot 1

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.08                                |
| Area Scan       | sam_direct_droit2_surf8mm.txt       |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Left head                           |
| Device Position | Cheek                               |
| Band            | GSM900                              |
| Channels        | Middle (62)                         |
| Signal          | TDMA (Crest factor: 8.0)            |

**B. Permittivity**

|  |         |
|--|---------|
| Frequency (MHz)                        | 902.400 |
| Relative permittivity (real part)      | 41.496  |
| Relative permittivity (imaginary part) | 19.380  |
| Conductivity (S/m)                     | 0.972   |

**C. SAR Surface and Volume**


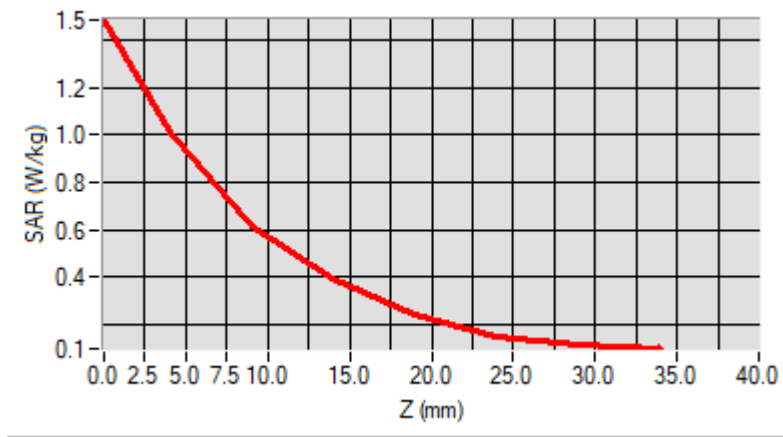
Maximum location: X=-37.00, Y=-39.00 ; SAR Peak: 1.58 W/kg

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

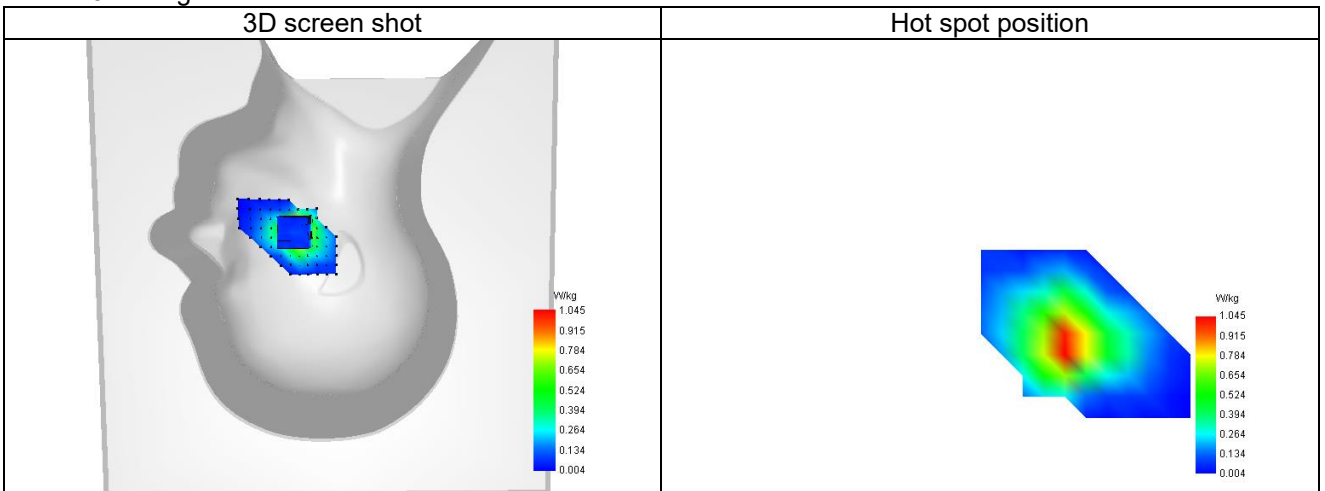
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.540     |
| SAR 1g (W/Kg)   | 0.961     |
| Variation (%)   | -2.700    |
| Horizontal validation criteria: minimum distance (mm) | 17.888544 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 60.526536 |

**E. Z Axis Scan**

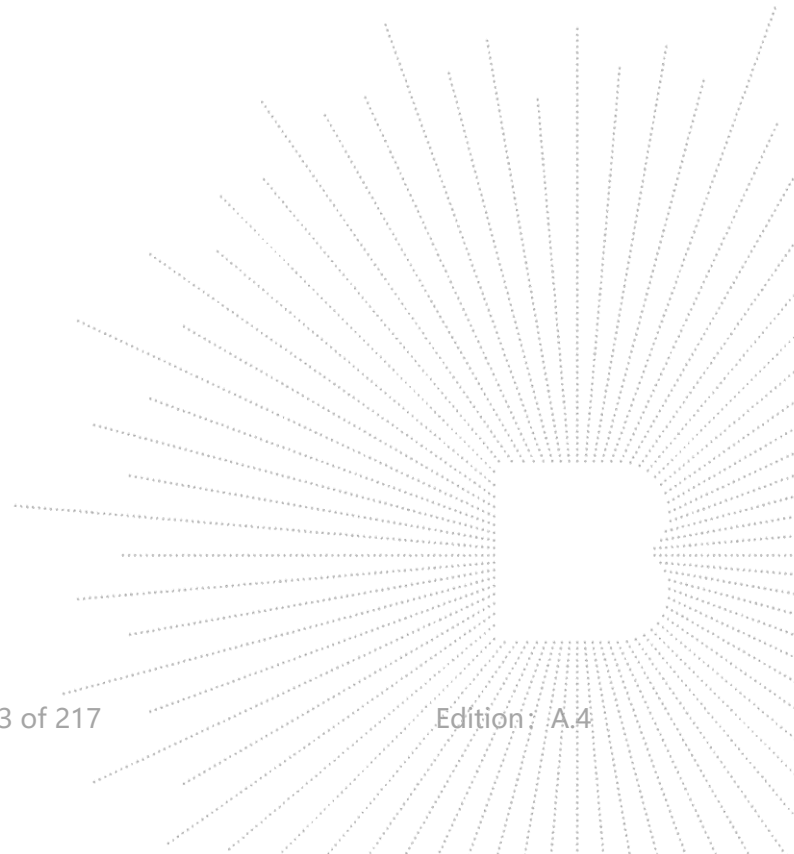
|            |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 1.484 | 1.013 | 0.613 | 0.397 | 0.240 | 0.154 | 0.118 |



## F. 3D Image



BCTC  
 3C  
 PPR  
 检测



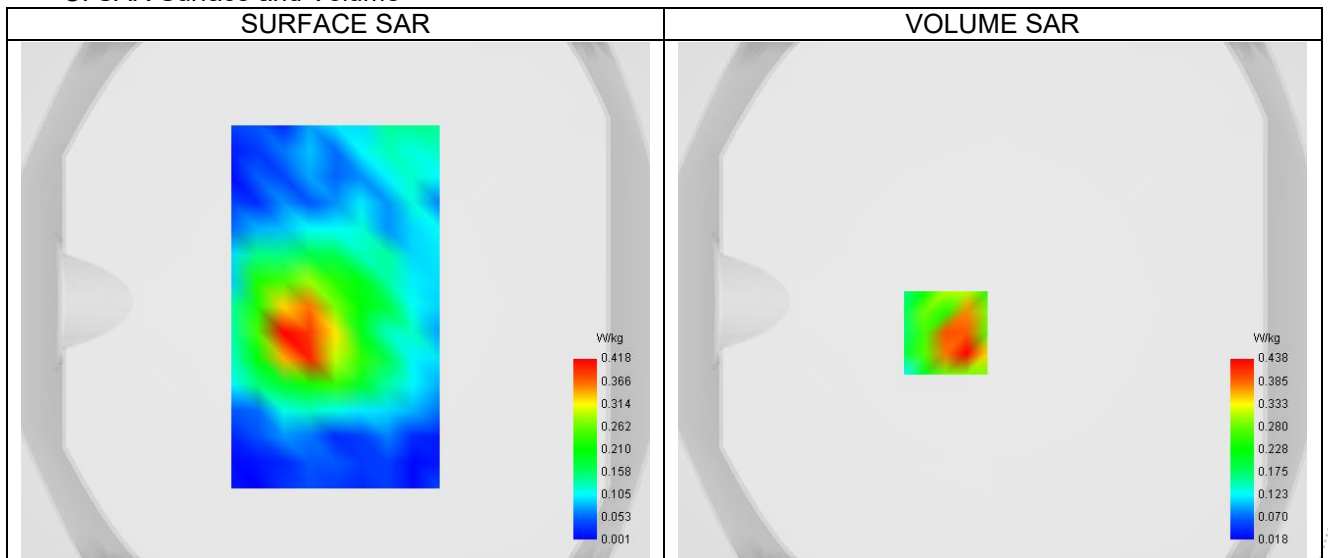
## Plot 2

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.08                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | GSM900                              |
| Channels        | Middle (62)                         |
| Signal          | TDMA (Crest factor: 8.0)            |

**B. Permittivity**

|  |         |
|--|---------|
| Frequency (MHz)                        | 902.400 |
| Relative permittivity (real part)      | 41.496  |
| Relative permittivity (imaginary part) | 19.380  |
| Conductivity (S/m)                     | 0.972   |

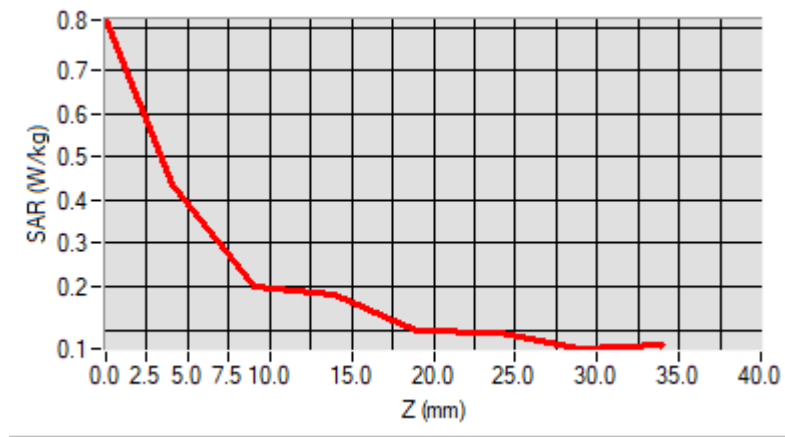
**C. SAR Surface and Volume**

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

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.233     |
| SAR 1g (W/Kg)   | 0.415     |
| Variation (%)   | -2.350    |
| Horizontal validation criteria: minimum distance (mm) | 17.888544 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 63.060223 |

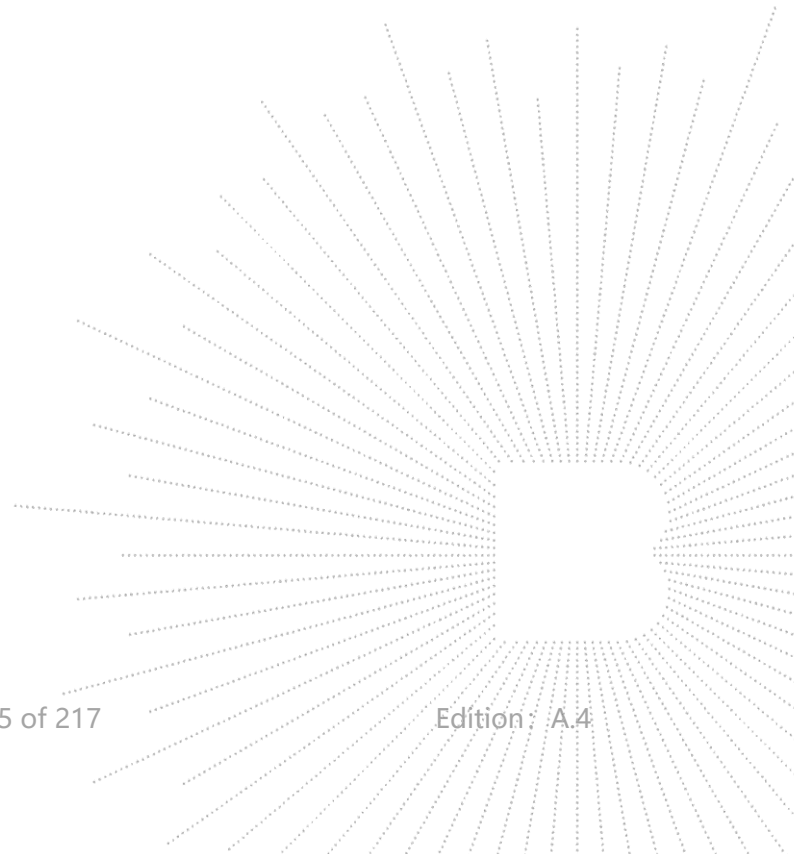
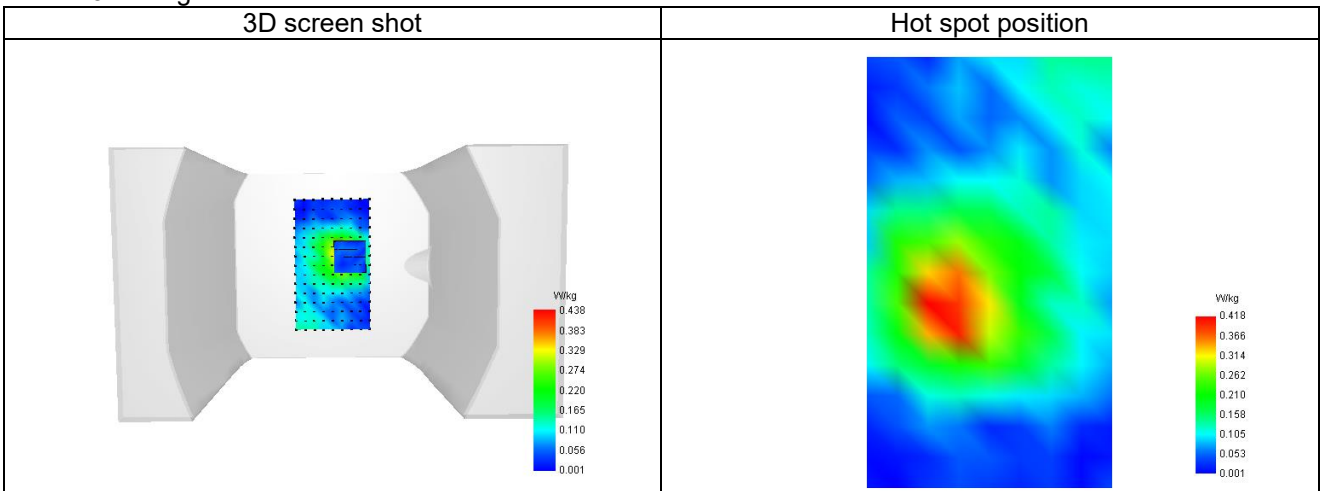
**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.817 | 0.438 | 0.198 | 0.181 | 0.099 | 0.092 | 0.056 |





## F. 3D Image



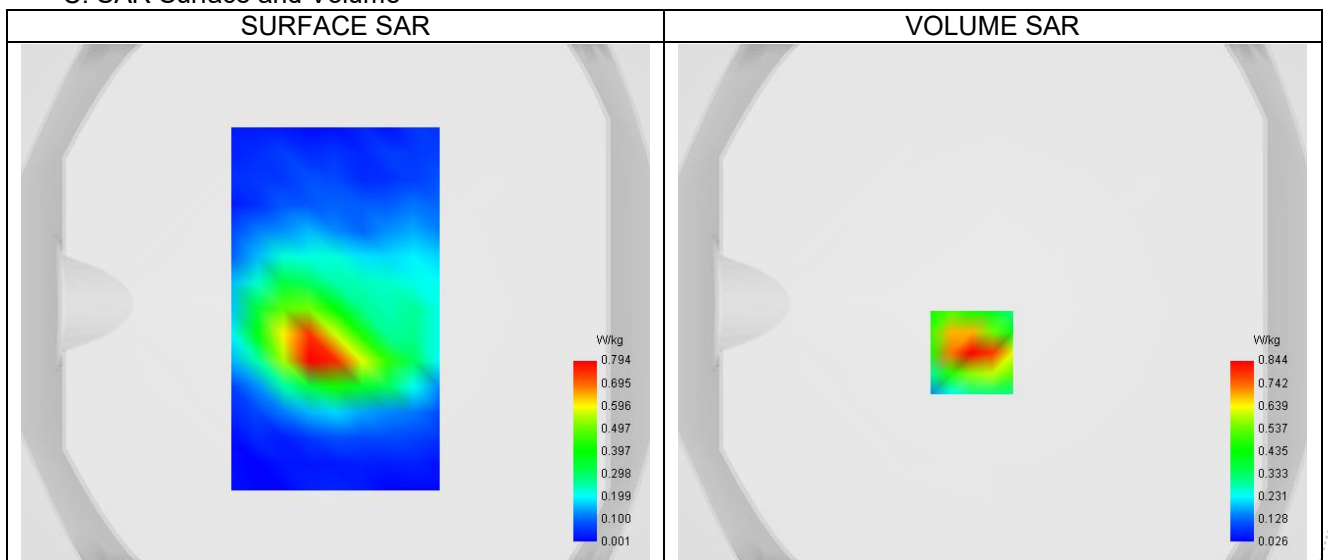
## Plot 3

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.08                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | GSM900                              |
| Channels        | Middle (62)                         |
| Signal          | TDMA (Crest factor: 8.0)            |

**B. Permittivity**

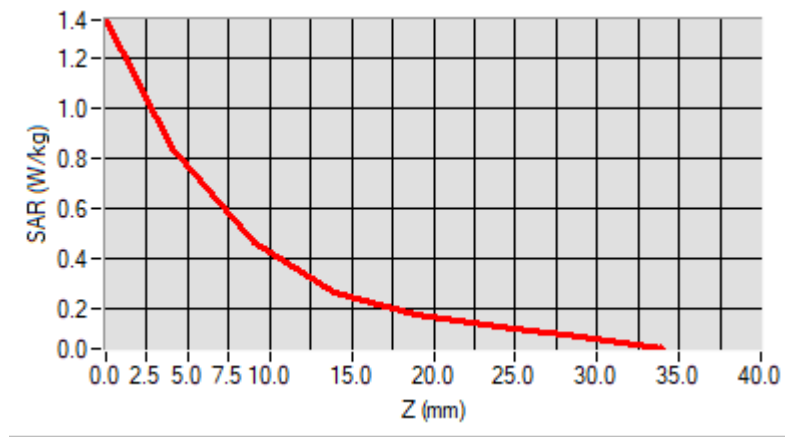
|  |         |
|--|---------|
| Frequency (MHz)                        | 902.400 |
| Relative permittivity (real part)      | 41.496  |
| Relative permittivity (imaginary part) | 19.380  |
| Conductivity (S/m)                     | 0.972   |

**C. SAR Surface and Volume**

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

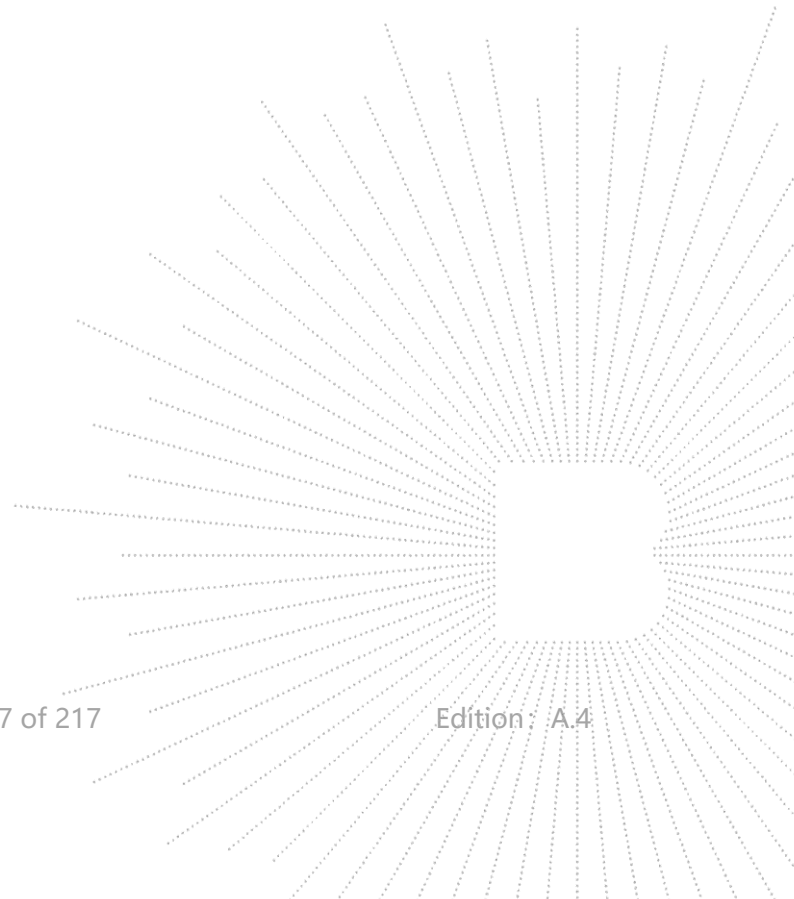
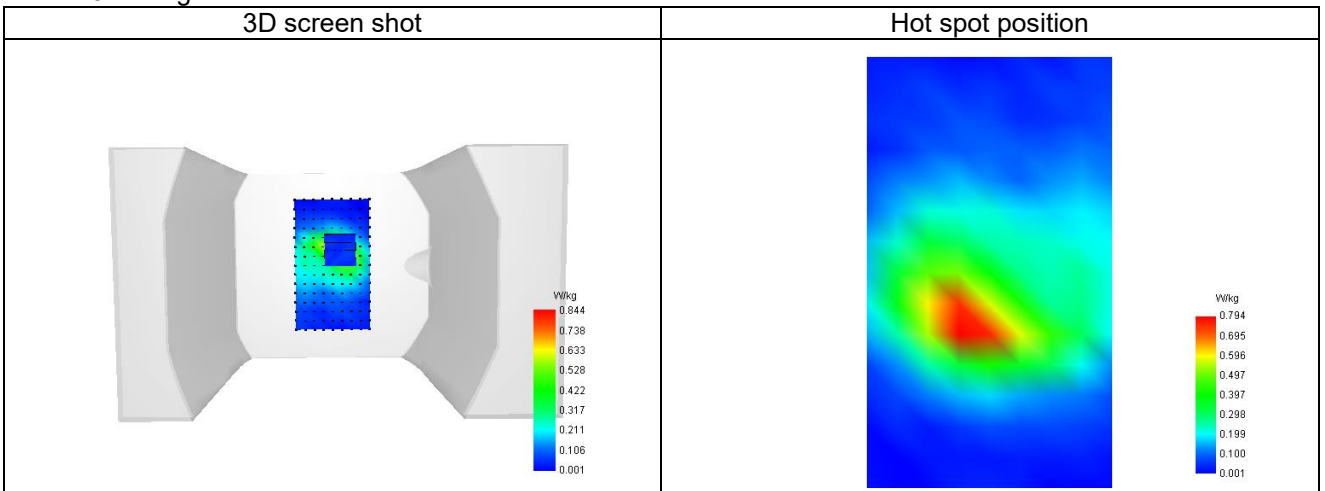
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.412     |
| SAR 1g (W/Kg)   | 0.795     |
| Variation (%)   | -1.030    |
| Horizontal validation criteria: minimum distance (mm) | 16.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 54.851604 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 1.357 | 0.844 | 0.463 | 0.263 | 0.174 | 0.124 | 0.082 |



## F. 3D Image



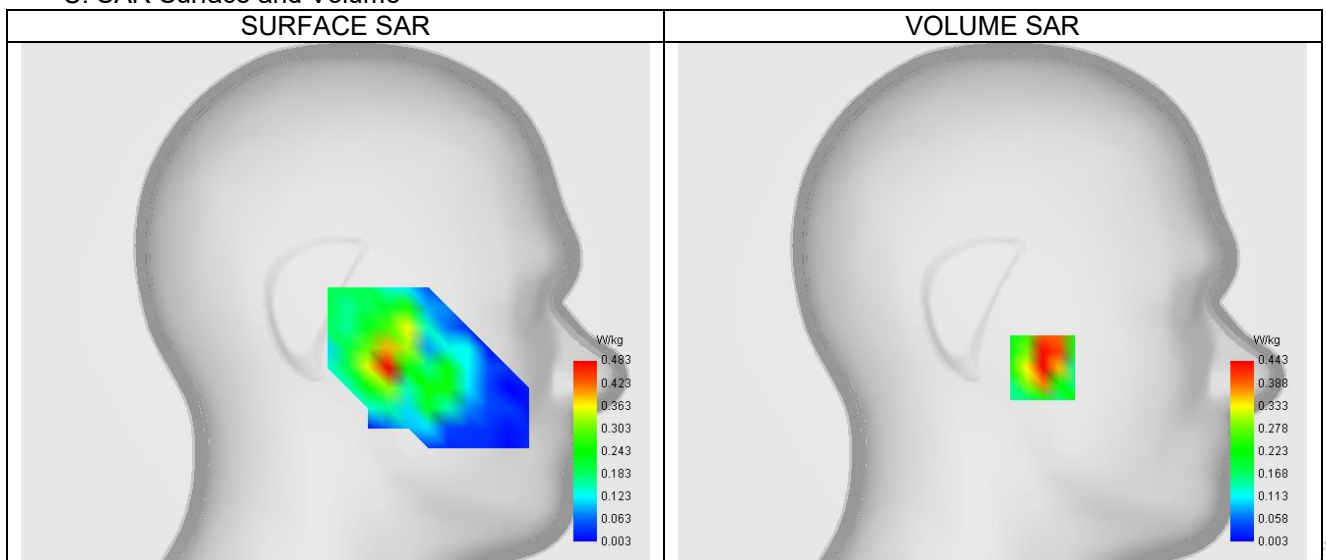
## Plot 4

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.35                                |
| Area Scan       | sam_direct_droit2_surf8mm.txt       |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Left head                           |
| Device Position | Cheek                               |
| Band            | GSM1800                             |
| Channels        | Middle (700)                        |
| Signal          | TDMA (Crest factor: 8.0)            |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 1747.800 |
| Relative permittivity (real part)      | 40.102   |
| Relative permittivity (imaginary part) | 14.096   |
| Conductivity (S/m)                     | 1.369    |

**C. SAR Surface and Volume**


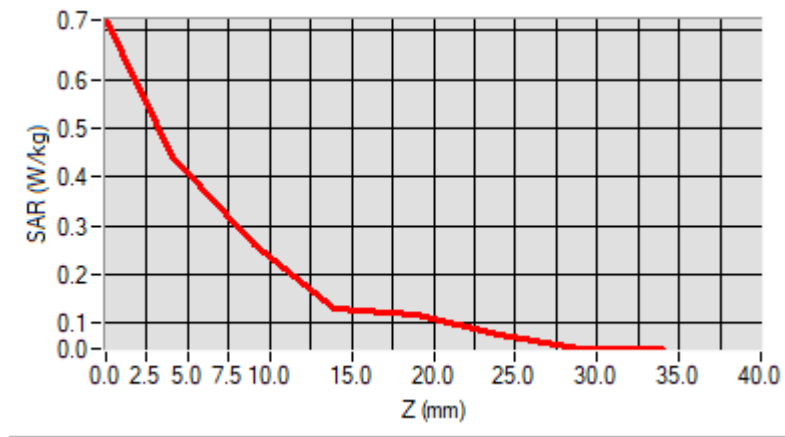
Maximum location: X=-25.00, Y=-32.00 ; SAR Peak: 0.79 W/kg

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

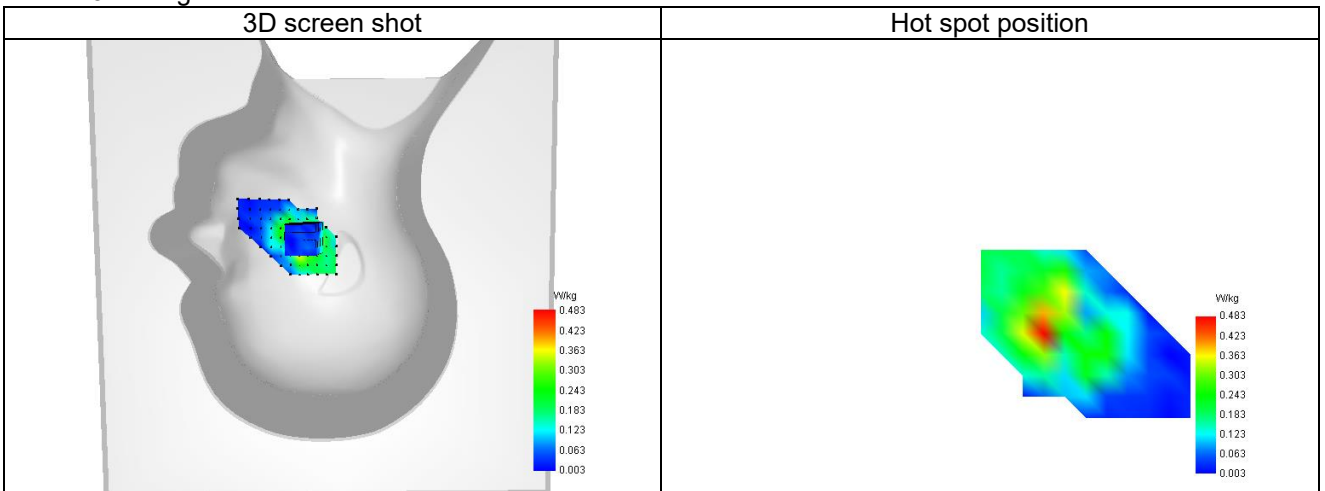
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.240     |
| SAR 1g (W/Kg)   | 0.450     |
| Variation (%)   | -3.210    |
| Horizontal validation criteria: minimum distance (mm) | 16.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 59.104875 |

**E. Z Axis Scan**

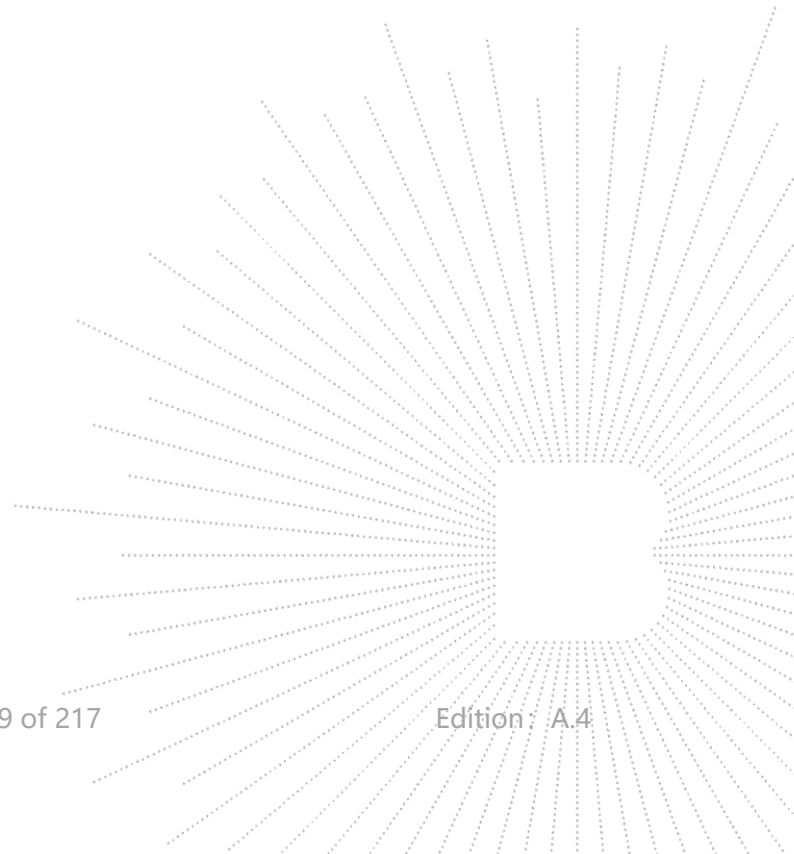
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.723 | 0.443 | 0.262 | 0.128 | 0.117 | 0.075 | 0.047 |



## F. 3D Image



BCTC  
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 PPR  
 检测



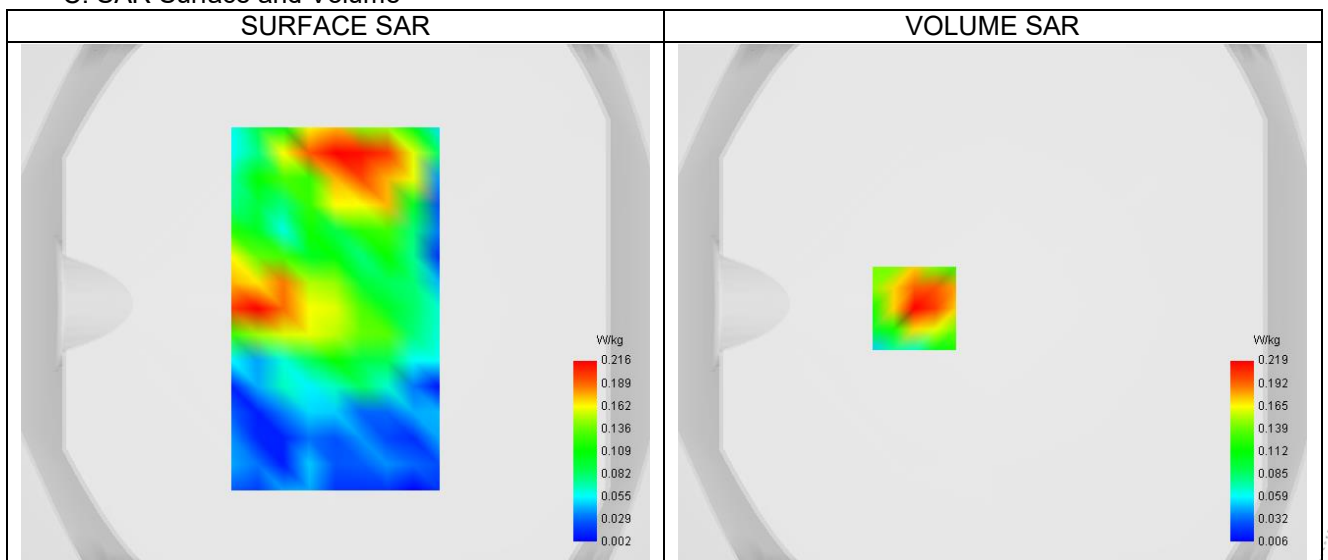
## Plot 5

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.35                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | GSM1800                             |
| Channels        | Middle (700)                        |
| Signal          | TDMA (Crest factor: 8.0)            |

**B. Permittivity**

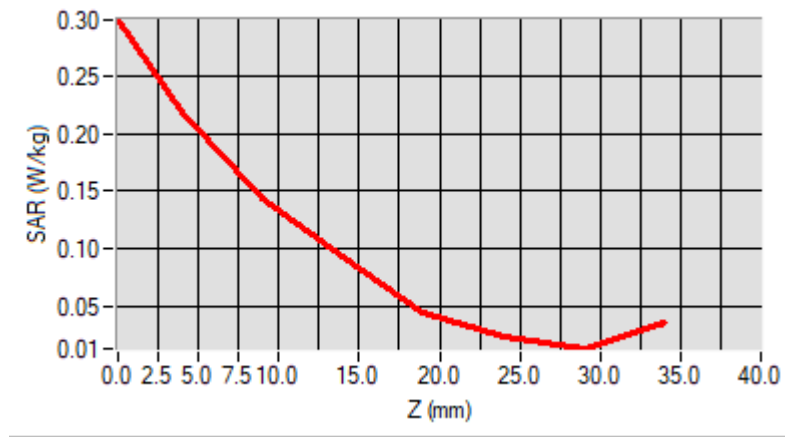
|  |          |
|--|----------|
| Frequency (MHz)                        | 1747.800 |
| Relative permittivity (real part)      | 40.102   |
| Relative permittivity (imaginary part) | 14.096   |
| Conductivity (S/m)                     | 1.369    |

**C. SAR Surface and Volume**

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

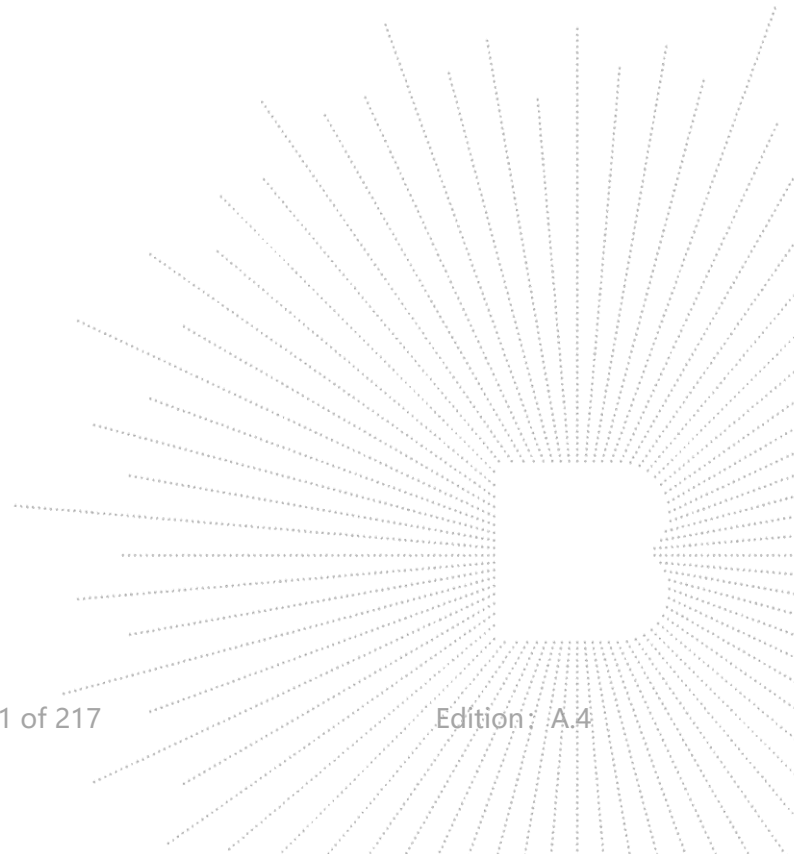
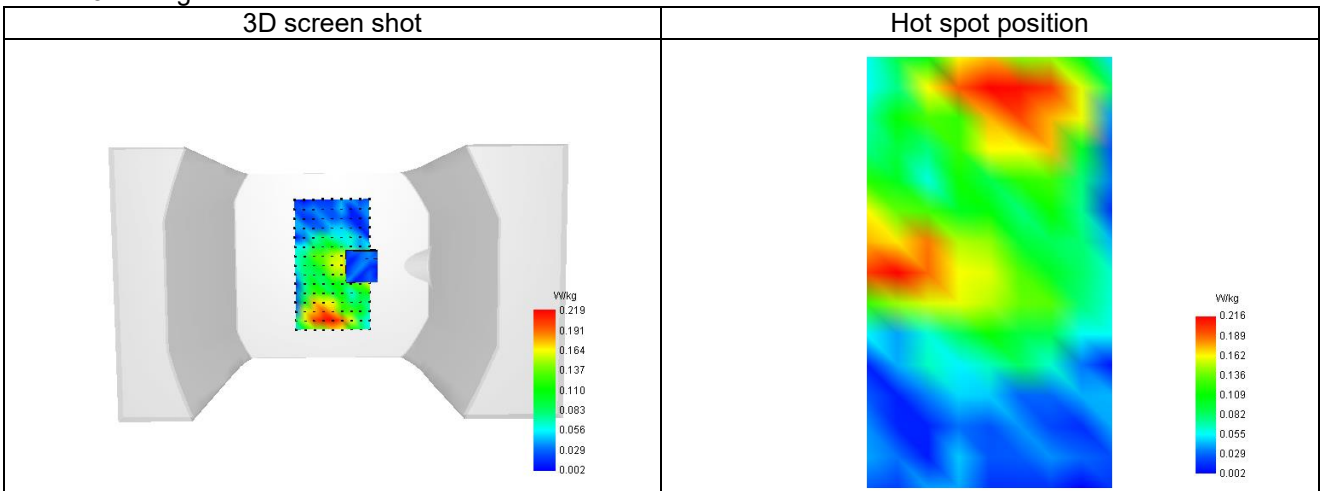
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.120     |
| SAR 1g (W/Kg)   | 0.201     |
| Variation (%)   | -1.210    |
| Horizontal validation criteria: minimum distance (mm) | 16.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 65.464777 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.298 | 0.219 | 0.143 | 0.094 | 0.046 | 0.025 | 0.014 |



## F. 3D Image



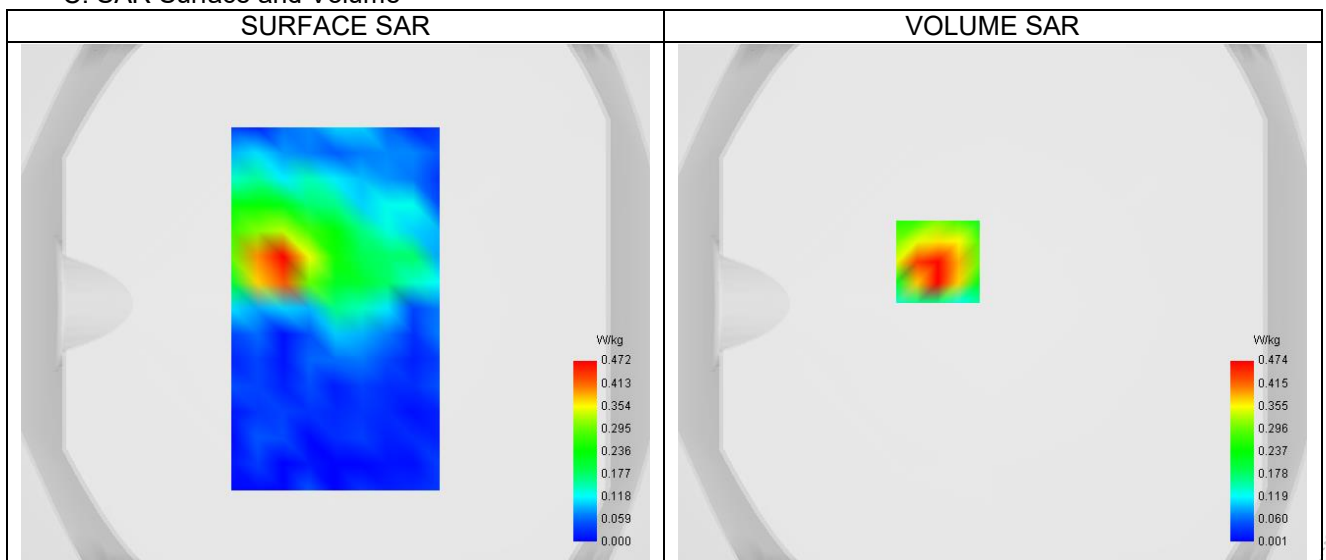
## Plot 6

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.35                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | GSM1800                             |
| Channels        | Middle (700)                        |
| Signal          | TDMA (Crest factor: 8.0)            |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 1747.800 |
| Relative permittivity (real part)      | 40.102   |
| Relative permittivity (imaginary part) | 14.096   |
| Conductivity (S/m)                     | 1.369    |

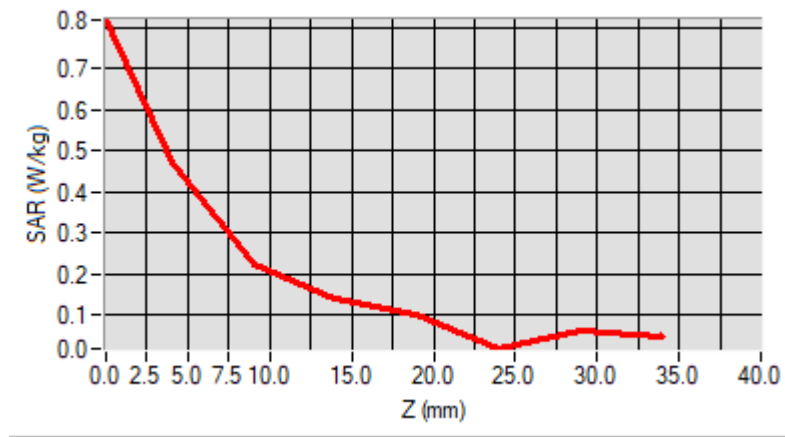
**C. SAR Surface and Volume**

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

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.232     |
| SAR 1g (W/Kg)   | 0.463     |
| Variation (%)   | -3.850    |
| Horizontal validation criteria: minimum distance (mm) | 8.000000  |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 52.436616 |

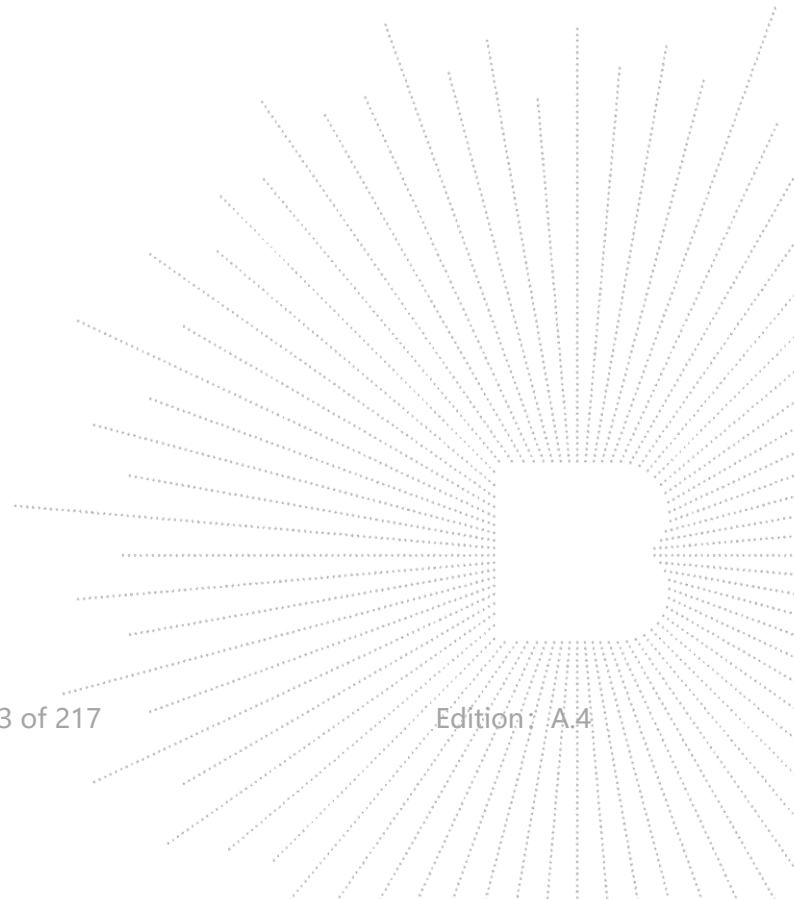
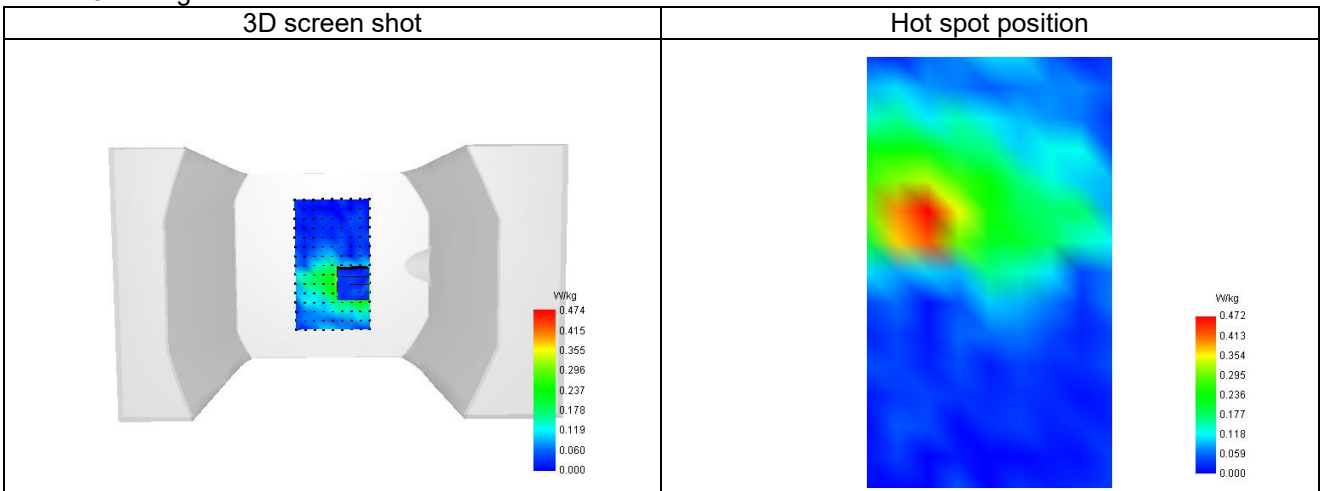
**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.818 | 0.474 | 0.222 | 0.142 | 0.103 | 0.019 | 0.063 |





## F. 3D Image



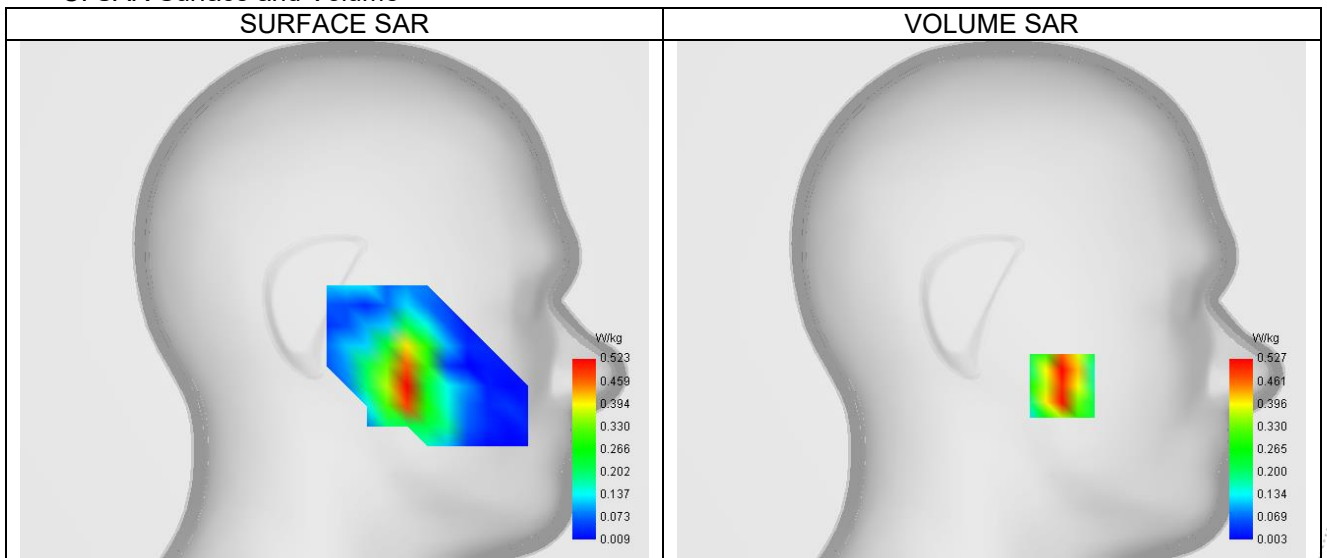
## Plot 7

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.27                                |
| Area Scan       | sam_direct_droit2_surf8mm.txt       |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Left head                           |
| Device Position | Cheek                               |
| Band            | Band1_UMTS                          |
| Channels        | Middle (9750)                       |
| Signal          | WCDMA (Crest factor: 1.0)           |

**B. Permittivity**

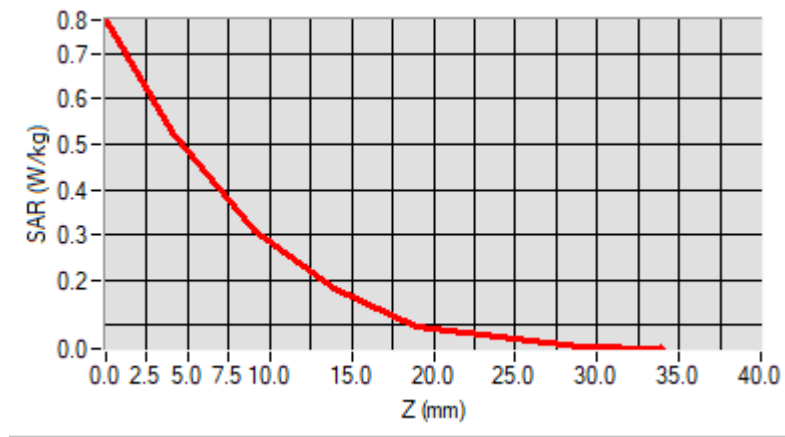
|  |          |
|--|----------|
| Frequency (MHz)                        | 1950.000 |
| Relative permittivity (real part)      | 40.000   |
| Relative permittivity (imaginary part) | 12.930   |
| Conductivity (S/m)                     | 1.401    |

**C. SAR Surface and Volume**

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

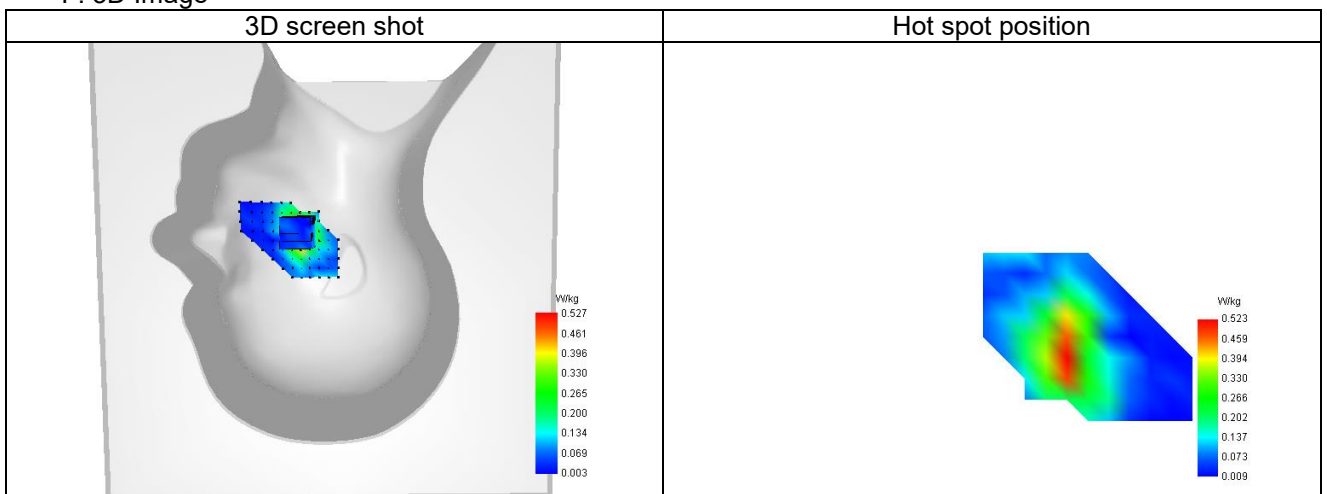
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.257     |
| SAR 1g (W/Kg)   | 0.474     |
| Variation (%)   | 0.900     |
| Horizontal validation criteria: minimum distance (mm) | 16.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 60.209568 |

**E. Z Axis Scan**

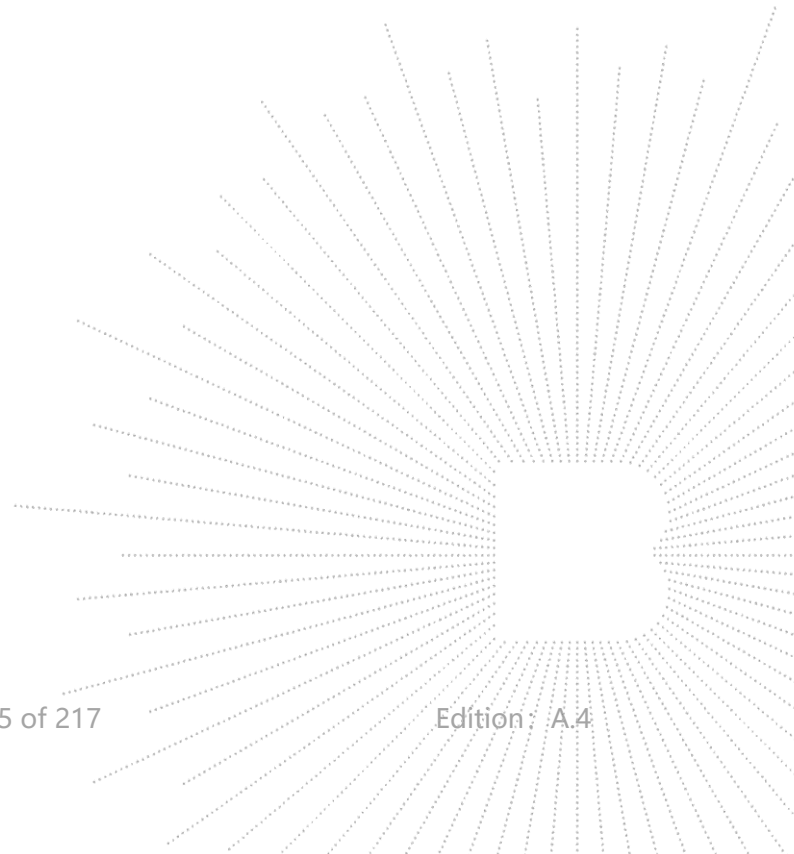
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.775 | 0.527 | 0.309 | 0.182 | 0.098 | 0.074 | 0.054 |



## F. 3D Image



BCTC  
 3C  
 PPR  
 检测



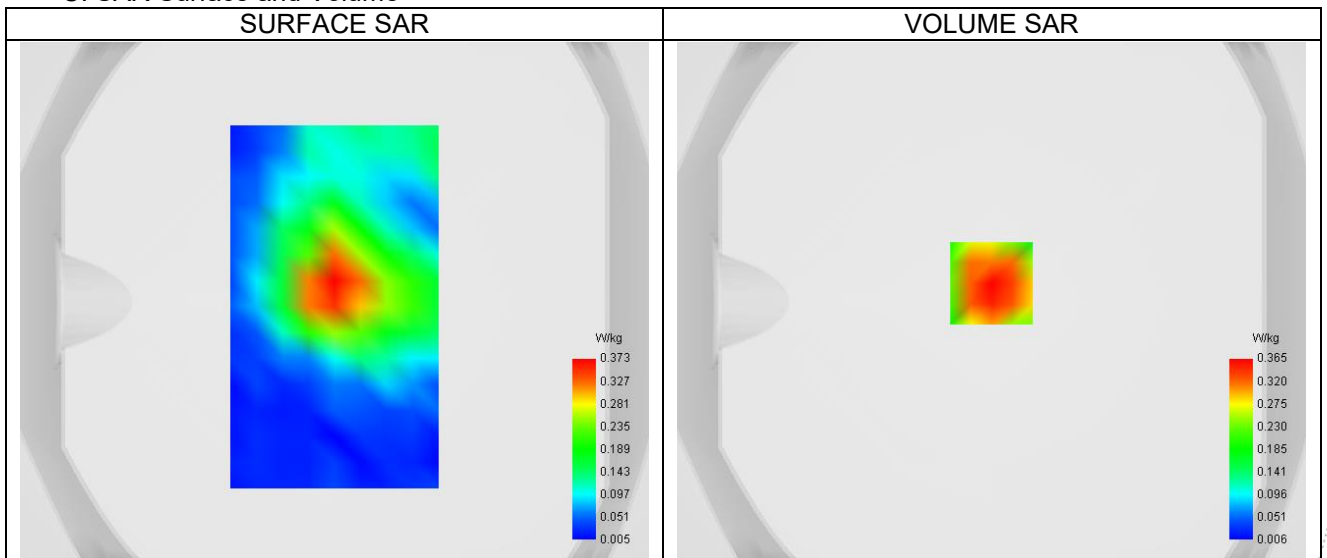
## Plot 8

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.27                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | Band1_UMTS                          |
| Channels        | Middle (9750)                       |
| Signal          | WCDMA (Crest factor: 1.0)           |

**B. Permittivity**

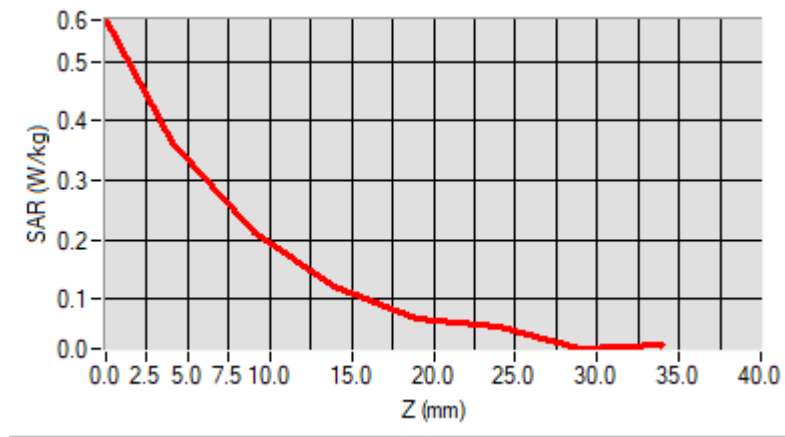
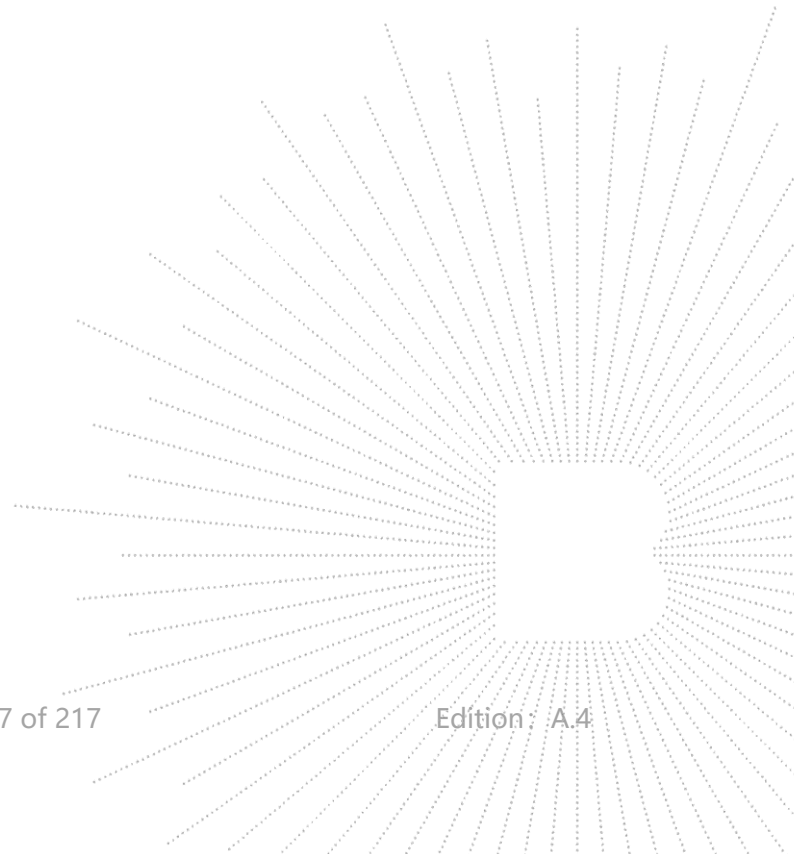
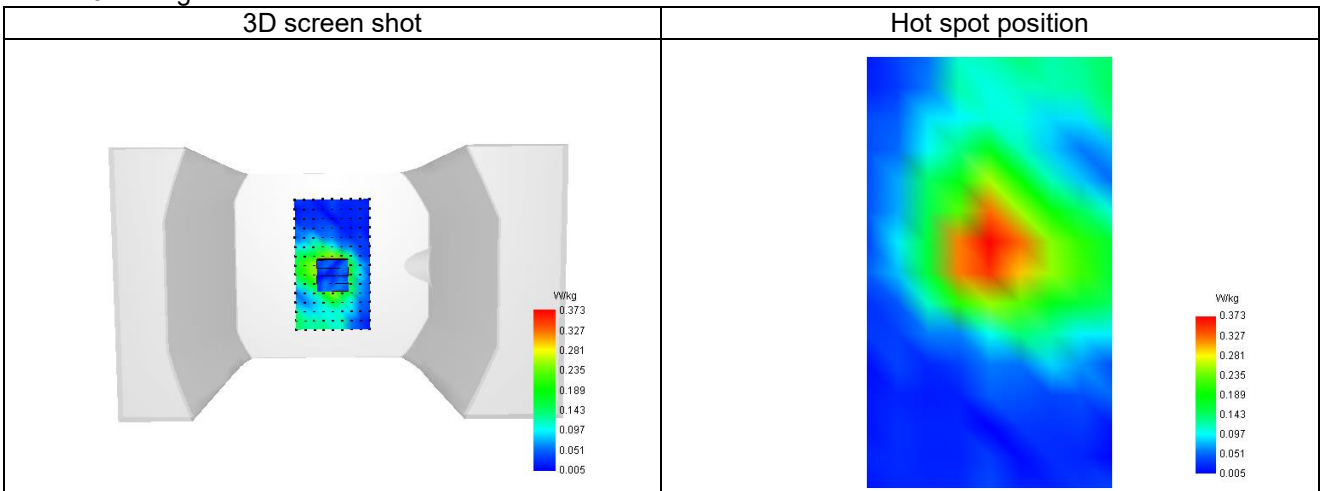
|  |          |
|--|----------|
| Frequency (MHz)                        | 1950.000 |
| Relative permittivity (real part)      | 40.000   |
| Relative permittivity (imaginary part) | 12.930   |
| Conductivity (S/m)                     | 1.401    |

**C. SAR Surface and Volume**

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

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.208     |
| SAR 1g (W/Kg)   | 0.351     |
| Variation (%)   | -0.590    |
| Horizontal validation criteria: minimum distance (mm) | 22.627417 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 57.986567 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.569 | 0.365 | 0.212 | 0.123 | 0.067 | 0.054 | 0.017 |


**F. 3D Image**


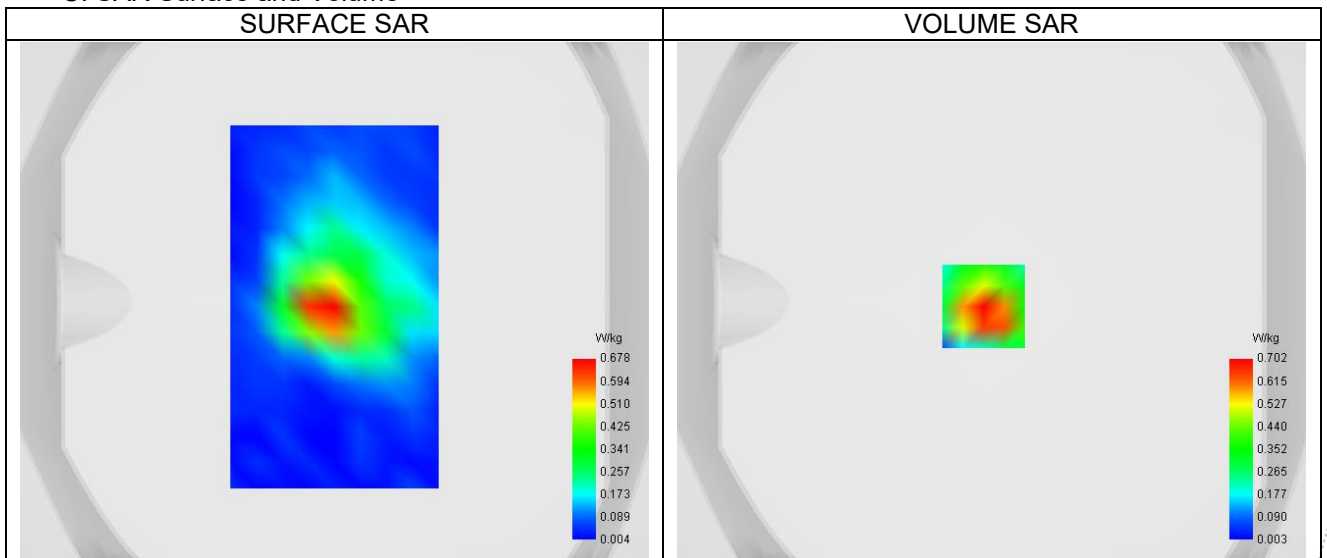
## Plot 9

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.27                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | Band1_UMTS                          |
| Channels        | Middle (9750)                       |
| Signal          | WCDMA (Crest factor: 1.0)           |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 1950.000 |
| Relative permittivity (real part)      | 40.000   |
| Relative permittivity (imaginary part) | 12.930   |
| Conductivity (S/m)                     | 1.401    |

**C. SAR Surface and Volume**


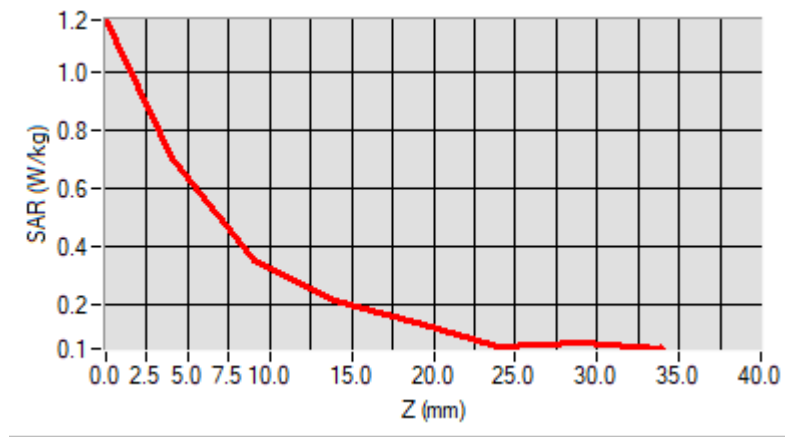
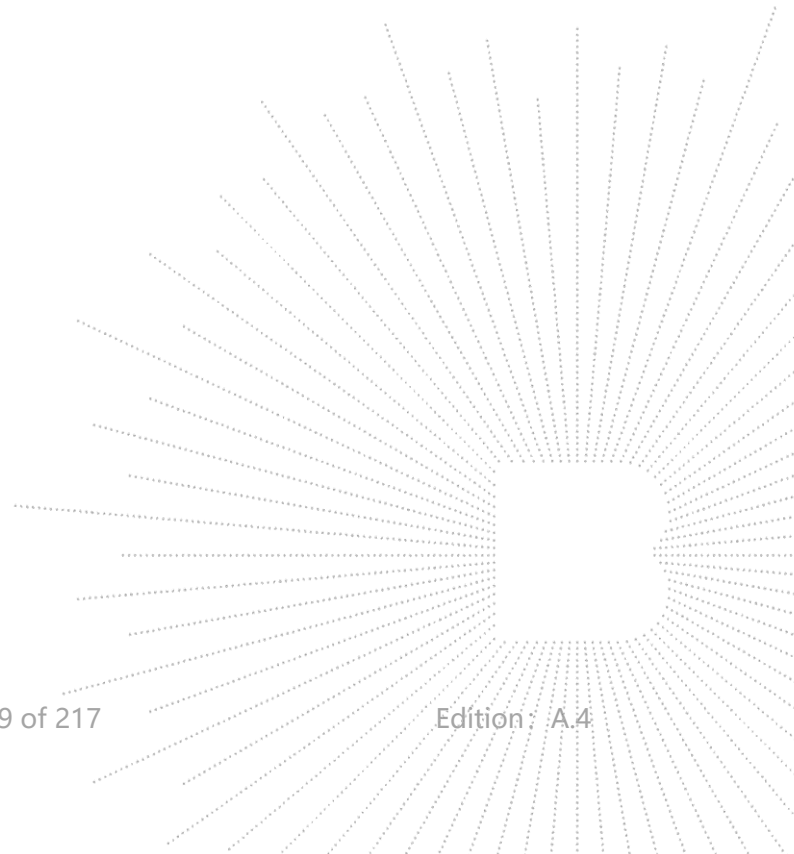
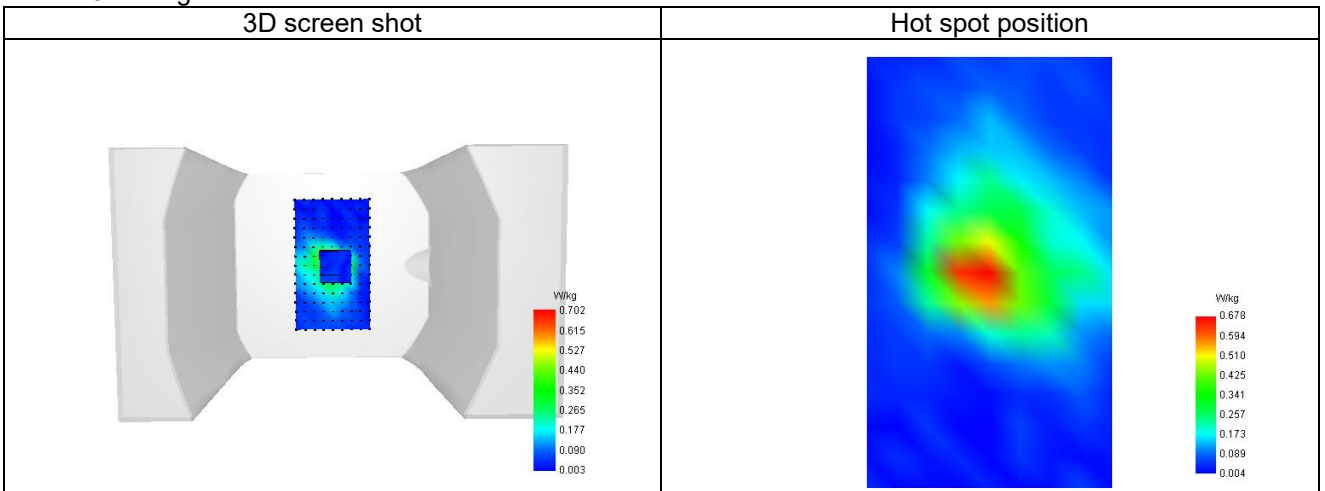
Maximum location: X=-3.00, Y=-2.00 ; SAR Peak: 1.32 W/kg

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

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.330     |
| SAR 1g (W/Kg)   | 0.696     |
| Variation (%)   | 1.350     |
| Horizontal validation criteria: minimum distance (mm) | 16.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 49.927804 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 1.180 | 0.702 | 0.350 | 0.213 | 0.137 | 0.058 | 0.071 |


**F. 3D Image**


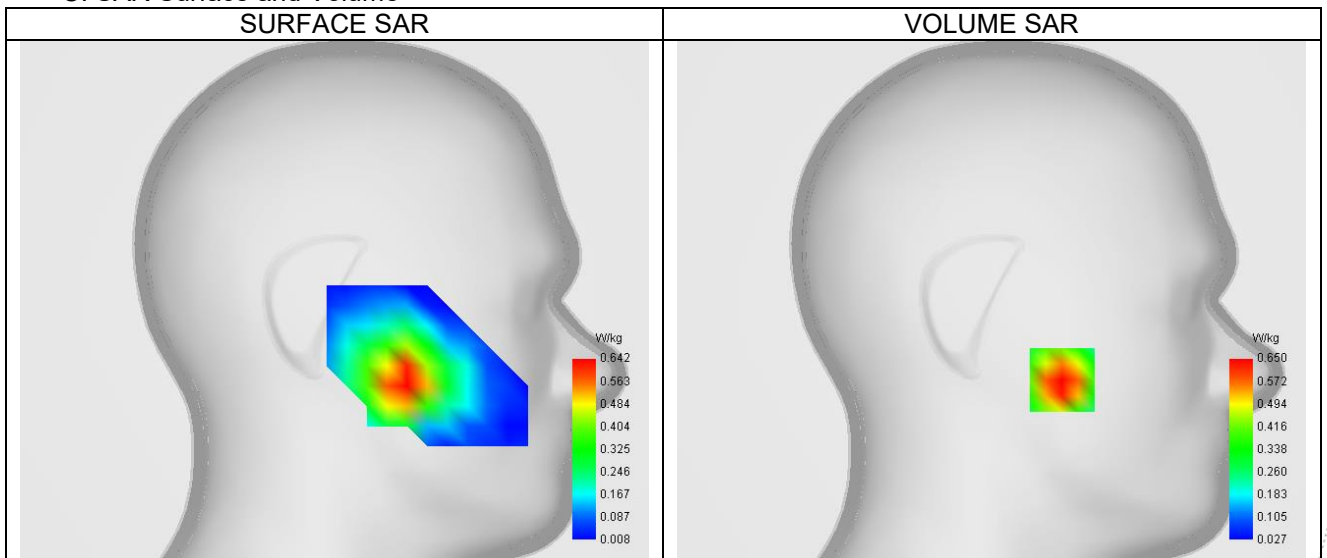
## Plot 10

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.08                                |
| Area Scan       | sam_direct_droit2_surf8mm.txt       |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Left head                           |
| Device Position | Cheek                               |
| Band            | Band8_WCDMA900                      |
| Channels        | Middle (2788)                       |
| Signal          | WCDMA (Crest factor: 1.0)           |

**B. Permittivity**

|  |         |
|--|---------|
| Frequency (MHz)                        | 897.600 |
| Relative permittivity (real part)      | 41.500  |
| Relative permittivity (imaginary part) | 19.400  |
| Conductivity (S/m)                     | 0.967   |

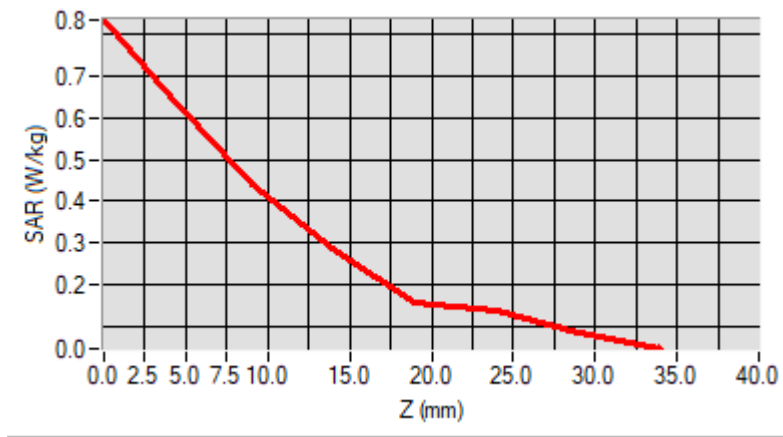
**C. SAR Surface and Volume**

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

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.372     |
| SAR 1g (W/Kg)   | 0.625     |
| Variation (%)   | -4.210    |
| Horizontal validation criteria: minimum distance (mm) | 22.355759 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 67.535137 |

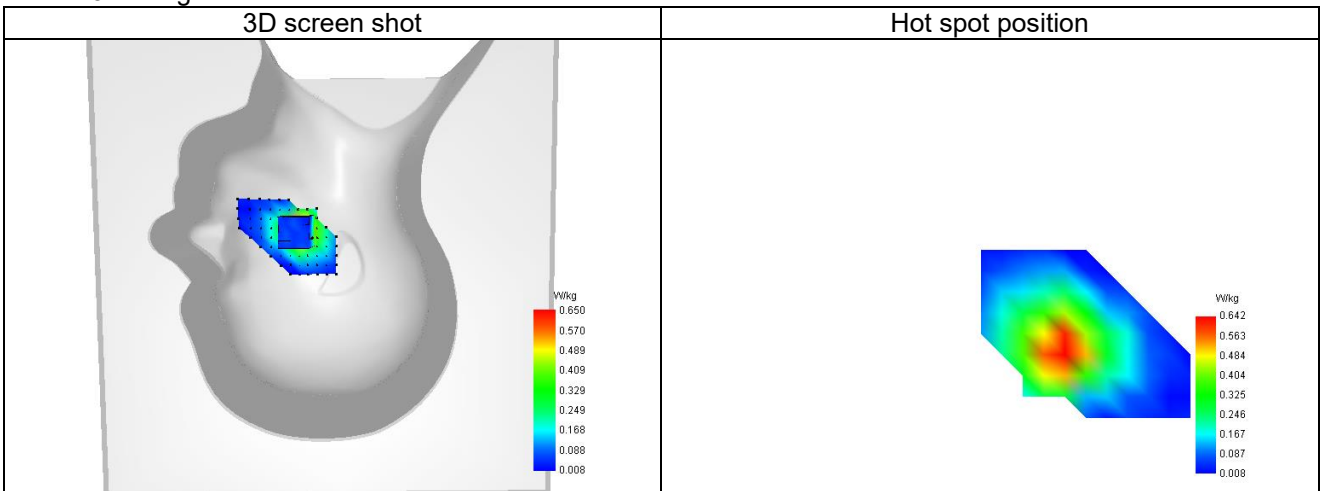
**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.834 | 0.650 | 0.439 | 0.289 | 0.159 | 0.139 | 0.085 |

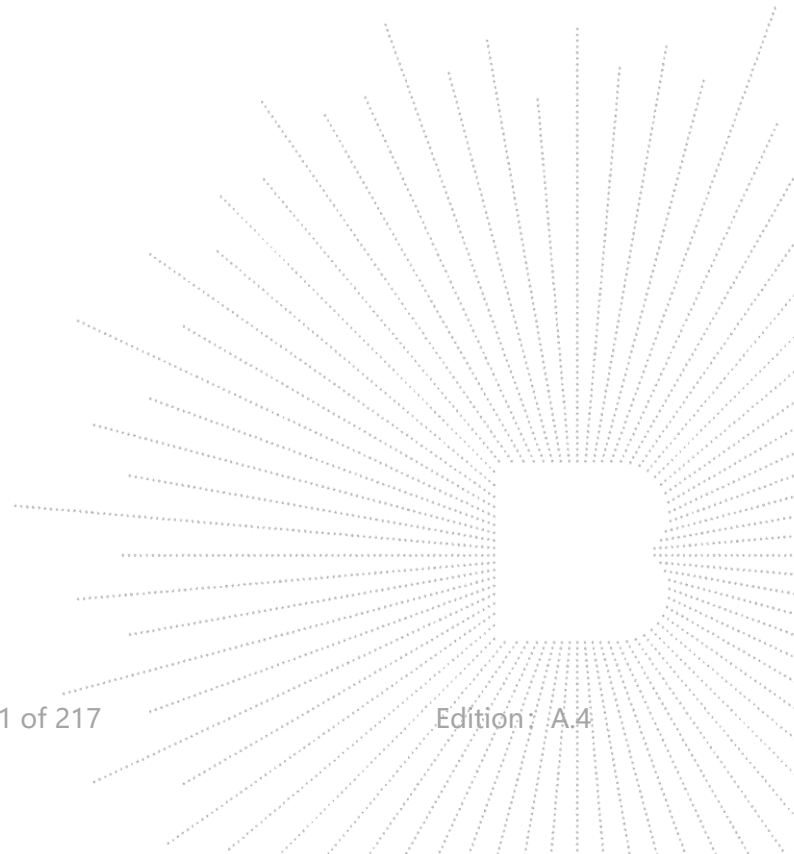




## F. 3D Image



BCTC  
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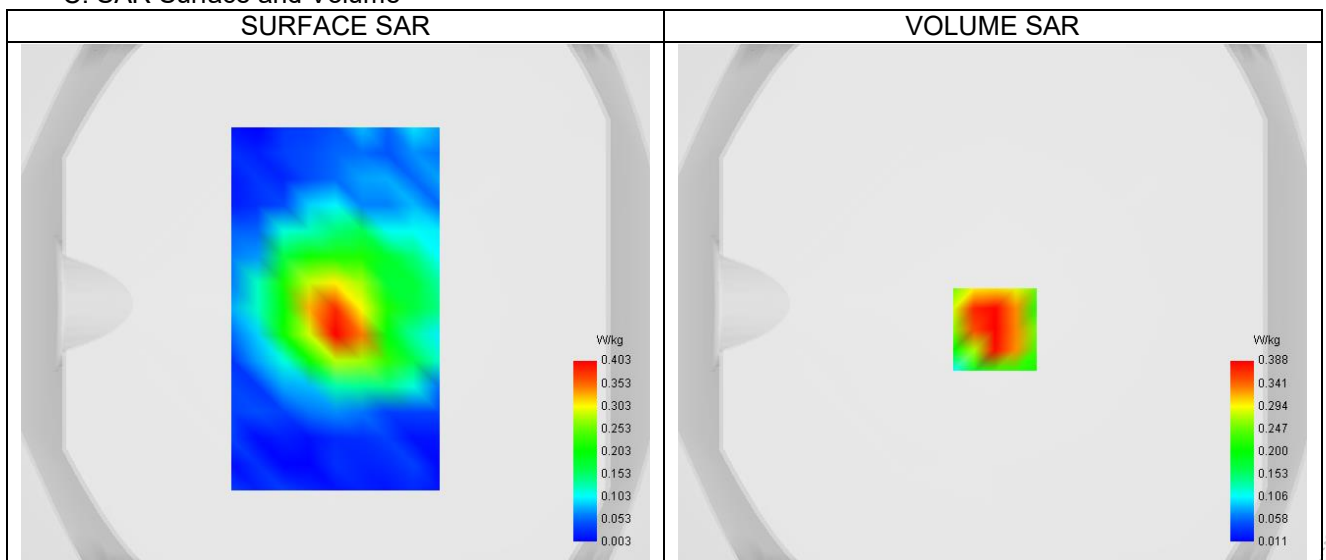
## Plot 11

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.08                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | Band8_WCDMA900                      |
| Channels        | Middle (2788)                       |
| Signal          | WCDMA (Crest factor: 1.0)           |

**B. Permittivity**

|  |         |
|--|---------|
| Frequency (MHz)                        | 897.600 |
| Relative permittivity (real part)      | 41.500  |
| Relative permittivity (imaginary part) | 19.400  |
| Conductivity (S/m)                     | 0.967   |

**C. SAR Surface and Volume**


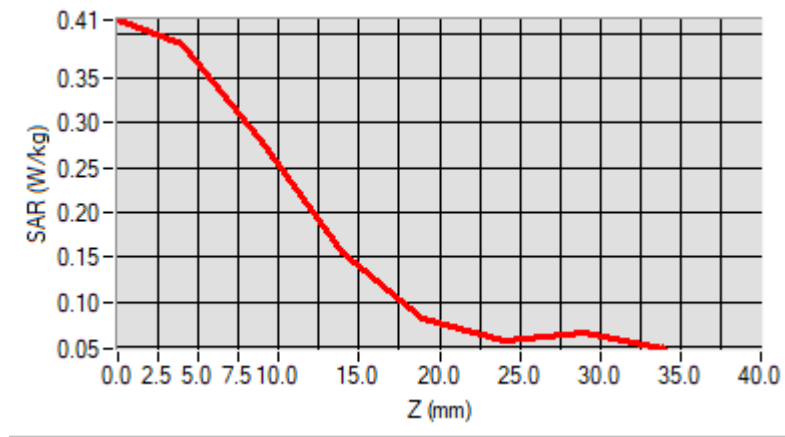
Maximum location: X=1.00, Y=-10.00 ; SAR Peak: 0.59 W/kg

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

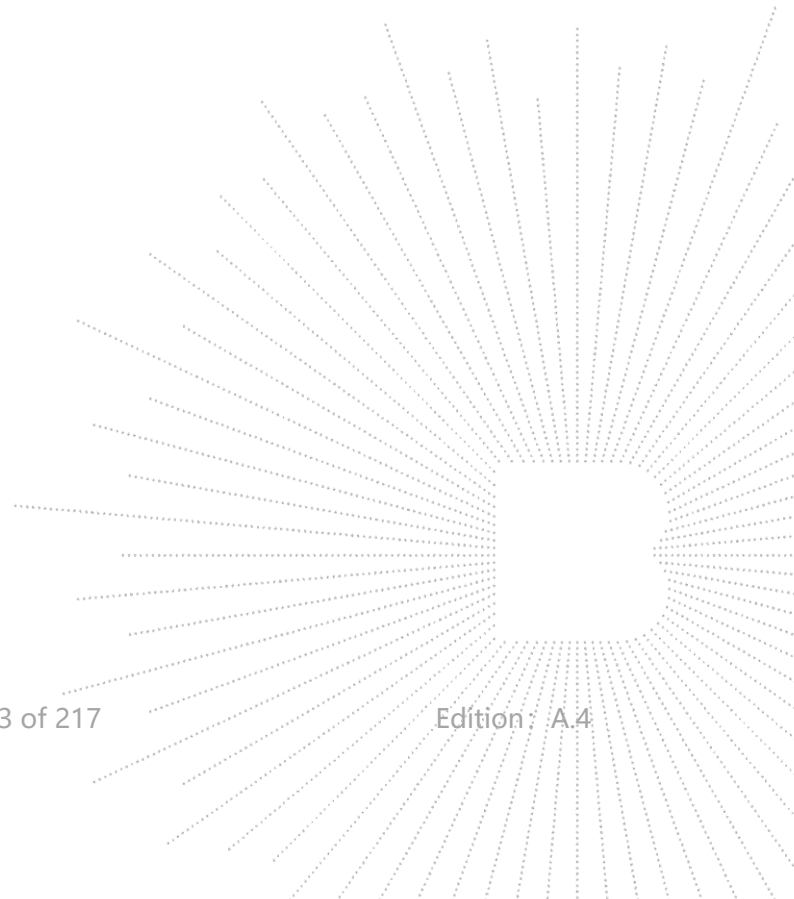
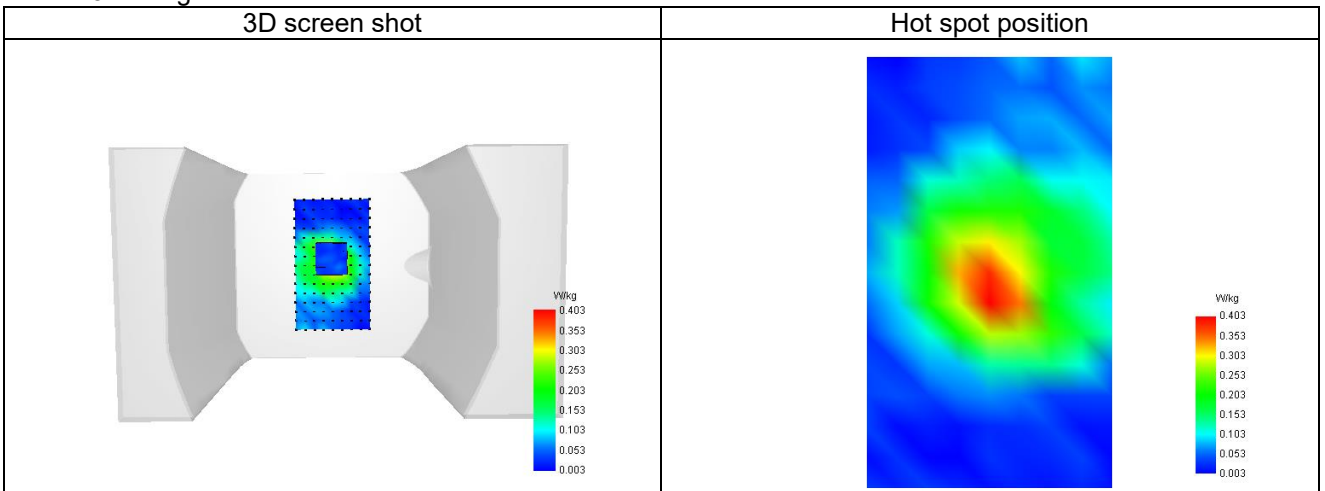
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.222     |
| SAR 1g (W/Kg)   | 0.368     |
| Variation (%)   | -0.890    |
| Horizontal validation criteria: minimum distance (mm) | 17.888544 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 71.711380 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.415 | 0.388 | 0.278 | 0.157 | 0.082 | 0.057 | 0.067 |



## F. 3D Image



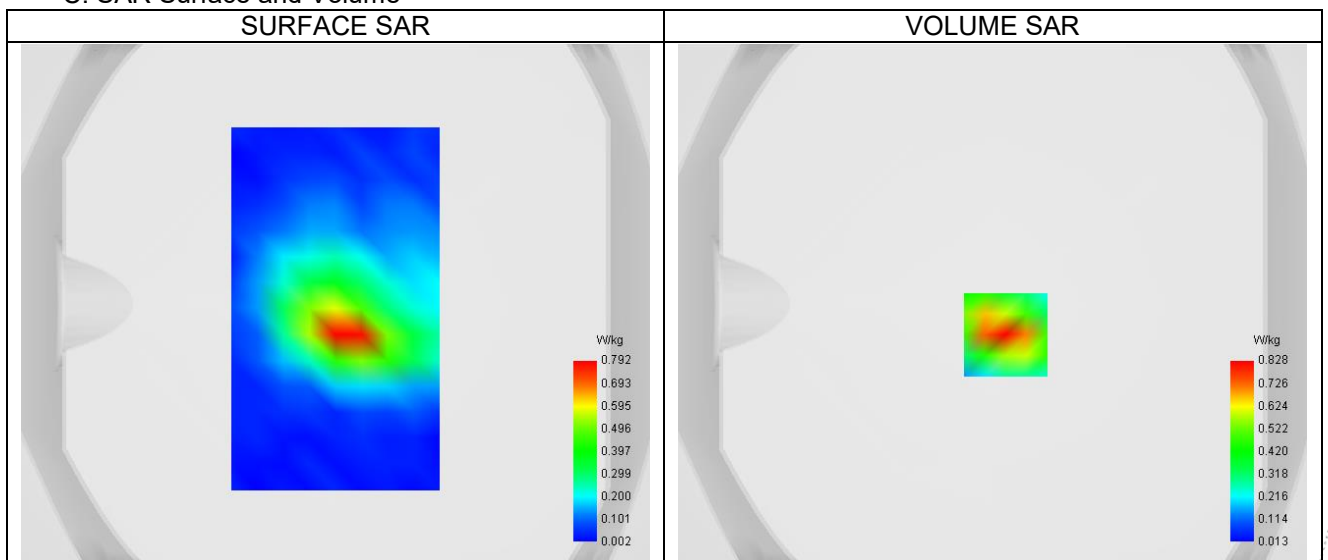
## Plot 12

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.08                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | Band8_WCDMA900                      |
| Channels        | Middle (2788)                       |
| Signal          | WCDMA (Crest factor: 1.0)           |

**B. Permittivity**

|  |         |
|--|---------|
| Frequency (MHz)                        | 897.600 |
| Relative permittivity (real part)      | 41.500  |
| Relative permittivity (imaginary part) | 19.400  |
| Conductivity (S/m)                     | 0.967   |

**C. SAR Surface and Volume**


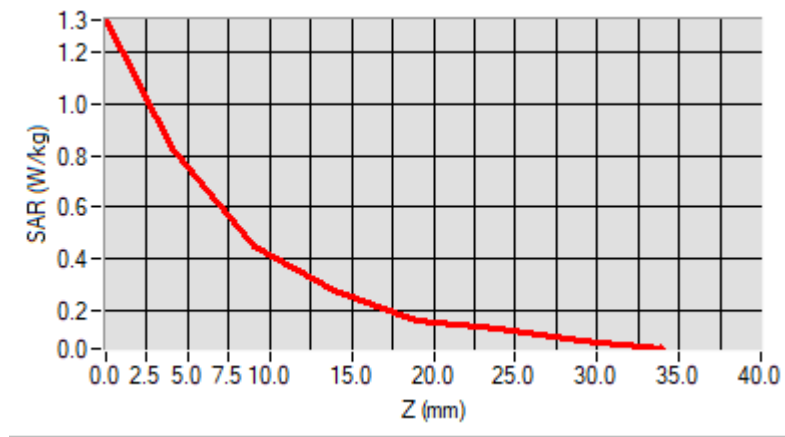
Maximum location: X=5.00, Y=-12.00 ; SAR Peak: 1.32 W/kg

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

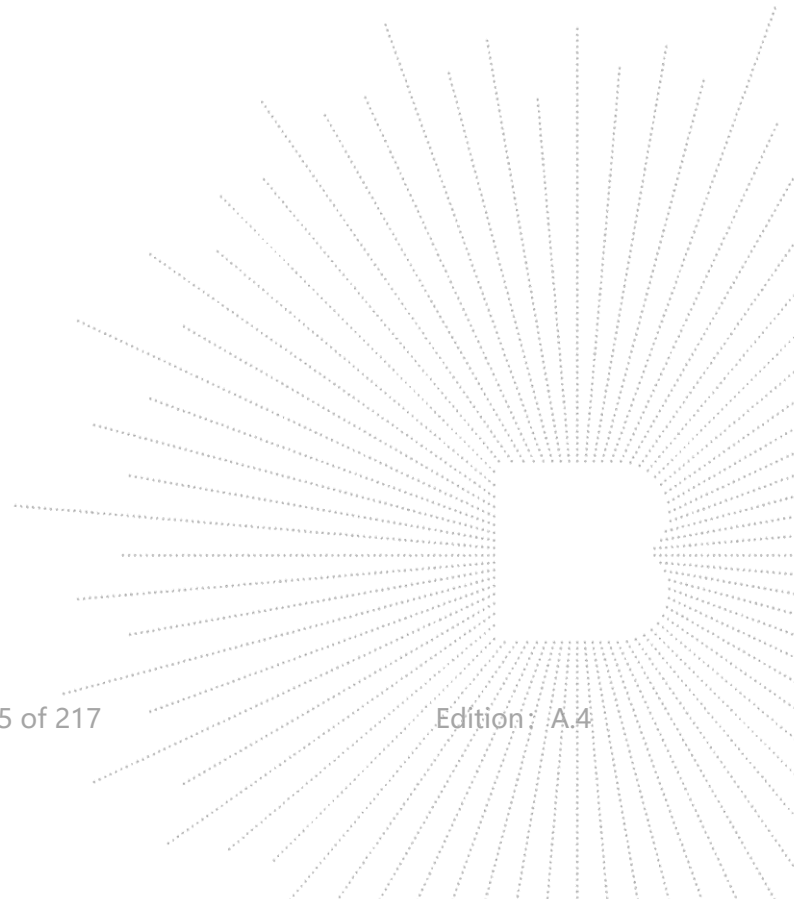
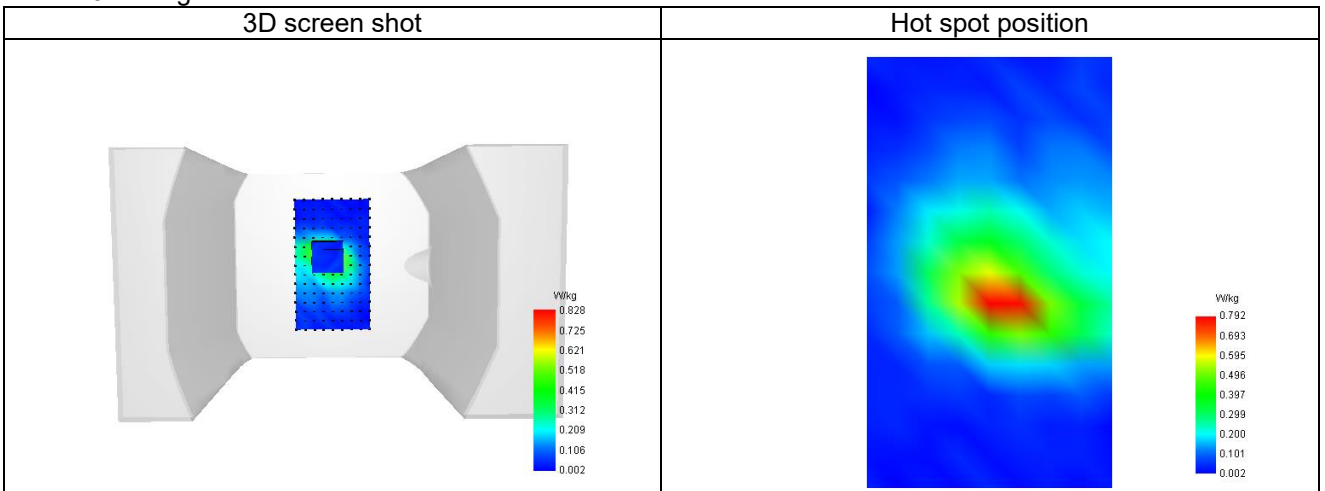
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.394     |
| SAR 1g (W/Kg)   | 0.755     |
| Variation (%)   | 1.990     |
| Horizontal validation criteria: minimum distance (mm) | 16.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 53.905152 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 1.328 | 0.828 | 0.446 | 0.277 | 0.160 | 0.126 | 0.083 |



## F. 3D Image



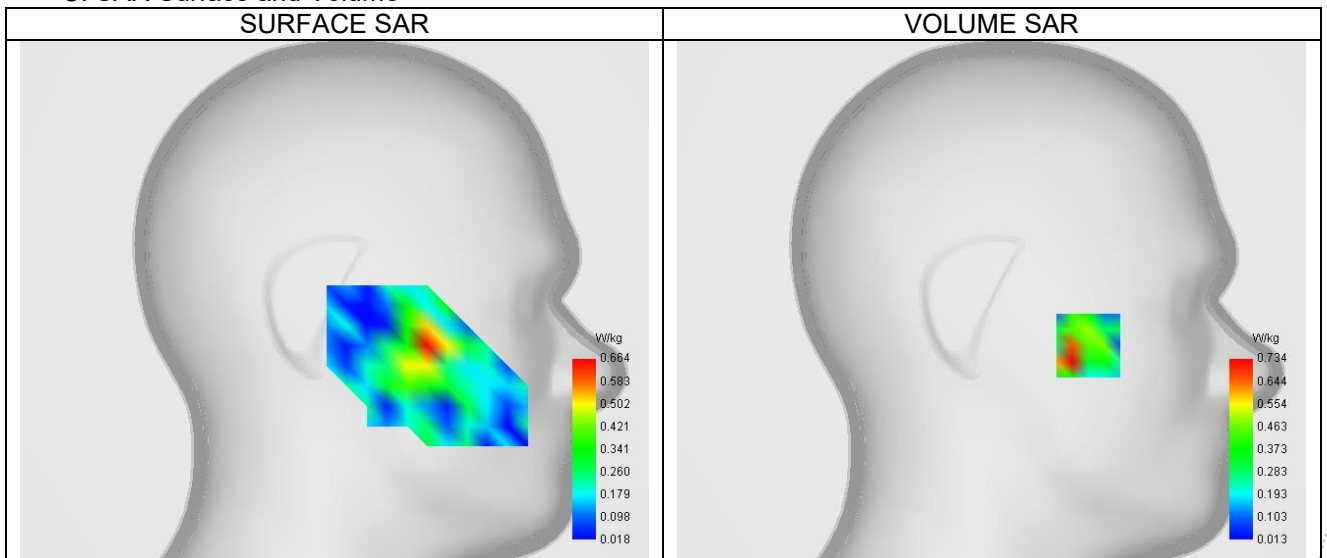
## Plot 13

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 2.92                                |
| Area Scan       | sam_direct_droit2_surf8mm.txt       |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Left head                           |
| Device Position | Cheek                               |
| Band            | IEEE 802.11a                        |
| Channels        | Middle (40)                         |
| Signal          | IEEE802.a (Crest factor: 1.0)       |

**B. Permittivity**

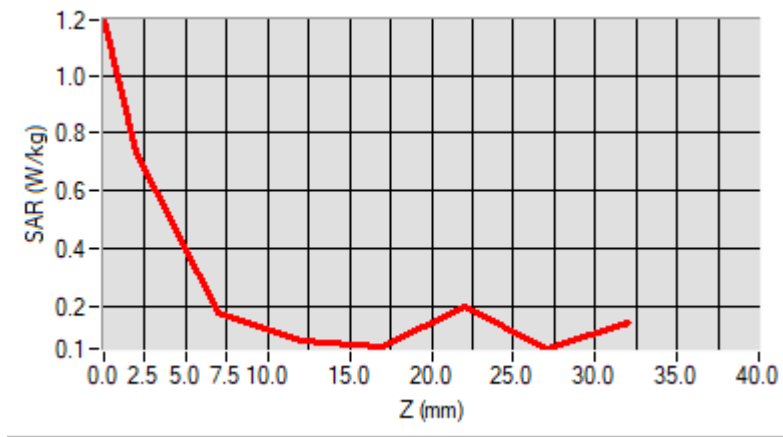
|  |          |
|--|----------|
| Frequency (MHz)                        | 5200.000 |
| Relative permittivity (real part)      | 35.650   |
| Relative permittivity (imaginary part) | 16.250   |
| Conductivity (S/m)                     | 4.965    |

**C. SAR Surface and Volume**

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

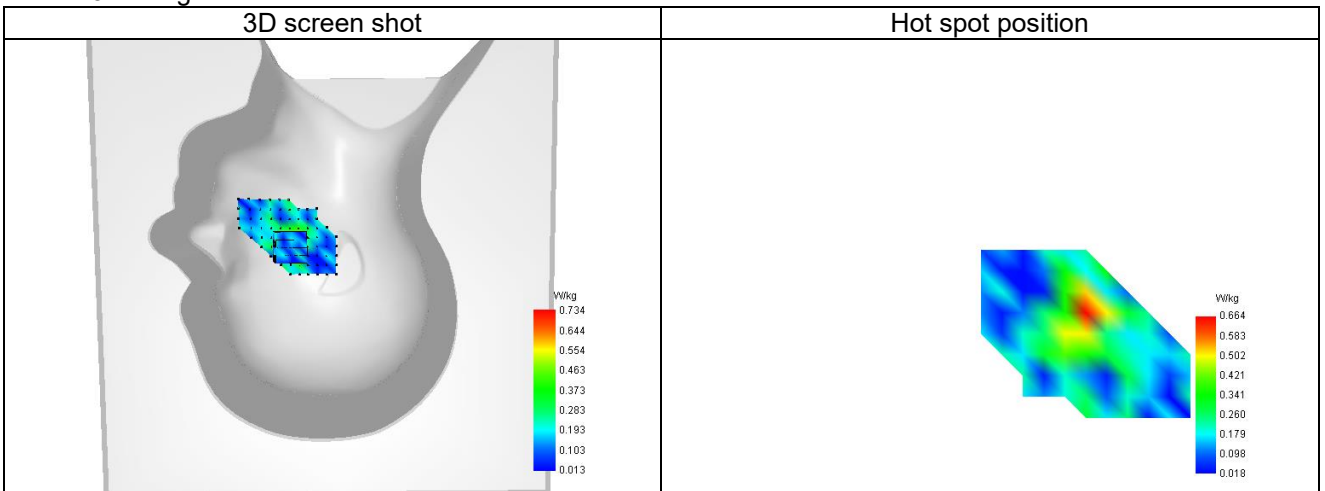
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.336     |
| SAR 1g (W/Kg)   | 0.674     |
| Variation (%)   | 4.720     |
| Horizontal validation criteria: minimum distance (mm) | 8.000000  |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 57.751274 |

**E. Z Axis Scan**

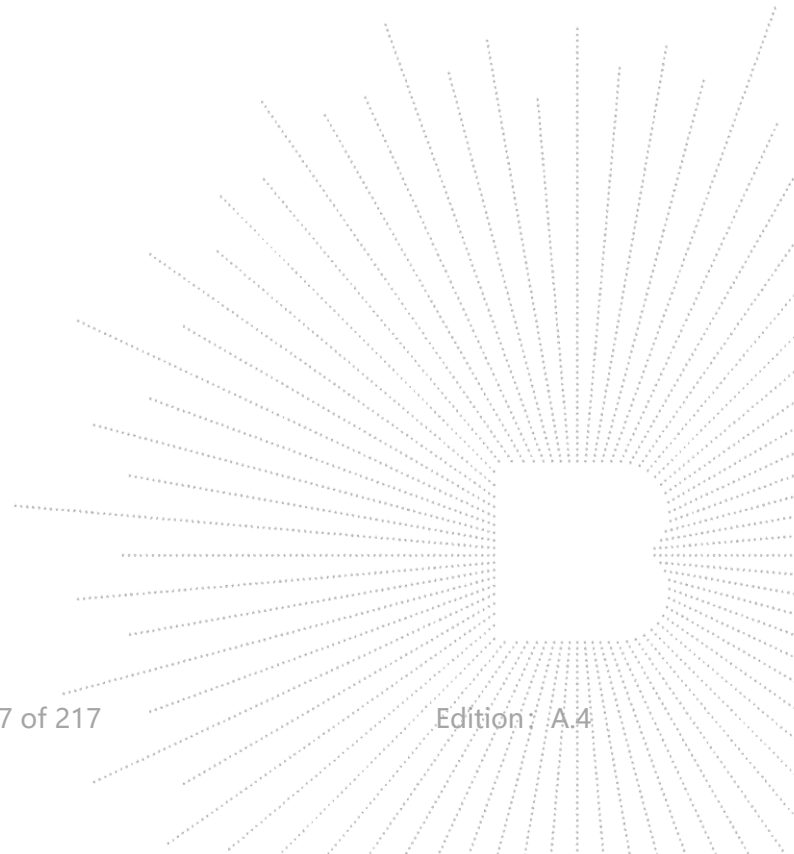
| Z (mm)     | 0.00  | 2.00  | 7.00  | 12.00 | 17.00 | 22.00 | 27.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 1.191 | 0.734 | 0.180 | 0.080 | 0.056 | 0.196 | 0.052 |



## F. 3D Image



BCTC  
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 PPR  
 検測



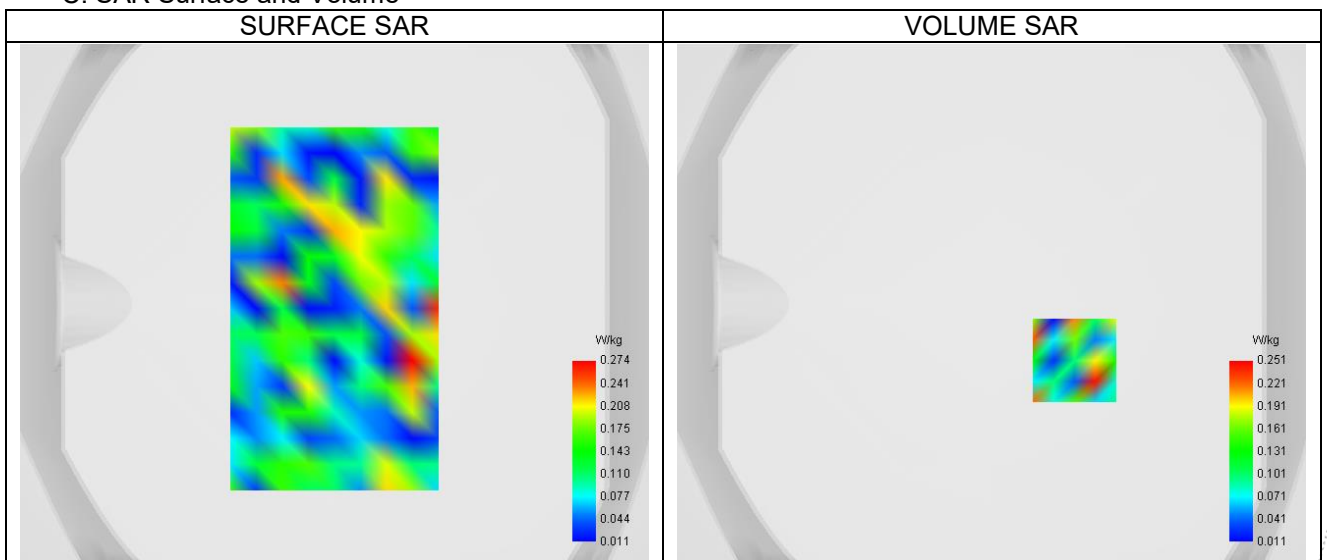
## Plot 14

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 2.92                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | IEEE 802.11a U-NII                  |
| Channels        | Middle (40)                         |
| Signal          | IEEE802.a (Crest factor: 1.0)       |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 5200.000 |
| Relative permittivity (real part)      | 35.650   |
| Relative permittivity (imaginary part) | 16.250   |
| Conductivity (S/m)                     | 4.965    |

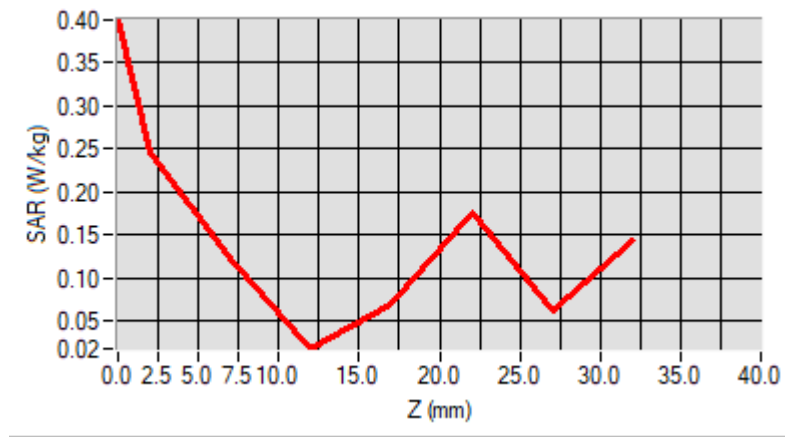
**C. SAR Surface and Volume**

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

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.129     |
| SAR 1g (W/Kg)   | 0.143     |
| Variation (%)   | 0.770     |
| Horizontal validation criteria: minimum distance (mm) | 8.000000  |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 87.309163 |

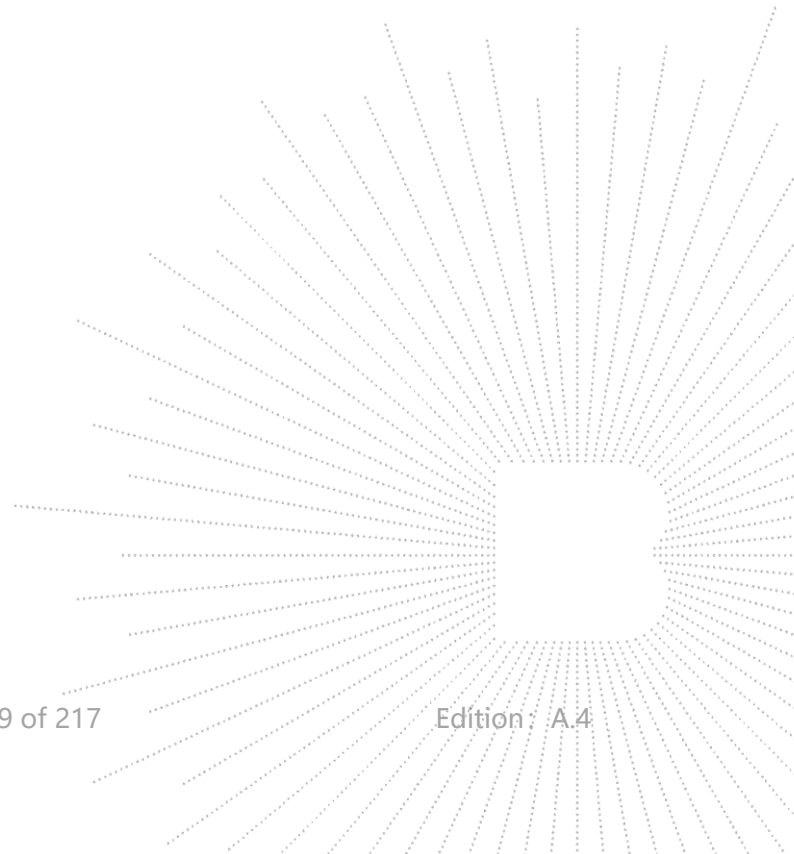
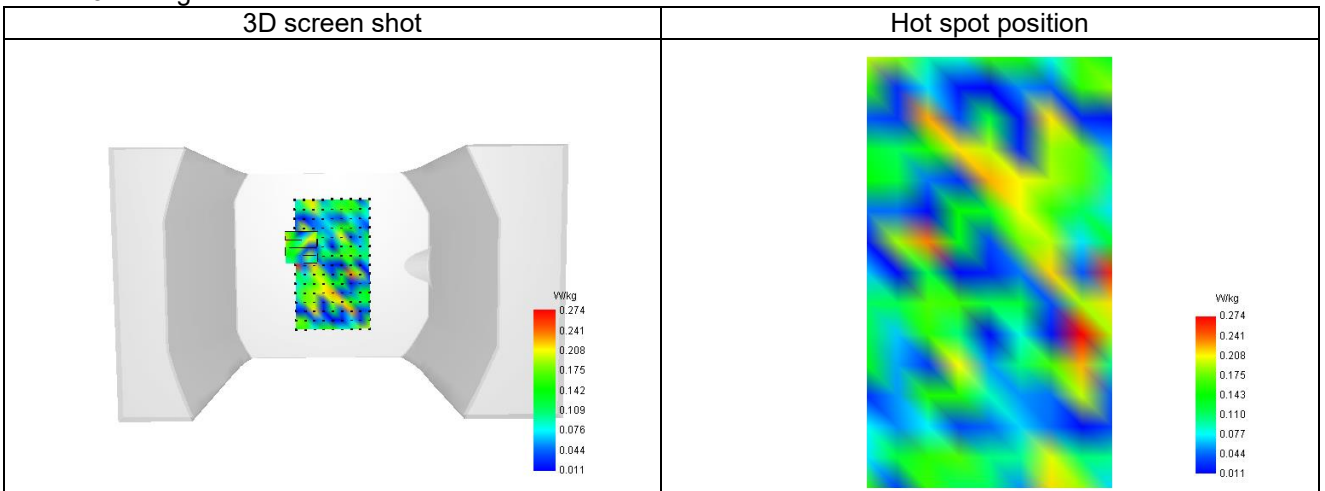
**E. Z Axis Scan**

|            |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 2.00  | 7.00  | 12.00 | 17.00 | 22.00 | 27.00 |
| SAR (W/Kg) | 0.399 | 0.246 | 0.122 | 0.018 | 0.070 | 0.177 | 0.062 |





## F. 3D Image



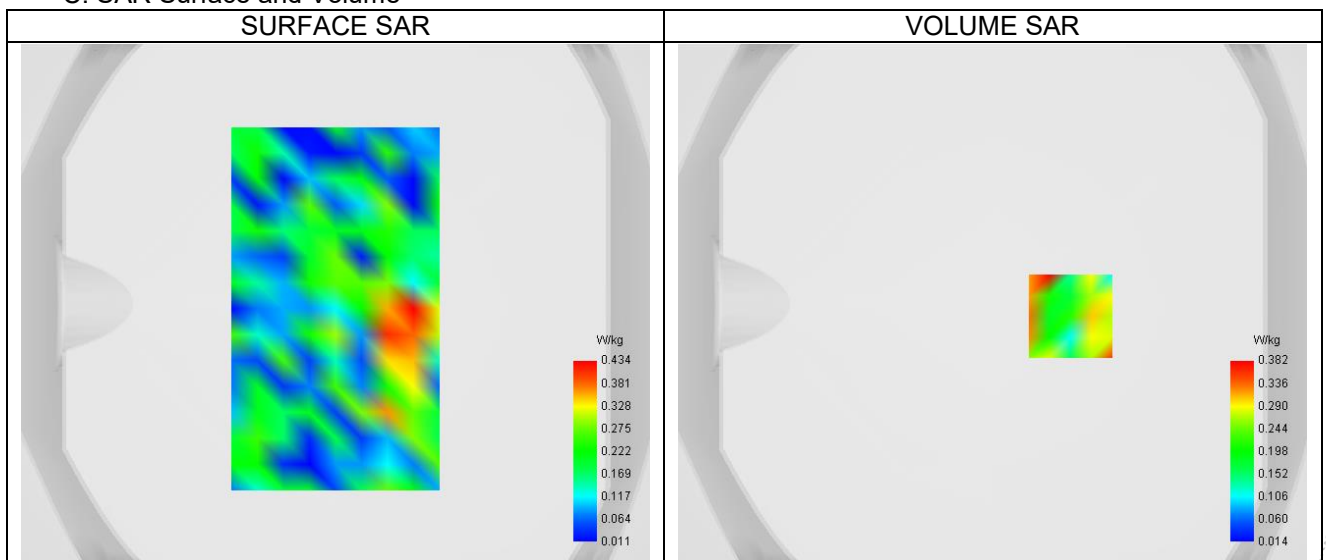
## Plot 15

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 2.92                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | IEEE 802.11a U-NII                  |
| Channels        | Middle (40)                         |
| Signal          | IEEE802.a (Crest factor: 1.0)       |

**B. Permittivity**

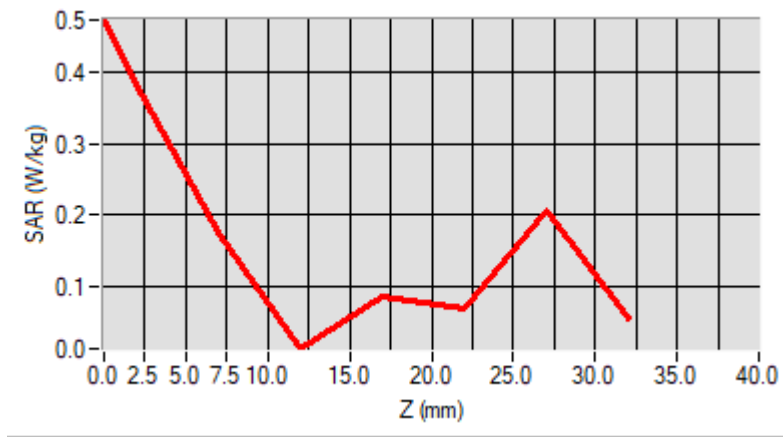
|  |          |
|--|----------|
| Frequency (MHz)                        | 5200.000 |
| Relative permittivity (real part)      | 35.650   |
| Relative permittivity (imaginary part) | 16.250   |
| Conductivity (S/m)                     | 4.965    |

**C. SAR Surface and Volume**

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

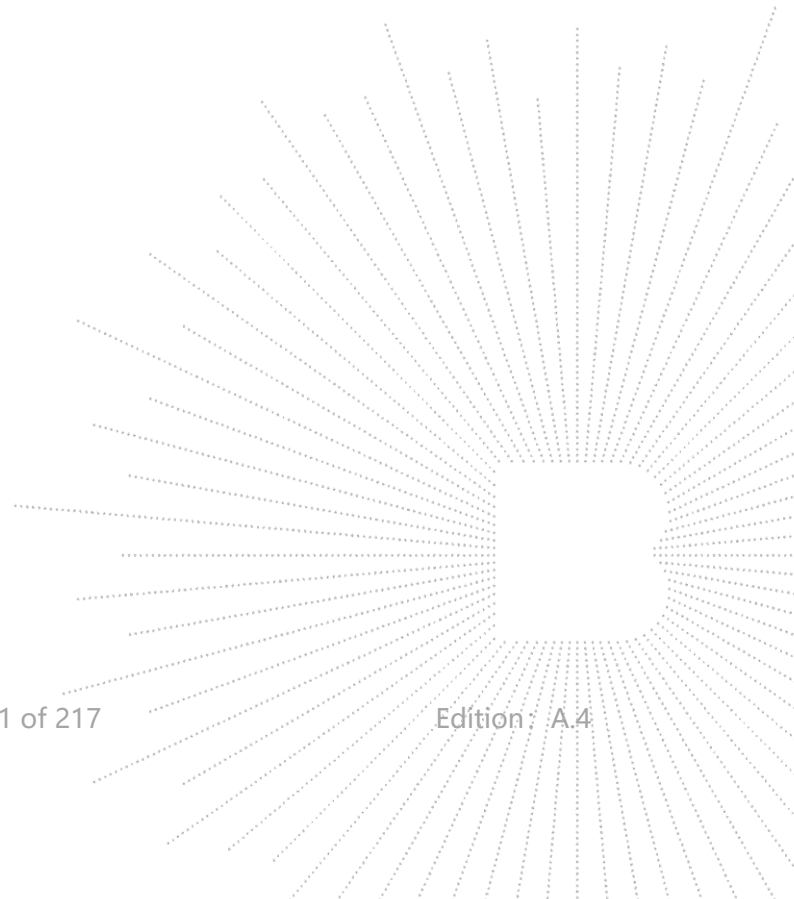
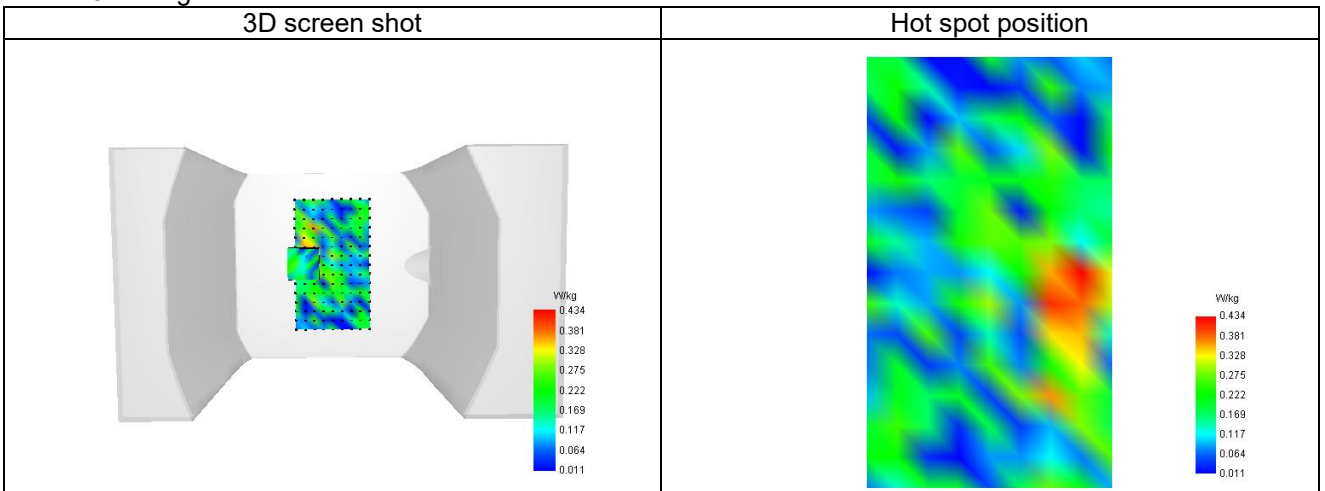
|   |          |
|---|----------|
| SAR 10g (W/Kg)  | 0.172    |
| SAR 1g (W/Kg)   | 0.273    |
| Variation (%)   | 0.010    |
| Horizontal validation criteria: minimum distance (mm) | 8.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 7.311296 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 2.00  | 7.00  | 12.00 | 17.00 | 22.00 | 27.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.472 | 0.382 | 0.175 | 0.014 | 0.086 | 0.069 | 0.208 |



## F. 3D Image



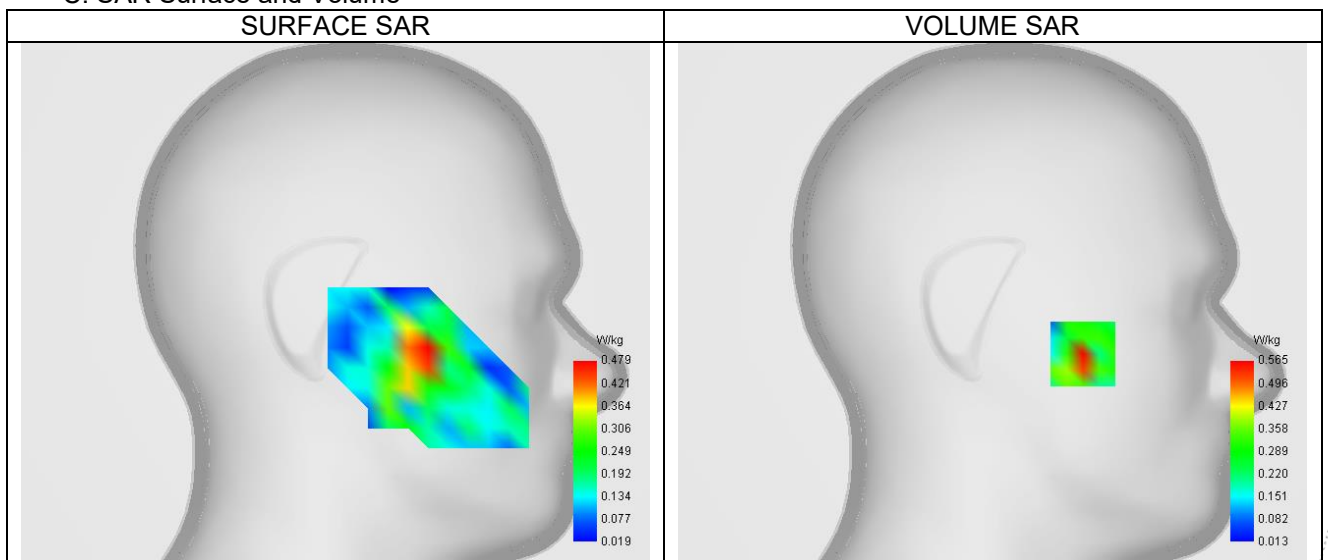
## Plot 16

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 2.92                                |
| Area Scan       | sam_direct_droit2_surf8mm.txt       |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Left head                           |
| Device Position | Cheek                               |
| Band            | IEEE 802.11a U-NII                  |
| Channels        | Middle (40)                         |
| Signal          | IEEE802.a (Crest factor: 1.0)       |

**B. Permittivity**

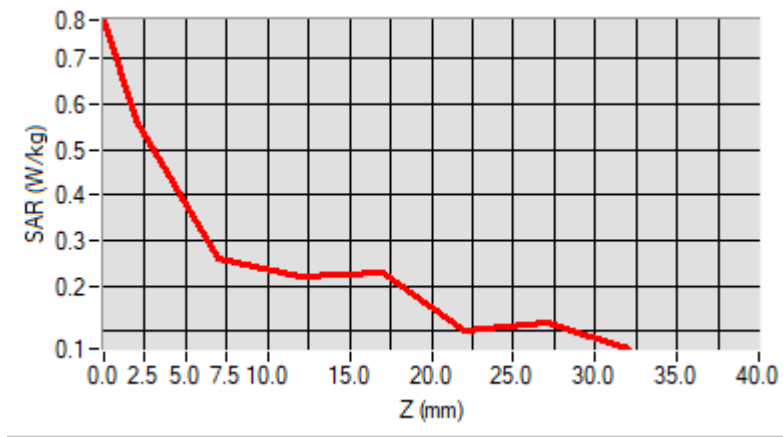
|  |          |
|--|----------|
| Frequency (MHz)                        | 5200.000 |
| Relative permittivity (real part)      | 35.650   |
| Relative permittivity (imaginary part) | 16.250   |
| Conductivity (S/m)                     | 4.965    |

**C. SAR Surface and Volume**

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

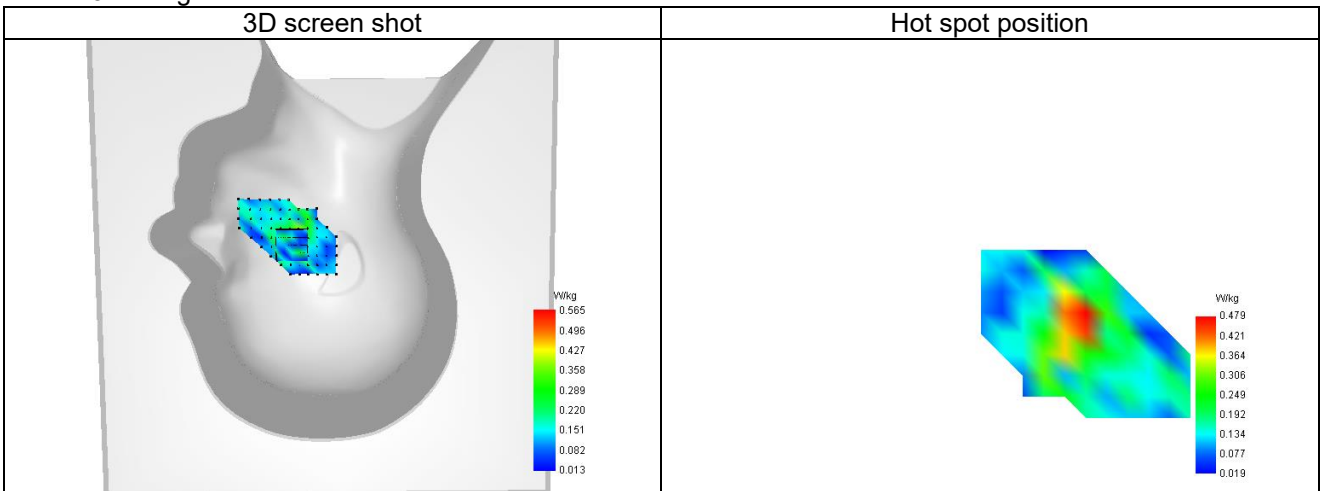
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.273     |
| SAR 1g (W/Kg)   | 0.562     |
| Variation (%)   | 0.220     |
| Horizontal validation criteria: minimum distance (mm) | 8.000000  |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 46.393043 |

**E. Z Axis Scan**

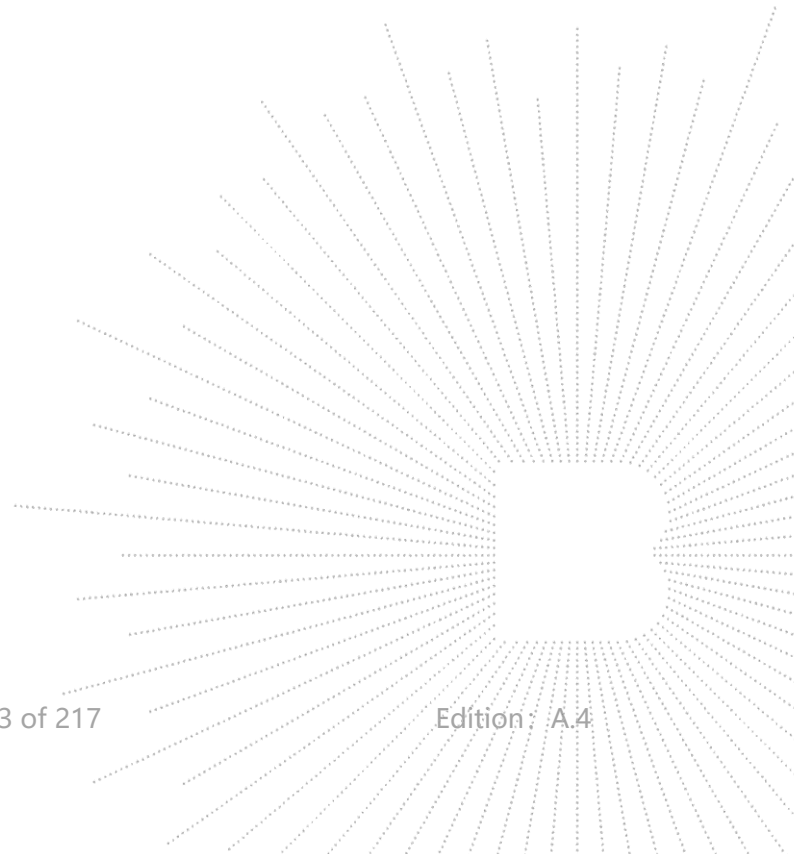
| Z (mm)     | 0.00  | 2.00  | 7.00  | 12.00 | 17.00 | 22.00 | 27.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.786 | 0.565 | 0.262 | 0.222 | 0.231 | 0.099 | 0.119 |



## F. 3D Image



BCTC  
 3C  
 PPR  
 検測



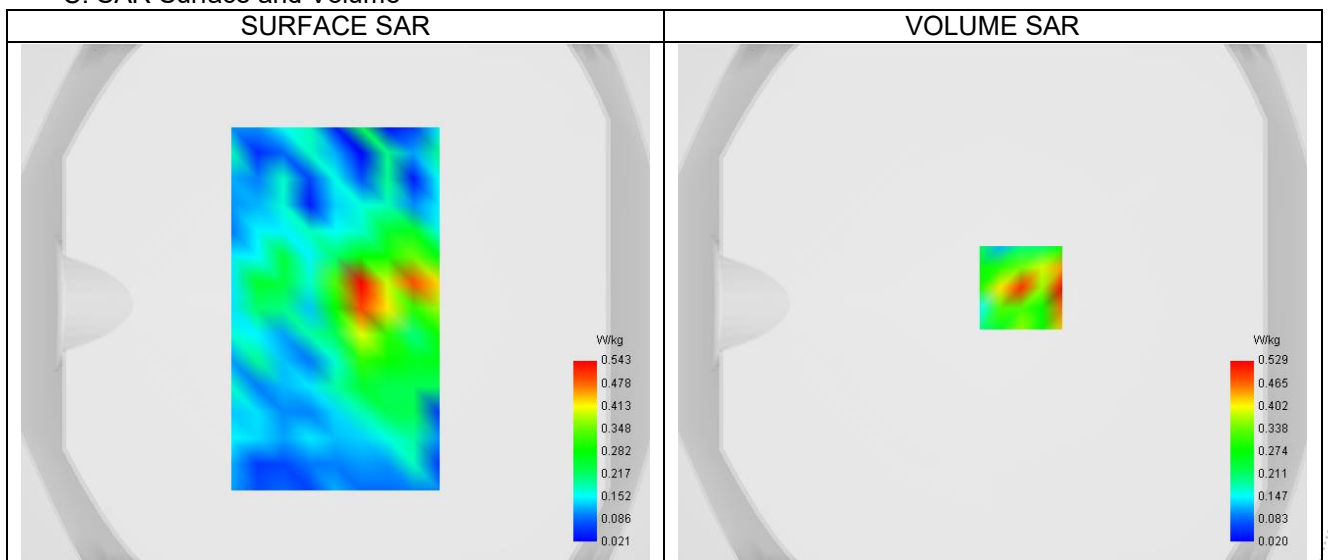
## Plot 17

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 2.92                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | IEEE 802.11a                        |
| Channels        | Middle (157)                        |
| Signal          | IEEE802.a (Crest factor: 1.0)       |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 5785.000 |
| Relative permittivity (real part)      | 35.650   |
| Relative permittivity (imaginary part) | 16.250   |
| Conductivity (S/m)                     | 4.965    |

**C. SAR Surface and Volume**


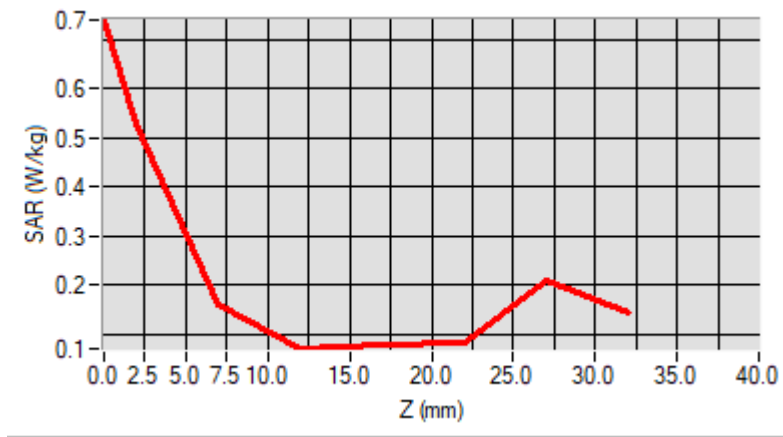
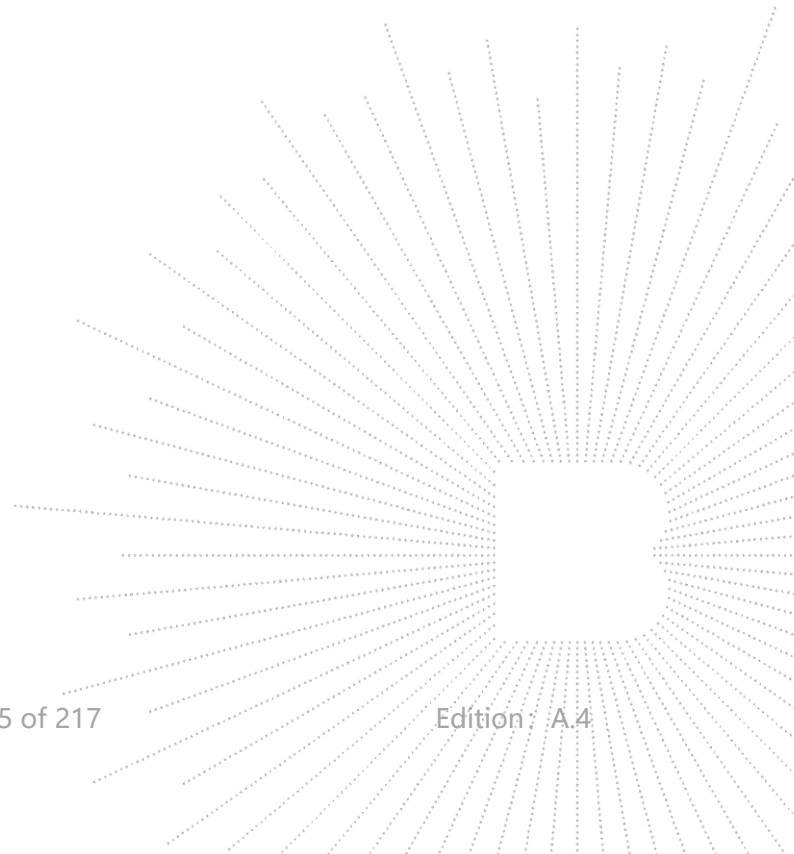
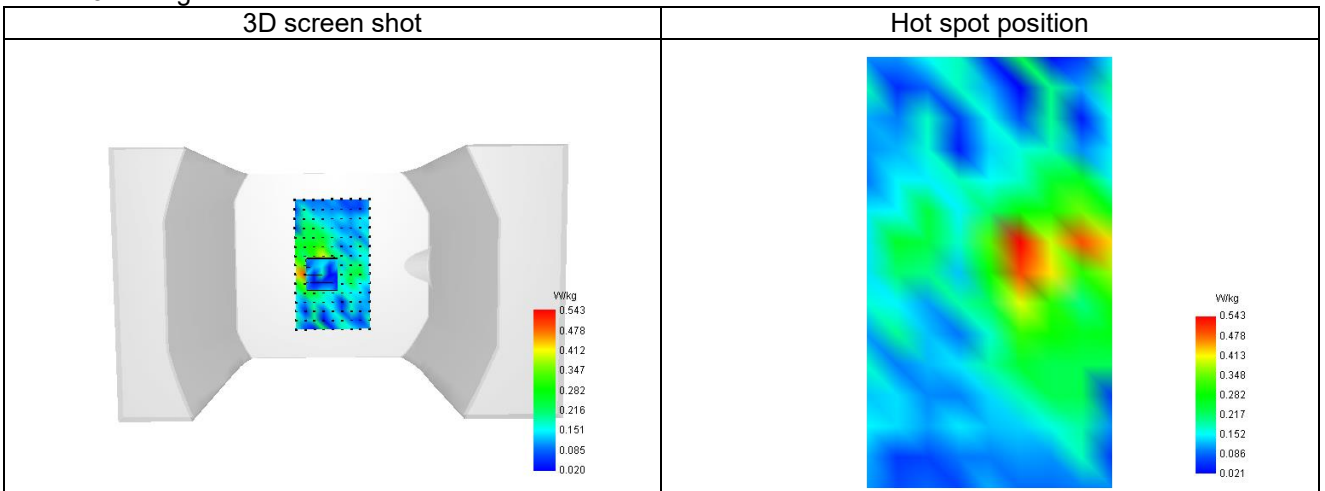
Maximum location: X=11.00, Y=6.00 ; SAR Peak: 0.72 W/kg

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

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.225     |
| SAR 1g (W/Kg)   | 0.398     |
| Variation (%)   | 2.540     |
| Horizontal validation criteria: minimum distance (mm) | 16.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 57.692724 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 2.00  | 7.00  | 12.00 | 17.00 | 22.00 | 27.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.740 | 0.529 | 0.162 | 0.070 | 0.080 | 0.083 | 0.209 |


**F. 3D Image**


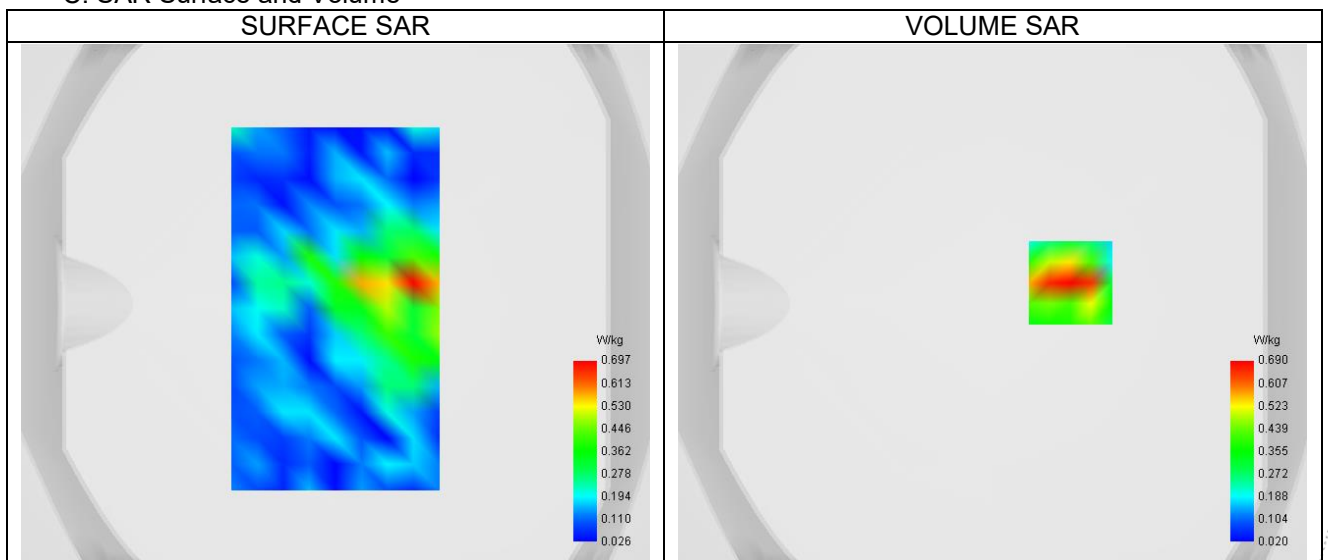
## Plot 18

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 2.92                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | IEEE 802.11a U-NII                  |
| Channels        | Middle (157)                        |
| Signal          | IEEE802.a (Crest factor: 1.0)       |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 5785.000 |
| Relative permittivity (real part)      | 35.650   |
| Relative permittivity (imaginary part) | 16.250   |
| Conductivity (S/m)                     | 4.965    |

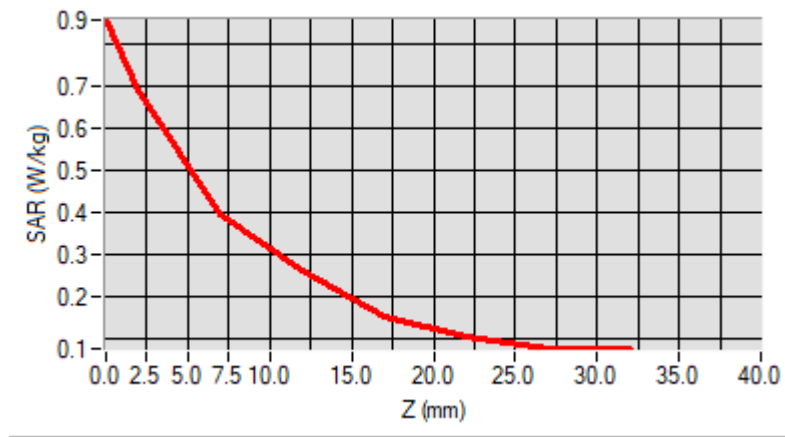
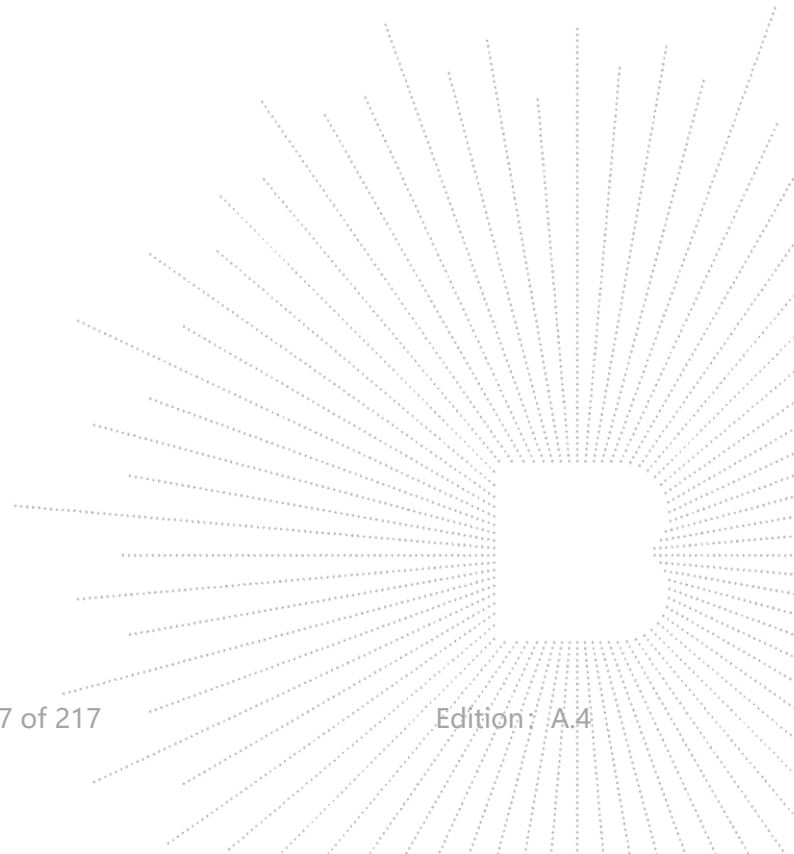
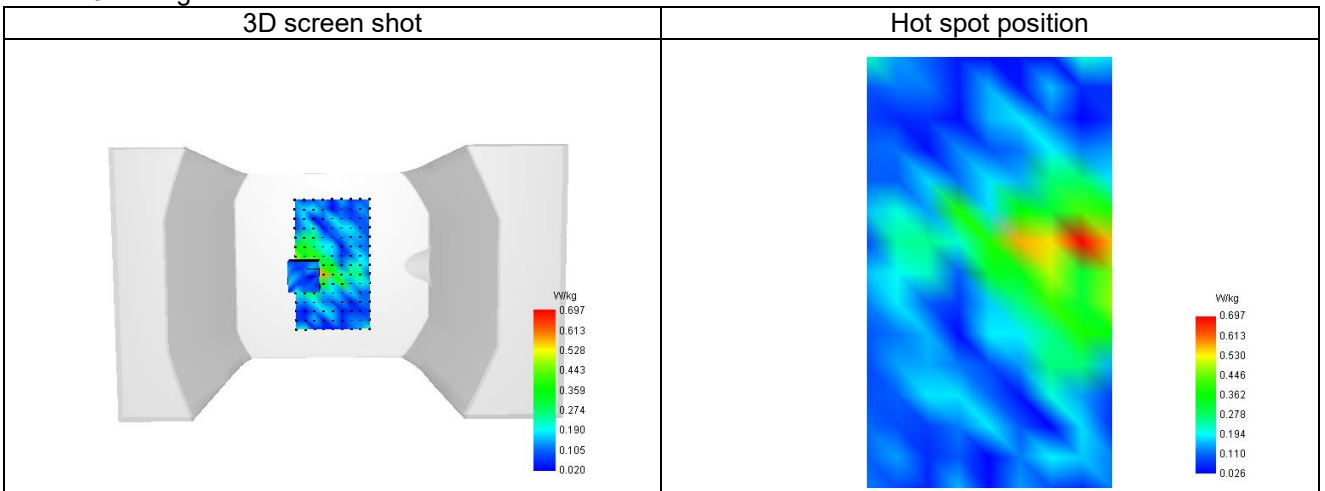
**C. SAR Surface and Volume**

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

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.279     |
| SAR 1g (W/Kg)   | 0.520     |
| Variation (%)   | 4.880     |
| Horizontal validation criteria: minimum distance (mm) | 16.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 57.191019 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 2.00  | 7.00  | 12.00 | 17.00 | 22.00 | 27.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.857 | 0.690 | 0.395 | 0.261 | 0.150 | 0.102 | 0.075 |




**F. 3D Image**


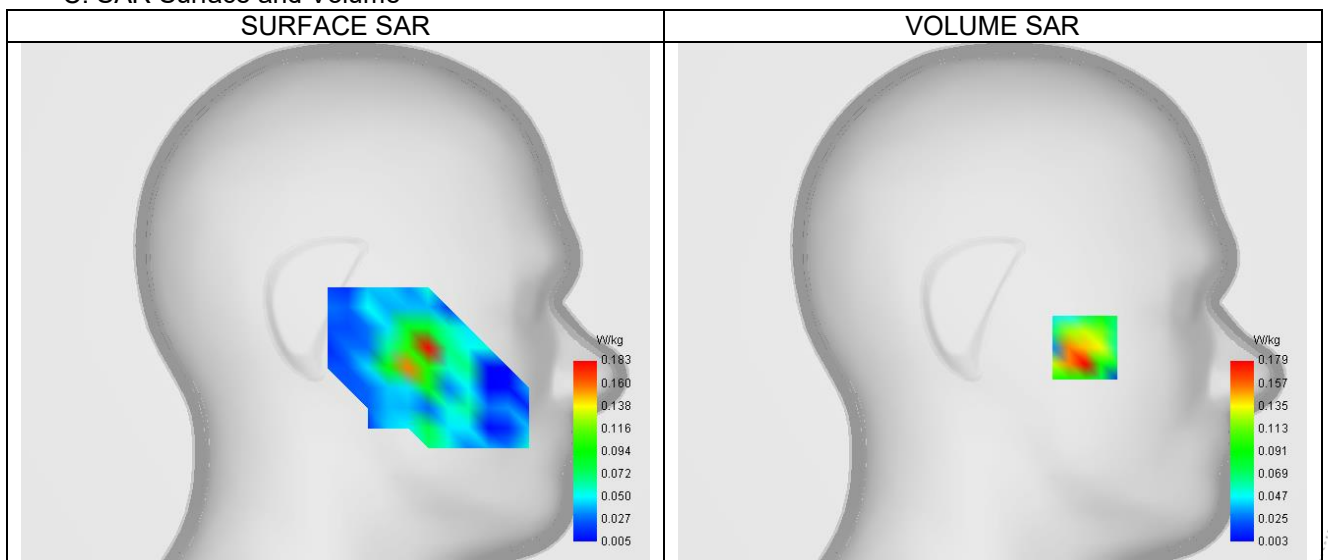
## Plot 19

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.96                                |
| Area Scan       | sam_direct_droit2_surf8mm.txt       |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Left head                           |
| Device Position | Cheek                               |
| Band            | IEEE 802.11b ISM                    |
| Channels        | Middle (7)                          |
| Signal          | IEEE802.b (Crest factor: 1.0)       |

**B. Permittivity**

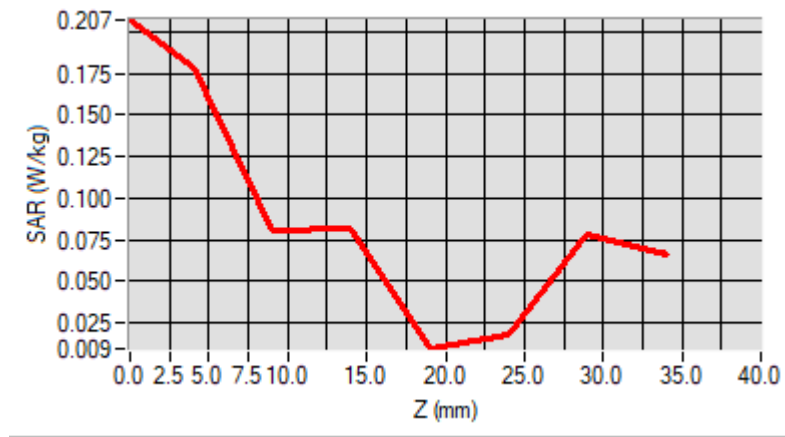
|  |          |
|--|----------|
| Frequency (MHz)                        | 2442.000 |
| Relative permittivity (real part)      | 39.226   |
| Relative permittivity (imaginary part) | 13.207   |
| Conductivity (S/m)                     | 1.788    |

**C. SAR Surface and Volume**

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

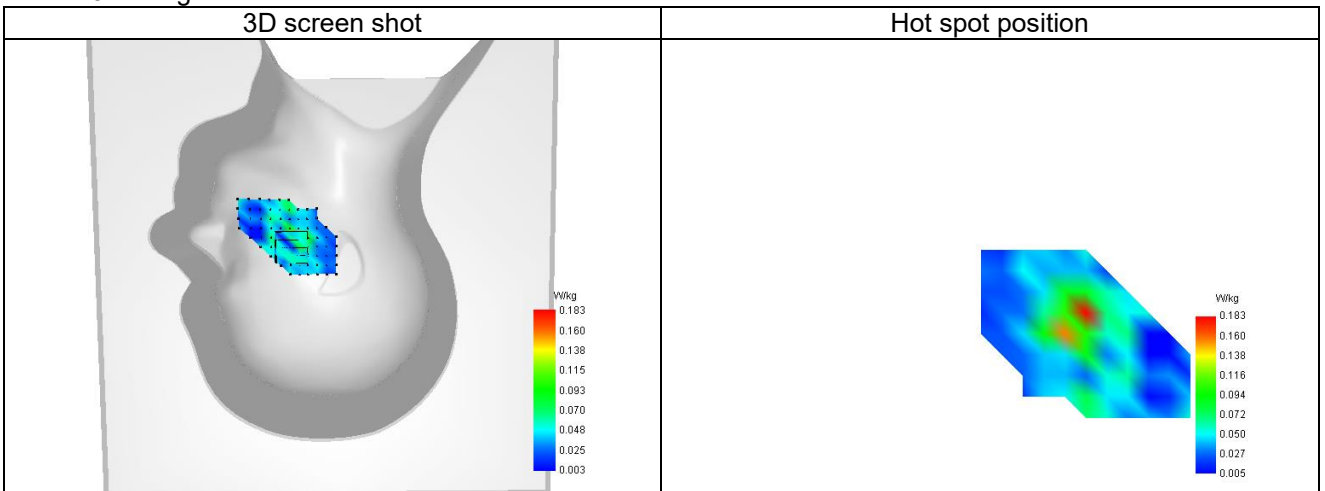
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.083     |
| SAR 1g (W/Kg)   | 0.180     |
| Variation (%)   | -0.060    |
| Horizontal validation criteria: minimum distance (mm) | 11.313708 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 31.556143 |

**E. Z Axis Scan**

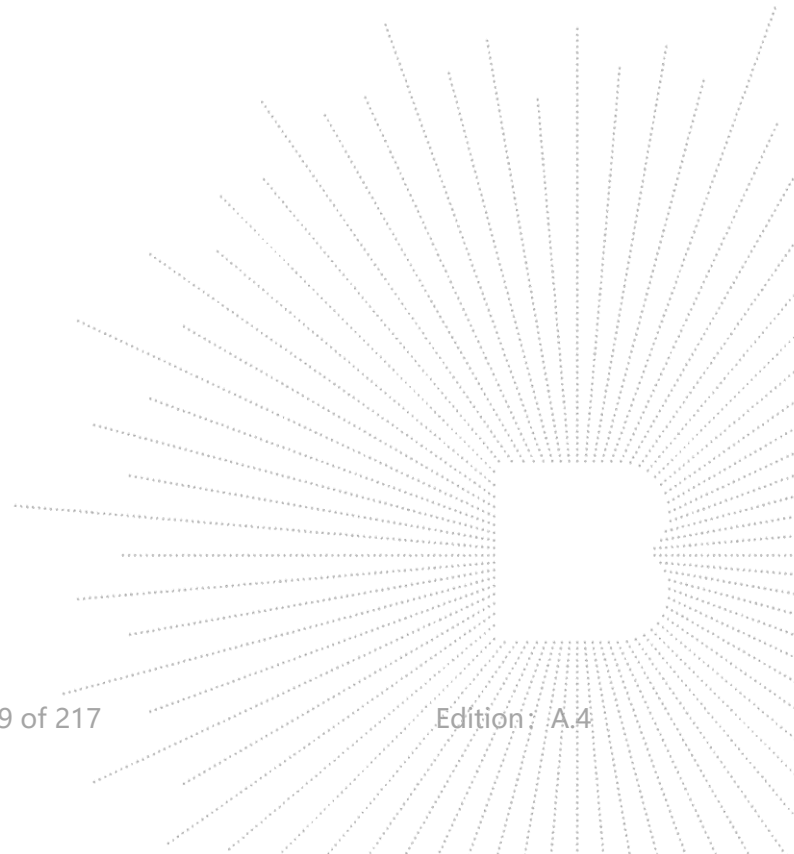
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.207 | 0.179 | 0.080 | 0.082 | 0.009 | 0.018 | 0.078 |



## F. 3D Image



BCTC  
 3C  
 PPR  
 検測



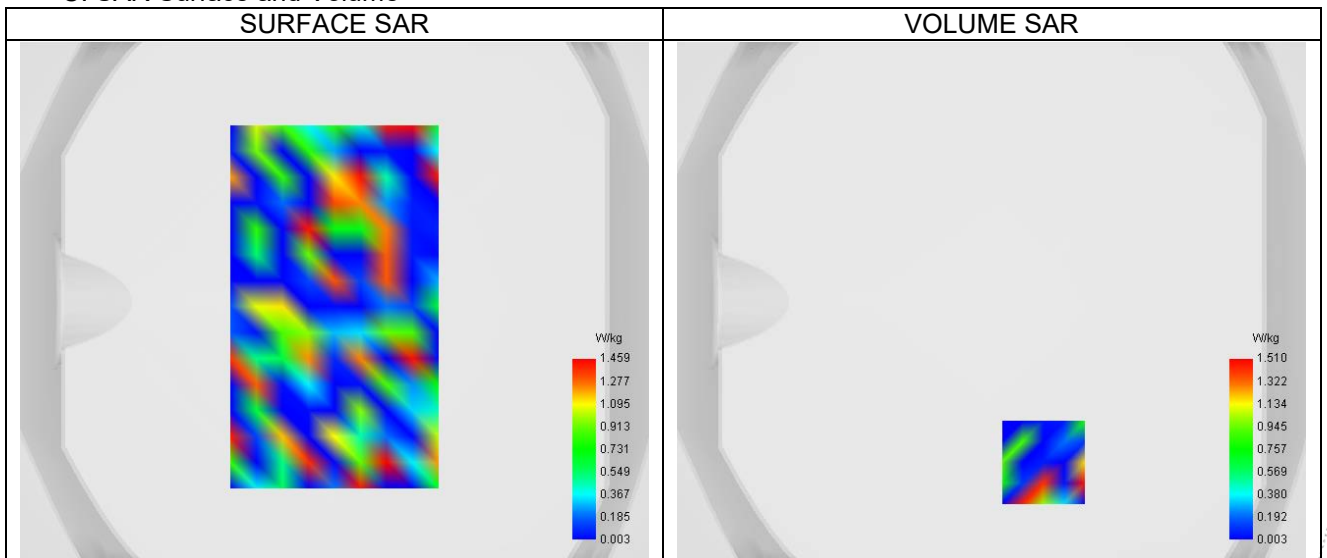
## Plot 20

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.96                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | IEEE 802.11b ISM                    |
| Channels        | Middle (7)                          |
| Signal          | IEEE802.b (Crest factor: 1.0)       |

**B. Permittivity**

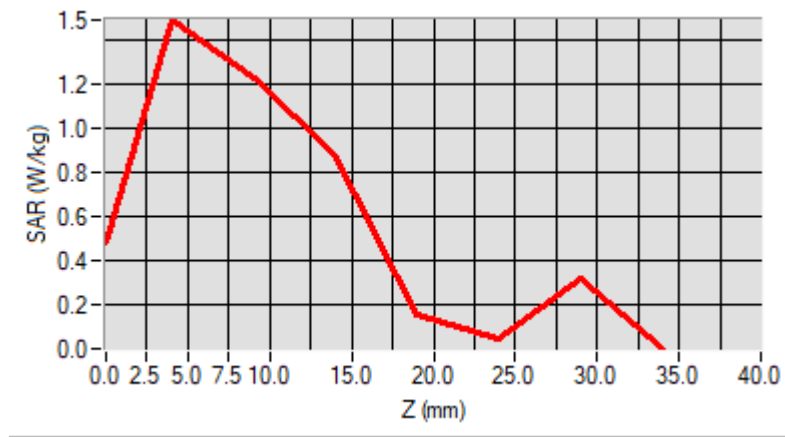
|  |          |
|--|----------|
| Frequency (MHz)                        | 2442.000 |
| Relative permittivity (real part)      | 39.226   |
| Relative permittivity (imaginary part) | 13.207   |
| Conductivity (S/m)                     | 1.788    |

**C. SAR Surface and Volume**

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

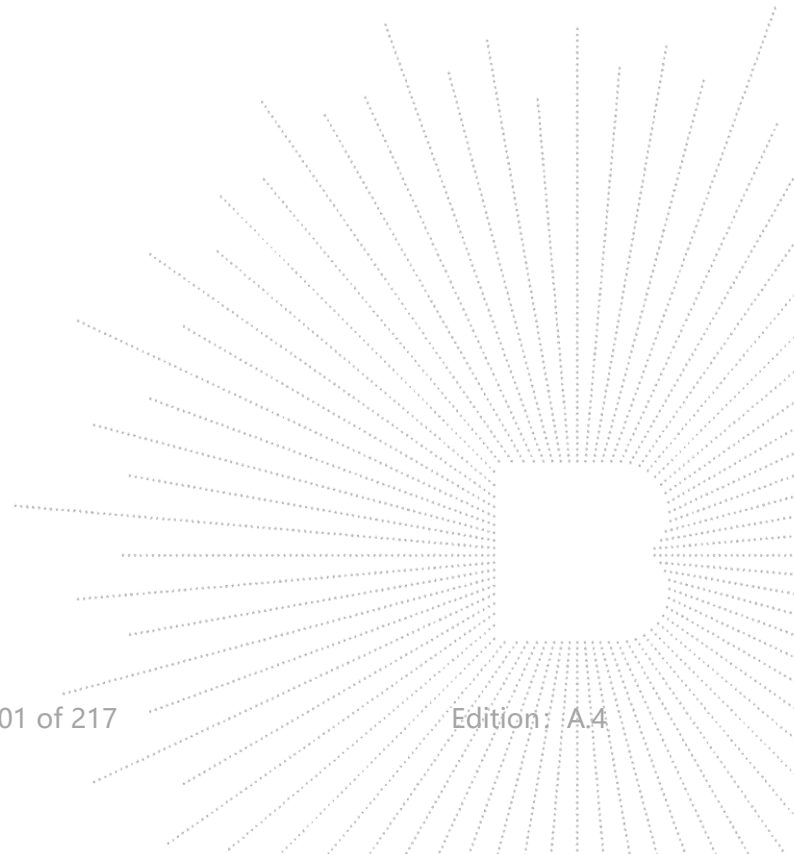
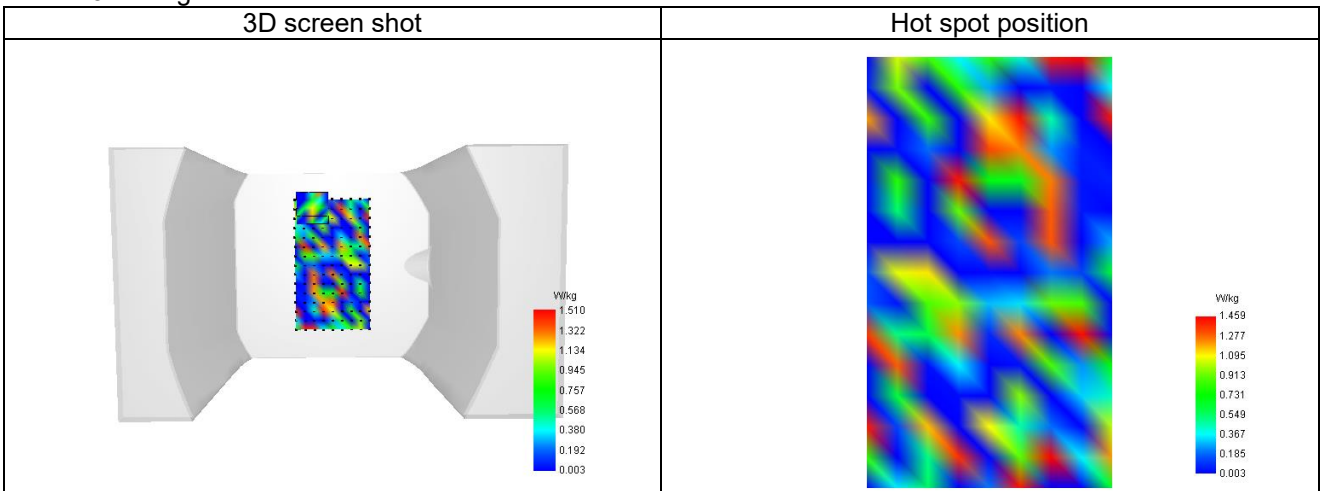
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.549     |
| SAR 1g (W/Kg)   | 0.727     |
| Variation (%)   | 2.040     |
| Horizontal validation criteria: minimum distance (mm) | 8.000000  |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 32.889900 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.488 | 1.490 | 1.223 | 0.881 | 0.153 | 0.046 | 0.325 |



## F. 3D Image



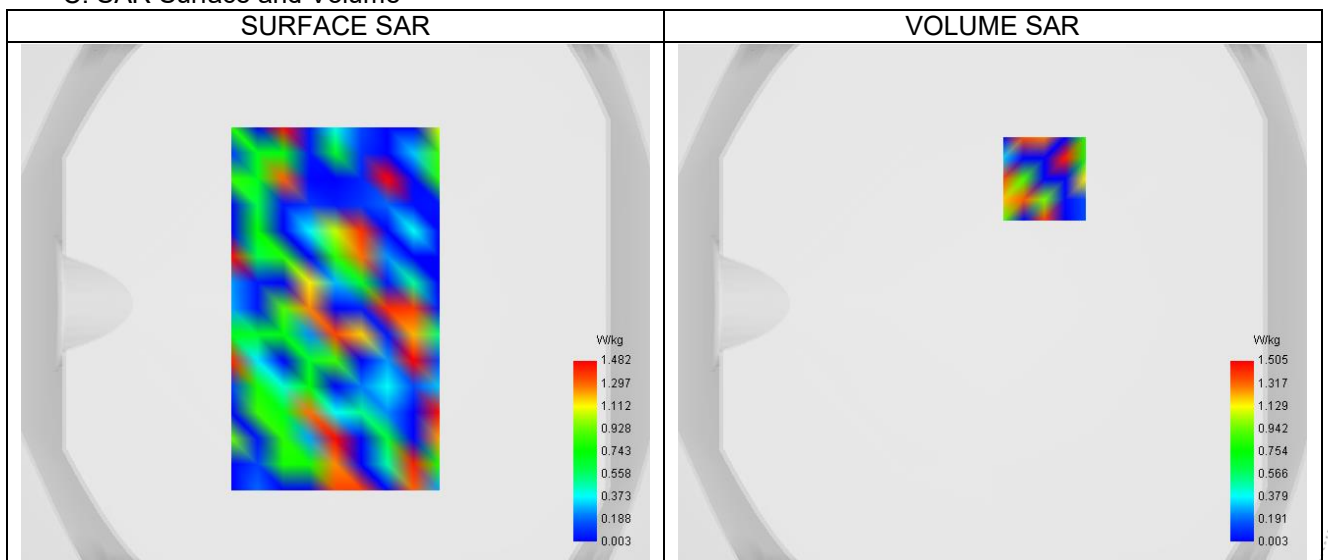
## Plot 21

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.96                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | IEEE 802.11b ISM                    |
| Channels        | Middle (7)                          |
| Signal          | IEEE802.b (Crest factor: 1.0)       |

**B. Permittivity**

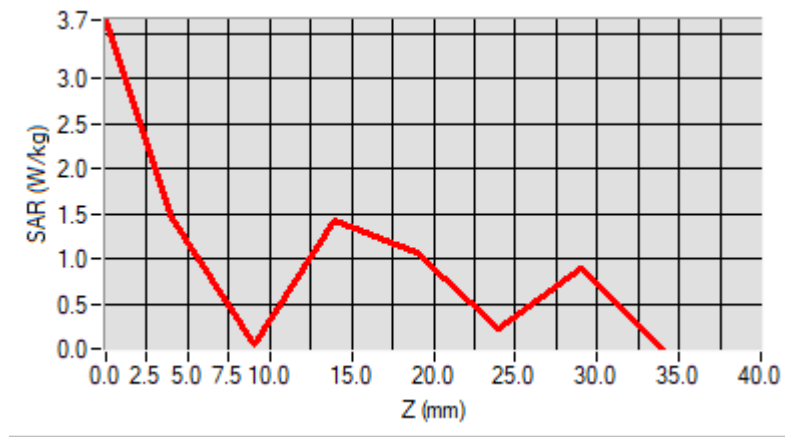
|  |          |
|--|----------|
| Frequency (MHz)                        | 2442.000 |
| Relative permittivity (real part)      | 39.226   |
| Relative permittivity (imaginary part) | 13.207   |
| Conductivity (S/m)                     | 1.788    |

**C. SAR Surface and Volume**

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

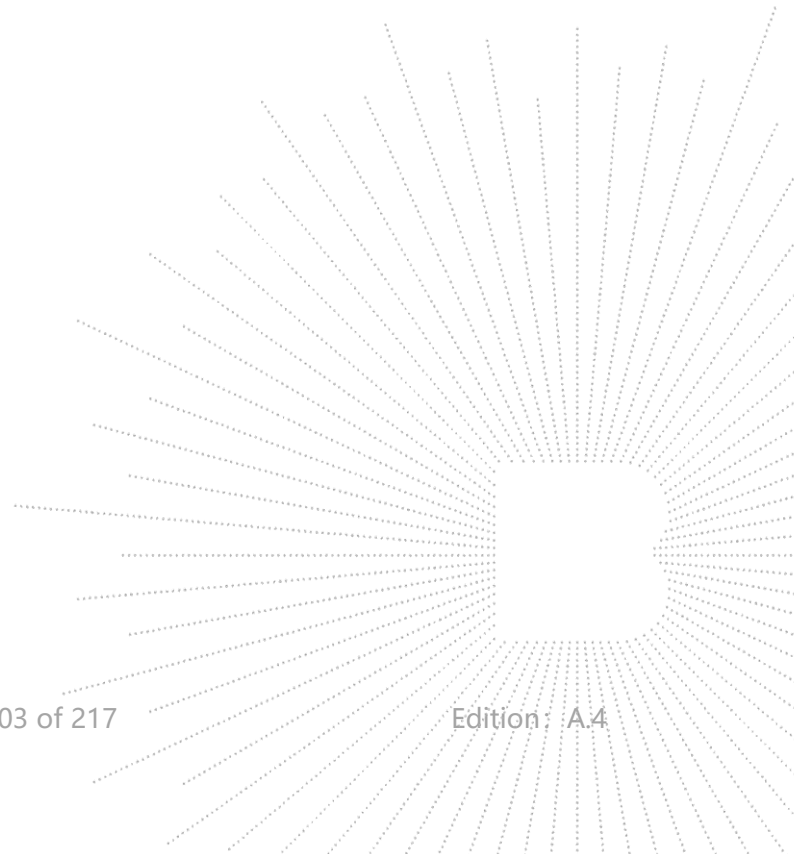
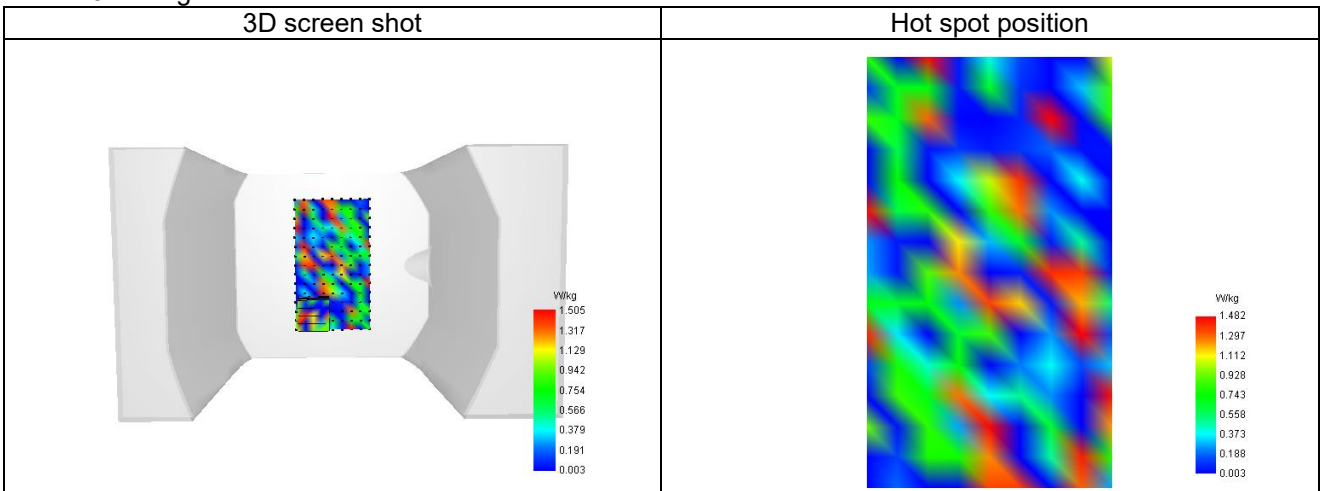
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.602     |
| SAR 1g (W/Kg)   | 1.158     |
| Variation (%)   | -4.450    |
| Horizontal validation criteria: minimum distance (mm) | 8.000000  |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 36.306272 |

**E. Z Axis Scan**

|            |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 3.651 | 1.453 | 0.052 | 1.417 | 1.075 | 0.227 | 0.900 |



## F. 3D Image



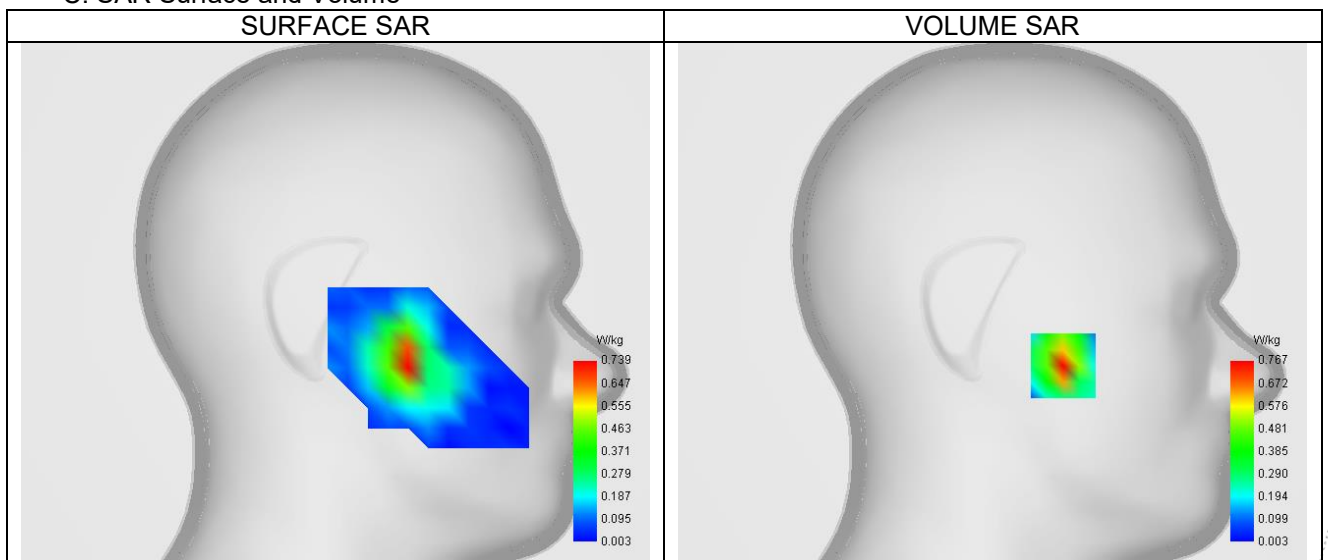
## Plot 22

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.27                                |
| Area Scan       | sam_direct_droit2_surf8mm.txt       |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Left head                           |
| Device Position | Cheek                               |
| Band            | LTE band 1                          |
| Channels        | Middle (18300)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 1950.000 |
| Relative permittivity (real part)      | 40.000   |
| Relative permittivity (imaginary part) | 12.930   |
| Conductivity (S/m)                     | 1.401    |

**C. SAR Surface and Volume**


Maximum location: X=-35.00, Y=-31.00 ; SAR Peak: 1.34 W/kg

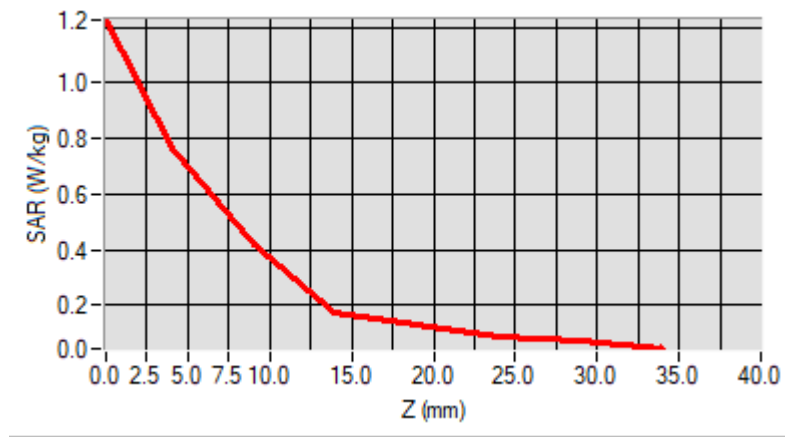
**D. SAR 1g & 10g**

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.323     |
| SAR 1g (W/Kg)   | 0.687     |
| Variation (%)   | -3.760    |
| Horizontal validation criteria: minimum distance (mm) | 11.313708 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 54.583922 |

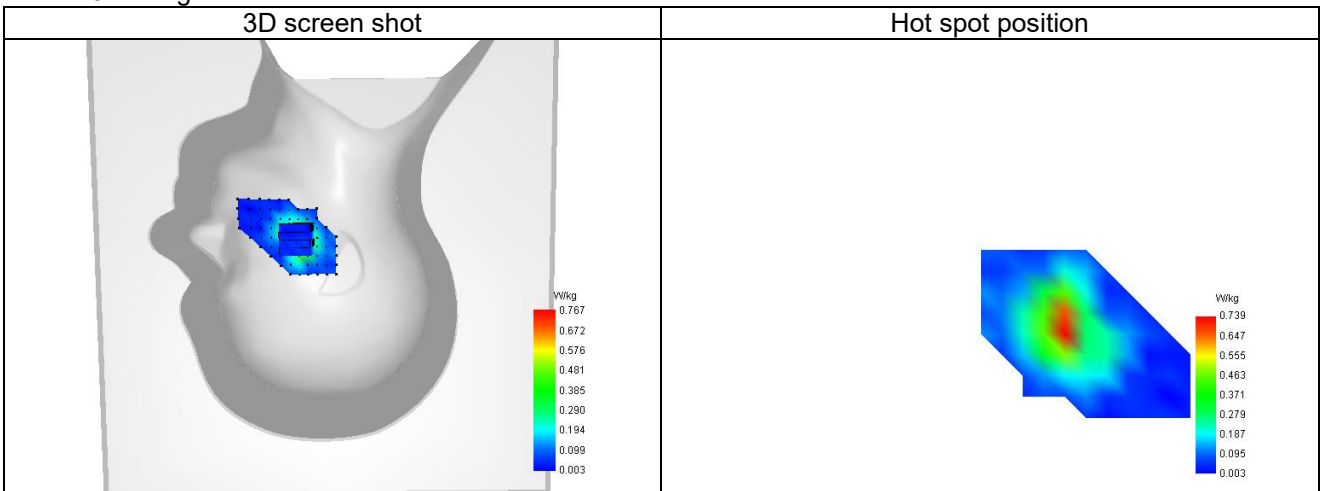
**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 1.226 | 0.767 | 0.419 | 0.173 | 0.128 | 0.091 | 0.071 |

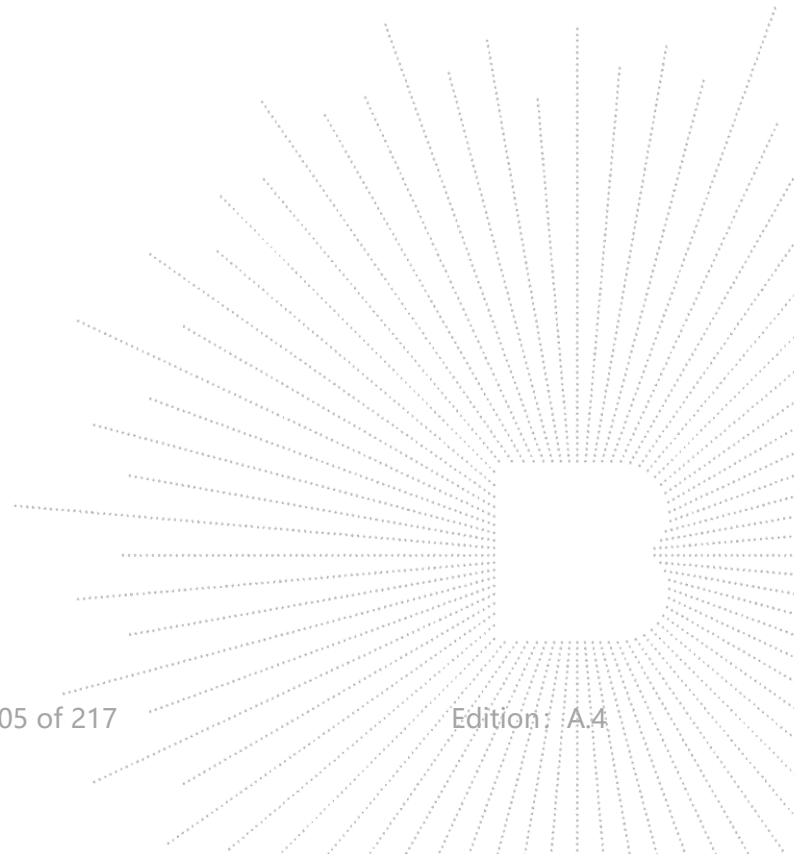




## F. 3D Image



BCTC  
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 PPR  
 检测



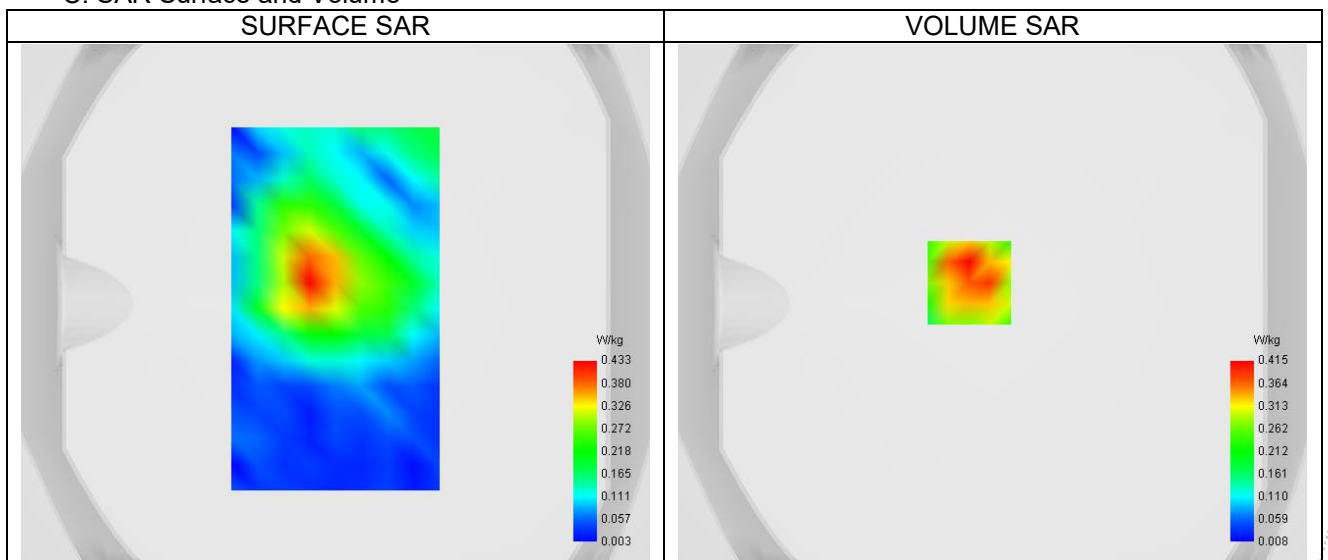
## Plot 23

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.27                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | LTE band 1                          |
| Channels        | Middle (18300)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 1950.000 |
| Relative permittivity (real part)      | 40.000   |
| Relative permittivity (imaginary part) | 12.930   |
| Conductivity (S/m)                     | 1.401    |

**C. SAR Surface and Volume**


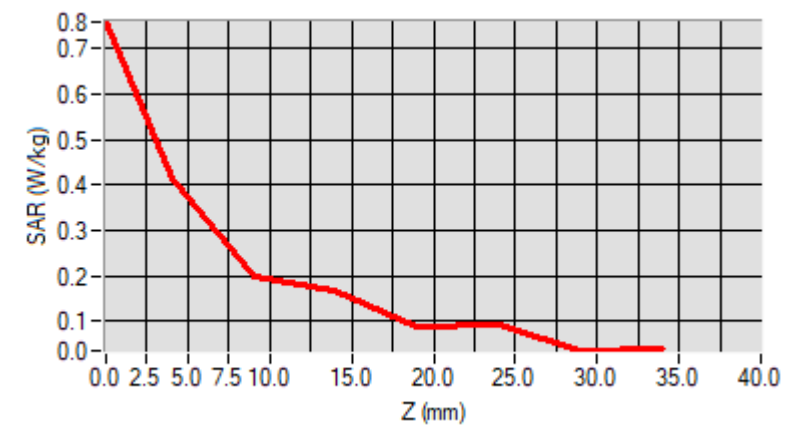
Maximum location: X=-9.00, Y=8.00 ; SAR Peak: 0.65 W/kg

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

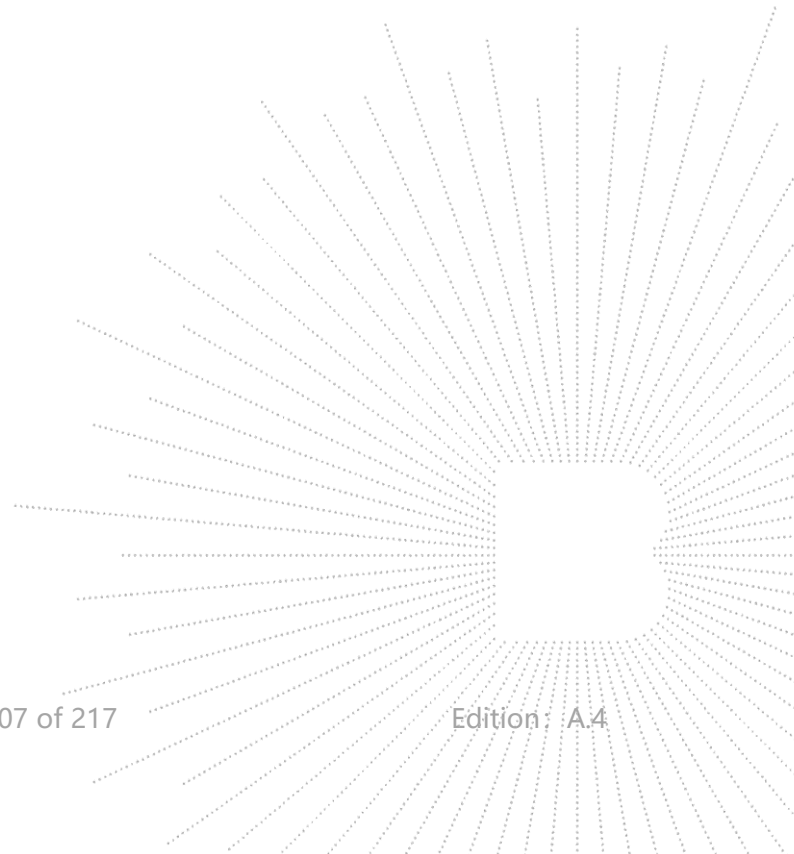
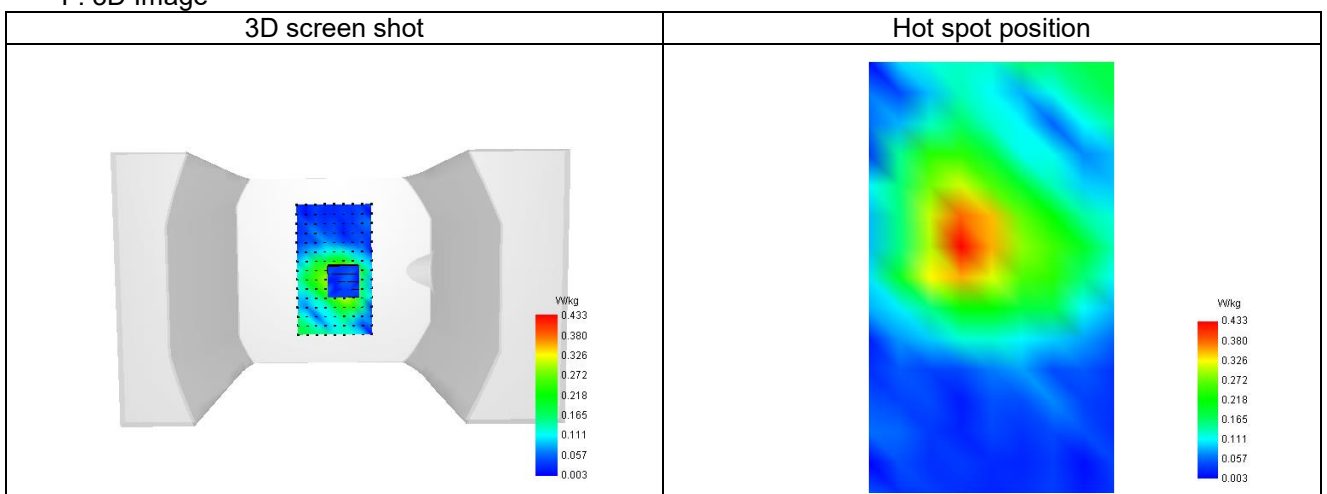
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.228     |
| SAR 1g (W/Kg)   | 0.386     |
| Variation (%)   | -4.660    |
| Horizontal validation criteria: minimum distance (mm) | 17.888544 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 59.675653 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.760 | 0.415 | 0.201 | 0.169 | 0.090 | 0.093 | 0.035 |



## F. 3D Image



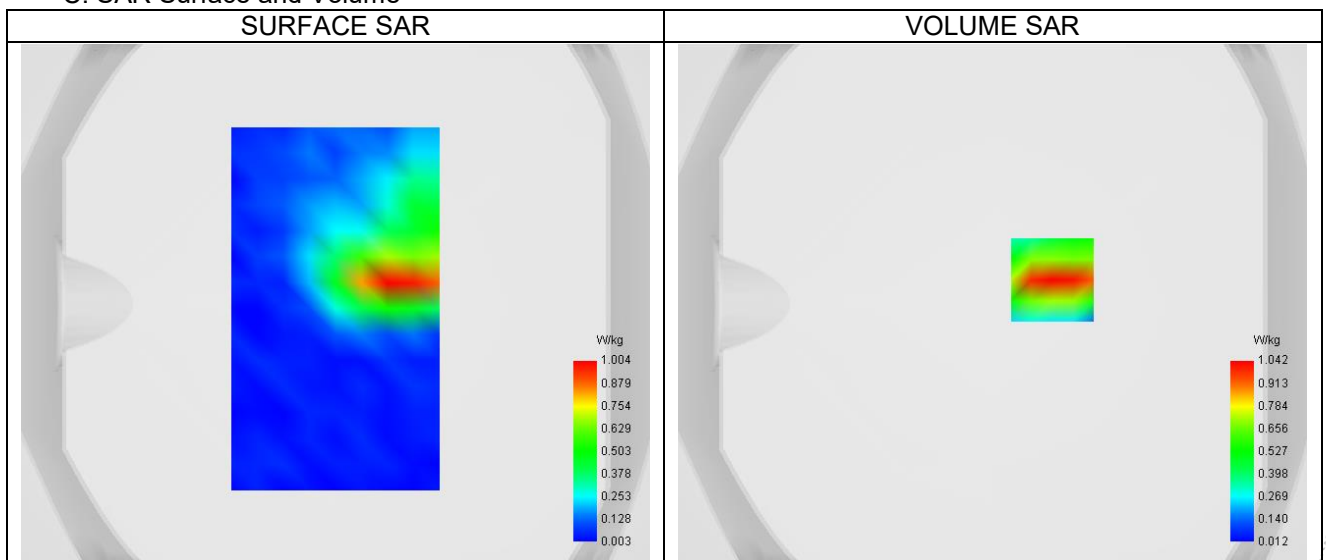
## Plot 24

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.27                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | LTE band 1                          |
| Channels        | Middle (18300)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

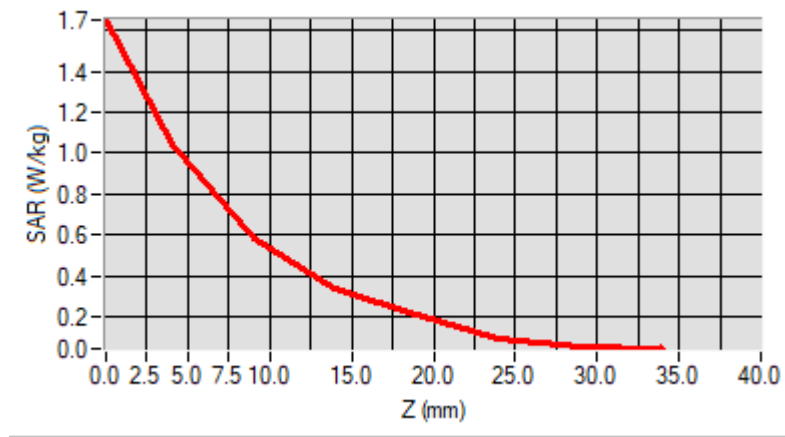
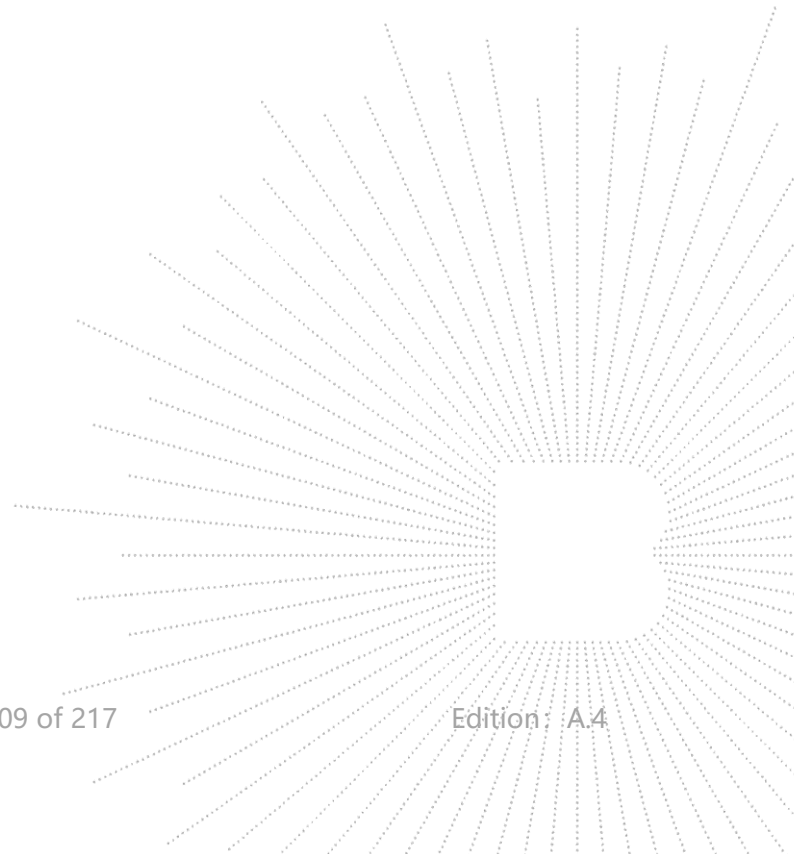
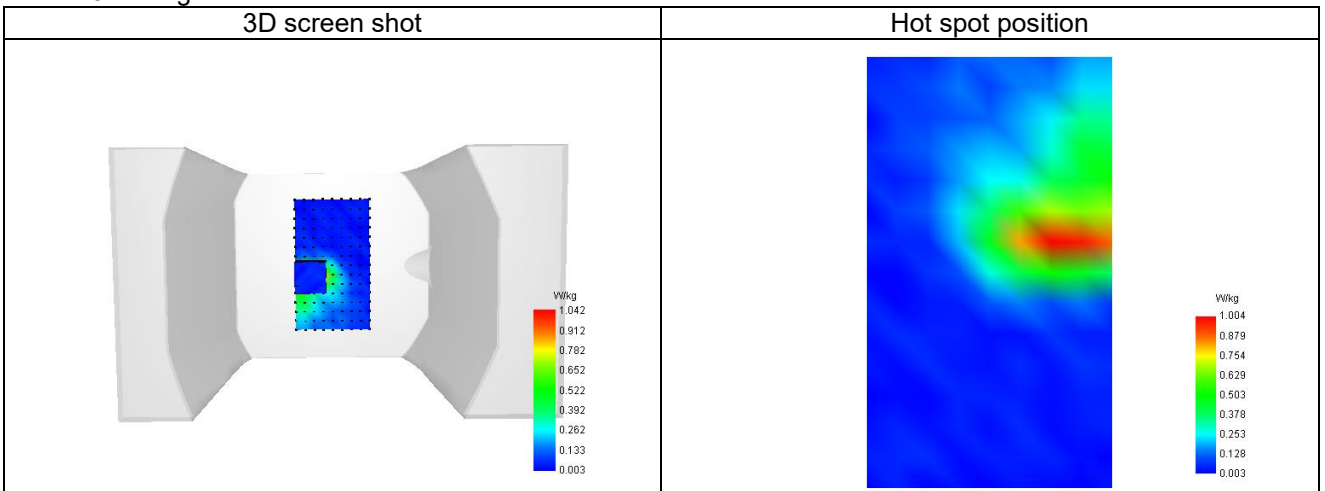
|  |          |
|--|----------|
| Frequency (MHz)                        | 1950.000 |
| Relative permittivity (real part)      | 40.000   |
| Relative permittivity (imaginary part) | 12.930   |
| Conductivity (S/m)                     | 1.401    |

**C. SAR Surface and Volume**

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

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.492     |
| SAR 1g (W/Kg)   | 0.974     |
| Variation (%)   | 0.500     |
| Horizontal validation criteria: minimum distance (mm) | 16.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 55.824009 |

**E. Z Axis Scan**

|            |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 1.650 | 1.042 | 0.582 | 0.332 | 0.207 | 0.089 | 0.057 |


**F. 3D Image**


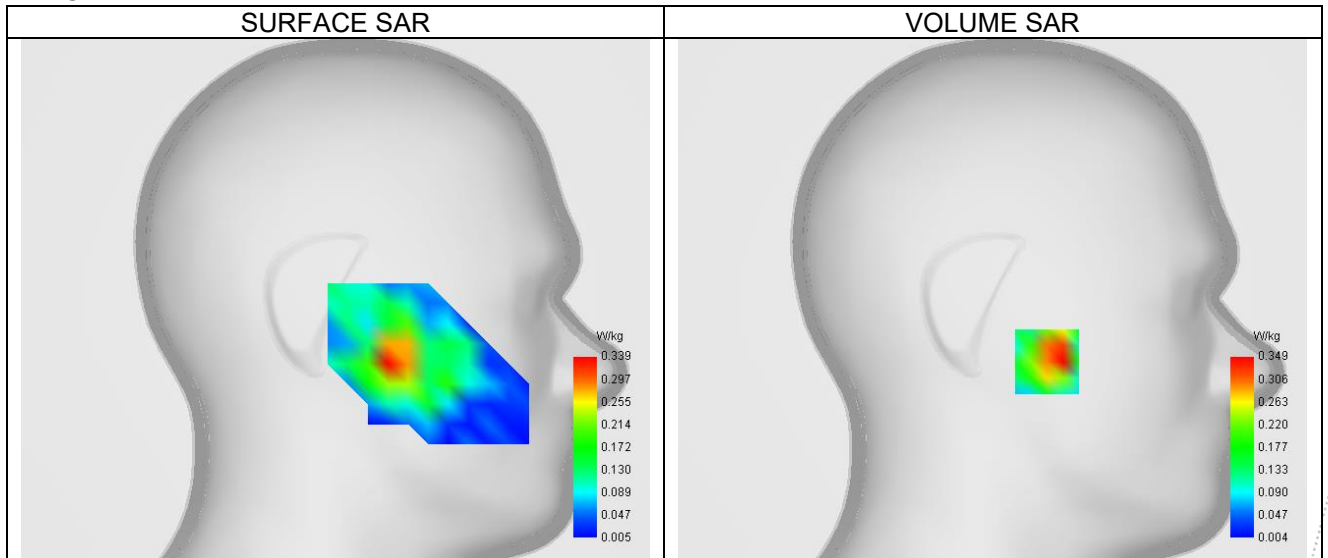
## Plot 25

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.35                                |
| Area Scan       | sam_direct_droit2_surf8mm.txt       |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Left head                           |
| Device Position | Cheek                               |
| Band            | LTE band 3                          |
| Channels        | Middle (19575)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

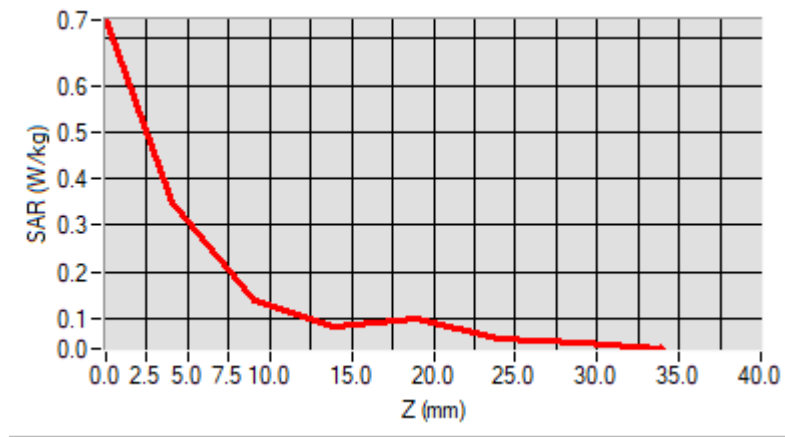
|  |          |
|--|----------|
| Frequency (MHz)                        | 1747.500 |
| Relative permittivity (real part)      | 40.102   |
| Relative permittivity (imaginary part) | 14.097   |
| Conductivity (S/m)                     | 1.369    |

**C. SAR Surface and Volume**

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

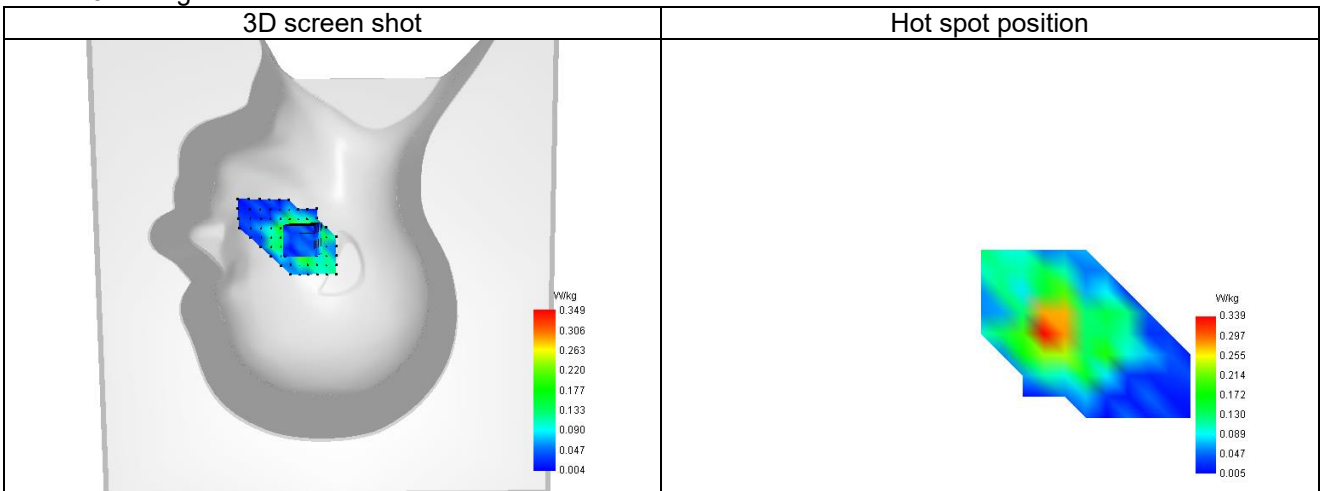
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.170     |
| SAR 1g (W/Kg)   | 0.329     |
| Variation (%)   | 4.820     |
| Horizontal validation criteria: minimum distance (mm) | 8.000000  |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 57.336723 |

**E. Z Axis Scan**

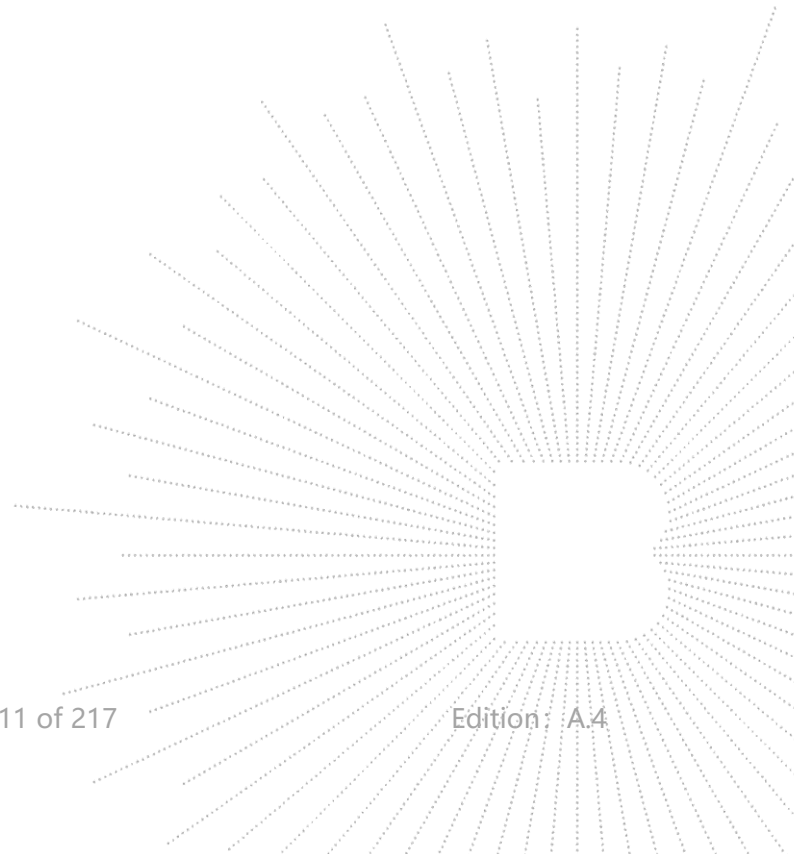
|            |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.740 | 0.349 | 0.139 | 0.080 | 0.100 | 0.055 | 0.048 |



## F. 3D Image



BCTC  
 3C  
 PPR  
 検測



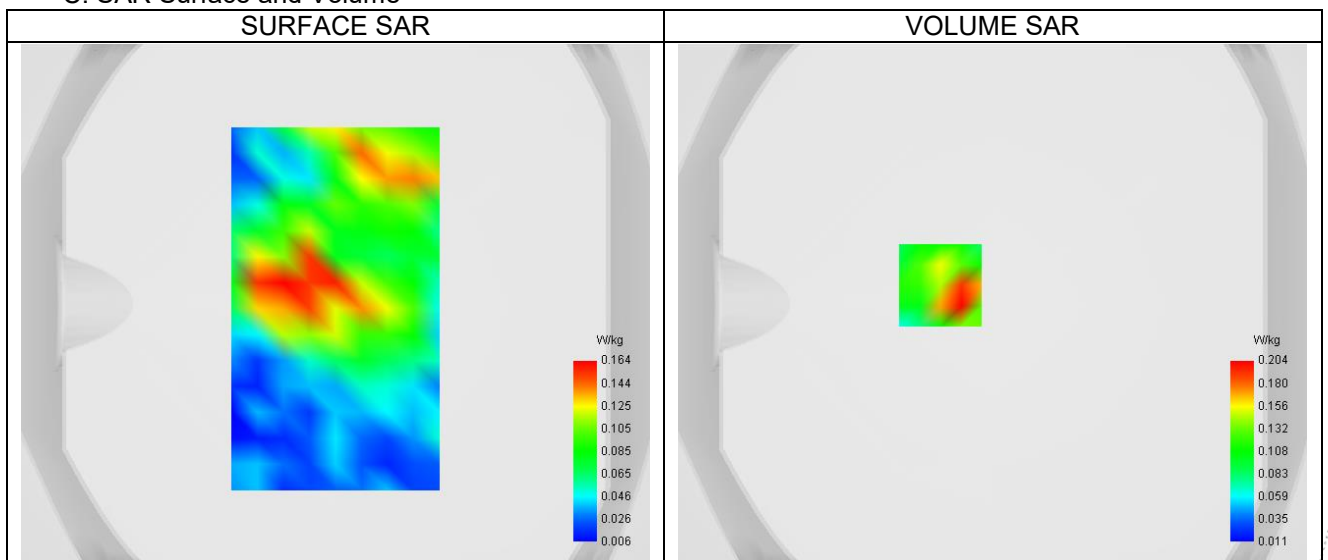
## Plot 26

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.35                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | LTE band 3                          |
| Channels        | Middle (19575)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 1747.500 |
| Relative permittivity (real part)      | 40.102   |
| Relative permittivity (imaginary part) | 14.097   |
| Conductivity (S/m)                     | 1.369    |

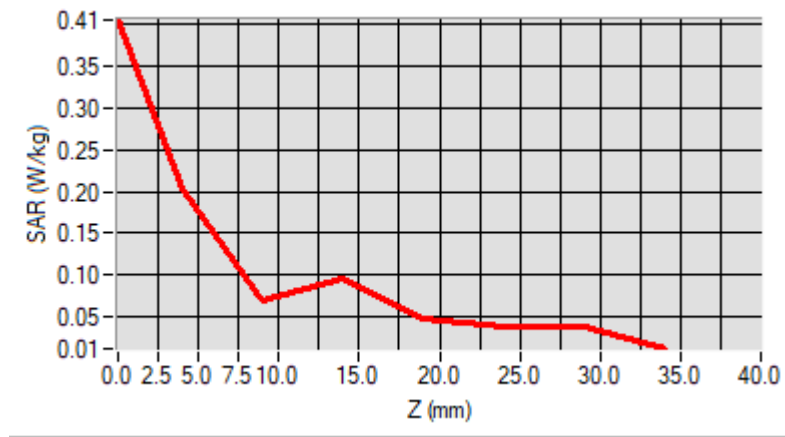
**C. SAR Surface and Volume**

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

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.105     |
| SAR 1g (W/Kg)   | 0.193     |
| Variation (%)   | 3.090     |
| Horizontal validation criteria: minimum distance (mm) | 16.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 55.235329 |

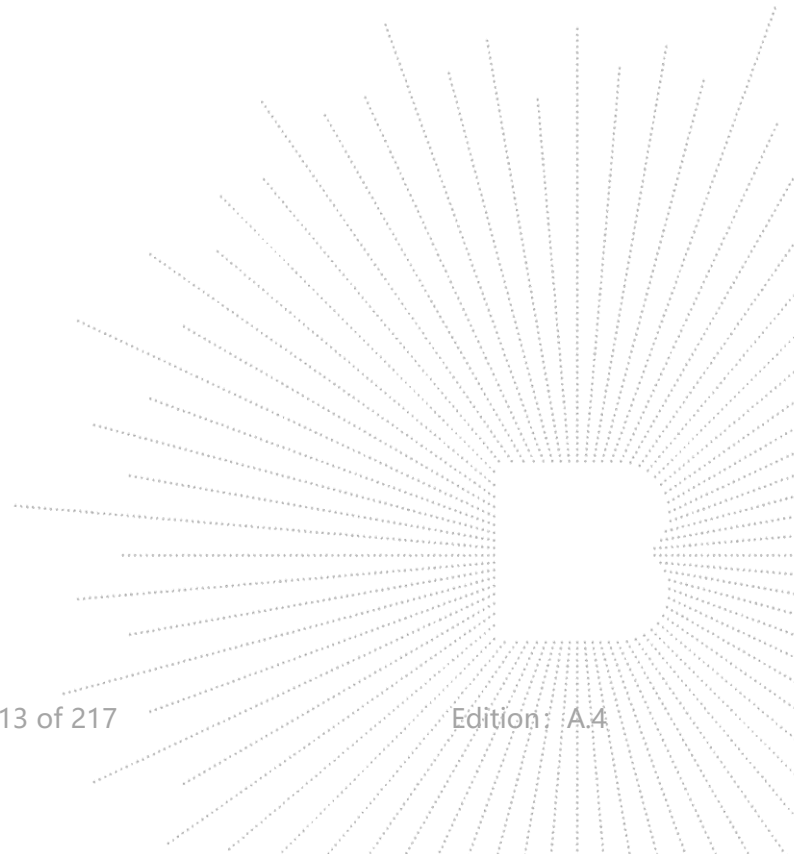
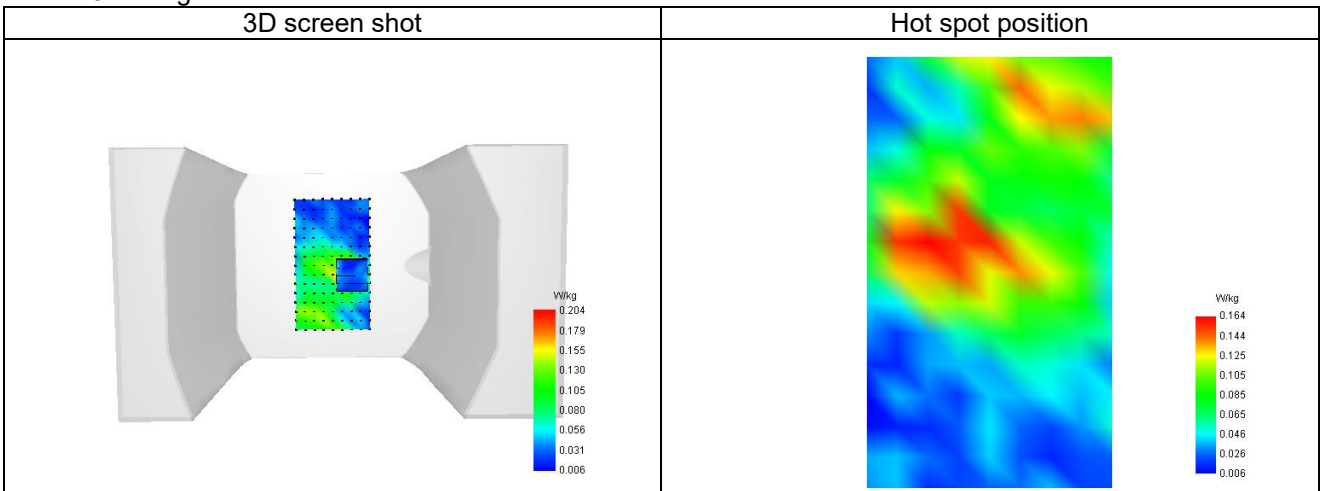
**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.405 | 0.204 | 0.070 | 0.095 | 0.047 | 0.038 | 0.037 |





## F. 3D Image



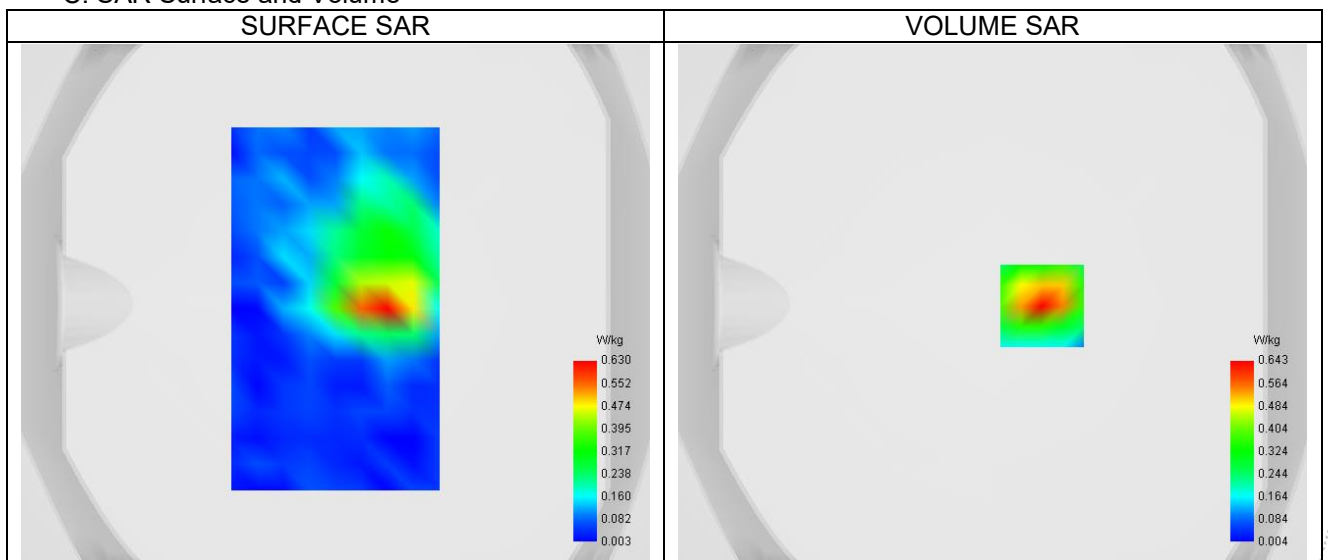
## Plot 27

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.35                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | LTE band 3                          |
| Channels        | Middle (19575)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 1747.500 |
| Relative permittivity (real part)      | 40.102   |
| Relative permittivity (imaginary part) | 14.097   |
| Conductivity (S/m)                     | 1.369    |

**C. SAR Surface and Volume**


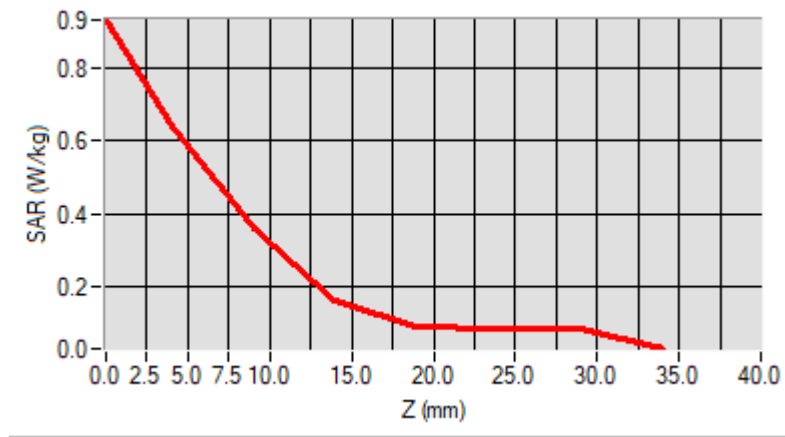
Maximum location: X=19.00, Y=-1.00 ; SAR Peak: 0.97 W/kg

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

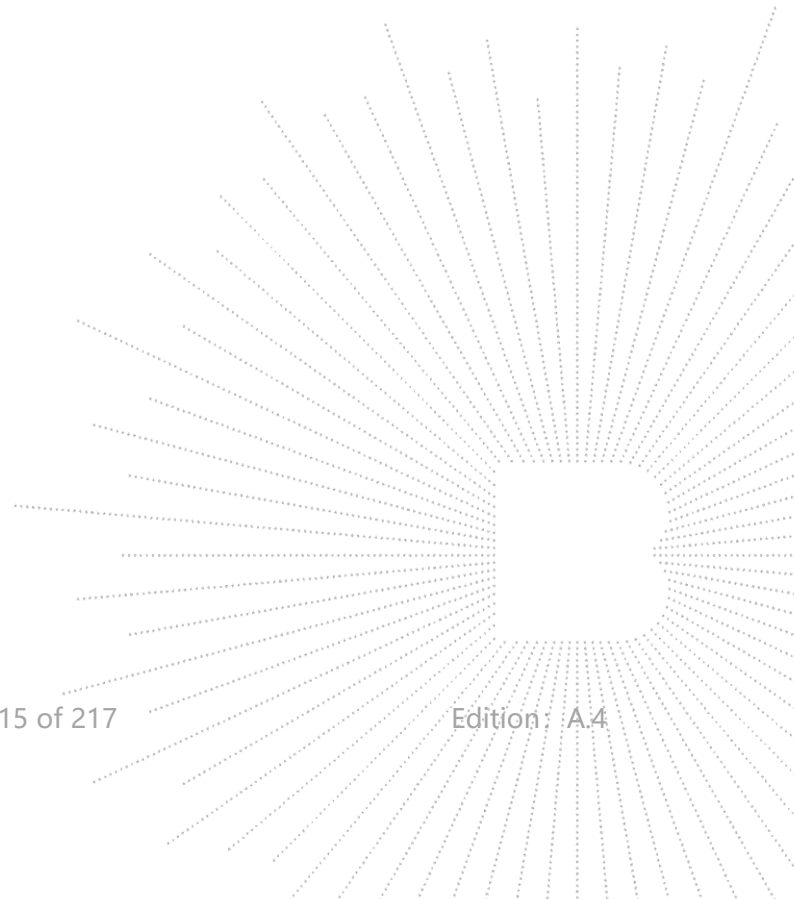
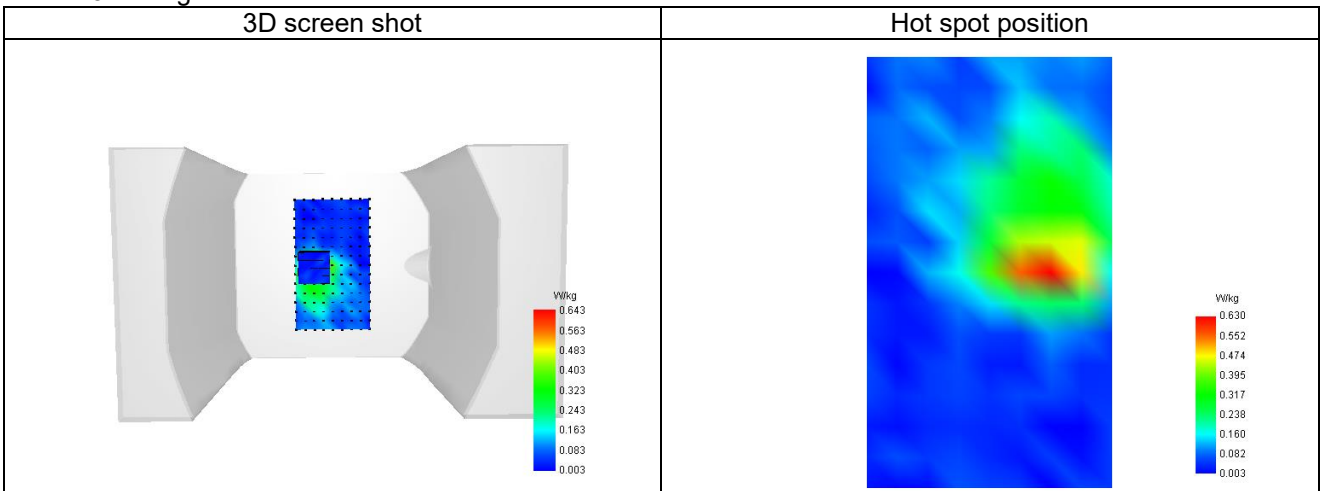
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.299     |
| SAR 1g (W/Kg)   | 0.570     |
| Variation (%)   | 3.380     |
| Horizontal validation criteria: minimum distance (mm) | 11.313708 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 56.273384 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.935 | 0.643 | 0.362 | 0.160 | 0.089 | 0.086 | 0.082 |



## F. 3D Image



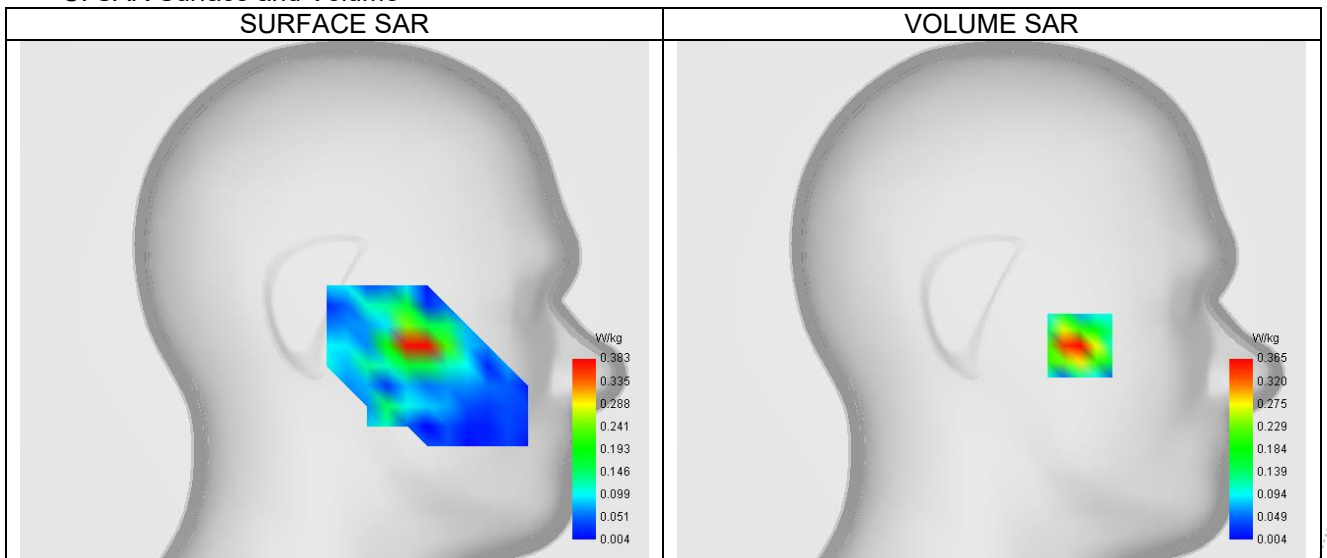
## Plot 28

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.63                                |
| Area Scan       | sam_direct_droit2_surf8mm.txt       |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Left head                           |
| Device Position | Cheek                               |
| Band            | LTE band 7                          |
| Channels        | Middle (21100)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

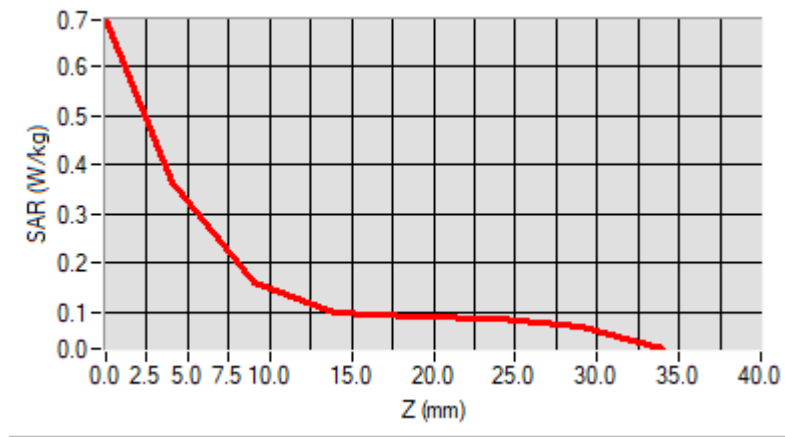
|  |          |
|--|----------|
| Frequency (MHz)                        | 2535.000 |
| Relative permittivity (real part)      | 39.087   |
| Relative permittivity (imaginary part) | 13.418   |
| Conductivity (S/m)                     | 1.890    |

**C. SAR Surface and Volume**

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

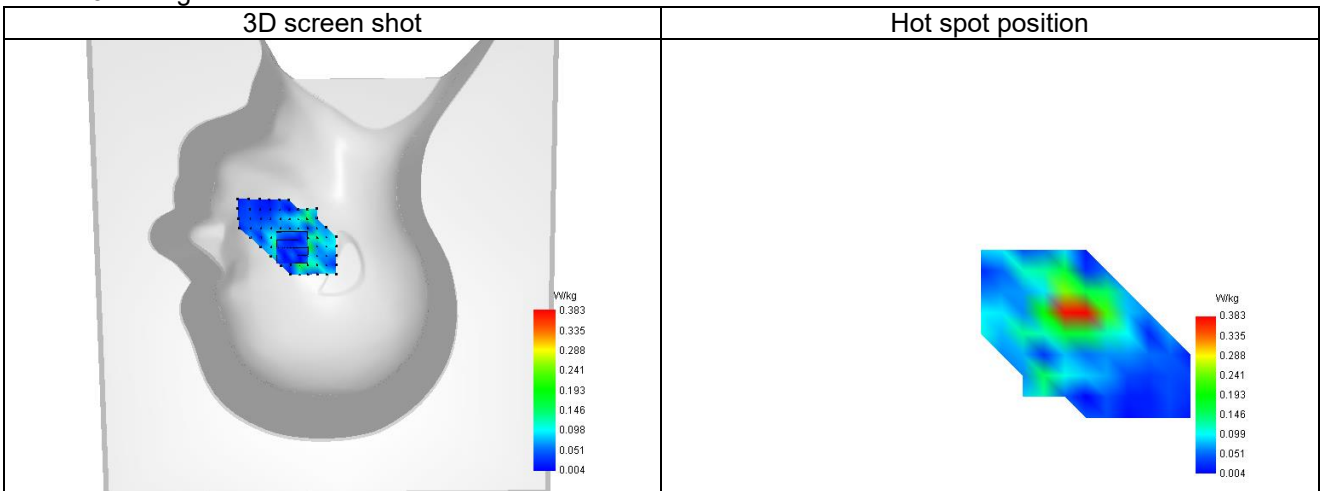
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.168     |
| SAR 1g (W/Kg)   | 0.353     |
| Variation (%)   | -1.460    |
| Horizontal validation criteria: minimum distance (mm) | 11.313708 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 43.601734 |

**E. Z Axis Scan**

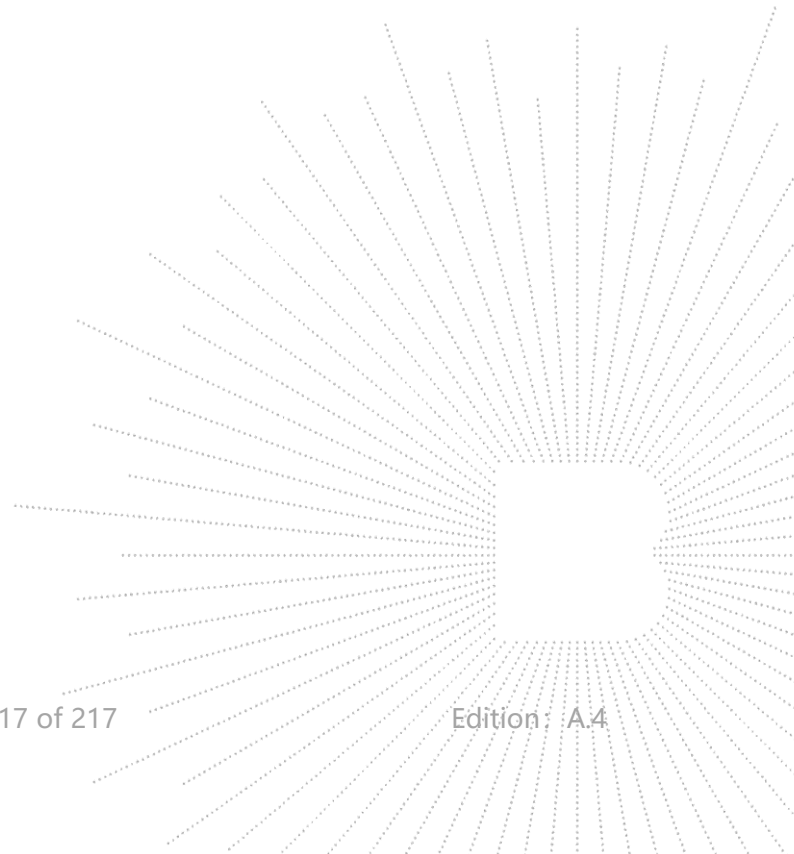
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.694 | 0.365 | 0.159 | 0.099 | 0.090 | 0.085 | 0.072 |



## F. 3D Image



BCTC  
 3C  
 PPR  
 检测



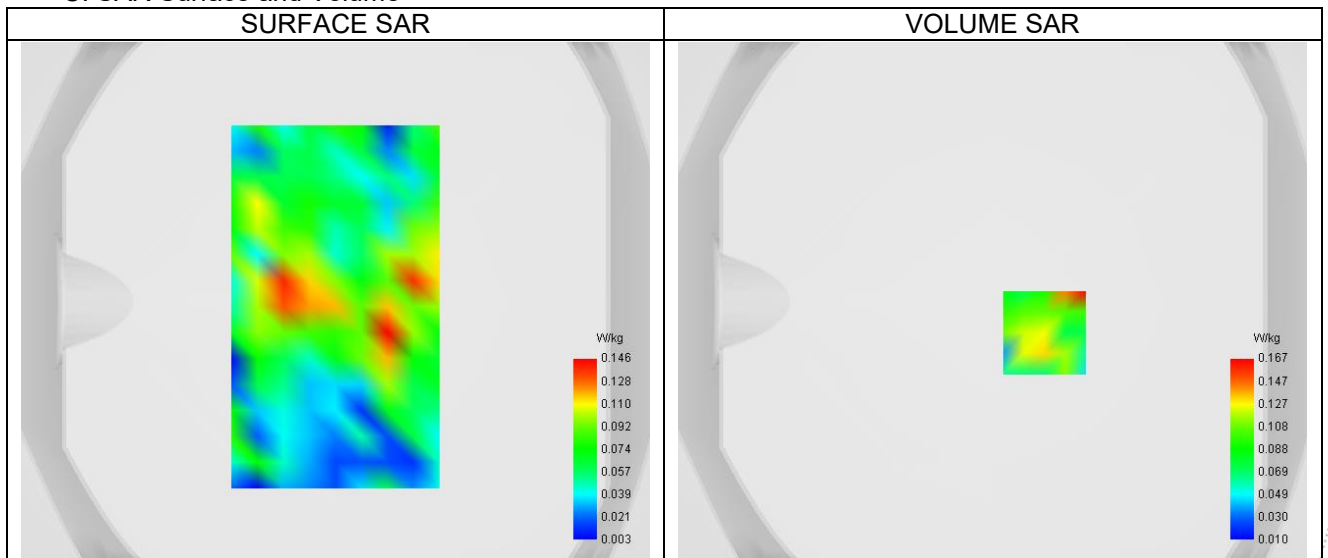
## Plot 29

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.63                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | LTE band 7                          |
| Channels        | Middle (21100)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

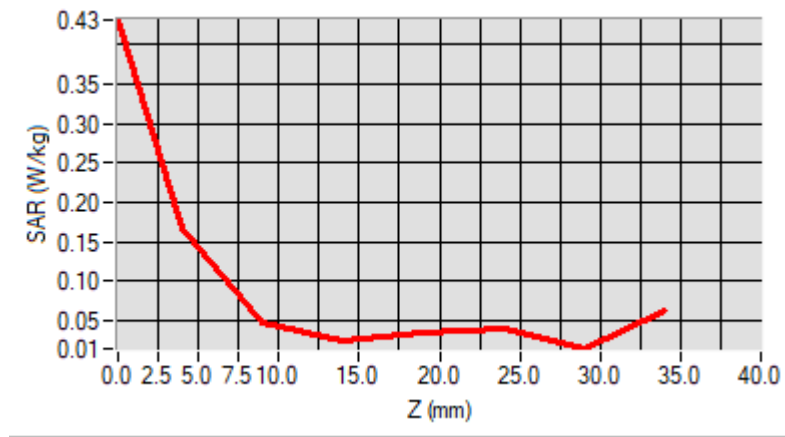
|  |          |
|--|----------|
| Frequency (MHz)                        | 2535.000 |
| Relative permittivity (real part)      | 39.087   |
| Relative permittivity (imaginary part) | 13.418   |
| Conductivity (S/m)                     | 1.890    |

**C. SAR Surface and Volume**

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

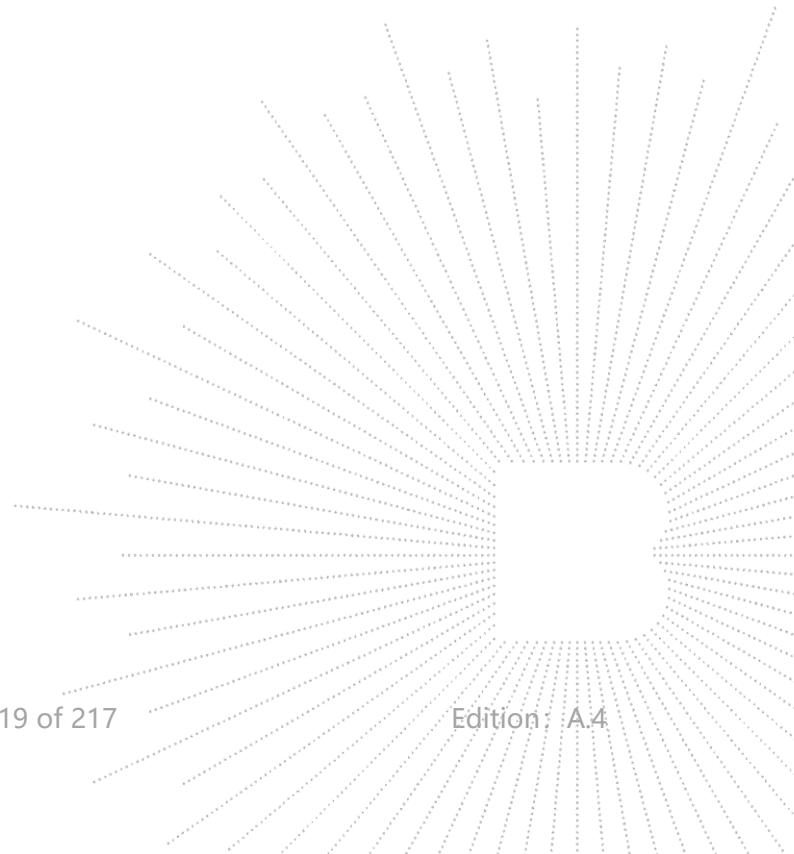
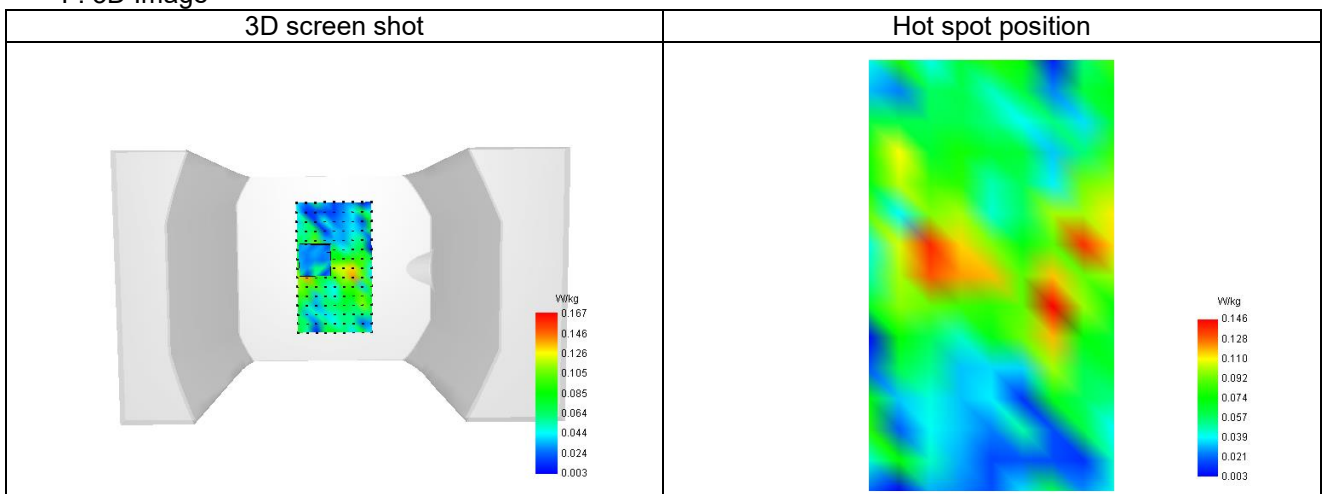
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.075     |
| SAR 1g (W/Kg)   | 0.127     |
| Variation (%)   | -1.140    |
| Horizontal validation criteria: minimum distance (mm) | 0.000000  |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 49.368964 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.431 | 0.167 | 0.049 | 0.026 | 0.036 | 0.039 | 0.015 |



## F. 3D Image



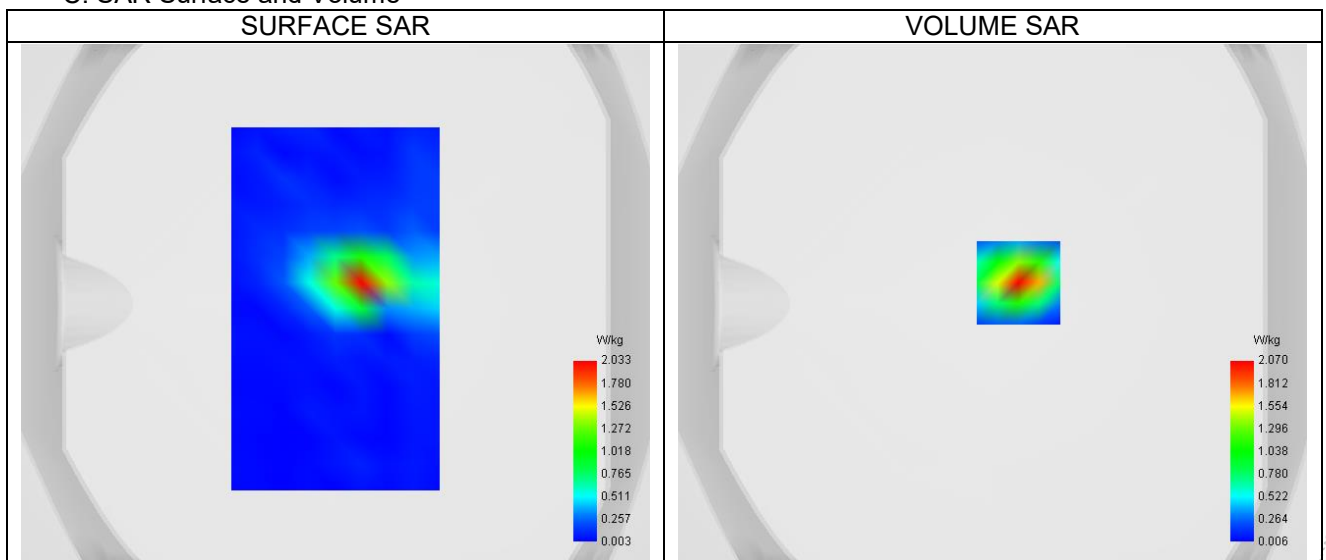
## Plot 30

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.63                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | LTE band 7                          |
| Channels        | Middle (21100)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

|  |          |
|--|----------|
| Frequency (MHz)                        | 2535.000 |
| Relative permittivity (real part)      | 39.087   |
| Relative permittivity (imaginary part) | 13.418   |
| Conductivity (S/m)                     | 1.890    |

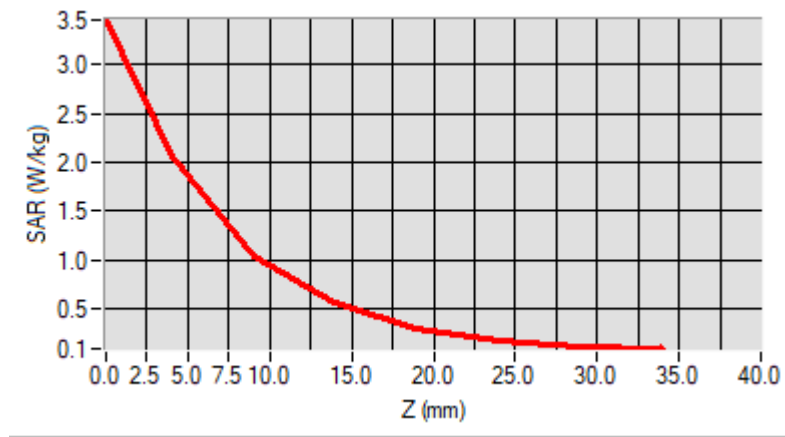
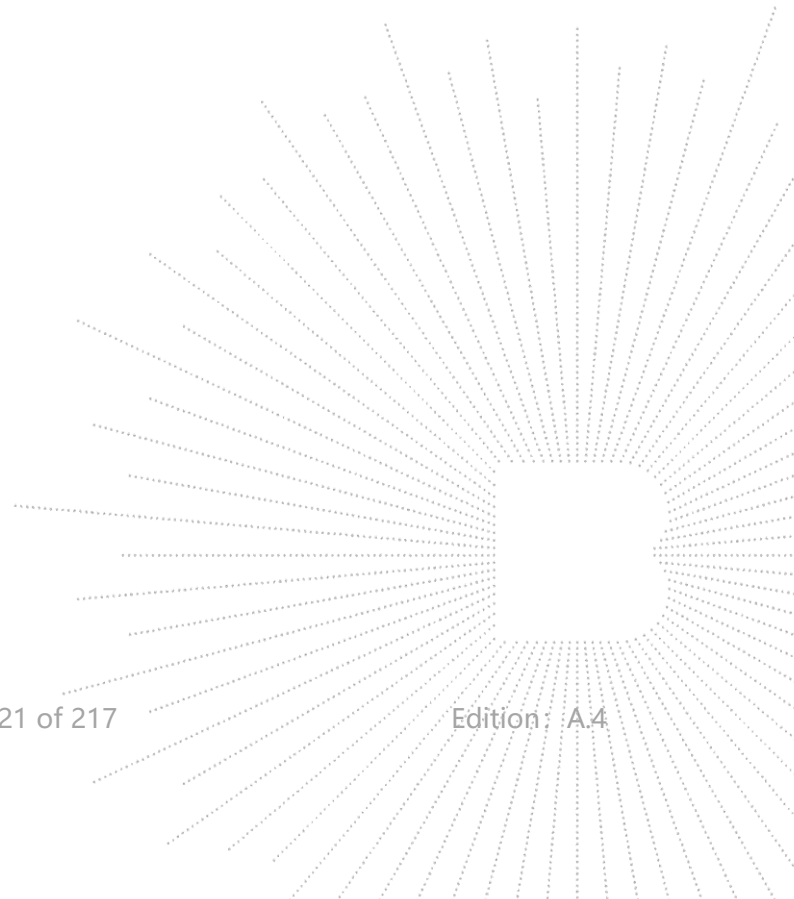
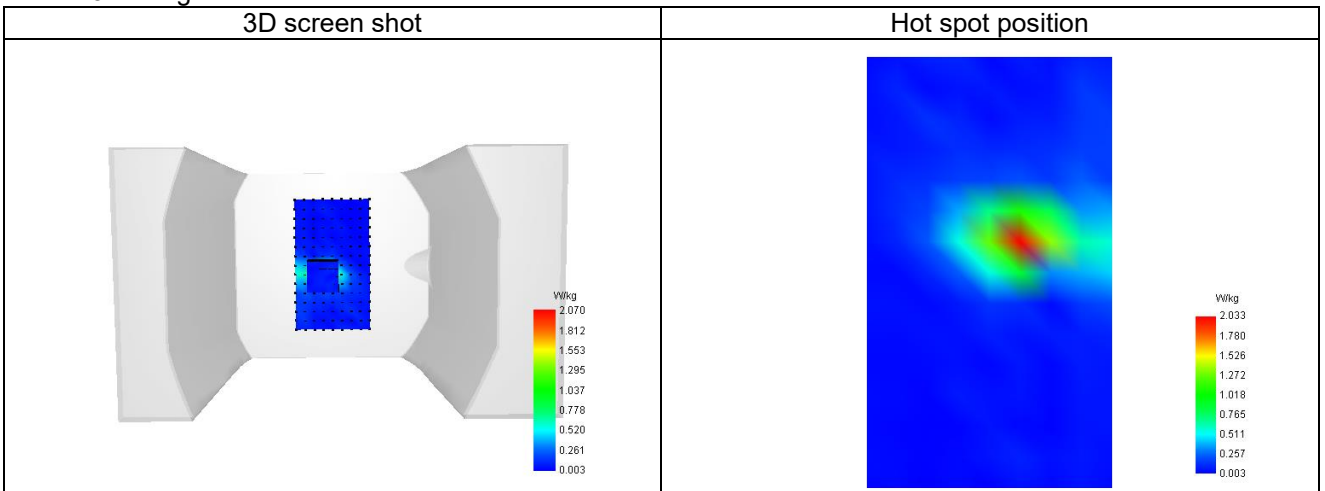
**C. SAR Surface and Volume**

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

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.779     |
| SAR 1g (W/Kg)   | 1.863     |
| Variation (%)   | -0.440    |
| Horizontal validation criteria: minimum distance (mm) | 11.313708 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 49.960387 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 3.460 | 2.070 | 1.034 | 0.555 | 0.290 | 0.176 | 0.116 |




**F. 3D Image**


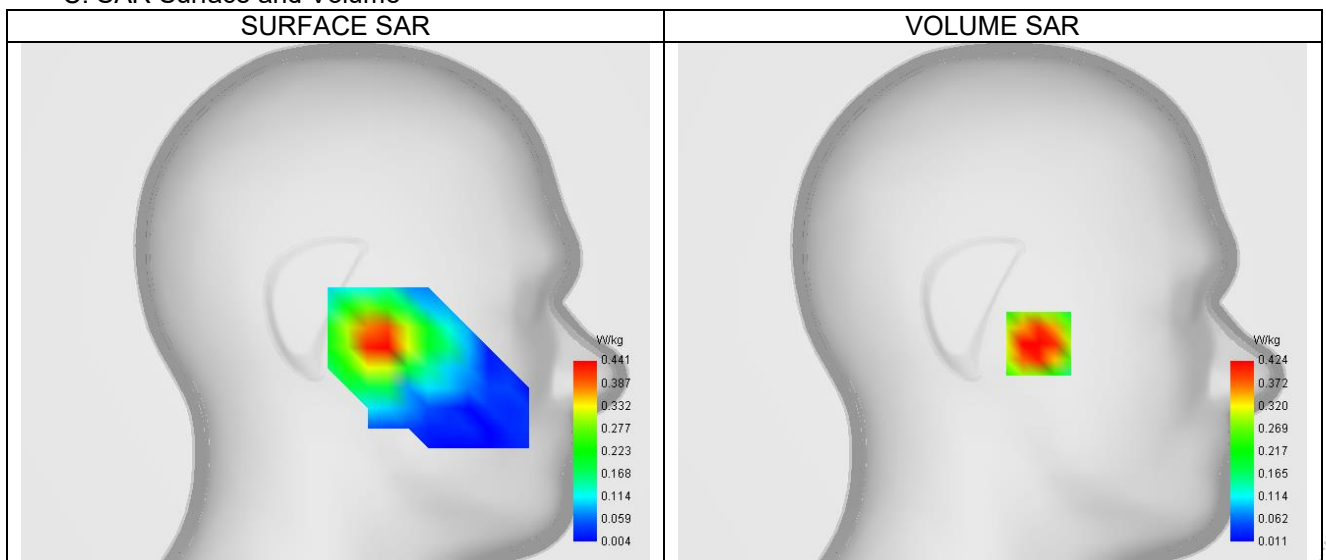
## Plot 31

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.08                                |
| Area Scan       | sam_direct_droit2_surf8mm.txt       |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Left head                           |
| Device Position | Cheek                               |
| Band            | LTE band 8                          |
| Channels        | Middle (21625)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

|  |         |
|--|---------|
| Frequency (MHz)                        | 897.500 |
| Relative permittivity (real part)      | 41.500  |
| Relative permittivity (imaginary part) | 19.400  |
| Conductivity (S/m)                     | 0.967   |

**C. SAR Surface and Volume**


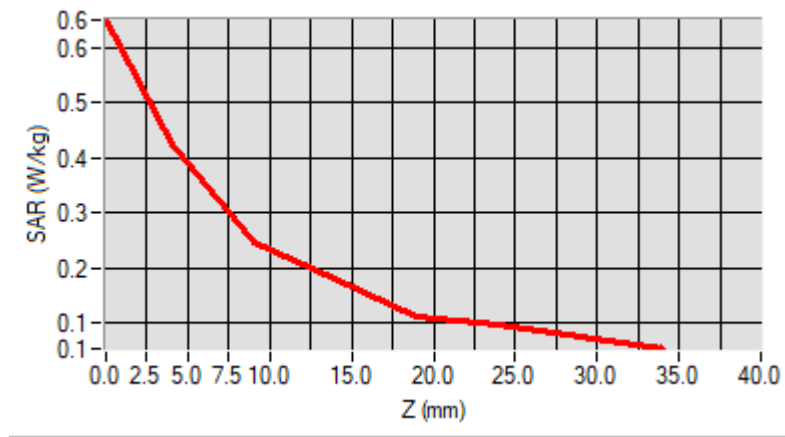
Maximum location: X=-23.00, Y=-20.00 ; SAR Peak: 0.76 W/kg

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

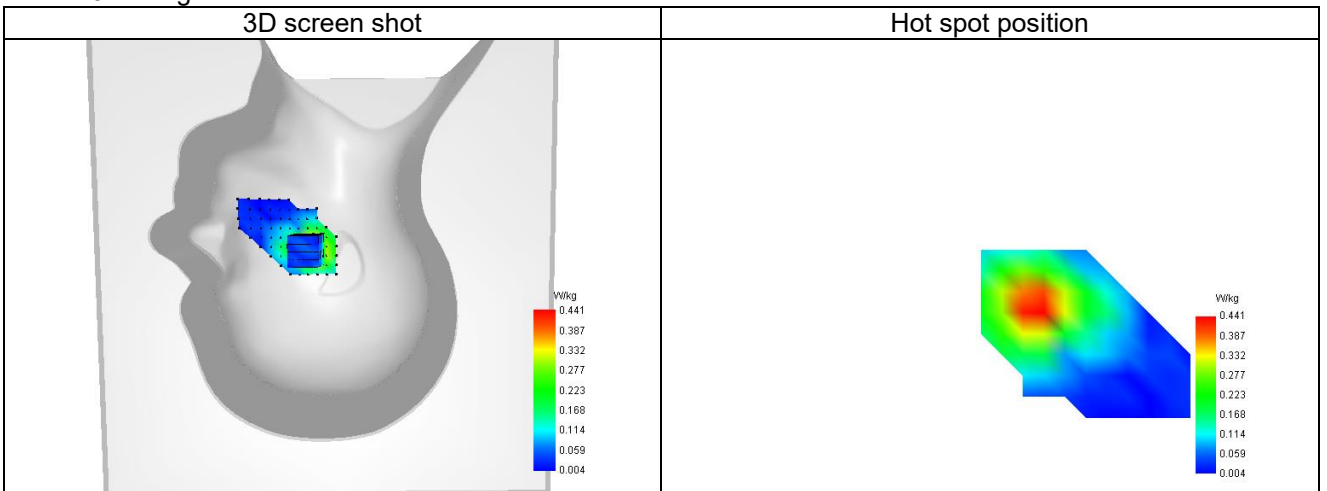
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.250     |
| SAR 1g (W/Kg)   | 0.434     |
| Variation (%)   | -3.300    |
| Horizontal validation criteria: minimum distance (mm) | 22.090722 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 57.942494 |

**E. Z Axis Scan**

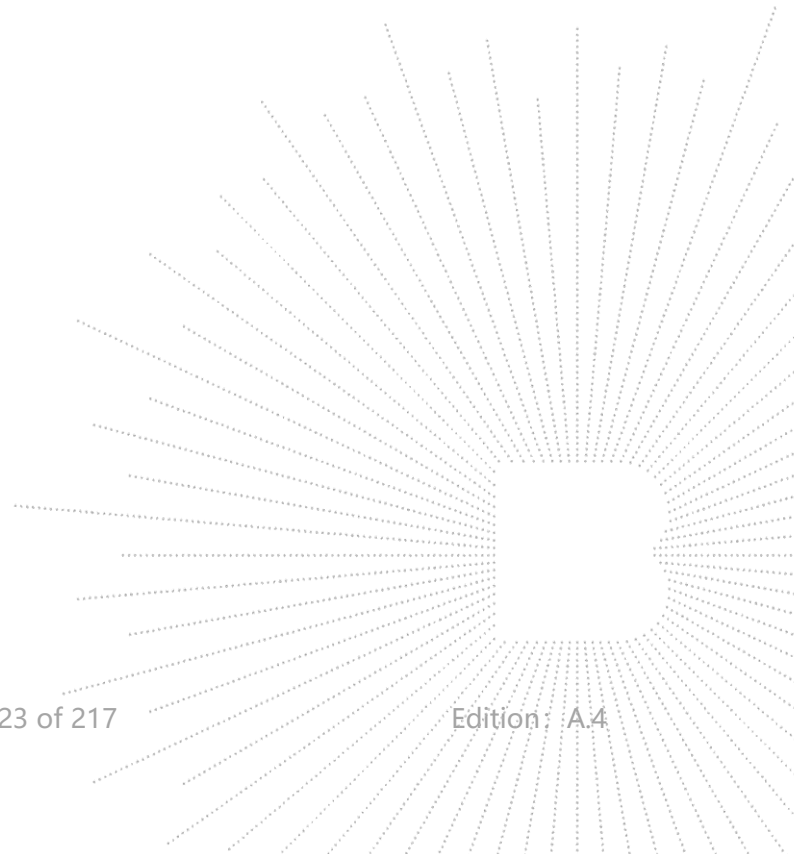
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.650 | 0.424 | 0.245 | 0.181 | 0.113 | 0.098 | 0.075 |



## F. 3D Image



BCTC  
 3C  
 PPR  
 检测



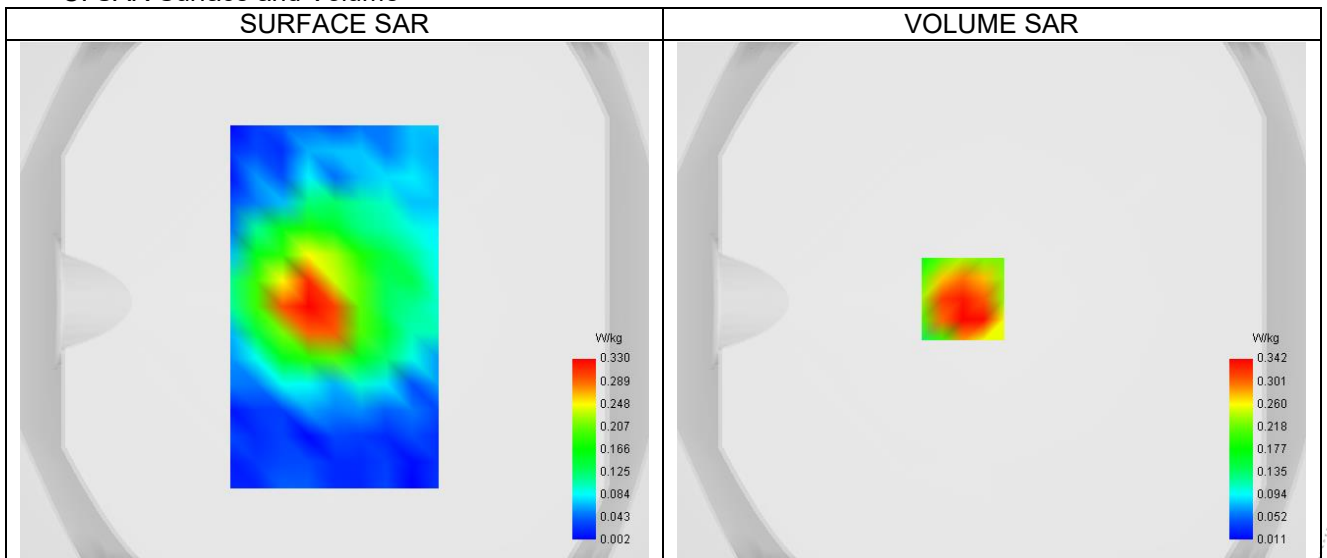
## Plot 32

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.08                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | LTE band 8                          |
| Channels        | Middle (21625)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

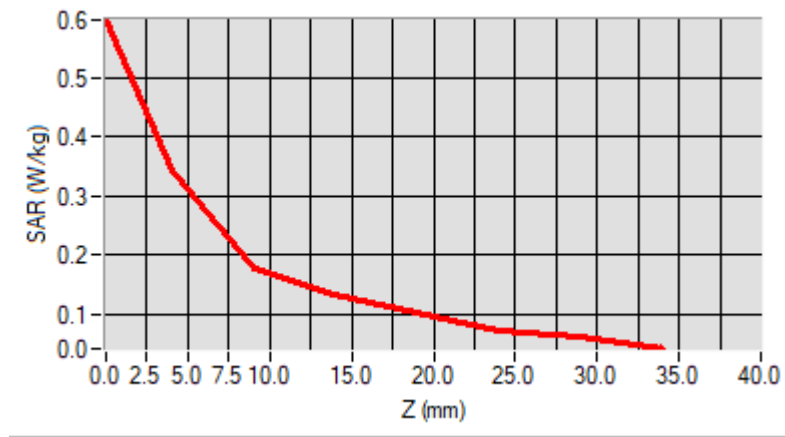
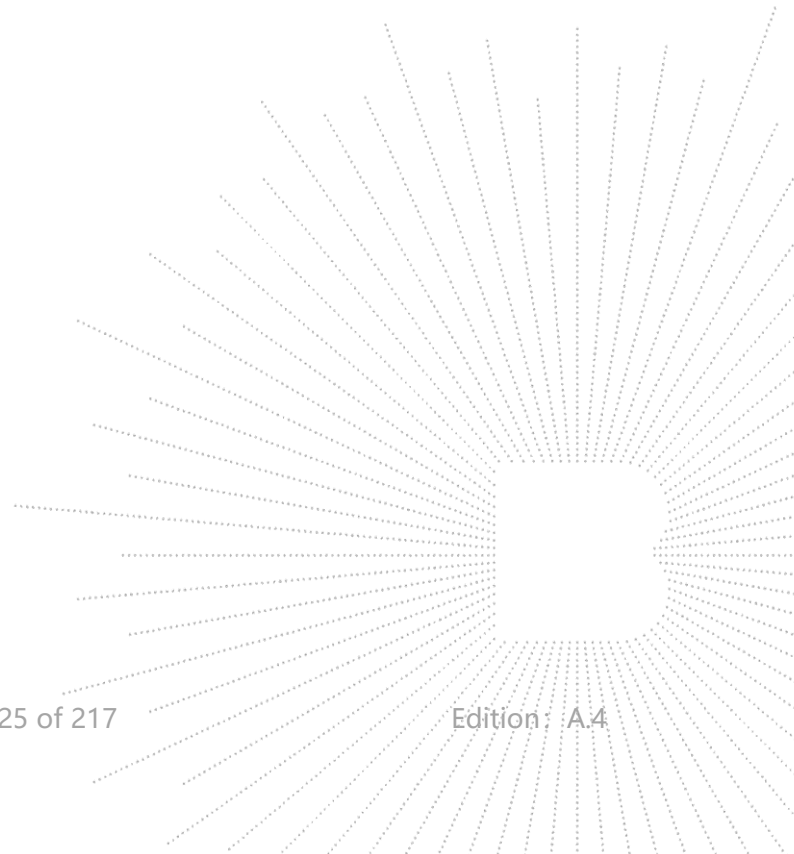
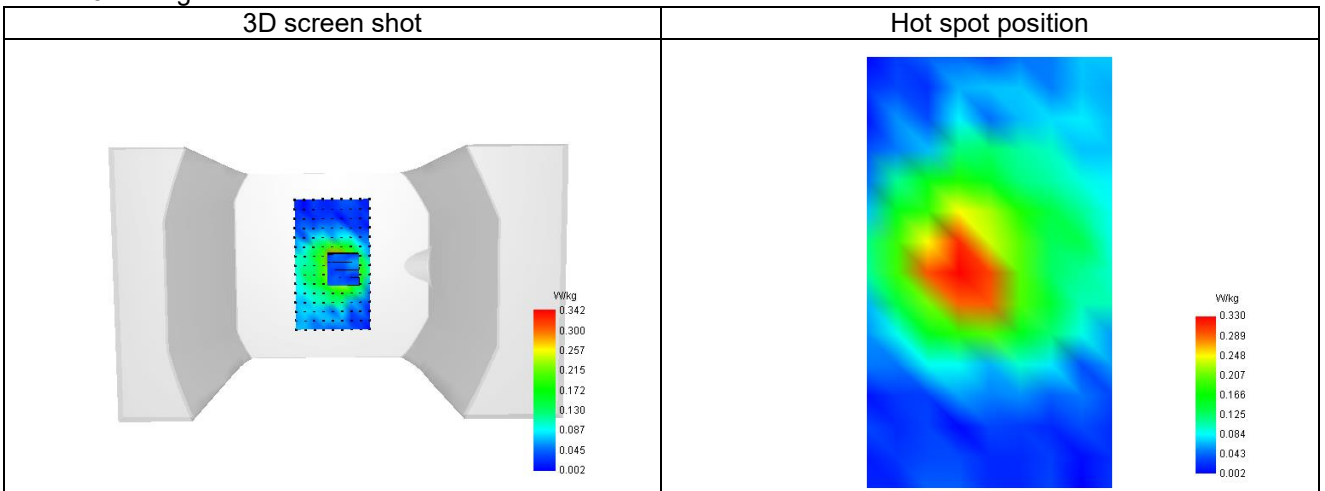
|  |         |
|--|---------|
| Frequency (MHz)                        | 897.500 |
| Relative permittivity (real part)      | 41.500  |
| Relative permittivity (imaginary part) | 19.400  |
| Conductivity (S/m)                     | 0.967   |

**C. SAR Surface and Volume**

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

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.200     |
| SAR 1g (W/Kg)   | 0.328     |
| Variation (%)   | -4.040    |
| Horizontal validation criteria: minimum distance (mm) | 17.888544 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 67.161828 |

**E. Z Axis Scan**

|            |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.597 | 0.342 | 0.178 | 0.133 | 0.105 | 0.073 | 0.063 |


**F. 3D Image**


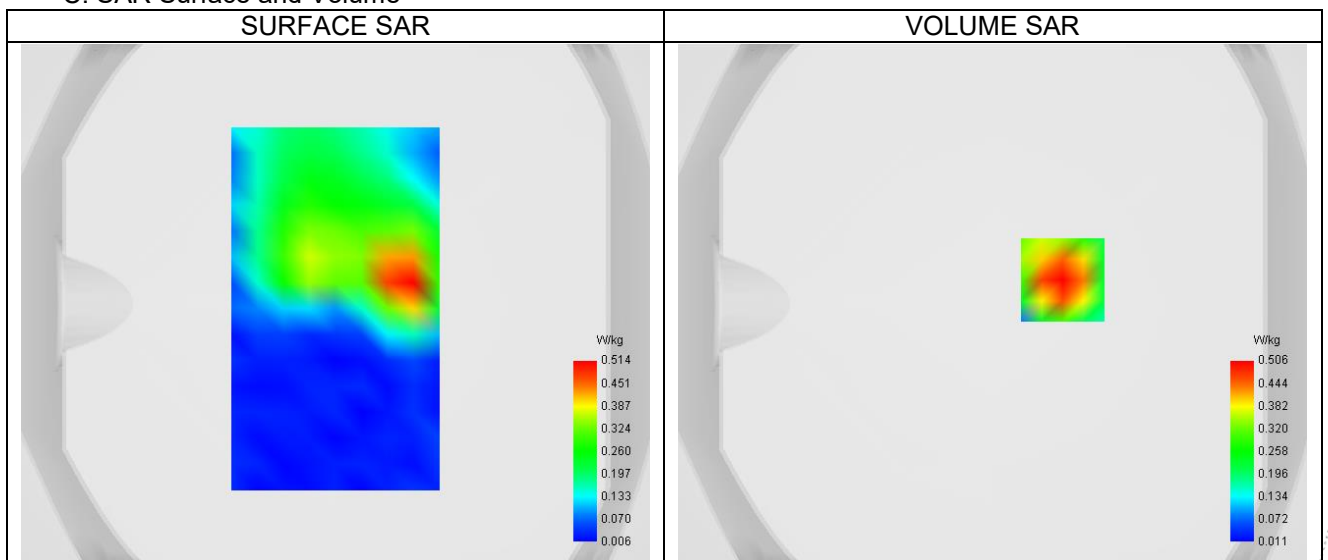
## Plot 33

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.08                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | LTE band 8                          |
| Channels        | Middle (21625)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

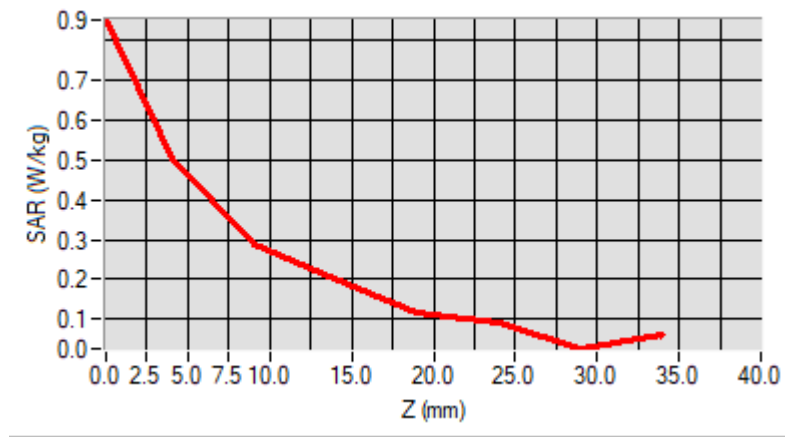
|  |         |
|--|---------|
| Frequency (MHz)                        | 897.500 |
| Relative permittivity (real part)      | 41.500  |
| Relative permittivity (imaginary part) | 19.400  |
| Conductivity (S/m)                     | 0.967   |

**C. SAR Surface and Volume**

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

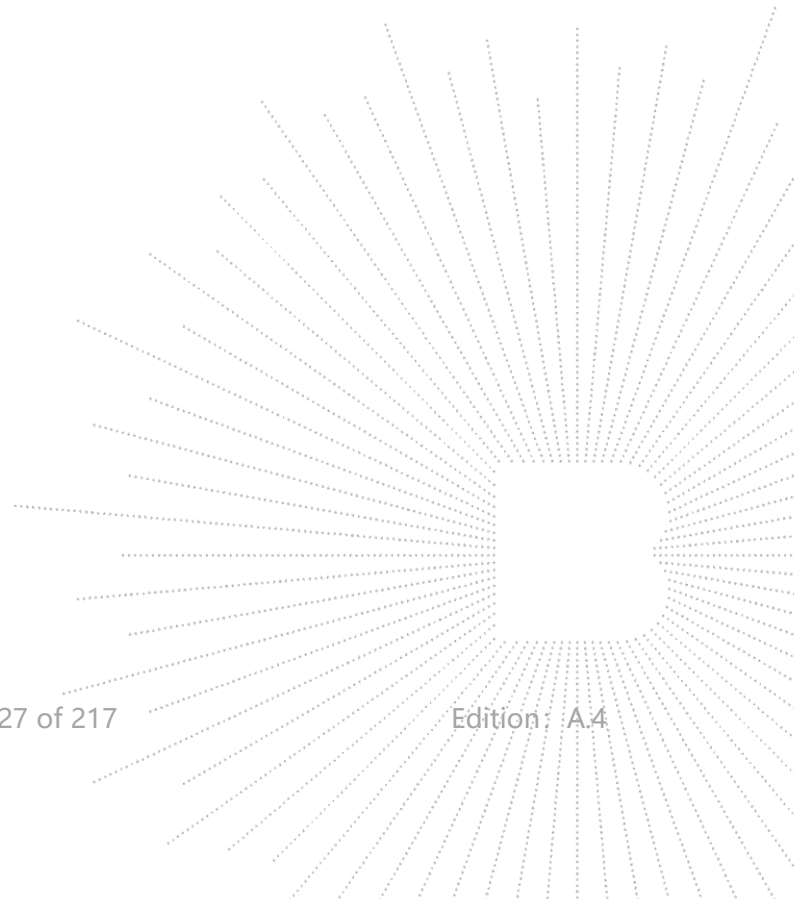
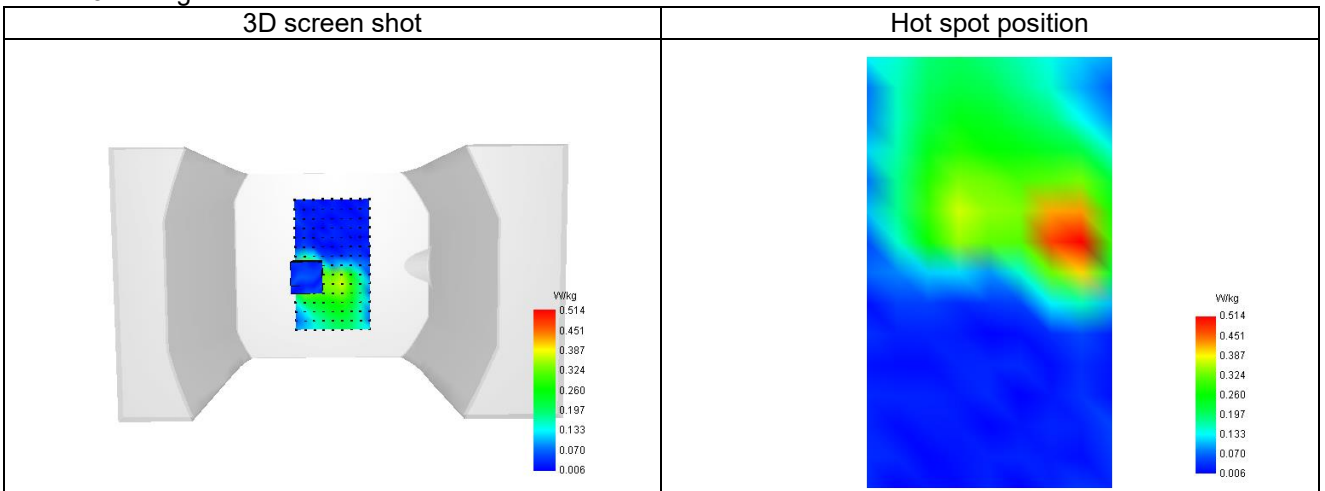
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.271     |
| SAR 1g (W/Kg)   | 0.501     |
| Variation (%)   | -3.900    |
| Horizontal validation criteria: minimum distance (mm) | 16.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 56.571457 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.852 | 0.506 | 0.286 | 0.202 | 0.117 | 0.094 | 0.026 |



## F. 3D Image



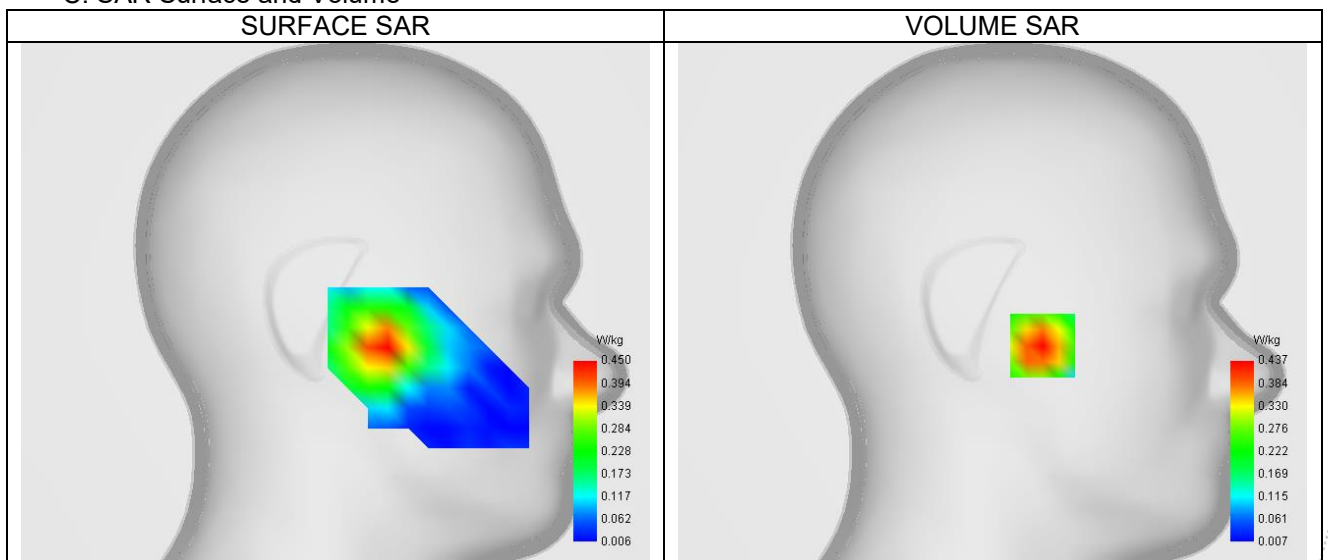
## Plot 34

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.01                                |
| Area Scan       | sam_direct_droit2_surf8mm.txt       |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Left head                           |
| Device Position | Cheek                               |
| Band            | LTE band 20                         |
| Channels        | Middle (24300)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

|  |         |
|--|---------|
| Frequency (MHz)                        | 847.000 |
| Relative permittivity (real part)      | 42.190  |
| Relative permittivity (imaginary part) | 20.108  |
| Conductivity (S/m)                     | 0.946   |

**C. SAR Surface and Volume**


Maximum location: X=-25.00, Y=-21.00 ; SAR Peak: 0.65 W/kg

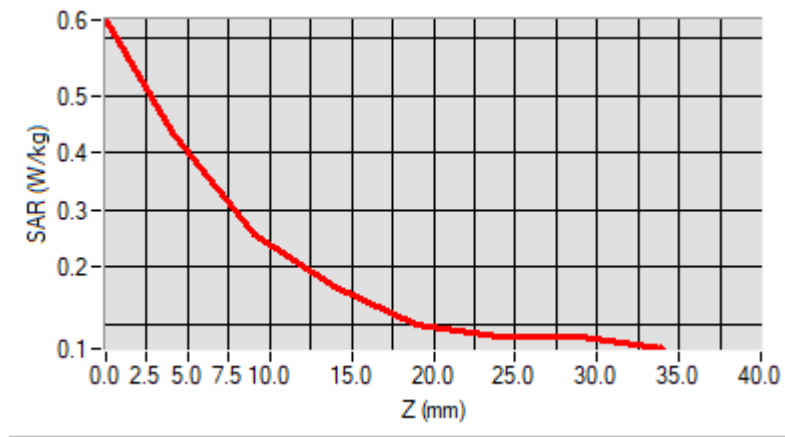
**D. SAR 1g & 10g**

|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.248     |
| SAR 1g (W/Kg)   | 0.418     |
| Variation (%)   | -4.710    |
| Horizontal validation criteria: minimum distance (mm) | 22.083931 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 59.073963 |

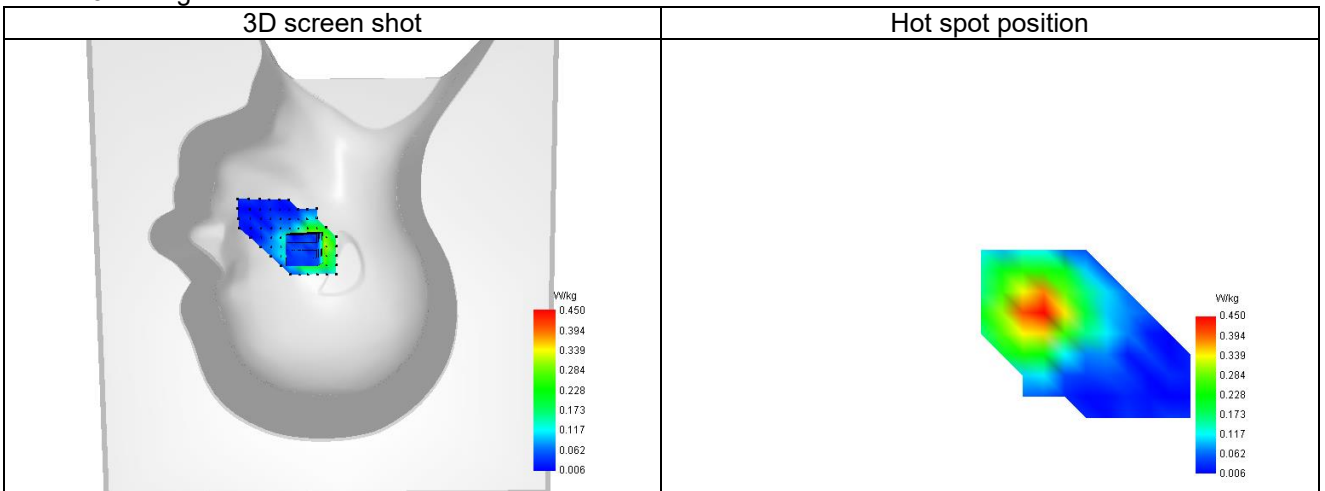
**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.633 | 0.437 | 0.258 | 0.165 | 0.100 | 0.079 | 0.077 |

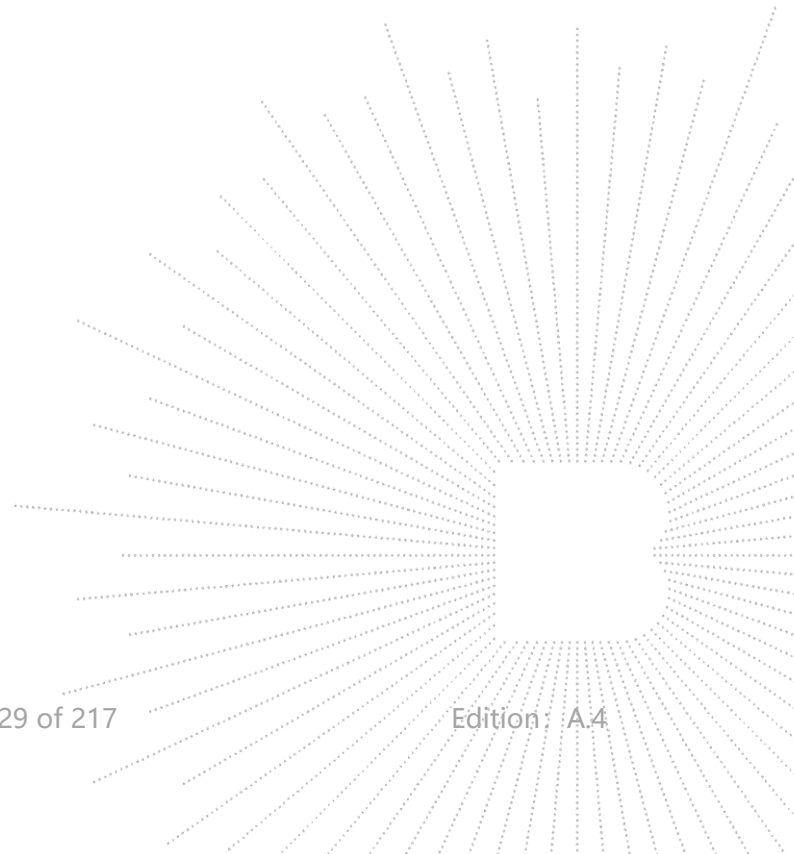




## F. 3D Image



BCTC  
 3C  
 PPR  
 検測



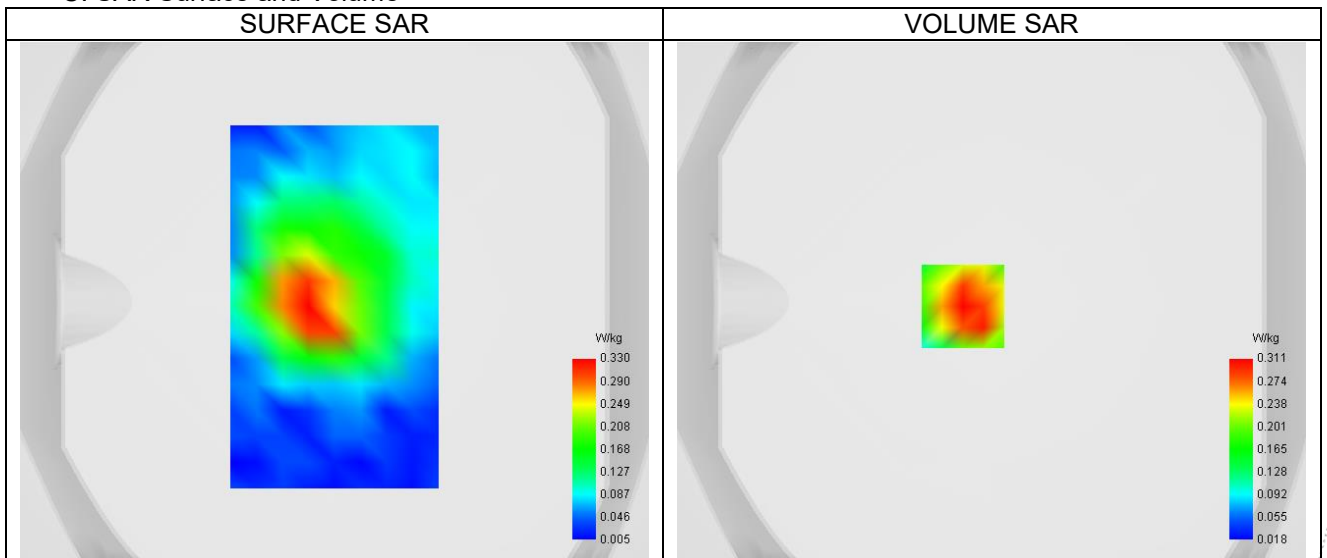
## Plot 35

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.01                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | LTE band 20                         |
| Channels        | Middle (24300)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

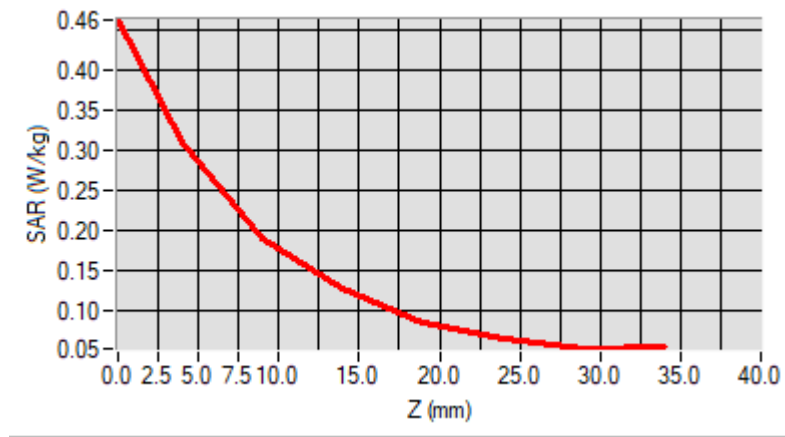
|  |         |
|--|---------|
| Frequency (MHz)                        | 847.000 |
| Relative permittivity (real part)      | 42.190  |
| Relative permittivity (imaginary part) | 20.108  |
| Conductivity (S/m)                     | 0.946   |

**C. SAR Surface and Volume**

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

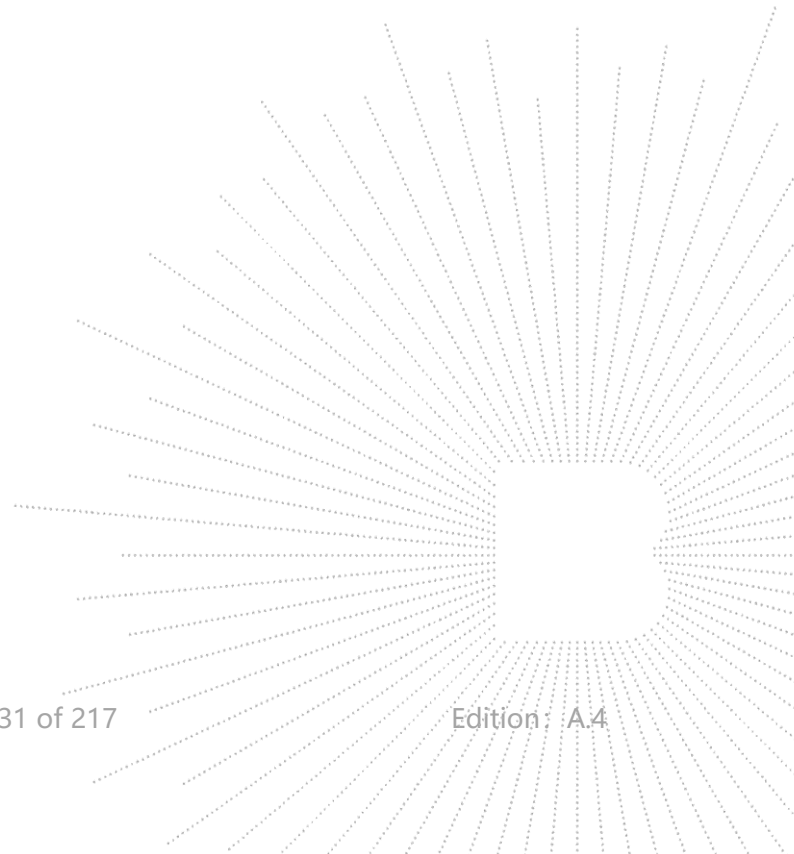
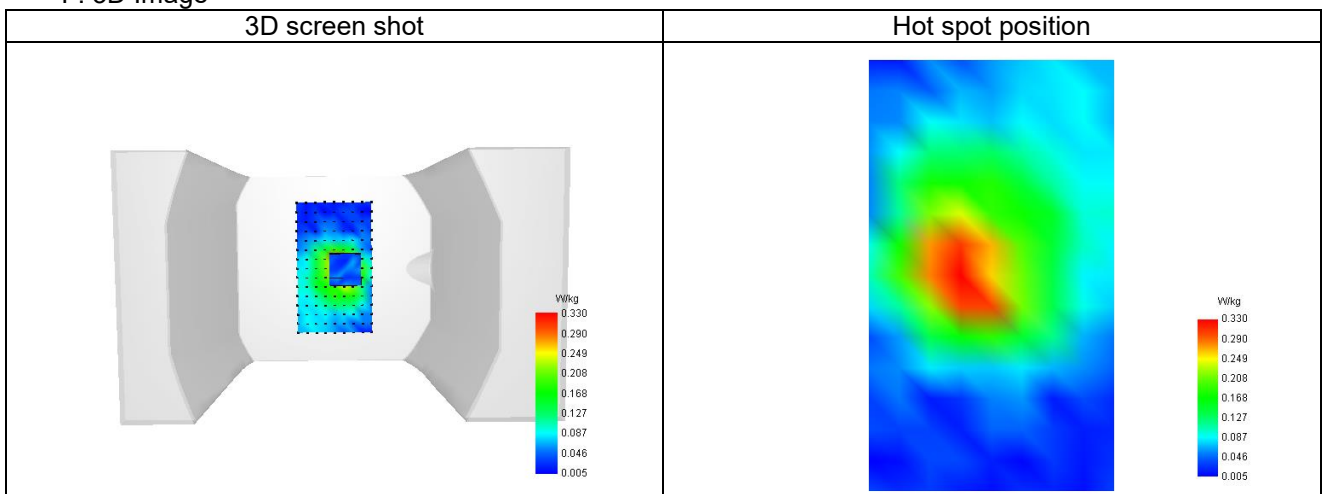
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.185     |
| SAR 1g (W/Kg)   | 0.304     |
| Variation (%)   | -0.150    |
| Horizontal validation criteria: minimum distance (mm) | 17.888544 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 61.324052 |

**E. Z Axis Scan**

| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
|------------|-------|-------|-------|-------|-------|-------|-------|
| SAR (W/Kg) | 0.464 | 0.311 | 0.191 | 0.127 | 0.085 | 0.065 | 0.052 |



## F. 3D Image



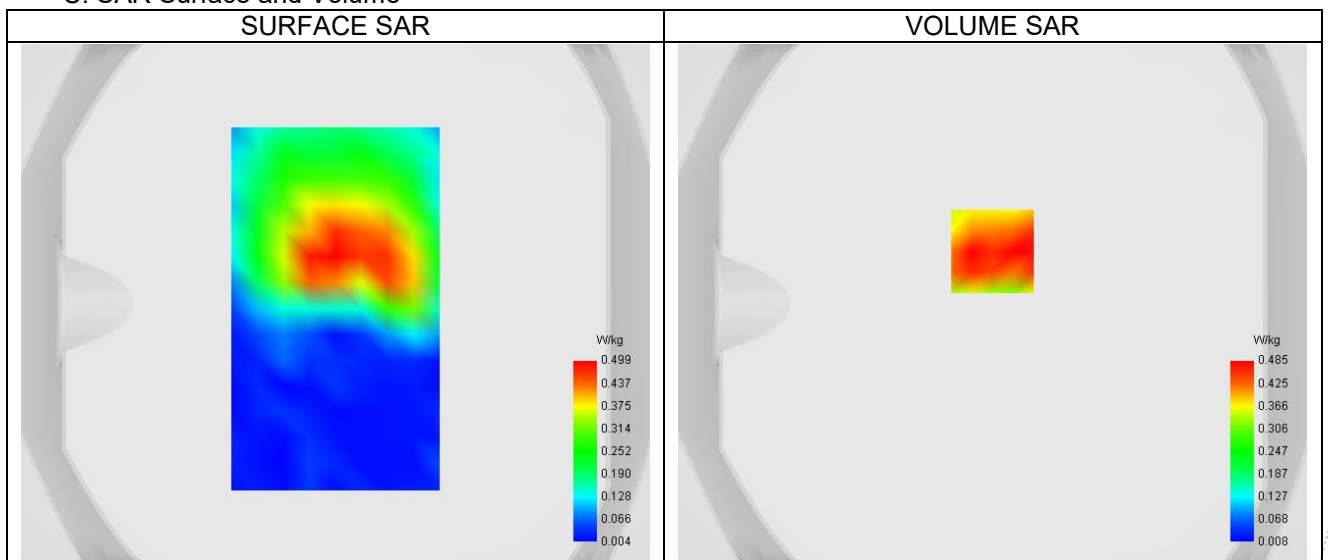
## Plot 36

**A. Experimental conditions.**

|                 |                                     |
|-----------------|-------------------------------------|
| Probe           | SN 25/22 EPG0373                    |
| ConvF           | 3.01                                |
| Area Scan       | surf_sam_plan.txt                   |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm,Complete |
| Phantom         | Validation plane                    |
| Device Position | Body                                |
| Band            | LTE band 20                         |
| Channels        | Middle (24300)                      |
| Signal          | LTE (Crest factor: 1.0)             |

**B. Permittivity**

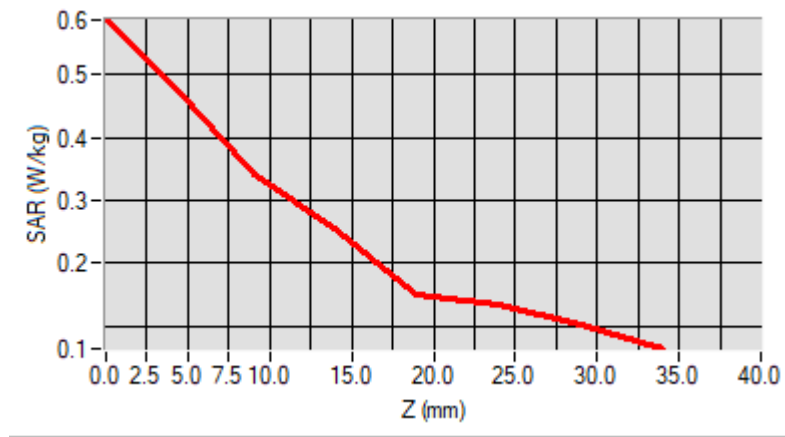
|  |         |
|--|---------|
| Frequency (MHz)                        | 847.000 |
| Relative permittivity (real part)      | 42.190  |
| Relative permittivity (imaginary part) | 20.108  |
| Conductivity (S/m)                     | 0.946   |

**C. SAR Surface and Volume**

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

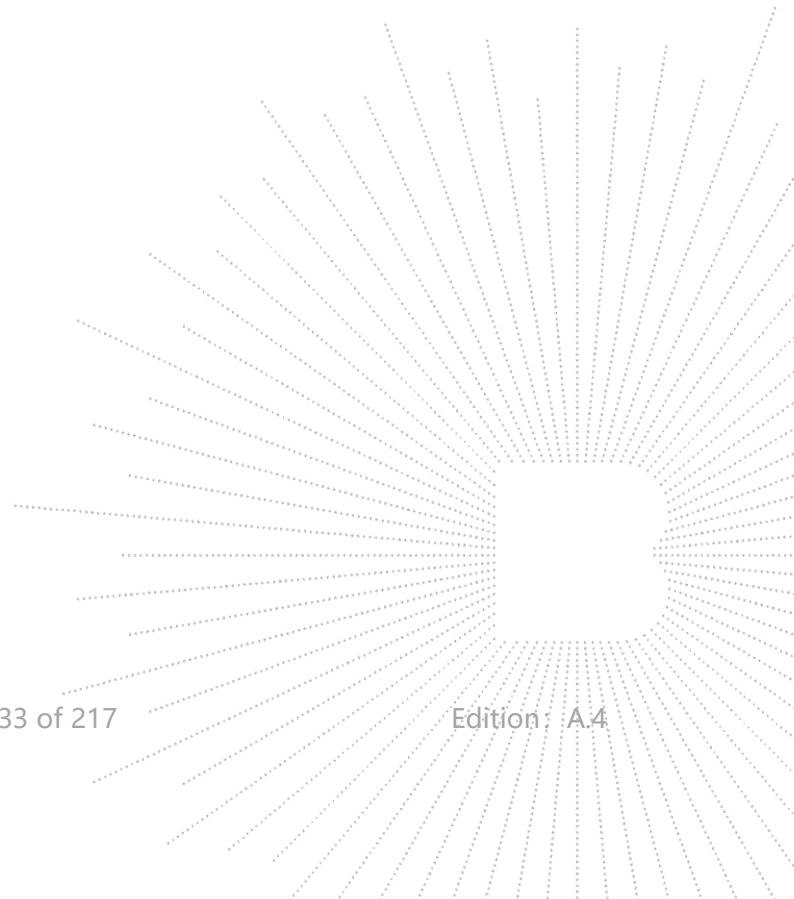
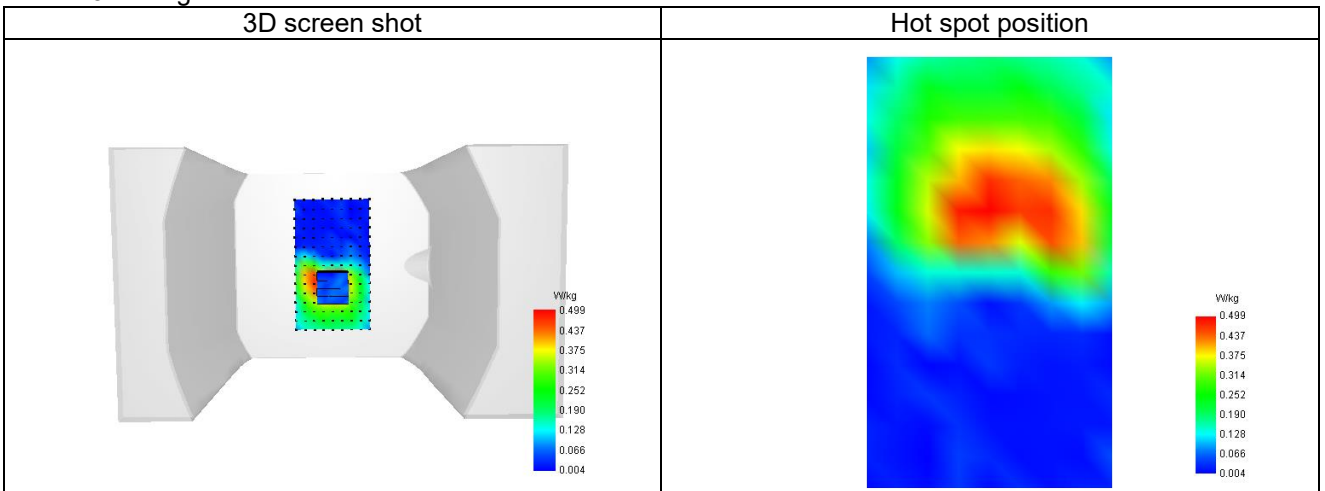
|   |           |
|---|-----------|
| SAR 10g (W/Kg)  | 0.316     |
| SAR 1g (W/Kg)   | 0.483     |
| Variation (%)   | -0.920    |
| Horizontal validation criteria: minimum distance (mm) | -1.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 76.491524 |

**E. Z Axis Scan**

|            |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 | 24.00 | 29.00 |
| SAR (W/Kg) | 0.587 | 0.485 | 0.343 | 0.256 | 0.152 | 0.135 | 0.102 |



## F. 3D Image



## 16. EUT Photographs

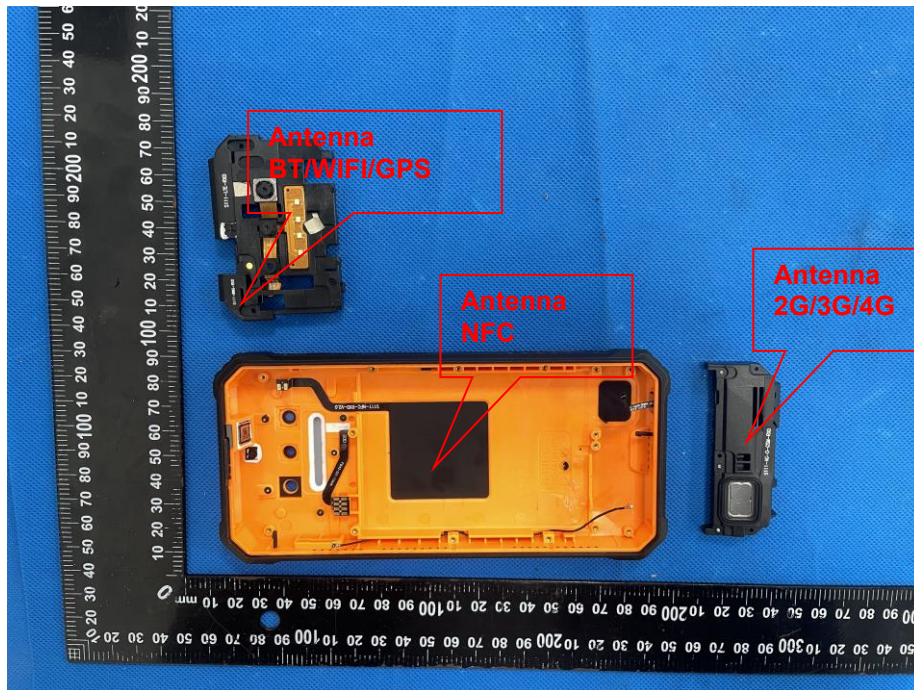
EUT Front View



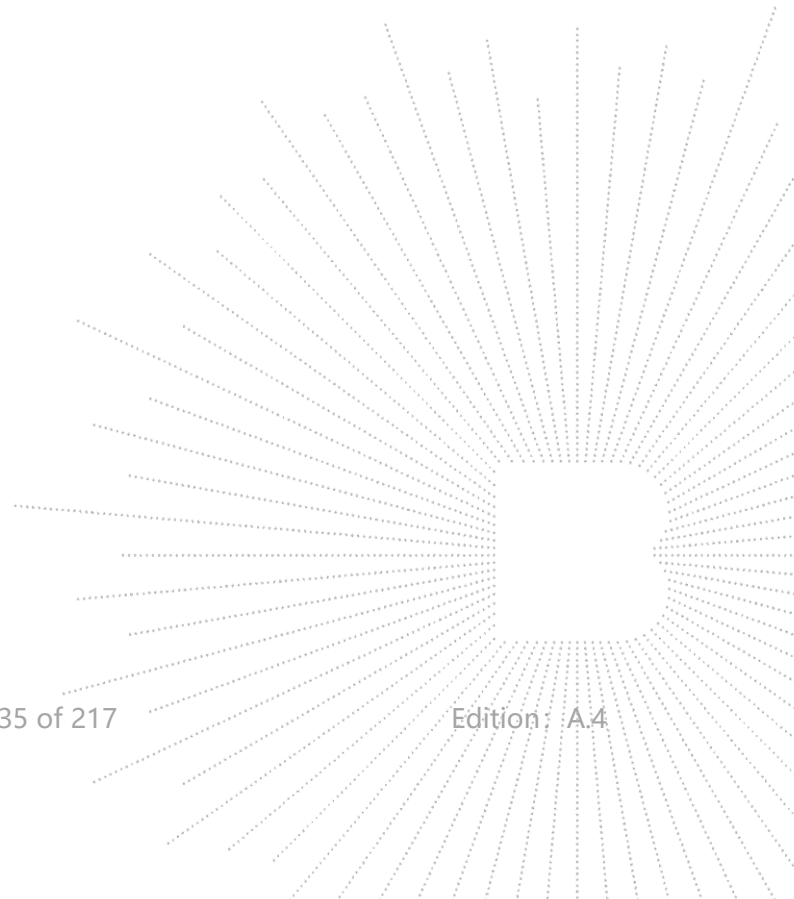
EUT Back View



**Antenna View**



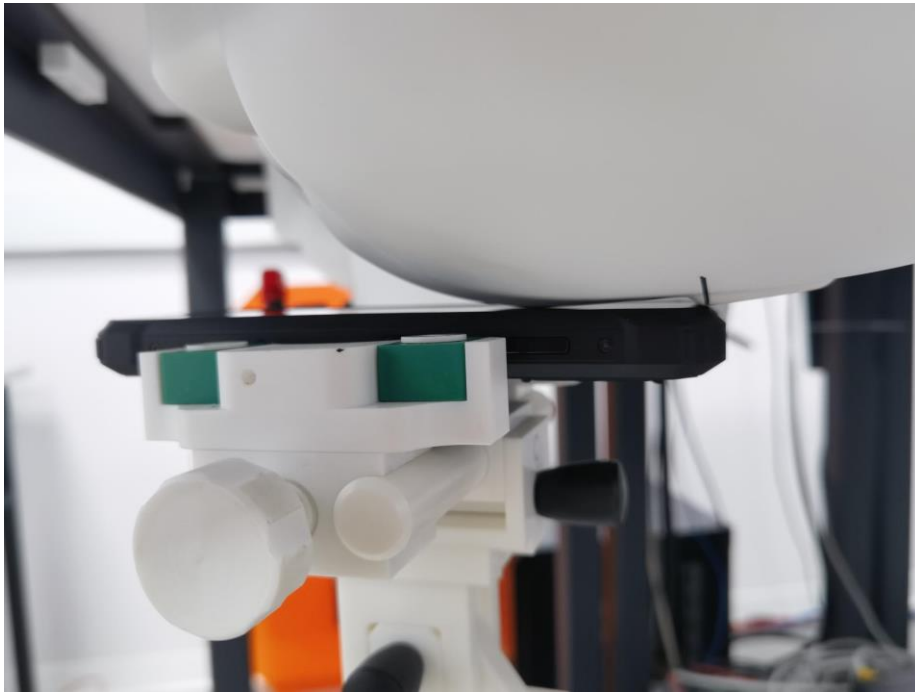
TC  
3C  
PPR  
測



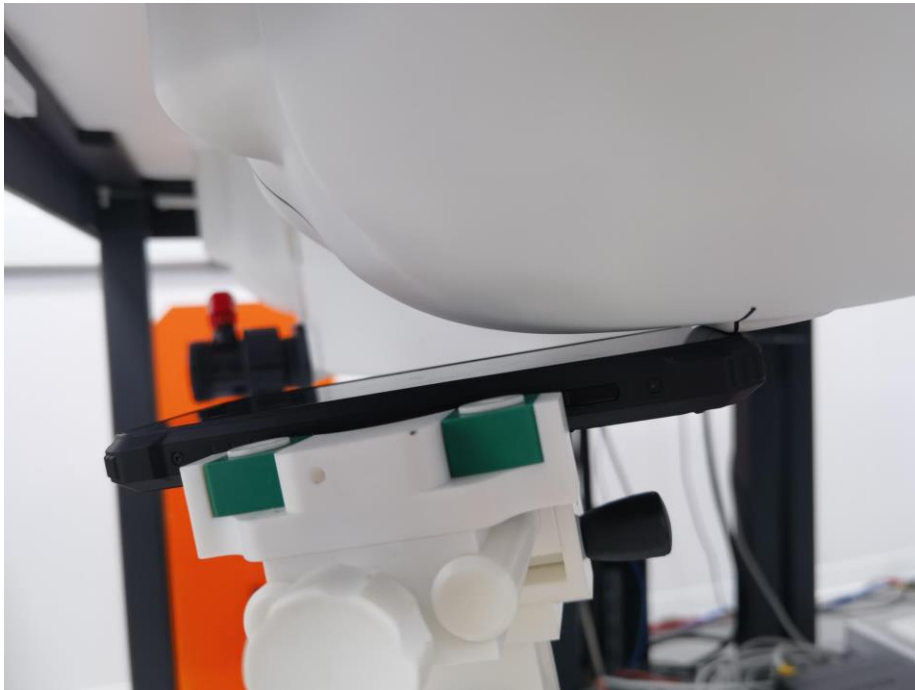
## 17. EUT Test Setup Photographs

### Head mode Exposure Conditions

**Left Cheek**

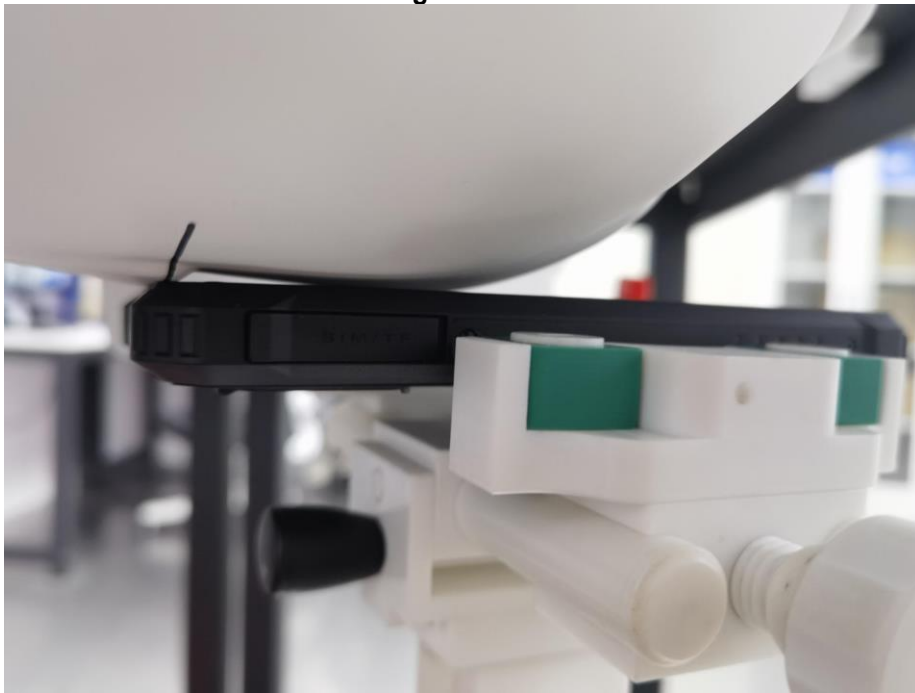


**Left Tilt**

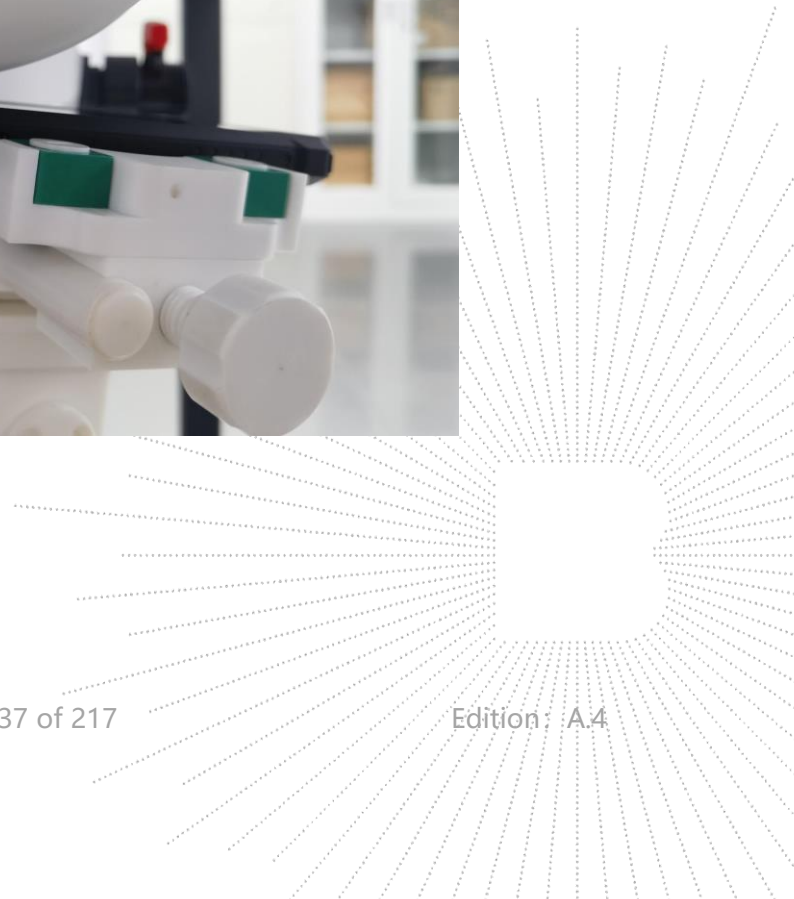
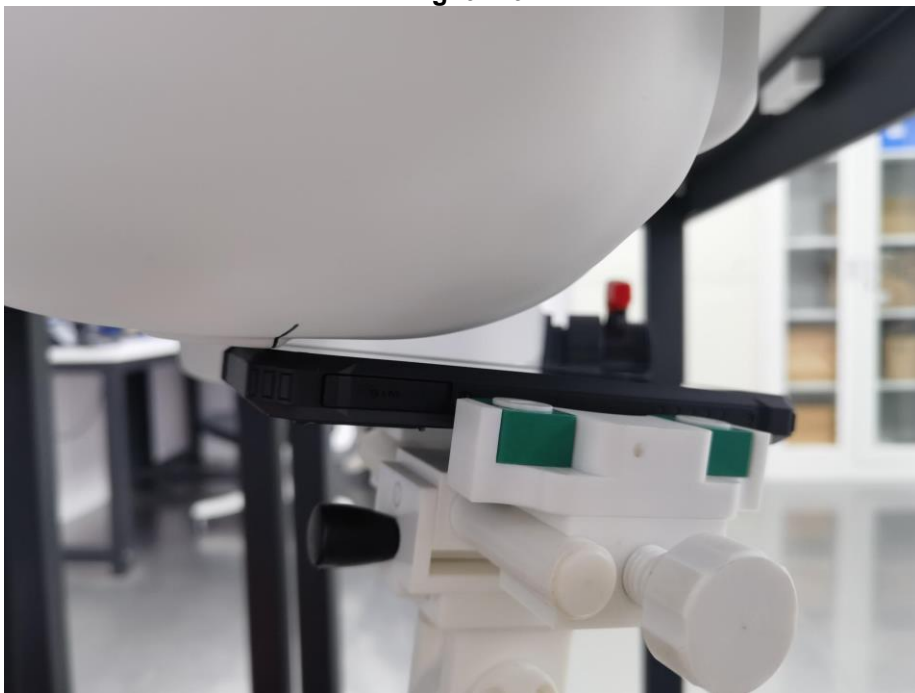




**Right Cheek**



**Right Tilt**



Body mode Exposure Conditions  
Test distance: 5mm

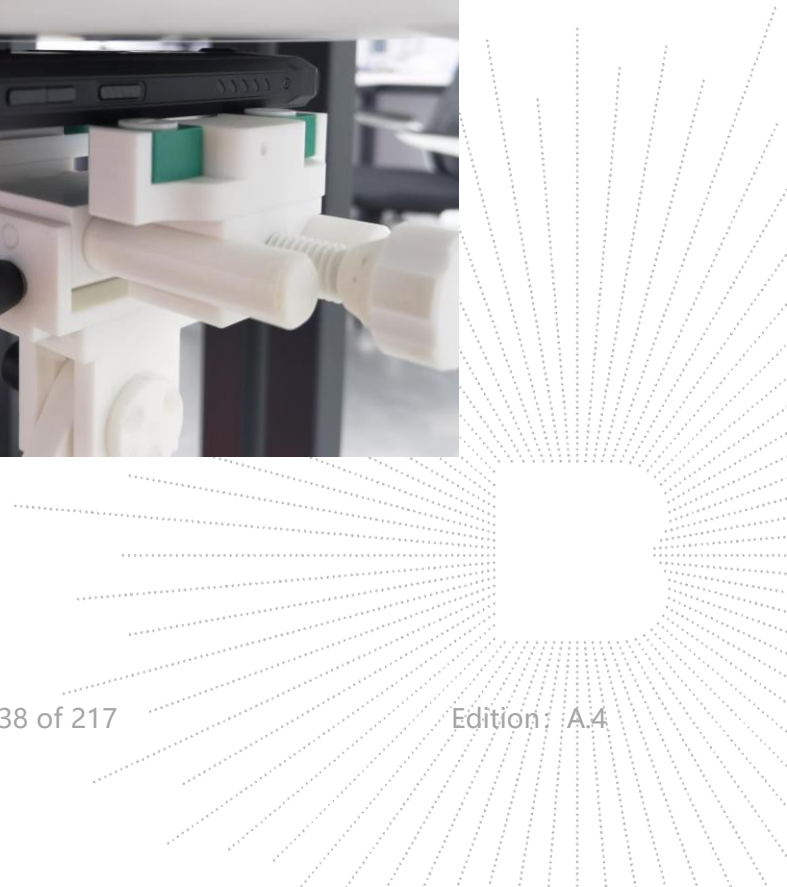
Front



Back

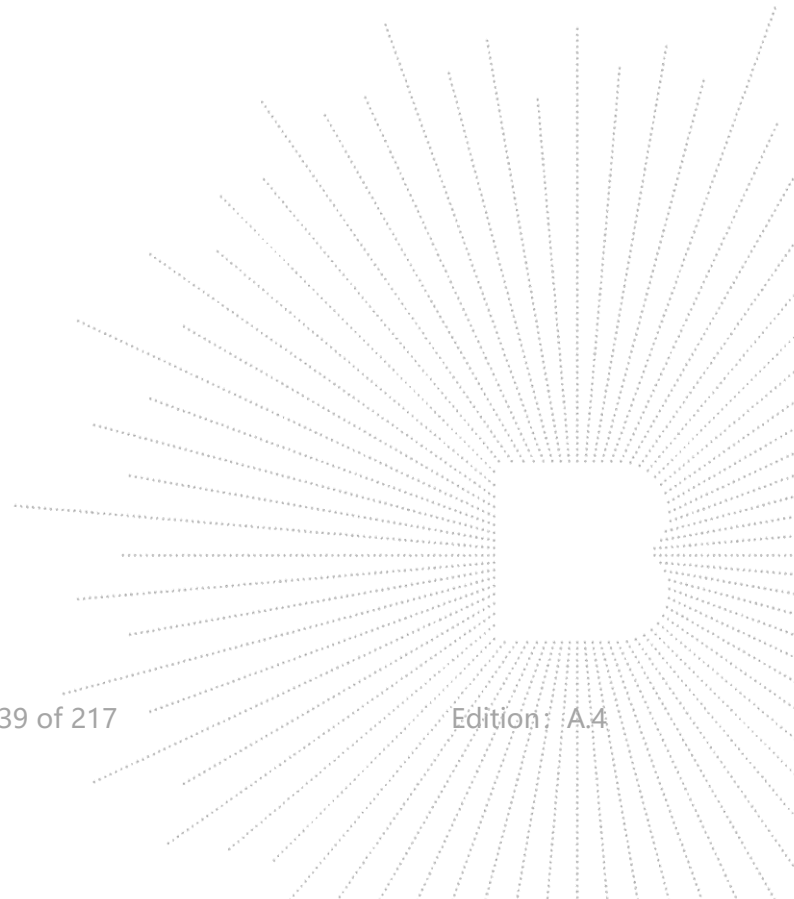


CO., LTD



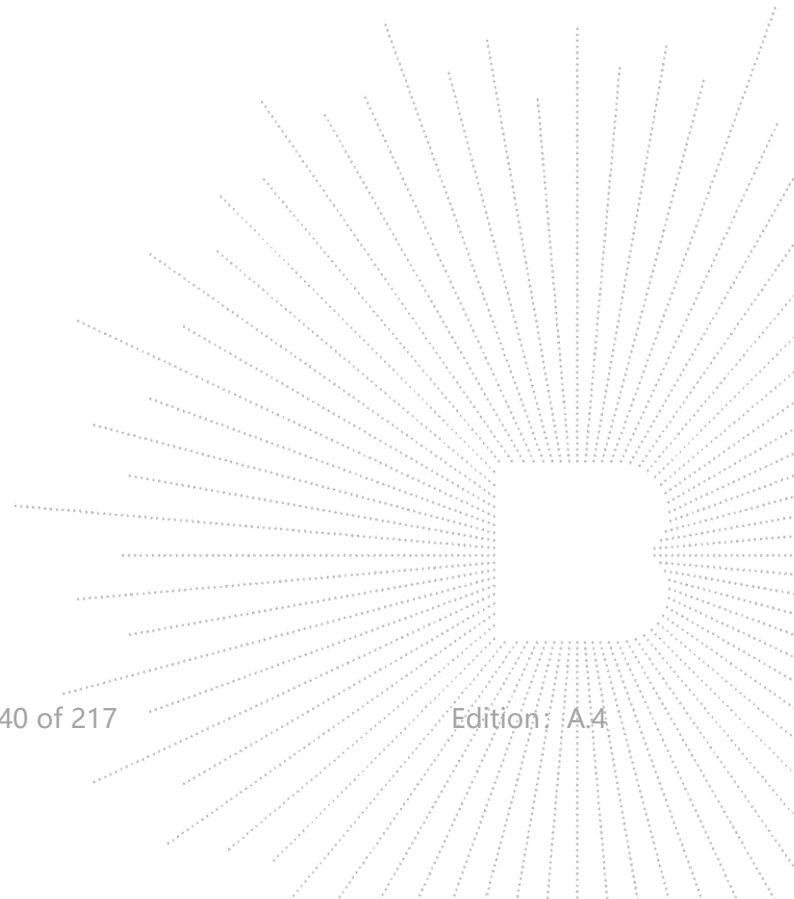
Test distance: 0mm

**Limb worn**



**18. Calibration Certificate**

**Probe-EPGO373 Calibration Certificate**  
**SID900Dipole Calibration Certificate**  
**SID1800Dipole Calibration Certificate**  
**SID2100Dipole Calibration Certificate**  
**SID2450Dipole Calibration Certificate**  
**SID5000Dipole Calibration Certificate**



**COMOSAR E-Field Probe Calibration Report**

Ref : ACR.180.5.22.BES.A

**SHENZHEN BCTC TECHNOLOGY CO., LTD.**  
1 ~2/ F, NO. B FACTORY BUILDING, PENGZHOU INDUSTRIAL  
PARK, FUYUAN 1ST ROAD,  
TANGWEI COMMUNITY, FUHAI STREET, BAO'AN DISTRICT,  
SHENZHEN, GUANGDONG, CHINA  
**MVG COMOSAR DOSIMETRIC E-FIELD PROBE**  
SERIAL NO.: SN 25/22 EPGO373

Calibrated at MVG  
Z.I. de la pointe du diable  
Technopôle Brest Iroise – 295 avenue Alexis de Rochon  
29280 PLOUZANE - FRANCE

Calibration date: 06/29/2022



Accreditations #2-6789  
Scope available on [www.cofrac.fr](http://www.cofrac.fr)

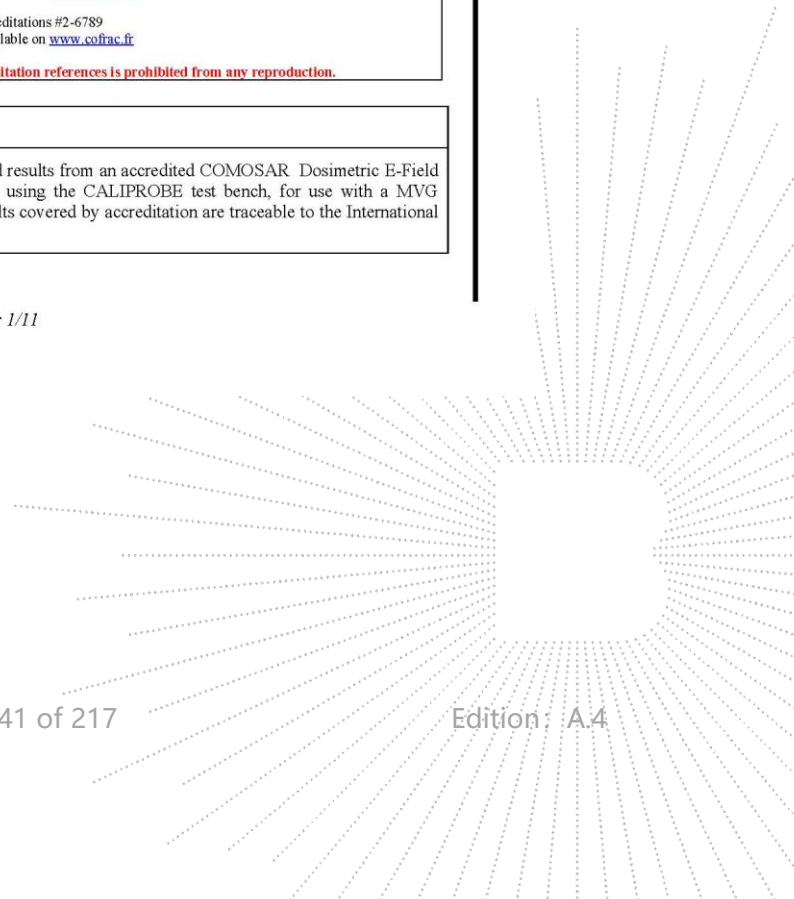
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**Summary:**




This document presents the method and results from an accredited COMOSAR Dosimetric E-Field Probe calibration performed at MVG, using the CALIPROBE test bench, for use with a MVG COMOSAR system only. The test results covered by accreditation are traceable to the International System of Units (SI).

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|                                   | <i>Name</i>    | <i>Function</i>         | <i>Date</i> | <i>Signature</i>  |
|-----------------------------------|----------------|-------------------------|-------------|---|
| <i>Prepared by:</i>               | Jérôme Le Gall | Measurement Responsible | 6/30/2022   |  |
| <i>Checked &amp; approved by:</i> | Jérôme Luc     | Technical Manager       | 6/30/2022   |  |
| <i>Authorized by:</i>             | Yann Toutain   | Laboratory Director     | 6/30/2022   |  |

2022.06.30  
13:38:42 +02'00'

|                       | <i>Customer Name</i>                     |
|-----------------------|--|
| <i>Distribution :</i> | Shenzhen BCTC<br>Technology Co.,<br>Ltd. |

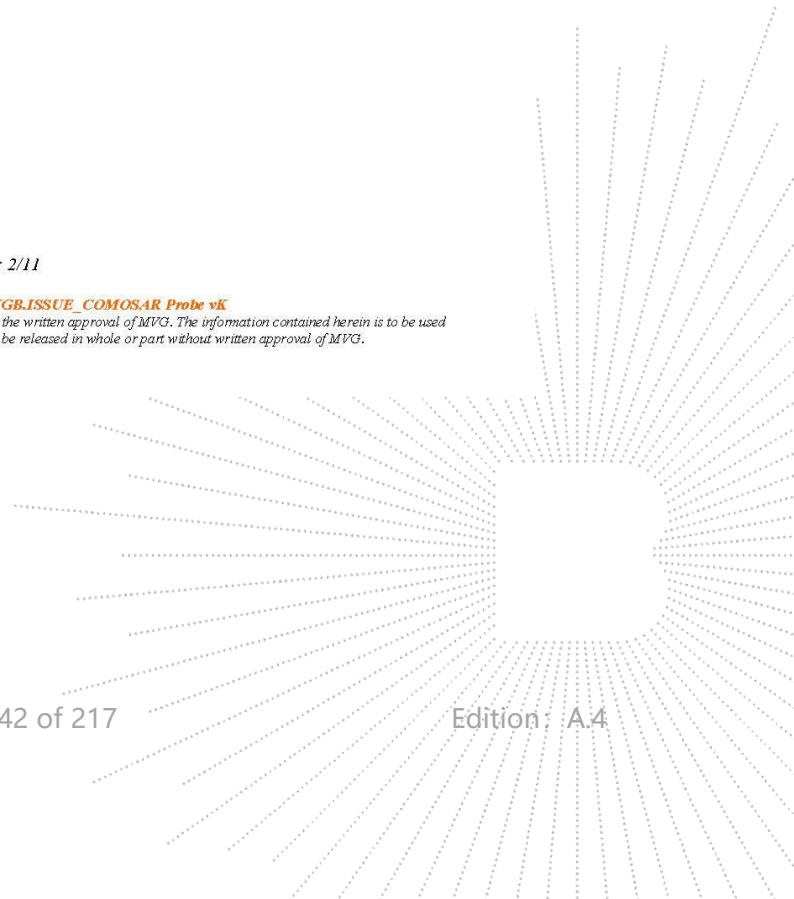
| <i>Issue</i> | <i>Name</i>    | <i>Date</i> | <i>Modifications</i> |
|--------------|----------------|-------------|----------------------|
| A            | Jérôme Le Gall | 6/30/2022   | Initial release      |
|              |                |             |                      |
|              |                |             |                      |
|              |                |             |                      |

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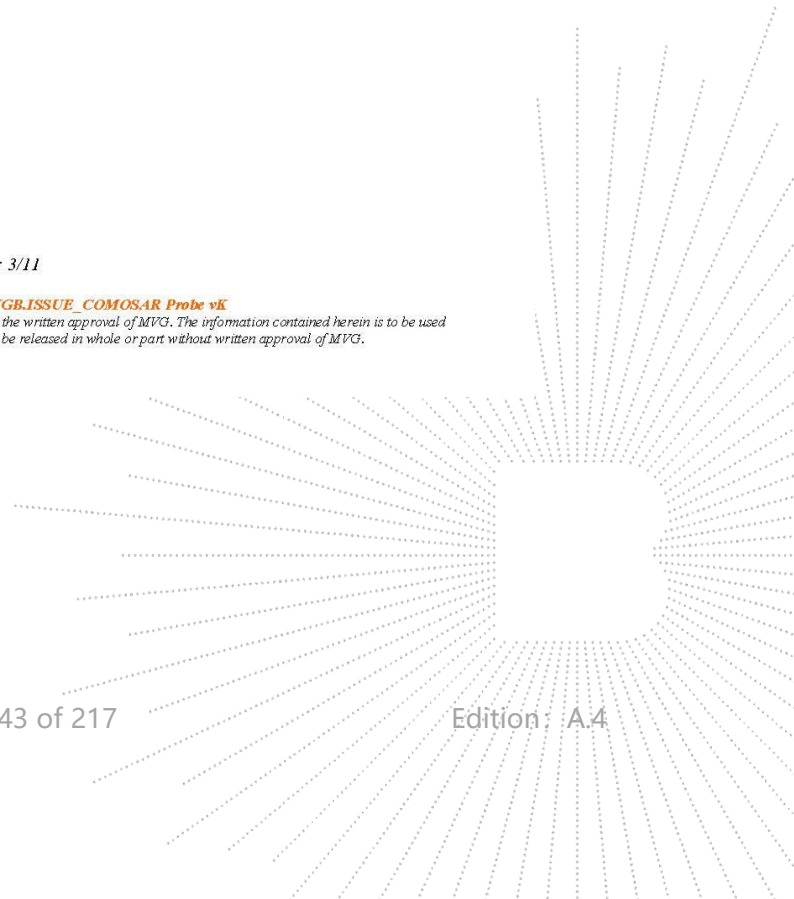
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**1 DEVICE UNDER TEST**

| Device Under Test                        |   |
|--|---|
| Device Type                              | COMOSAR DOSIMETRIC E FIELD PROBE  |
| Manufacturer                             | MVG   |
| Model                                    | SSE2  |
| Serial Number                            | SN 25/22 EPGO373  |
| Product Condition (new / used)           | New   |
| Frequency Range of Probe                 | 0.15 GHz-6GHz   |
| Resistance of Three Dipoles at Connector | Dipole 1: R1=0.234 MΩ<br>Dipole 2: R2=0.195 MΩ<br>Dipole 3: R3=0.250 MΩ |

**2 PRODUCT DESCRIPTION**
**2.1 GENERAL INFORMATION**

MVG's COMOSAR E field Probes are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards.



**Figure 1 – MVG COMOSAR Dosimetric E field Probe**

|  |        |
|--|--------|
| Probe Length                               | 330 mm |
| Length of Individual Dipoles               | 2 mm   |
| Maximum external diameter                  | 8 mm   |
| Probe Tip External Diameter                | 2.5 mm |
| Distance between dipoles / probe extremity | 1 mm   |

**3 MEASUREMENT METHOD**

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide recommended practices for the probe calibrations, including the performance characteristics of interest and methods by which to assess their affect. All calibrations / measurements performed meet the fore mentioned standards.

**3.1 LINEARITY**

The evaluation of the linearity was done in free space using the waveguide, performing a power sweep to cover the SAR range 0.01W/kg to 100W/kg.

**3.2 SENSITIVITY**

The sensitivity factors of the three dipoles were determined using a two step calibration method (air and tissue simulating liquid) using waveguides as outlined in the standards.

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### 3.3 LOWER DETECTION LIMIT

The lower detection limit was assessed using the same measurement set up as used for the linearity measurement. The required lower detection limit is 10 mW/kg.

### 3.4 ISOTROPY

The axial isotropy was evaluated by exposing the probe to a reference wave from a standard dipole with the dipole mounted under the flat phantom in the test configuration suggested for system validations and checks. The probe was rotated along its main axis from 0 to 360 degrees in 15-degree steps. The hemispherical isotropy is determined by inserting the probe in a thin plastic box filled with tissue-equivalent liquid, with the plastic box illuminated with the fields from a half wave dipole. The dipole is rotated about its axis (0°–180°) in 15° increments. At each step the probe is rotated about its axis (0°–360°).

### 3.1 BOUNDARY EFFECT

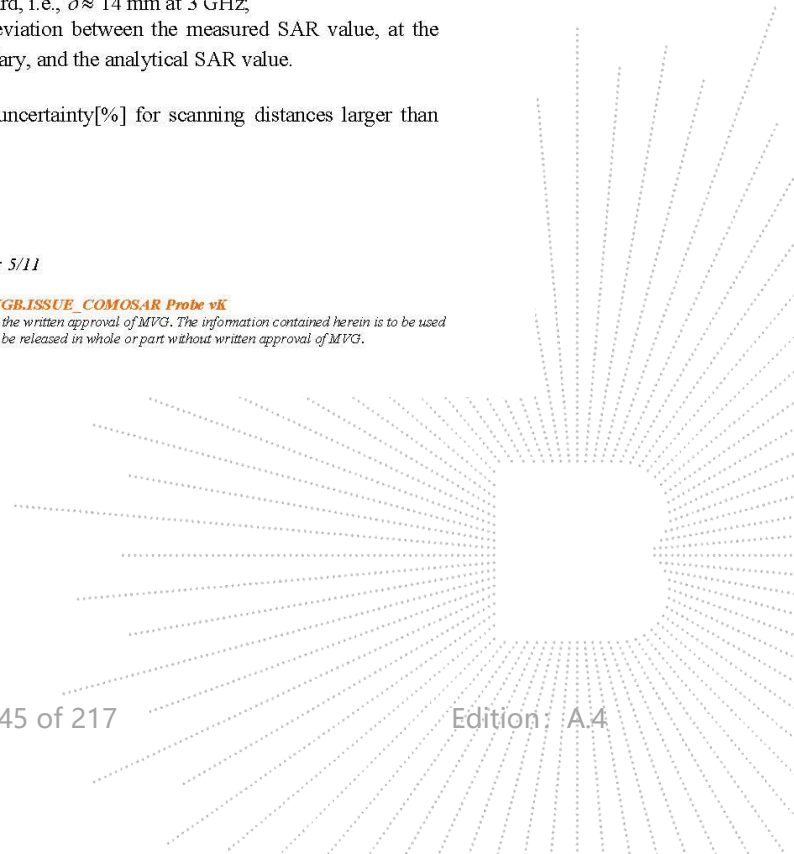
The boundary effect is defined as the deviation between the SAR measured data and the expected exponential decay in the liquid when the probe is oriented normal to the interface. To evaluate this effect, the liquid filled flat phantom is exposed to fields from either a reference dipole or waveguide. With the probe normal to the phantom surface, the peak spatial average SAR is measured and compared to the analytical value at the surface.

The boundary effect uncertainty can be estimated according to the following uncertainty approximation formula based on linear and exponential extrapolations between the surface and  $d_{be} + d_{step}$  along lines that are approximately normal to the surface:

$$SAR_{uncertainty} [\%] = \Delta SAR_{be} \frac{(d_{be} + d_{step})^2 (e^{-d_{be}/(\delta/2)})}{2d_{step} \delta/2} \quad \text{for } (d_{be} + d_{step}) < 10 \text{ mm}$$

|                            |  |
|----------------------------|--|
| where                      |  |
| $\Delta SAR_{uncertainty}$ | is the uncertainty in percent of the probe boundary effect   |
| $d_{be}$                   | is the distance between the surface and the closest <i>zoom-scan</i> measurement point, in millimetre  |
| $\Delta_{step}$            | is the separation distance between the first and second measurement points that are closest to the phantom surface, in millimetre, assuming the boundary effect at the second location is negligible |
| $\delta$                   | is the minimum penetration depth in millimetres of the head tissue-equivalent liquids defined in this standard, i.e., $\delta \approx 14$ mm at 3 GHz,   |
| $\Delta SAR_{be}$          | in percent of SAR is the deviation between the measured SAR value, at the distance $d_{be}$ from the boundary, and the analytical SAR value.   |

The measured worst case boundary effect SAR uncertainty[%] for scanning distances larger than 4mm is 1.0% Limit ,2%).





#### 4 MEASUREMENT UNCERTAINTY

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty associated with an E-field probe calibration using the waveguide technique. All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ , traceable to the Internationally Accepted Guides to Measurement Uncertainty.

| Uncertainty analysis of the probe calibration in waveguide |                       |                          |         |    |                          |
|--|-----------------------|--------------------------|---------|----|--------------------------|
| ERROR SOURCES  | Uncertainty value (%) | Probability Distribution | Divisor | ci | Standard Uncertainty (%) |
| Expanded uncertainty<br>95 % confidence level $k = 2$      |                       |                          |         |    | 14 %                     |

#### 5 CALIBRATION MEASUREMENT RESULTS

| Calibration Parameters |             |
|------------------------|-------------|
| Liquid Temperature     | 20 +/- 1 °C |
| Lab Temperature        | 20 +/- 1 °C |
| Lab Humidity           | 30-70 %     |

##### 5.1 SENSITIVITY IN AIR

| Normx dipole 1 ( $\mu\text{V}/(\text{V}/\text{m}^2)$ ) | Normy dipole 2 ( $\mu\text{V}/(\text{V}/\text{m}^2)$ ) | Normz dipole 3 ( $\mu\text{V}/(\text{V}/\text{m}^2)$ ) |
|--|--|--|
| 1.19   | 0.77   | 1.05   |

| DCP dipole 1 (mV) | DCP dipole 2 (mV) | DCP dipole 3 (mV) |
|-------------------|-------------------|-------------------|
| 108               | 109               | 110               |

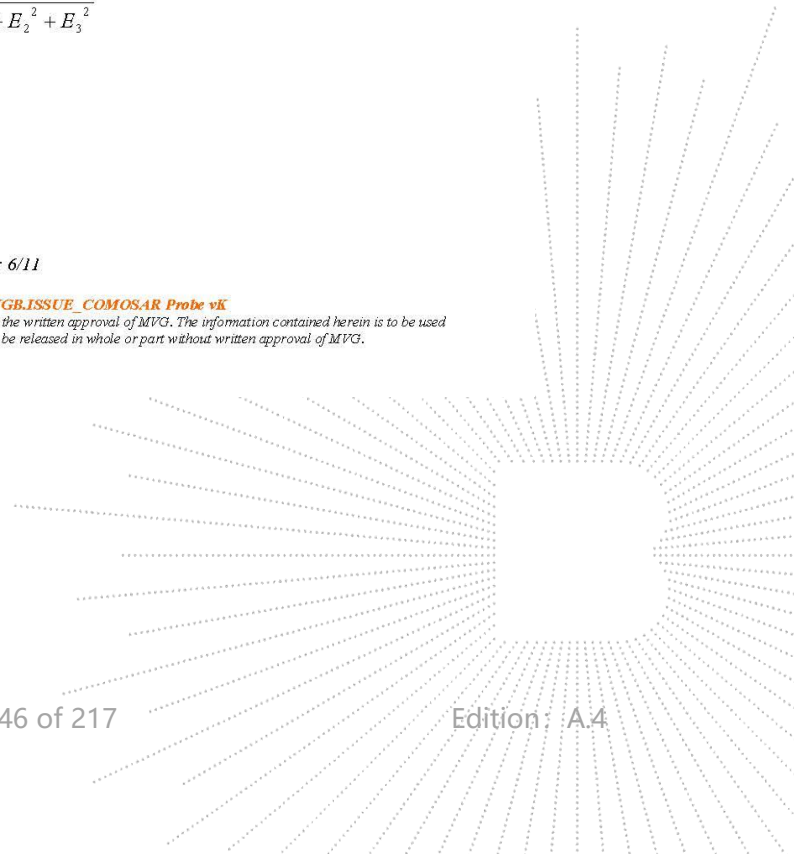
Calibration curves  $e_i=f(V)$  ( $i=1,2,3$ ) allow to obtain E-field value using the formula:

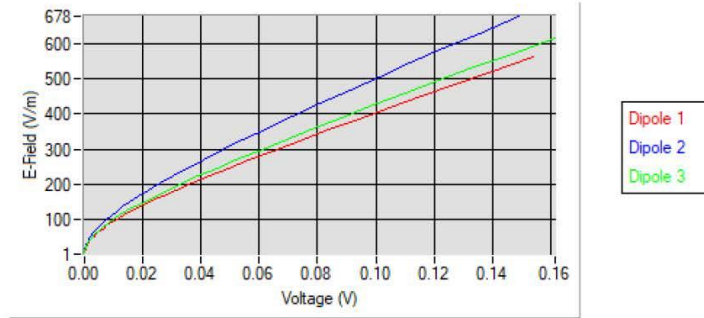
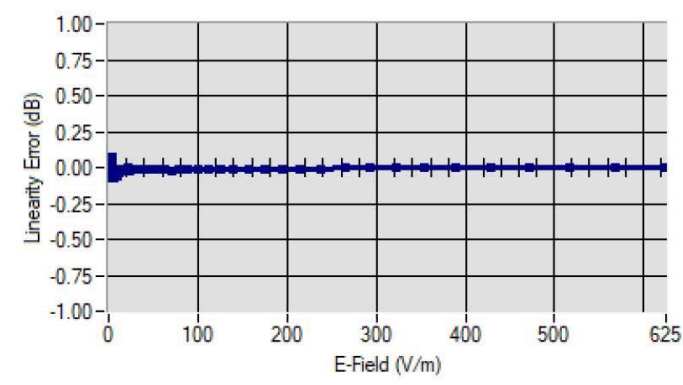
$$E = \sqrt{E_1^2 + E_2^2 + E_3^2}$$

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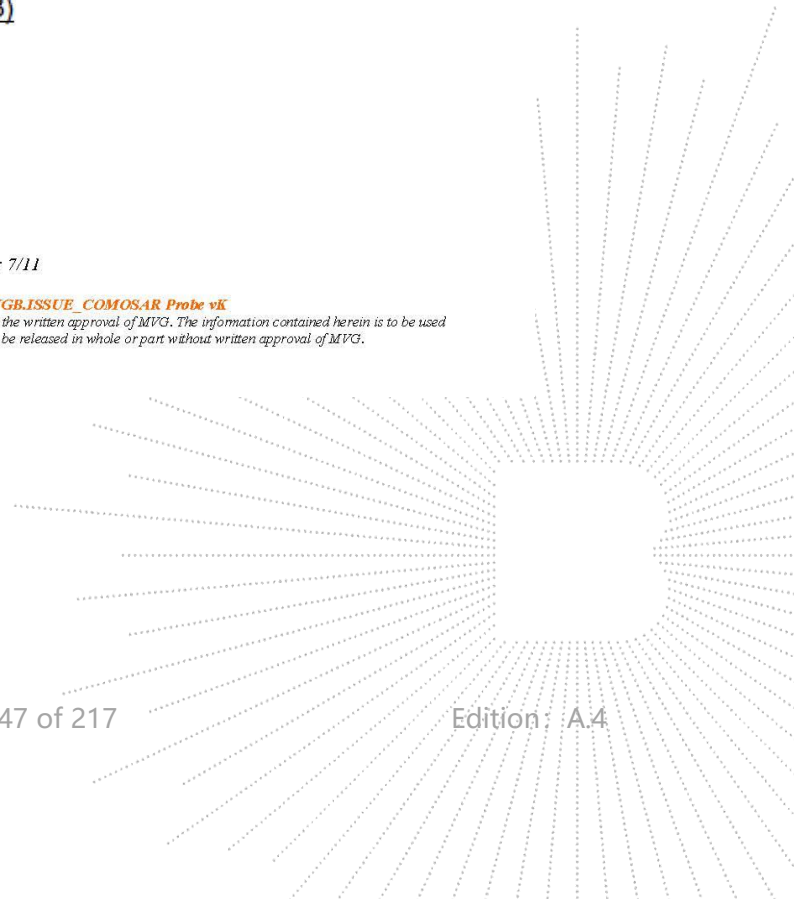

**Calibration curves**

 5.2 LINEARITY
**Linearity**


**Linearity:  $\pm 1.77\%$  ( $\pm 0.08\text{dB}$ )**

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 5.3 SENSITIVITY IN LIQUID

| Liquid | Frequency<br>(MHz +/-<br>100MHz) | ConvF |
|--------|----------------------------------|-------|
| HL450* | 450*                             | 3.00* |
| BL450* | 450*                             | 2.83* |
| HL750  | 750                              | 2.96  |
| BL750  | 750                              | 3.07  |
| HL850  | 835                              | 3.01  |
| BL850  | 835                              | 3.13  |
| HL900  | 900                              | 3.08  |
| BL900  | 900                              | 3.18  |
| HL1800 | 1800                             | 3.35  |
| BL1800 | 1800                             | 3.42  |
| HL1900 | 1900                             | 3.27  |
| BL1900 | 1900                             | 3.55  |
| HL2100 | 2100                             | 3.77  |
| BL2100 | 2100                             | 3.92  |
| HL2300 | 2300                             | 3.77  |
| BL2300 | 2300                             | 3.94  |
| HL2450 | 2450                             | 3.96  |
| BL2450 | 2450                             | 4.13  |
| HL2600 | 2600                             | 3.63  |
| BL2600 | 2600                             | 3.79  |
| HL5200 | 5200                             | 2.72  |
| BL5200 | 5200                             | 2.45  |
| HL5400 | 5400                             | 2.92  |
| BL5400 | 5400                             | 2.74  |
| HL5600 | 5600                             | 3.09  |
| BL5600 | 5600                             | 2.90  |
| HL5800 | 5800                             | 2.86  |
| BL5800 | 5800                             | 2.72  |

\* Frequency not cover by COFRAC scope, calibration not accredited

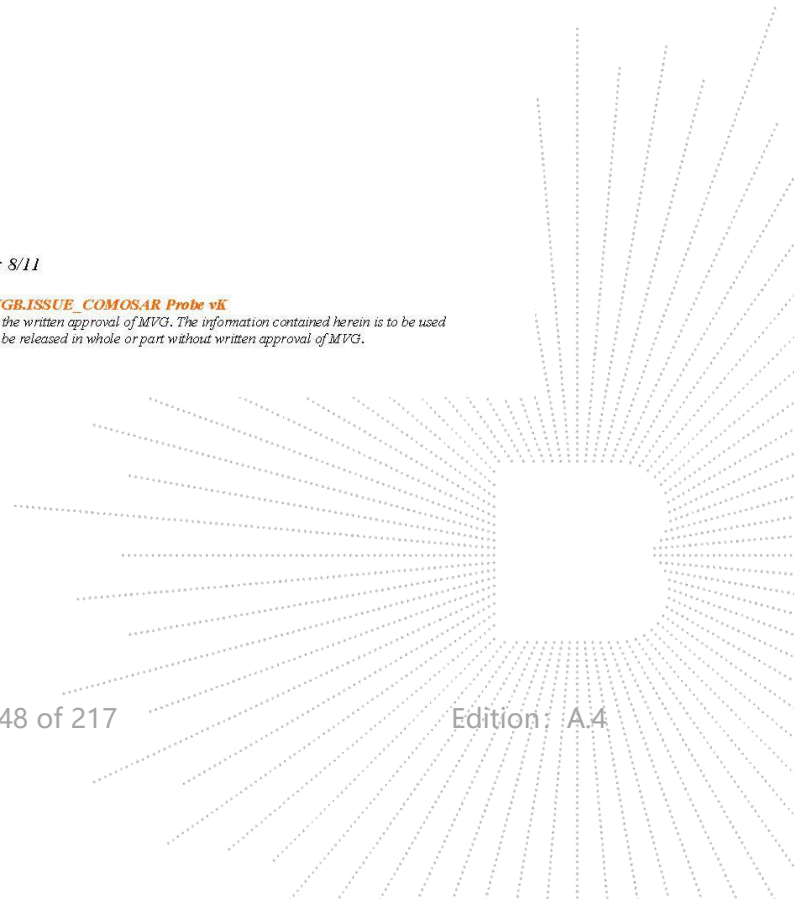
LOWER DETECTION LIMIT: 7mW/kg

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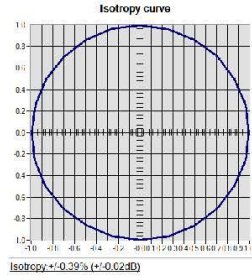
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5.4 ISOTROPY

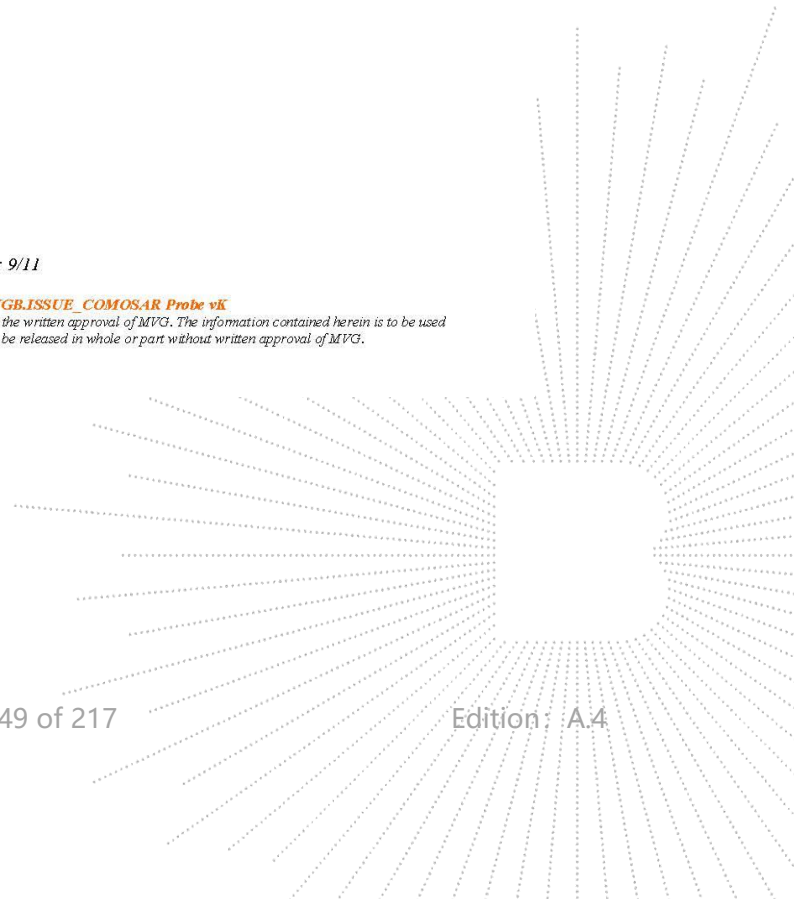
HL1800 MHz



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**6 LIST OF EQUIPMENT**

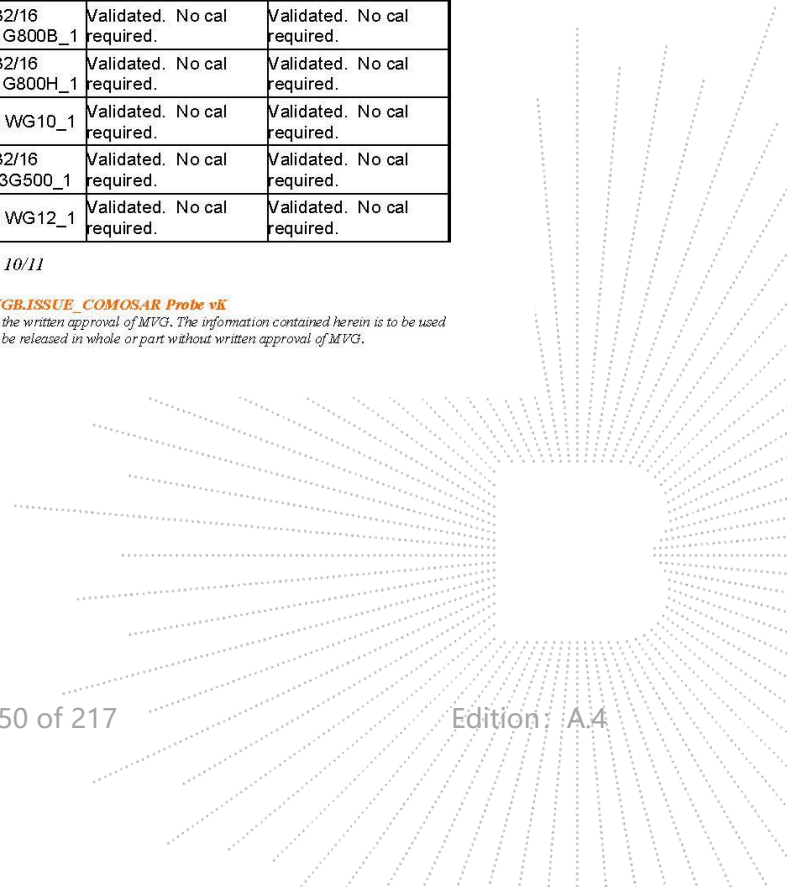
| Equipment Summary Sheet            |                      |                         |   |   |
|------------------------------------|----------------------|-------------------------|---|---|
| Equipment Description              | Manufacturer / Model | Identification No.      | Current Calibration Date                      | Next Calibration Date                         |
| CALIPROBE Test Bench               | Version 2            | NA                      | Validated. No cal required.                   | Validated. No cal required.                   |
| Network Analyzer                   | Rohde & Schwarz ZVM  | 100203                  | 08/2021                                       | 08/2024                                       |
| Network Analyzer                   | Agilent 8753ES       | MY40003210              | 10/2019                                       | 10/2022                                       |
| Network Analyzer – Calibration kit | HP 85033D            | 3423A08186              | 06/2021                                       | 06/2027                                       |
| Multimeter                         | Keithley 2000        | 1160271                 | 02/2020                                       | 02/2023                                       |
| Signal Generator                   | Rohde & Schwarz SMB  | 106589                  | 03/2022                                       | 03/2025                                       |
| Amplifier                          | MVG                  | MODU-023-C-0002         | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Power Meter                        | NI-USB 5680          | 170100013               | 06/2021                                       | 06/2024                                       |
| Power Meter                        | Rohde & Schwarz NRVD | 832839-056              | 11/2019                                       | 11/2022                                       |
| Directional Coupler                | Krytar 158020        | 131467                  | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Waveguide                          | MVG                  | SN 32/16 WG4_1          | Validated. No cal required.                   | Validated. No cal required.                   |
| Liquid transition                  | MVG                  | SN 32/16 WGLIQ_0G900_1  | Validated. No cal required.                   | Validated. No cal required.                   |
| Waveguide                          | MVG                  | SN 32/16 WG6_1          | Validated. No cal required.                   | Validated. No cal required.                   |
| Liquid transition                  | MVG                  | SN 32/16 WGLIQ_1G500_1  | Validated. No cal required.                   | Validated. No cal required.                   |
| Waveguide                          | MVG                  | SN 32/16 WG8_1          | Validated. No cal required.                   | Validated. No cal required.                   |
| Liquid transition                  | MVG                  | SN 32/16 WGLIQ_1G800B_1 | Validated. No cal required.                   | Validated. No cal required.                   |
| Liquid transition                  | MVG                  | SN 32/16 WGLIQ_1G800H_1 | Validated. No cal required.                   | Validated. No cal required.                   |
| Waveguide                          | MVG                  | SN 32/16 WG10_1         | Validated. No cal required.                   | Validated. No cal required.                   |
| Liquid transition                  | MVG                  | SN 32/16 WGLIQ_3G500_1  | Validated. No cal required.                   | Validated. No cal required.                   |
| Waveguide                          | MVG                  | SN 32/16 WG12_1         | Validated. No cal required.                   | Validated. No cal required.                   |

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## COMOSAR E-FIELD PROBE CALIBRATION REPORT

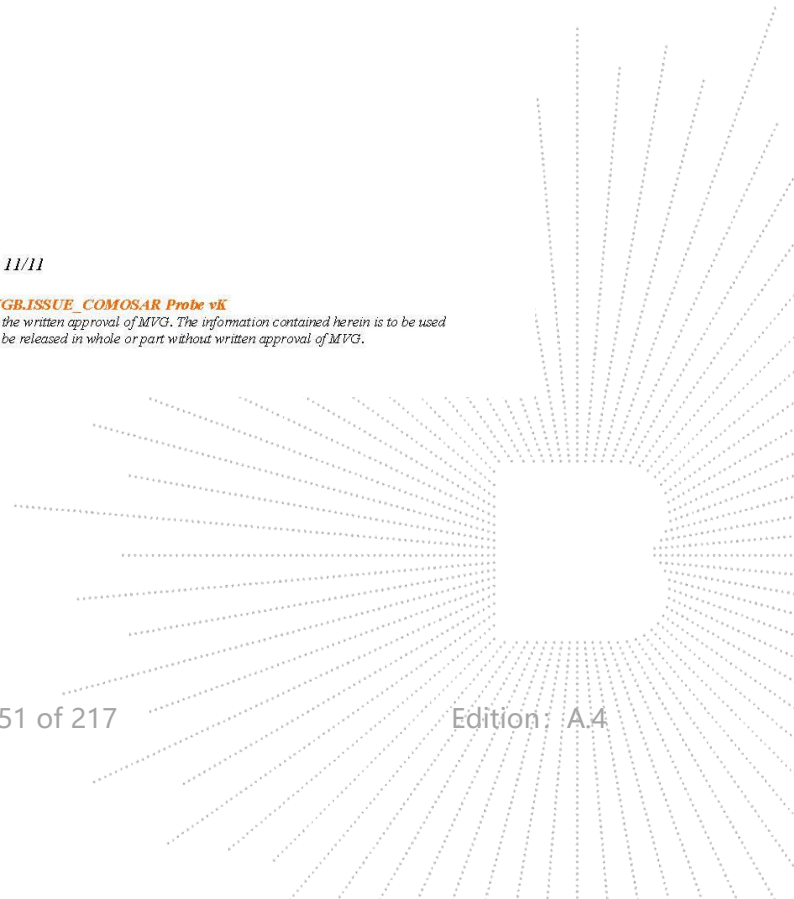
Ref. ACR.180.5.22.BES.A

|                                  |              |                           |                                |                                |
|----------------------------------|--------------|---------------------------|--------------------------------|--------------------------------|
| Liquid transition                | MVG          | SN 32/16<br>WGLIQ_5G000_1 | Validated. No cal<br>required. | Validated. No cal<br>required. |
| Temperature / Humidity<br>Sensor | Testo 184 H1 | 44225320                  | 06/2021                        | 06/2024                        |

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## SAR Reference Dipole Calibration Report

Ref : ACR.329.10.21.BES.A

**SHENZHEN BCTC TECHNOLOGY CO., LTD.**  
1 ~2/ F, NO. B FACTORY BUILDING, PENGZHOU  
INDUSTRIAL PARK, FUYUAN 1ST ROAD,  
TANGWEI COMMUNITY, FUHAI STREET, BAO'AN  
DISTRICT, SHENZHEN, GUANGDONG, CHINA  
**MVG COMOSAR REFERENCE DIPOLE**  
FREQUENCY: 900 MHZ  
SERIAL NO.: SN 47/21 DIP 0G900-622

Calibrated at MVG  
Z.I. de la pointe du diable  
Technopôle Brest Iroise – 295 avenue Alexis de Rochon  
29280 PLOUZANE - FRANCE

Calibration date: 11/25/2021



Accreditations #2-6789 and #2-6814  
Scope available on [www.cofrac.fr](http://www.cofrac.fr)

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

### Summary:

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

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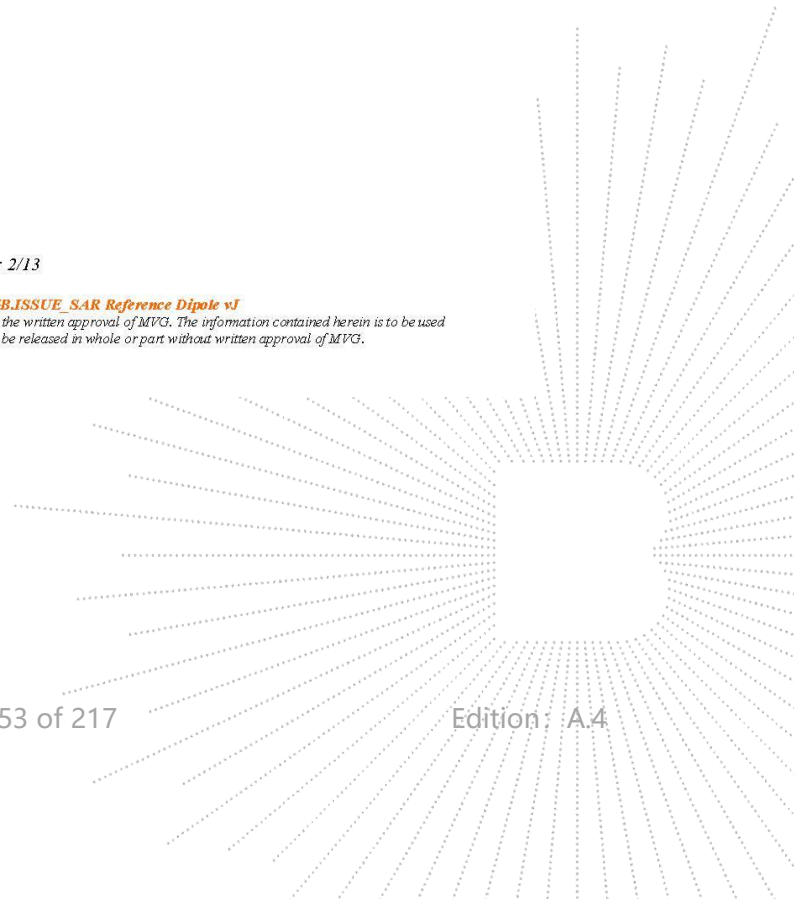




|                      | <i>Name</i>    | <i>Function</i>         | <i>Date</i> | <i>Signature</i>  |
|----------------------|----------------|-------------------------|-------------|---|
| <i>Prepared by :</i> | Jérôme Le Gall | Measurement Responsible | 11/25/2021  |                                    |
| <i>Checked by :</i>  | Jérôme Luc     | Technical Manager       | 11/25/2021  |                                    |
| <i>Approved by :</i> | Yann Toutain   | Laboratory Director     | 11/25/2021  | <br>2021.11.25<br>11:53:05 +01'00' |

|                       | <i>Customer Name</i>                     |
|-----------------------|--|
| <i>Distribution :</i> | Shenzhen BCTC<br>Technology Co.,<br>Ltd. |

| <i>Issue</i> | <i>Name</i> | <i>Date</i> | <i>Modifications</i> |
|--------------|-------------|-------------|----------------------|
| A            | Jérôme Luc  | 11/25/2021  | Initial release      |
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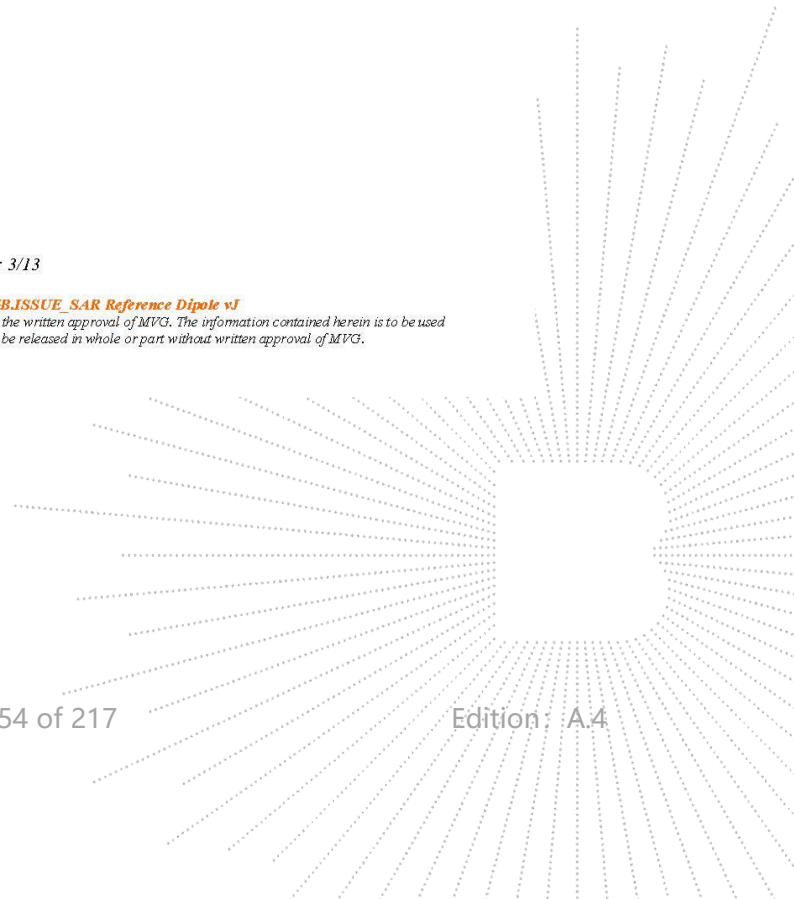
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## 1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

## 2 DEVICE UNDER TEST

| Device Under Test              |                                  |
|--------------------------------|----------------------------------|
| Device Type                    | COMOSAR 900 MHz REFERENCE DIPOLE |
| Manufacturer                   | MVG                              |
| Model                          | SID900                           |
| Serial Number                  | SN 47/21 DIP.0G900-622           |
| Product Condition (new / used) | New                              |

## 3 PRODUCT DESCRIPTION

### 3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards. The product is designed for use with the COMOSAR test bench only.



**Figure 1** – MVG COMOSAR Validation Dipole

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#### 4 MEASUREMENT METHOD

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

##### 4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. A direct method is used with a network analyser and its calibration kit, both with a valid ISO17025 calibration.

##### 4.2 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards specify the mechanical components and dimensions of the validation dipoles, with the dimension's frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness. A direct method is used with a ISO17025 calibrated caliper.

#### 5 MEASUREMENT UNCERTAINTY

All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

##### 5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

| Frequency band | Expanded Uncertainty on Return Loss |
|----------------|-------------------------------------|
| 400-6000MHz    | 0.08 LIN                            |

##### 5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

| Length (mm) | Expanded Uncertainty on Length |
|-------------|--------------------------------|
| 0 - 300     | 0.20 mm                        |
| 300 - 450   | 0.44 mm                        |

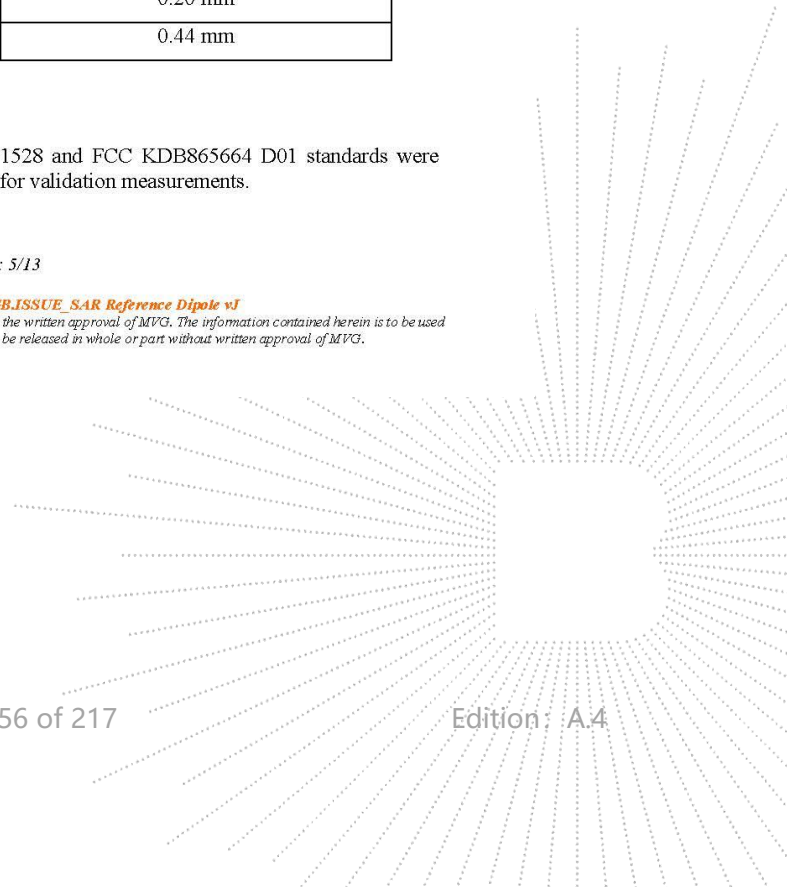
##### 5.3 VALIDATION MEASUREMENT

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

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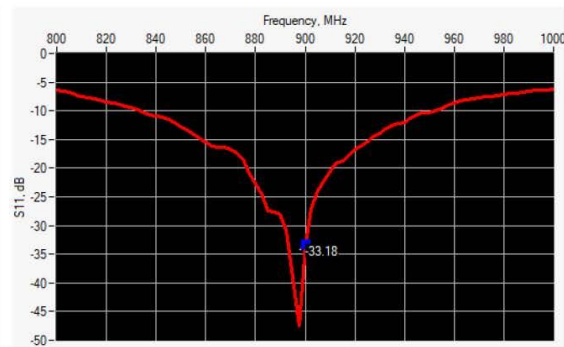




| Scan Volume | Expanded Uncertainty |
|-------------|----------------------|
| 1 g         | 19 % (SAR)           |
| 10 g        | 19 % (SAR)           |

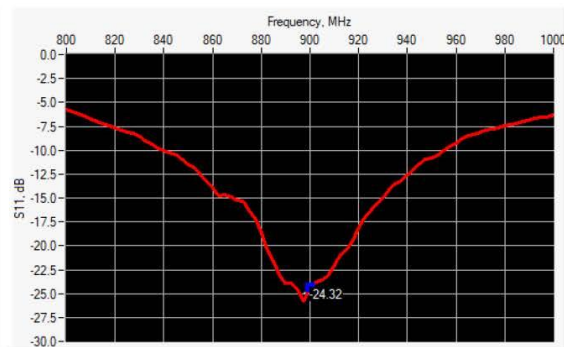
## 6 CALIBRATION MEASUREMENT RESULTS

### 6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



| Frequency (MHz) | Return Loss (dB) | Requirement (dB) | Impedance                   |
|-----------------|------------------|------------------|-----------------------------|
| 900             | -33.18           | -20              | $52.1 \Omega + 0.7 j\Omega$ |

### 6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



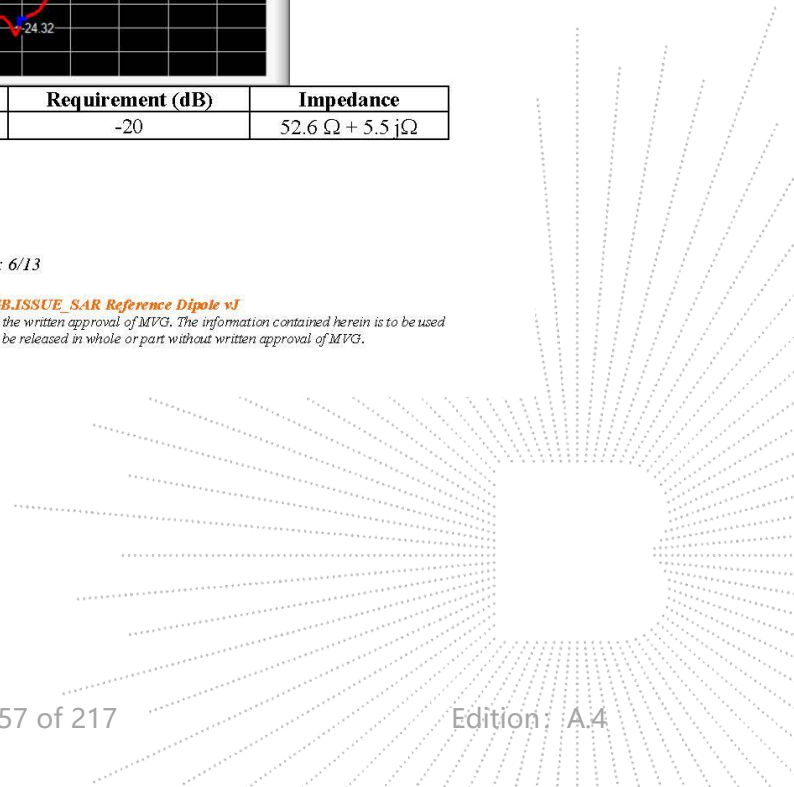
| Frequency (MHz) | Return Loss (dB) | Requirement (dB) | Impedance                   |
|-----------------|------------------|------------------|-----------------------------|
| 900             | -24.32           | -20              | $52.6 \Omega + 5.5 j\Omega$ |

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## 6.3 MECHANICAL DIMENSIONS

| Frequency MHz | L mm       |          | h mm       |          | d mm      |          |
|---------------|------------|----------|------------|----------|-----------|----------|
|               | required   | measured | required   | measured | required  | measured |
| 300           | 420.0 ±1 % |          | 250.0 ±1 % |          | 6.35 ±1 % |          |
| 450           | 290.0 ±1 % |          | 166.7 ±1 % |          | 6.35 ±1 % |          |
| 750           | 176.0 ±1 % |          | 100.0 ±1 % |          | 6.35 ±1 % |          |
| 835           | 161.0 ±1 % |          | 89.8 ±1 %  |          | 3.6 ±1 %  |          |
| 900           | 149.0 ±1 % | 149.49   | 83.3 ±1 %  | 83.01    | 3.6 ±1 %  | 3.59     |
| 1450          | 89.1 ±1 %  |          | 51.7 ±1 %  |          | 3.6 ±1 %  |          |
| 1500          | 86.2 ±1 %  |          | 50.0 ±1 %  |          | 3.6 ±1 %  |          |
| 1640          | 79.0 ±1 %  |          | 45.7 ±1 %  |          | 3.6 ±1 %  |          |
| 1750          | 75.2 ±1 %  |          | 42.9 ±1 %  |          | 3.6 ±1 %  |          |
| 1800          | 72.0 ±1 %  |          | 41.7 ±1 %  |          | 3.6 ±1 %  |          |
| 1900          | 68.0 ±1 %  |          | 39.5 ±1 %  |          | 3.6 ±1 %  |          |
| 1950          | 66.3 ±1 %  |          | 38.5 ±1 %  |          | 3.6 ±1 %  |          |
| 2000          | 64.5 ±1 %  |          | 37.5 ±1 %  |          | 3.6 ±1 %  |          |
| 2100          | 61.0 ±1 %  |          | 35.7 ±1 %  |          | 3.6 ±1 %  |          |
| 2300          | 55.5 ±1 %  |          | 32.6 ±1 %  |          | 3.6 ±1 %  |          |
| 2450          | 51.5 ±1 %  |          | 30.4 ±1 %  |          | 3.6 ±1 %  |          |
| 2600          | 48.5 ±1 %  |          | 28.8 ±1 %  |          | 3.6 ±1 %  |          |
| 3000          | 41.5 ±1 %  |          | 25.0 ±1 %  |          | 3.6 ±1 %  |          |
| 3300          | -          |          | -          |          | -         |          |
| 3500          | 37.0 ±1 %  |          | 26.4 ±1 %  |          | 3.6 ±1 %  |          |
| 3700          | 34.7 ±1 %  |          | 26.4 ±1 %  |          | 3.6 ±1 %  |          |
| 3900          | -          |          | -          |          | -         |          |
| 4200          | -          |          | -          |          | -         |          |
| 4600          | -          |          | -          |          | -         |          |
| 4900          | -          |          | -          |          | -         |          |

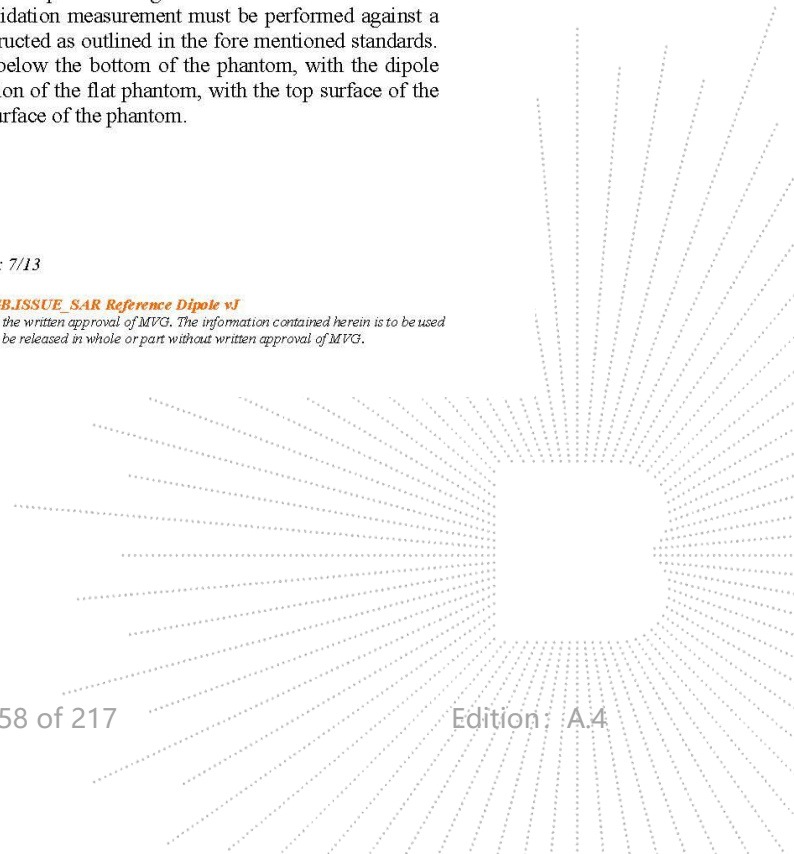
## 7 VALIDATION MEASUREMENT

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

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 7.1 HEAD LIQUID MEASUREMENT

| Frequency<br>MHz | Relative permittivity ( $\epsilon_r$ ) |          | Conductivity ( $\sigma$ ) S/m |          |
|------------------|--|----------|-------------------------------|----------|
|                  | required                               | measured | required                      | measured |
| 300              | 45.3 $\pm$ 10 %                        |          | 0.87 $\pm$ 10 %               |          |
| 450              | 43.5 $\pm$ 10 %                        |          | 0.87 $\pm$ 10 %               |          |
| 750              | 41.9 $\pm$ 10 %                        |          | 0.89 $\pm$ 10 %               |          |
| 835              | 41.5 $\pm$ 10 %                        |          | 0.90 $\pm$ 10 %               |          |
| 900              | 41.5 $\pm$ 10 %                        | 39.1     | 0.97 $\pm$ 10 %               | 0.98     |
| 1450             | 40.5 $\pm$ 10 %                        |          | 1.20 $\pm$ 10 %               |          |
| 1500             | 40.4 $\pm$ 10 %                        |          | 1.23 $\pm$ 10 %               |          |
| 1640             | 40.2 $\pm$ 10 %                        |          | 1.31 $\pm$ 10 %               |          |
| 1750             | 40.1 $\pm$ 10 %                        |          | 1.37 $\pm$ 10 %               |          |
| 1800             | 40.0 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 1900             | 40.0 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 1950             | 40.0 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 2000             | 40.0 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 2100             | 39.8 $\pm$ 10 %                        |          | 1.49 $\pm$ 10 %               |          |
| 2300             | 39.5 $\pm$ 10 %                        |          | 1.67 $\pm$ 10 %               |          |
| 2450             | 39.2 $\pm$ 10 %                        |          | 1.80 $\pm$ 10 %               |          |
| 2600             | 39.0 $\pm$ 10 %                        |          | 1.96 $\pm$ 10 %               |          |
| 3000             | 38.5 $\pm$ 10 %                        |          | 2.40 $\pm$ 10 %               |          |
| 3300             | 38.2 $\pm$ 10 %                        |          | 2.71 $\pm$ 10 %               |          |
| 3500             | 37.9 $\pm$ 10 %                        |          | 2.91 $\pm$ 10 %               |          |
| 3700             | 37.7 $\pm$ 10 %                        |          | 3.12 $\pm$ 10 %               |          |
| 3900             | 37.5 $\pm$ 10 %                        |          | 3.32 $\pm$ 10 %               |          |
| 4200             | 37.1 $\pm$ 10 %                        |          | 3.63 $\pm$ 10 %               |          |
| 4600             | 36.7 $\pm$ 10 %                        |          | 4.04 $\pm$ 10 %               |          |
| 4900             | 36.3 $\pm$ 10 %                        |          | 4.35 $\pm$ 10 %               |          |

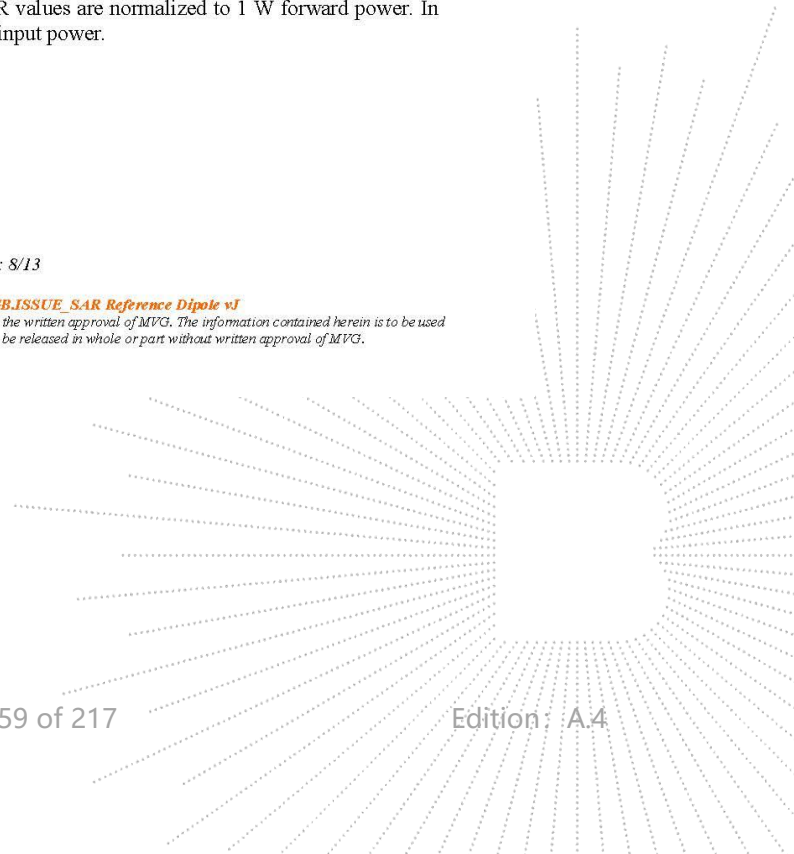
 7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

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**SAR REFERENCE DIPOLE CALIBRATION REPORT**

Ref: ACR.329.10.21.BES.A

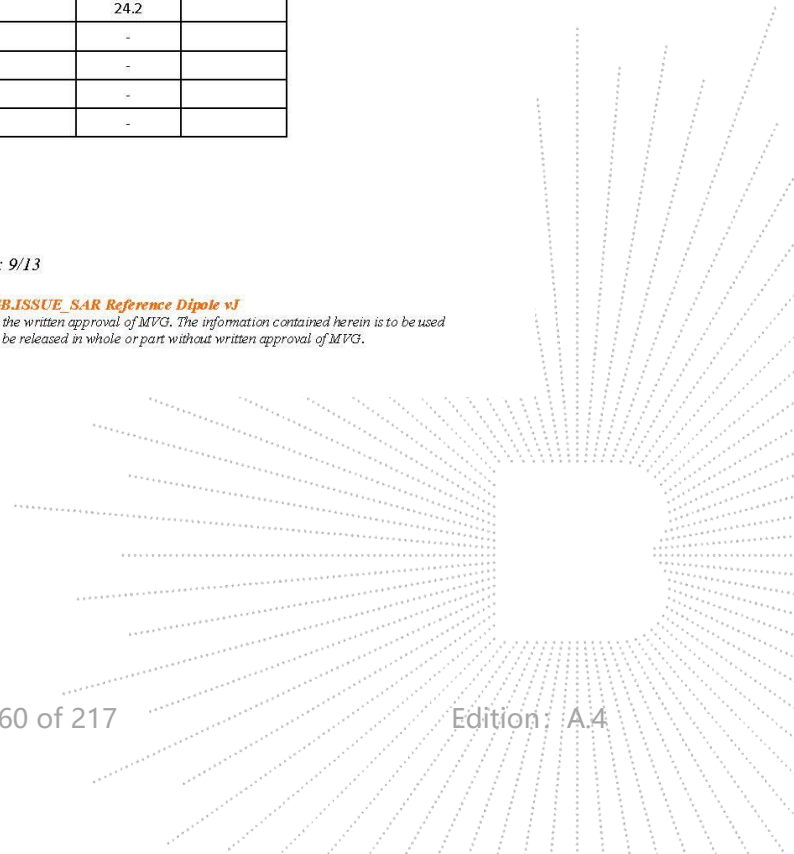
|   |  |
|---|--|
| Software                                  | OPENSAR V5   |
| Phantom                                   | SN 13/09 SAM68   |
| Probe                                     | SN 41/18 EPG0333   |
| Liquid                                    | Head Liquid Values: $\epsilon_{ps}^*$ : 39.1 $\sigma$ : 0.98 |
| Distance between dipole center and liquid | 15.0 mm  |
| Area scan resolution                      | $dx=8mm/dy=8mm$  |
| Zoon Scan Resolution                      | $dx=8mm/dy=8mm/dz=5mm$                                       |
| Frequency                                 | 900 MHz  |
| Input power                               | 20 dBm   |
| Liquid Temperature                        | 20 +/- 1 °C  |
| Lab Temperature                           | 20 +/- 1 °C  |
| Lab Humidity                              | 30-70 %  |

| Frequency<br>MHz | 1 g SAR (W/kg/W) |              | 10 g SAR (W/kg/W) |             |
|------------------|------------------|--------------|-------------------|-------------|
|                  | required         | measured     | required          | measured    |
| 300              | 2.85             |              | 1.94              |             |
| 450              | 4.58             |              | 3.06              |             |
| 750              | 8.49             |              | 5.55              |             |
| 835              | 9.56             |              | 6.22              |             |
| 900              | 10.9             | 11.39 (1.14) | 6.99              | 6.96 (0.70) |
| 1450             | 29               |              | 16                |             |
| 1500             | 30.5             |              | 16.8              |             |
| 1640             | 34.2             |              | 18.4              |             |
| 1750             | 36.4             |              | 19.3              |             |
| 1800             | 38.4             |              | 20.1              |             |
| 1900             | 39.7             |              | 20.5              |             |
| 1950             | 40.5             |              | 20.9              |             |
| 2000             | 41.1             |              | 21.1              |             |
| 2100             | 43.6             |              | 21.9              |             |
| 2300             | 48.7             |              | 23.3              |             |
| 2450             | 52.4             |              | 24                |             |
| 2600             | 55.3             |              | 24.6              |             |
| 3000             | 63.8             |              | 25.7              |             |
| 3300             | -                |              | -                 |             |
| 3500             | 67.1             |              | 25                |             |
| 3700             | 67.4             |              | 24.2              |             |
| 3900             | -                |              | -                 |             |
| 4200             | -                |              | -                 |             |
| 4600             | -                |              | -                 |             |
| 4900             | -                |              | -                 |             |

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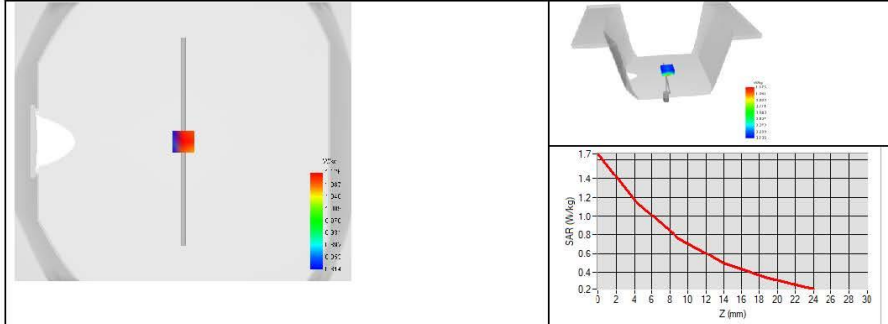
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**SAR REFERENCE DIPOLE CALIBRATION REPORT**

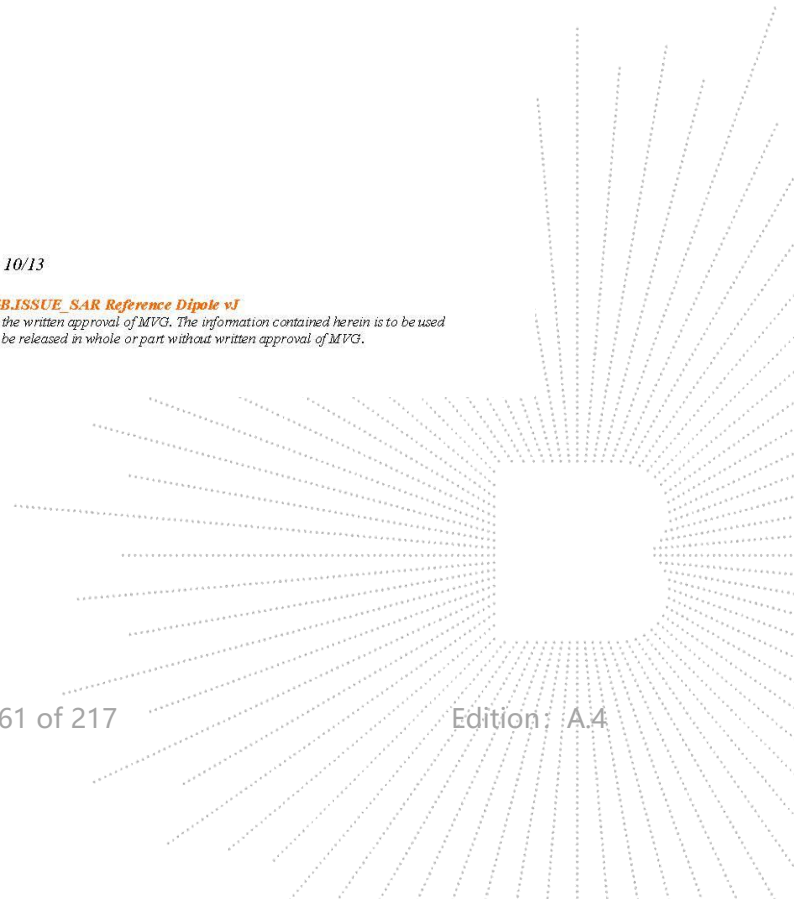
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 7.3 BODY LIQUID MEASUREMENT

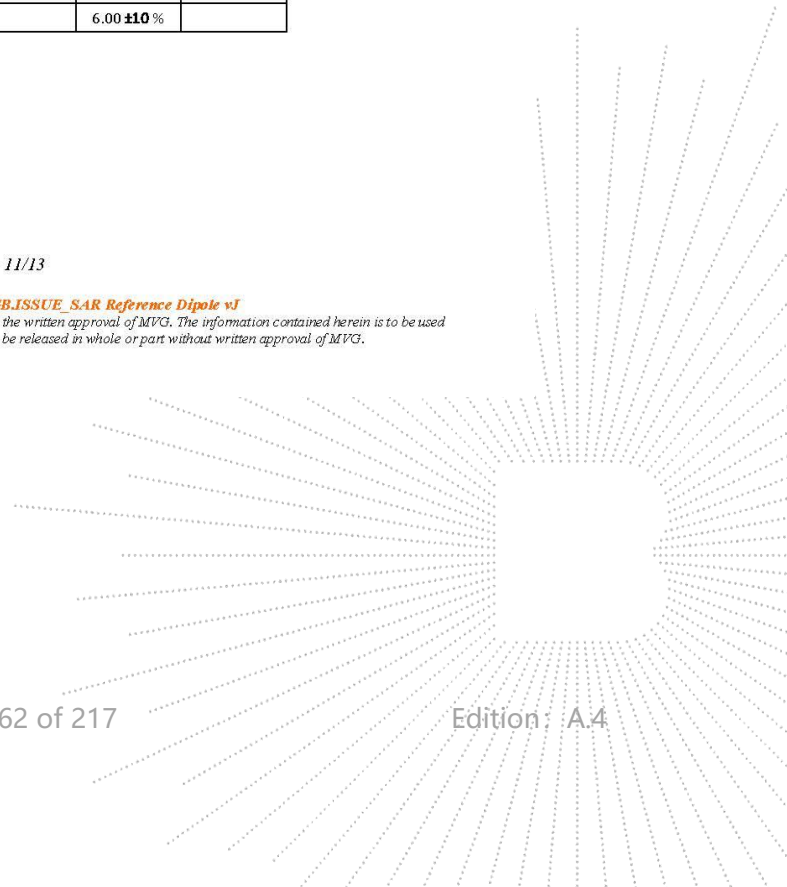
| Frequency<br>MHz | Relative permittivity ( $\epsilon_r$ ) |          | Conductivity ( $\sigma$ ) S/m |          |
|------------------|--|----------|-------------------------------|----------|
|                  | required                               | measured | required                      | measured |
| 150              | 61.9 $\pm$ 10 %                        |          | 0.80 $\pm$ 10 %               |          |
| 300              | 58.2 $\pm$ 10 %                        |          | 0.92 $\pm$ 10 %               |          |
| 450              | 56.7 $\pm$ 10 %                        |          | 0.94 $\pm$ 10 %               |          |
| 750              | 55.5 $\pm$ 10 %                        |          | 0.96 $\pm$ 10 %               |          |
| 835              | 55.2 $\pm$ 10 %                        |          | 0.97 $\pm$ 10 %               |          |
| 900              | 55.0 $\pm$ 10 %                        | 51.7     | 1.05 $\pm$ 10 %               | 1.01     |
| 915              | 55.0 $\pm$ 10 %                        |          | 1.06 $\pm$ 10 %               |          |
| 1450             | 54.0 $\pm$ 10 %                        |          | 1.30 $\pm$ 10 %               |          |
| 1610             | 53.8 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 1800             | 53.3 $\pm$ 10 %                        |          | 1.52 $\pm$ 10 %               |          |
| 1900             | 53.3 $\pm$ 10 %                        |          | 1.52 $\pm$ 10 %               |          |
| 2000             | 53.3 $\pm$ 10 %                        |          | 1.52 $\pm$ 10 %               |          |
| 2100             | 53.2 $\pm$ 10 %                        |          | 1.62 $\pm$ 10 %               |          |
| 2300             | 52.9 $\pm$ 10 %                        |          | 1.81 $\pm$ 10 %               |          |
| 2450             | 52.7 $\pm$ 10 %                        |          | 1.95 $\pm$ 10 %               |          |
| 2600             | 52.5 $\pm$ 10 %                        |          | 2.16 $\pm$ 10 %               |          |
| 3000             | 52.0 $\pm$ 10 %                        |          | 2.73 $\pm$ 10 %               |          |
| 3300             | 51.6 $\pm$ 10 %                        |          | 3.08 $\pm$ 10 %               |          |
| 3500             | 51.3 $\pm$ 10 %                        |          | 3.31 $\pm$ 10 %               |          |
| 3700             | 51.0 $\pm$ 10 %                        |          | 3.55 $\pm$ 10 %               |          |
| 3900             | 50.8 $\pm$ 10 %                        |          | 3.78 $\pm$ 10 %               |          |
| 4200             | 50.4 $\pm$ 10 %                        |          | 4.13 $\pm$ 10 %               |          |
| 4600             | 49.8 $\pm$ 10 %                        |          | 4.60 $\pm$ 10 %               |          |
| 4900             | 49.4 $\pm$ 10 %                        |          | 4.95 $\pm$ 10 %               |          |
| 5200             | 49.0 $\pm$ 10 %                        |          | 5.30 $\pm$ 10 %               |          |
| 5300             | 48.9 $\pm$ 10 %                        |          | 5.42 $\pm$ 10 %               |          |
| 5400             | 48.7 $\pm$ 10 %                        |          | 5.53 $\pm$ 10 %               |          |
| 5500             | 48.6 $\pm$ 10 %                        |          | 5.65 $\pm$ 10 %               |          |
| 5600             | 48.5 $\pm$ 10 %                        |          | 5.77 $\pm$ 10 %               |          |
| 5800             | 48.2 $\pm$ 10 %                        |          | 6.00 $\pm$ 10 %               |          |

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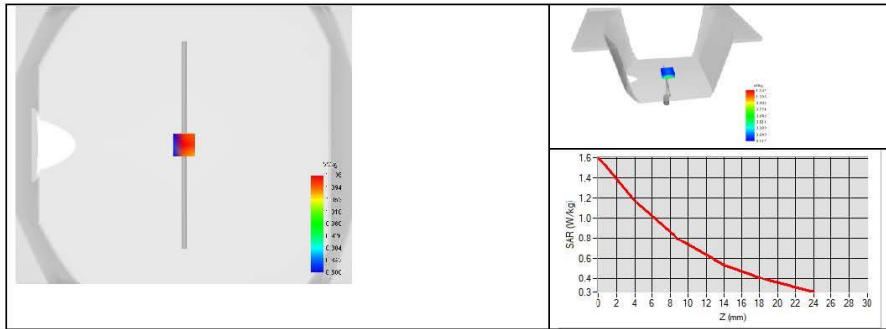




## 7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

|   |  |
|---|--|
| Software                                  | OPENSAR V5                                   |
| Phantom                                   | SN 13/09 SAM68                               |
| Probe                                     | SN 41/18 EPG0333                             |
| Liquid                                    | Body Liquid Values: eps' : 51.7 sigma : 1.01 |
| Distance between dipole center and liquid | 15.0 mm                                      |
| Area scan resolution                      | dx=8mm/dy=8mm                                |
| Zoon Scan Resolution                      | dx=8mm/dy=8mm/dz=5mm                         |
| Frequency                                 | 900 MHz                                      |
| Input power                               | 20 dBm                                       |
| Liquid Temperature                        | 20 +/- 1 °C                                  |
| Lab Temperature                           | 20 +/- 1 °C                                  |
| Lab Humidity                              | 30-70 %                                      |

| Frequency MHz | 1 g SAR (W/kg/W) | 10 g SAR (W/kg/W) |
|---------------|------------------|-------------------|
|               | measured         | measured          |
| 900           | 11.03 (1.10)     | 6.96 (0.70)       |



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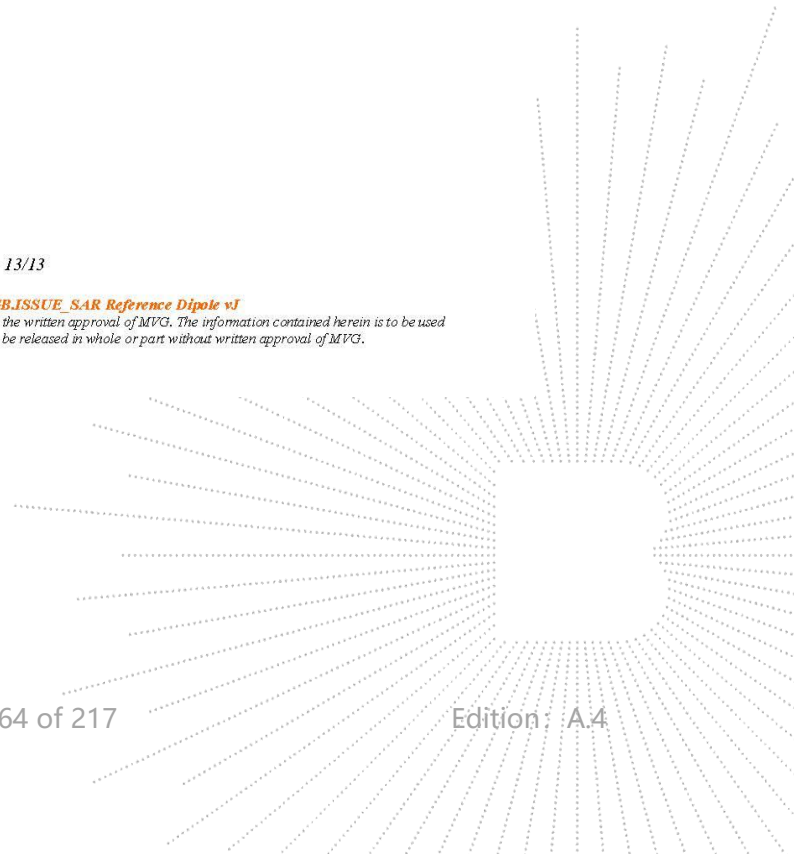

**8 LIST OF EQUIPMENT**

| Equipment Summary Sheet            |                         |                    |   |   |
|------------------------------------|-------------------------|--------------------|---|---|
| Equipment Description              | Manufacturer / Model    | Identification No. | Current Calibration Date                      | Next Calibration Date                         |
| SAM Phantom                        | MVG                     | SN 13/09 SAM68     | Validated. No cal required.                   | Validated. No cal required.                   |
| COMOSAR Test Bench                 | Version 3               | NA                 | Validated. No cal required.                   | Validated. No cal required.                   |
| Network Analyzer                   | Rohde & Schwarz ZVM     | 100203             | 08/2021                                       | 08/2024                                       |
| Network Analyzer                   | Agilent 8753ES          | MY40003210         | 10/2019                                       | 10/2022                                       |
| Network Analyzer – Calibration kit | Rohde & Schwarz ZV-Z235 | 101223             | 05/2019                                       | 05/2022                                       |
| Network Analyzer – Calibration kit | HP 85033D               | 3423A08186         | 06/2021                                       | 06/2027                                       |
| Calipers                           | Mitutoyo                | SN 0009732         | 10/2019                                       | 10/2022                                       |
| Reference Probe                    | MVG                     | SN 41/18 EPGO333   | 10/2021                                       | 10/2022                                       |
| Multimeter                         | Keithley 2000           | 1160271            | 02/2020                                       | 02/2023                                       |
| Signal Generator                   | Rohde & Schwarz SMB     | 106589             | 04/2019                                       | 04/2022                                       |
| Amplifier                          | MVG                     | MODU-023-C-0002    | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Power Meter                        | NI-USB 5680             | 170100013          | 06/2021                                       | 06/2024                                       |
| Power Meter                        | Rohde & Schwarz NRVD    | 832839-056         | 11/2019                                       | 11/2022                                       |
| Directional Coupler                | Krytar 158020           | 131467             | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Temperature / Humidity Sensor      | Testo 184 H1            | 44225320           | 06/2021                                       | 06/2024                                       |

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**SAR Reference Dipole Calibration Report**

Ref : ACR.329.11.21.BES.A

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INDUSTRIAL PARK, FUYUAN 1ST ROAD,  
TANGWEI COMMUNITY, FUHAI STREET, BAO'AN  
DISTRICT, SHENZHEN, GUANGDONG, CHINA  
**MVG COMOSAR REFERENCE DIPOLE**  
FREQUENCY: 1800 MHZ  
SERIAL NO.: SN 47/21 DIP 1G800-623

Calibrated at MVG  
Z.I. de la pointe du diable  
Technopôle Brest Iroise – 295 avenue Alexis de Rochon  
29280 PLOUZANE - FRANCE

Calibration date: 11/25/2021



Accreditations #2-6789 and #2-6814  
Scope available on [www.cofrac.fr](http://www.cofrac.fr)

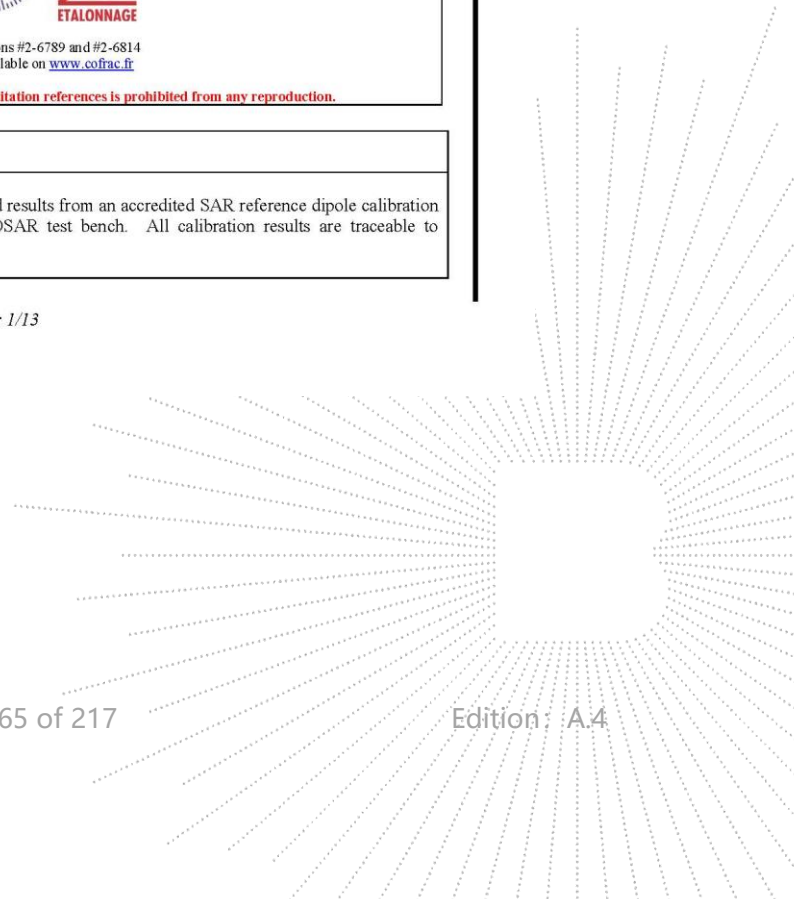
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*Summary:*

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

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**SAR REFERENCE DIPOLE CALIBRATION REPORT**

Ref: ACR.329.11.21.BES.A

|                      | <i>Name</i>  | <i>Function</i>     | <i>Date</i> | <i>Signature</i>    |
|----------------------|--------------|---------------------|-------------|---------------------|
| <i>Prepared by :</i> | Jérôme Luc   | Technical Manager   | 11/25/2021  | <i>JS</i>           |
| <i>Checked by :</i>  | Jérôme Luc   | Technical Manager   | 11/25/2021  | <i>JS</i>           |
| <i>Approved by :</i> | Yann Toutain | Laboratory Director | 11/25/2021  | <i>Yann TOUTAIN</i> |

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11:53:42 +01'00'

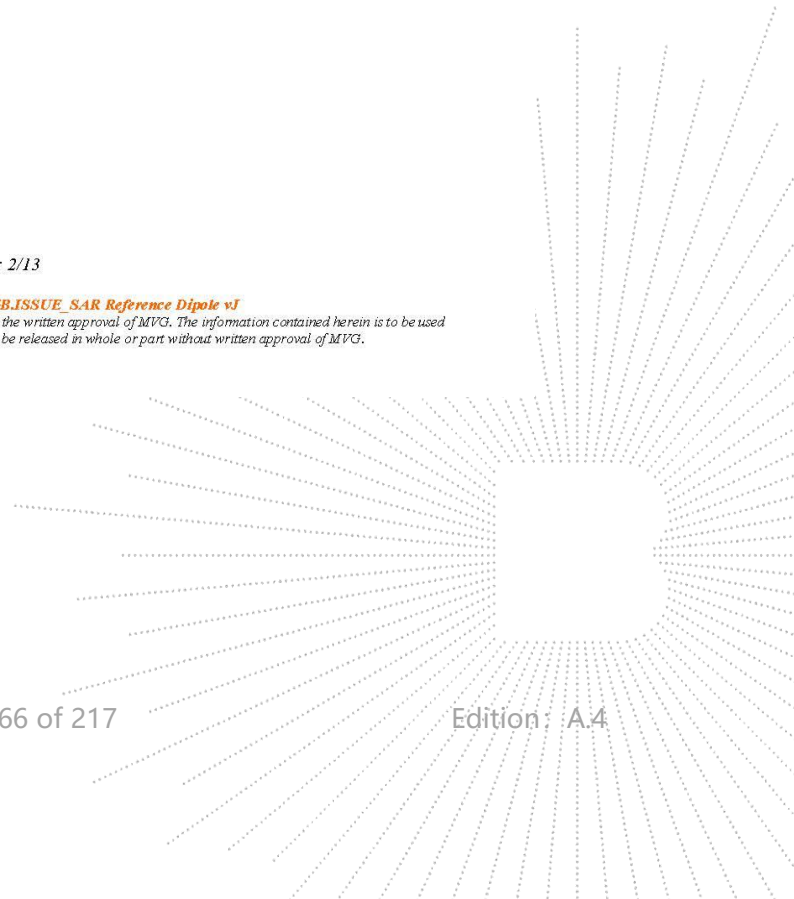
|                       | <i>Customer Name</i>                     |
|-----------------------|--|
| <i>Distribution :</i> | Shenzhen BCTC<br>Technology Co.,<br>Ltd. |

| <i>Issue</i> | <i>Name</i> | <i>Date</i> | <i>Modifications</i> |
|--------------|-------------|-------------|----------------------|
| A            | Jérôme Luc  | 11/25/2021  | Initial release      |
|              |             |             |                      |
|              |             |             |                      |
|              |             |             |                      |

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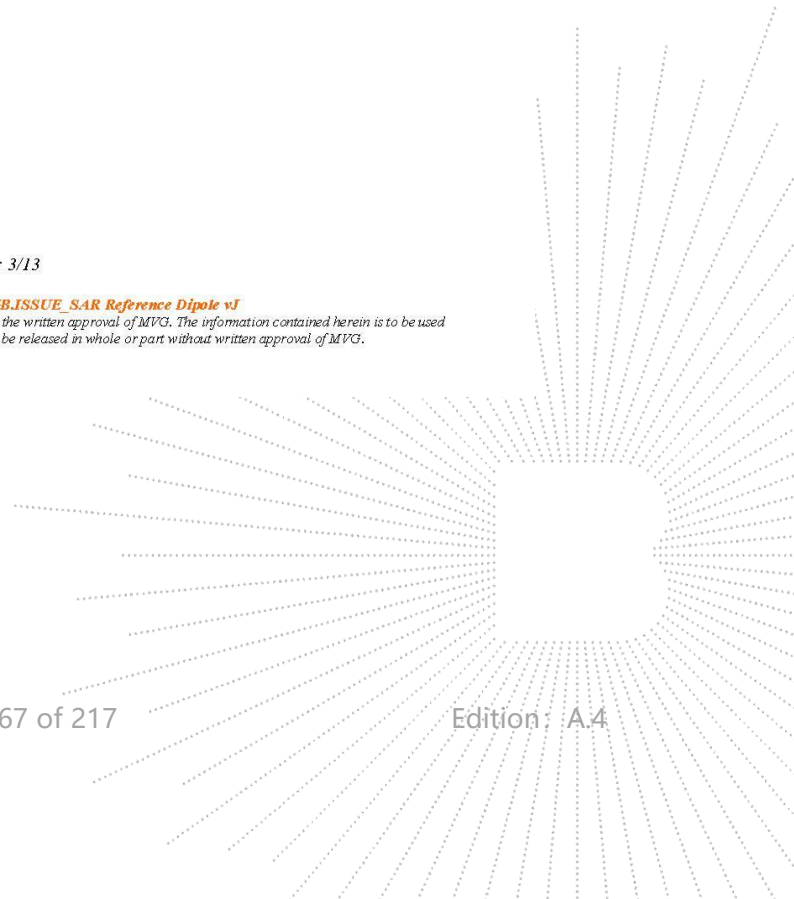
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## 1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

## 2 DEVICE UNDER TEST

| Device Under Test              |                                   |
|--------------------------------|-----------------------------------|
| Device Type                    | COMOSAR 1800 MHz REFERENCE DIPOLE |
| Manufacturer                   | MVG                               |
| Model                          | SID1800                           |
| Serial Number                  | SN 47/21 DIP 1G800-623            |
| Product Condition (new / used) | New                               |

## 3 PRODUCT DESCRIPTION

### 3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards. The product is designed for use with the COMOSAR test bench only.



**Figure 1 – MVG COMOSAR Validation Dipole**

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#### 4 MEASUREMENT METHOD

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

##### 4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. A direct method is used with a network analyser and its calibration kit, both with a valid ISO17025 calibration.

##### 4.2 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards specify the mechanical components and dimensions of the validation dipoles, with the dimension's frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness. A direct method is used with a ISO17025 calibrated caliper.

#### 5 MEASUREMENT UNCERTAINTY

All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

##### 5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

| Frequency band | Expanded Uncertainty on Return Loss |
|----------------|-------------------------------------|
| 400-6000MHz    | 0.08 LIN                            |

##### 5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

| Length (mm) | Expanded Uncertainty on Length |
|-------------|--------------------------------|
| 0 - 300     | 0.20 mm                        |
| 300 - 450   | 0.44 mm                        |

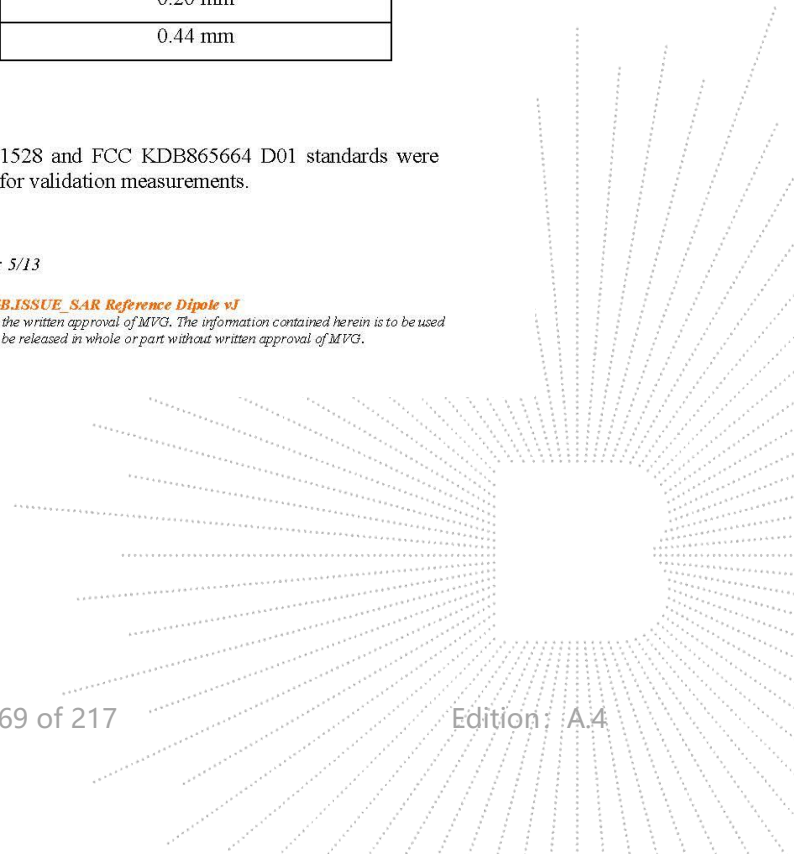
##### 5.3 VALIDATION MEASUREMENT

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

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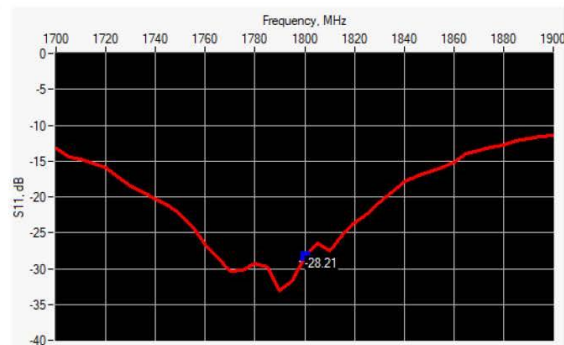




| Scan Volume | Expanded Uncertainty |
|-------------|----------------------|
| 1 g         | 19 % (SAR)           |
| 10 g        | 19 % (SAR)           |

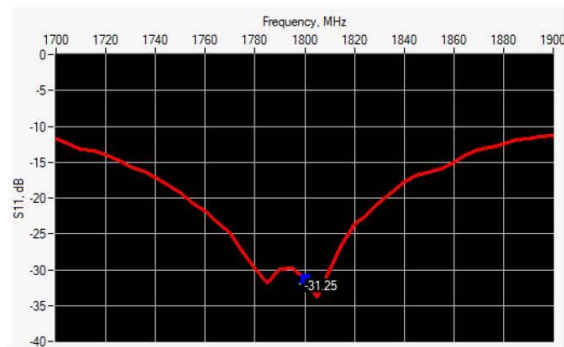
## 6 CALIBRATION MEASUREMENT RESULTS

### 6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



| Frequency (MHz) | Return Loss (dB) | Requirement (dB) | Impedance                   |
|-----------------|------------------|------------------|-----------------------------|
| 1800            | -28.21           | -20              | $49.8 \Omega + 3.9 j\Omega$ |

### 6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



| Frequency (MHz) | Return Loss (dB) | Requirement (dB) | Impedance                   |
|-----------------|------------------|------------------|-----------------------------|
| 1800            | -31.25           | -20              | $47.7 \Omega - 1.4 j\Omega$ |

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## 6.3 MECHANICAL DIMENSIONS

| Frequency MHz | L mm       |          | h mm       |          | d mm      |          |
|---------------|------------|----------|------------|----------|-----------|----------|
|               | required   | measured | required   | measured | required  | measured |
| 300           | 420.0 ±1 % |          | 250.0 ±1 % |          | 6.35 ±1 % |          |
| 450           | 290.0 ±1 % |          | 166.7 ±1 % |          | 6.35 ±1 % |          |
| 750           | 176.0 ±1 % |          | 100.0 ±1 % |          | 6.35 ±1 % |          |
| 835           | 161.0 ±1 % |          | 89.8 ±1 %  |          | 3.6 ±1 %  |          |
| 900           | 149.0 ±1 % |          | 83.3 ±1 %  |          | 3.6 ±1 %  |          |
| 1450          | 89.1 ±1 %  |          | 51.7 ±1 %  |          | 3.6 ±1 %  |          |
| 1500          | 86.2 ±1 %  |          | 50.0 ±1 %  |          | 3.6 ±1 %  |          |
| 1640          | 79.0 ±1 %  |          | 45.7 ±1 %  |          | 3.6 ±1 %  |          |
| 1750          | 75.2 ±1 %  |          | 42.9 ±1 %  |          | 3.6 ±1 %  |          |
| 1800          | 72.0 ±1 %  | 72.31    | 41.7 ±1 %  | 41.63    | 3.6 ±1 %  | 3.59     |
| 1900          | 68.0 ±1 %  |          | 39.5 ±1 %  |          | 3.6 ±1 %  |          |
| 1950          | 66.3 ±1 %  |          | 38.5 ±1 %  |          | 3.6 ±1 %  |          |
| 2000          | 64.5 ±1 %  |          | 37.5 ±1 %  |          | 3.6 ±1 %  |          |
| 2100          | 61.0 ±1 %  |          | 35.7 ±1 %  |          | 3.6 ±1 %  |          |
| 2300          | 55.5 ±1 %  |          | 32.6 ±1 %  |          | 3.6 ±1 %  |          |
| 2450          | 51.5 ±1 %  |          | 30.4 ±1 %  |          | 3.6 ±1 %  |          |
| 2600          | 48.5 ±1 %  |          | 28.8 ±1 %  |          | 3.6 ±1 %  |          |
| 3000          | 41.5 ±1 %  |          | 25.0 ±1 %  |          | 3.6 ±1 %  |          |
| 3300          | -          |          | -          |          | -         |          |
| 3500          | 37.0 ±1 %  |          | 26.4 ±1 %  |          | 3.6 ±1 %  |          |
| 3700          | 34.7 ±1 %  |          | 26.4 ±1 %  |          | 3.6 ±1 %  |          |
| 3900          | -          |          | -          |          | -         |          |
| 4200          | -          |          | -          |          | -         |          |
| 4600          | -          |          | -          |          | -         |          |
| 4900          | -          |          | -          |          | -         |          |

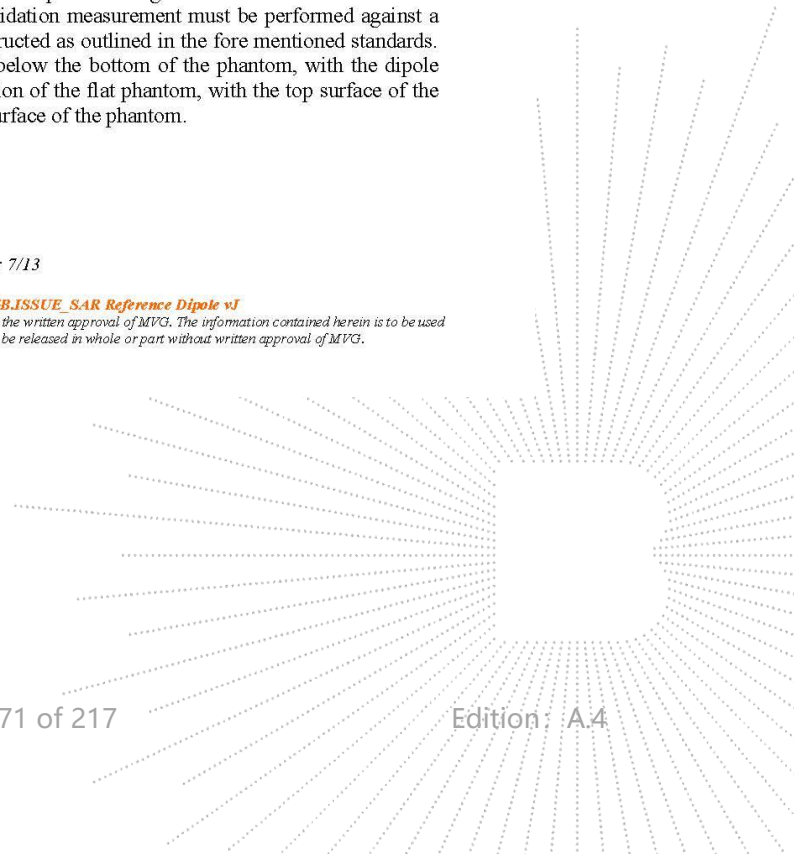
## 7 VALIDATION MEASUREMENT

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

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**SAR REFERENCE DIPOLE CALIBRATION REPORT**

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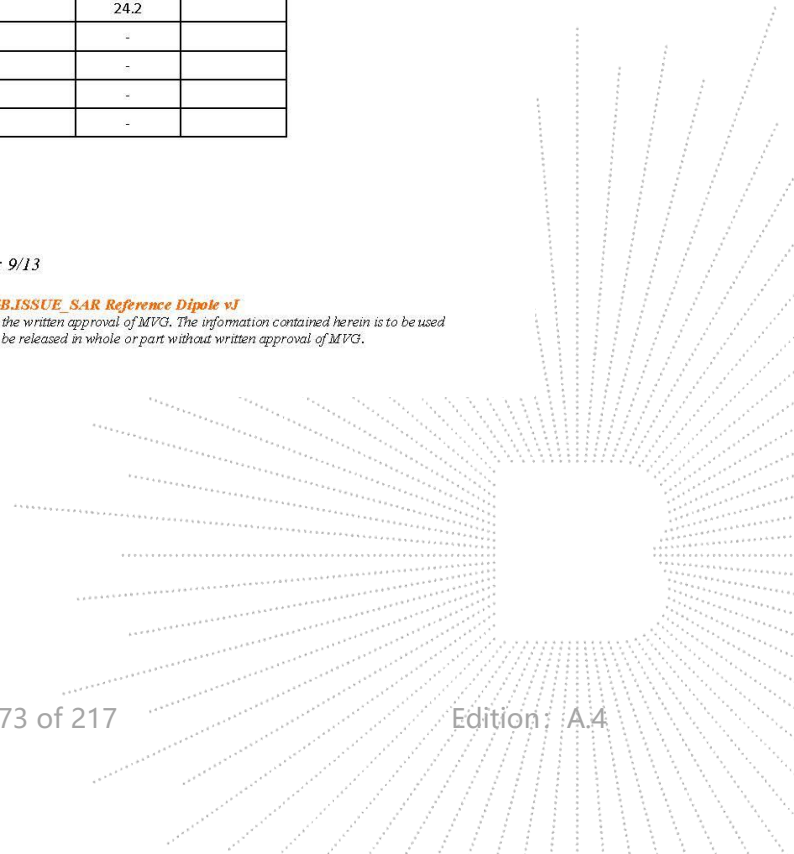
|   |  |
|---|--|
| Software                                  | OPENSAR V5   |
| Phantom                                   | SN 13/09 SAM68   |
| Probe                                     | SN 41/18 EPG0333   |
| Liquid                                    | Head Liquid Values: $\epsilon_{ps}^*$ : 38.4 $\sigma$ : 1.36 |
| Distance between dipole center and liquid | 10.0 mm  |
| Area scan resolution                      | $dx=8mm/dy=8mm$  |
| Zoon Scan Resolution                      | $dx=8mm/dy=8mm/dz=5mm$                                       |
| Frequency                                 | 1800 MHz   |
| Input power                               | 20 dBm   |
| Liquid Temperature                        | 20 +/- 1 °C  |
| Lab Temperature                           | 20 +/- 1 °C  |
| Lab Humidity                              | 30-70 %  |

| Frequency<br>MHz | 1 g SAR (W/kg/W) |              | 10 g SAR (W/kg/W) |              |
|------------------|------------------|--------------|-------------------|--------------|
|                  | required         | measured     | required          | measured     |
| 300              | 2.85             |              | 1.94              |              |
| 450              | 4.58             |              | 3.06              |              |
| 750              | 8.49             |              | 5.55              |              |
| 835              | 9.56             |              | 6.22              |              |
| 900              | 10.9             |              | 6.99              |              |
| 1450             | 29               |              | 16                |              |
| 1500             | 30.5             |              | 16.8              |              |
| 1640             | 34.2             |              | 18.4              |              |
| 1750             | 36.4             |              | 19.3              |              |
| 1800             | 38.4             | 39.74 (3.97) | 20.1              | 20.82 (2.08) |
| 1900             | 39.7             |              | 20.5              |              |
| 1950             | 40.5             |              | 20.9              |              |
| 2000             | 41.1             |              | 21.1              |              |
| 2100             | 43.6             |              | 21.9              |              |
| 2300             | 48.7             |              | 23.3              |              |
| 2450             | 52.4             |              | 24                |              |
| 2600             | 55.3             |              | 24.6              |              |
| 3000             | 63.8             |              | 25.7              |              |
| 3300             | -                |              | -                 |              |
| 3500             | 67.1             |              | 25                |              |
| 3700             | 67.4             |              | 24.2              |              |
| 3900             | -                |              | -                 |              |
| 4200             | -                |              | -                 |              |
| 4600             | -                |              | -                 |              |
| 4900             | -                |              | -                 |              |

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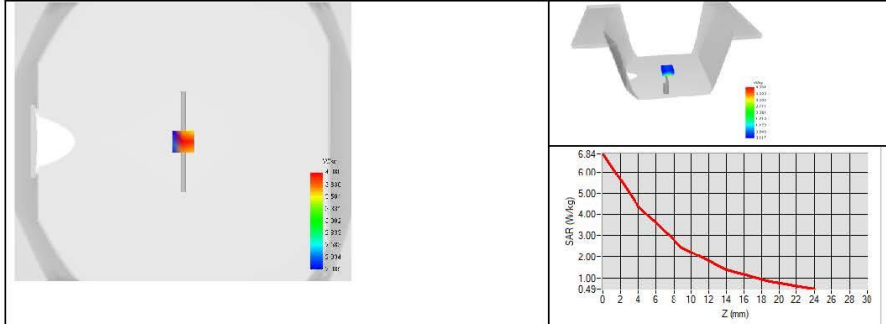
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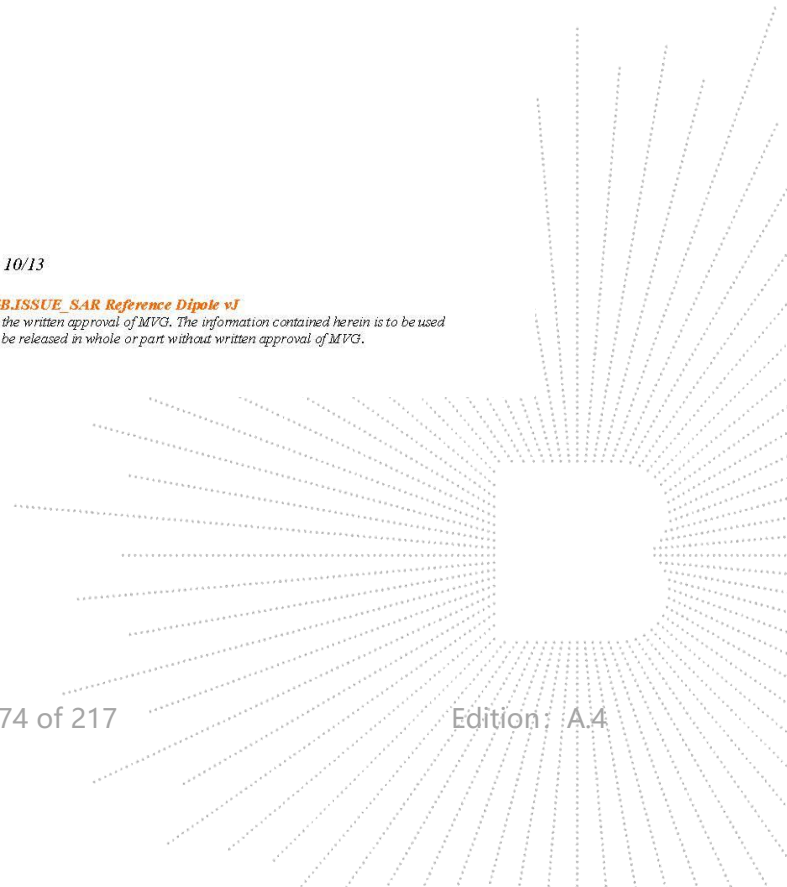


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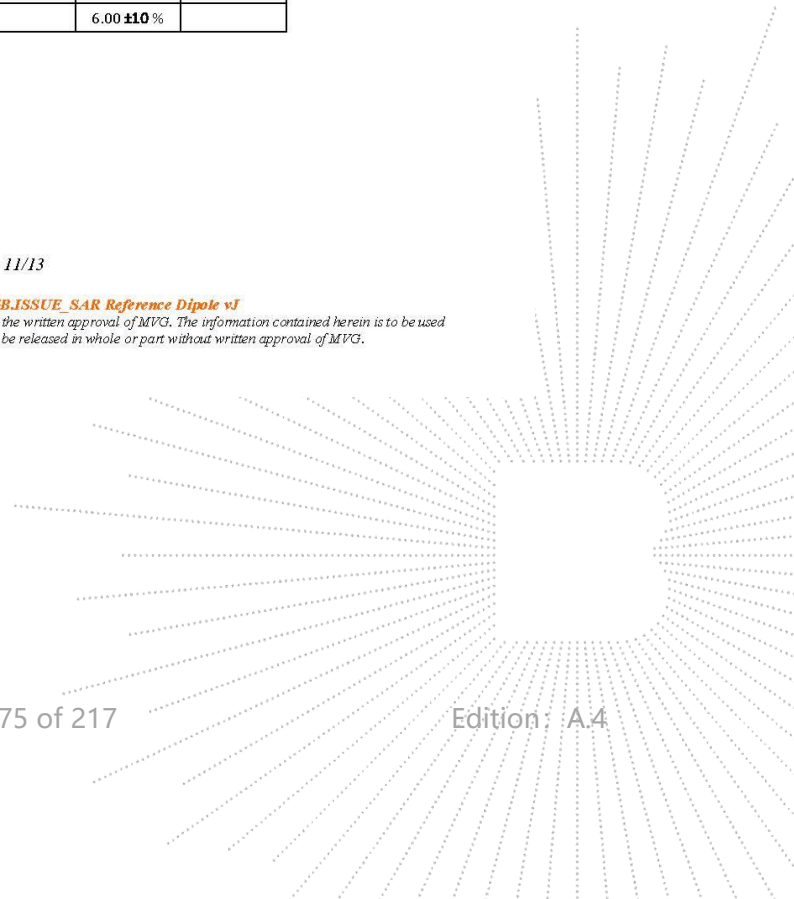

 7.3 BODY LIQUID MEASUREMENT

| Frequency<br>MHz | Relative permittivity ( $\epsilon_r$ ) |          | Conductivity ( $\sigma$ ) S/m |          |
|------------------|--|----------|-------------------------------|----------|
|                  | required                               | measured | required                      | measured |
| 150              | 61.9 $\pm$ 10 %                        |          | 0.80 $\pm$ 10 %               |          |
| 300              | 58.2 $\pm$ 10 %                        |          | 0.92 $\pm$ 10 %               |          |
| 450              | 56.7 $\pm$ 10 %                        |          | 0.94 $\pm$ 10 %               |          |
| 750              | 55.5 $\pm$ 10 %                        |          | 0.96 $\pm$ 10 %               |          |
| 835              | 55.2 $\pm$ 10 %                        |          | 0.97 $\pm$ 10 %               |          |
| 900              | 55.0 $\pm$ 10 %                        |          | 1.05 $\pm$ 10 %               |          |
| 915              | 55.0 $\pm$ 10 %                        |          | 1.06 $\pm$ 10 %               |          |
| 1450             | 54.0 $\pm$ 10 %                        |          | 1.30 $\pm$ 10 %               |          |
| 1610             | 53.8 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 1800             | 53.3 $\pm$ 10 %                        | 55.3     | 1.52 $\pm$ 10 %               | 1.49     |
| 1900             | 53.3 $\pm$ 10 %                        |          | 1.52 $\pm$ 10 %               |          |
| 2000             | 53.3 $\pm$ 10 %                        |          | 1.52 $\pm$ 10 %               |          |
| 2100             | 53.2 $\pm$ 10 %                        |          | 1.62 $\pm$ 10 %               |          |
| 2300             | 52.9 $\pm$ 10 %                        |          | 1.81 $\pm$ 10 %               |          |
| 2450             | 52.7 $\pm$ 10 %                        |          | 1.95 $\pm$ 10 %               |          |
| 2600             | 52.5 $\pm$ 10 %                        |          | 2.16 $\pm$ 10 %               |          |
| 3000             | 52.0 $\pm$ 10 %                        |          | 2.73 $\pm$ 10 %               |          |
| 3300             | 51.6 $\pm$ 10 %                        |          | 3.08 $\pm$ 10 %               |          |
| 3500             | 51.3 $\pm$ 10 %                        |          | 3.31 $\pm$ 10 %               |          |
| 3700             | 51.0 $\pm$ 10 %                        |          | 3.55 $\pm$ 10 %               |          |
| 3900             | 50.8 $\pm$ 10 %                        |          | 3.78 $\pm$ 10 %               |          |
| 4200             | 50.4 $\pm$ 10 %                        |          | 4.13 $\pm$ 10 %               |          |
| 4600             | 49.8 $\pm$ 10 %                        |          | 4.60 $\pm$ 10 %               |          |
| 4900             | 49.4 $\pm$ 10 %                        |          | 4.95 $\pm$ 10 %               |          |
| 5200             | 49.0 $\pm$ 10 %                        |          | 5.30 $\pm$ 10 %               |          |
| 5300             | 48.9 $\pm$ 10 %                        |          | 5.42 $\pm$ 10 %               |          |
| 5400             | 48.7 $\pm$ 10 %                        |          | 5.53 $\pm$ 10 %               |          |
| 5500             | 48.6 $\pm$ 10 %                        |          | 5.65 $\pm$ 10 %               |          |
| 5600             | 48.5 $\pm$ 10 %                        |          | 5.77 $\pm$ 10 %               |          |
| 5800             | 48.2 $\pm$ 10 %                        |          | 6.00 $\pm$ 10 %               |          |

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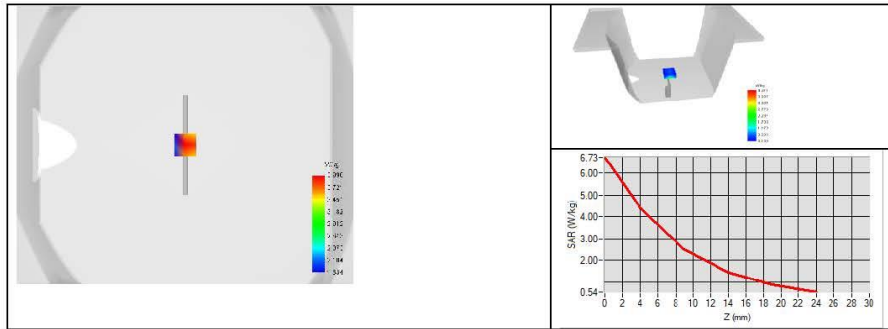




## 7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

|   |  |
|---|--|
| Software                                  | OPENSAR V5                                   |
| Phantom                                   | SN 13/09 SAM68                               |
| Probe                                     | SN 41/18 EPGO333                             |
| Liquid                                    | Body Liquid Values: eps' : 55.3 sigma : 1.49 |
| Distance between dipole center and liquid | 10.0 mm                                      |
| Area scan resolution                      | dx=8mm/dy=8mm                                |
| Zoon Scan Resolution                      | dx=8mm/dy=8mm/dz=5mm                         |
| Frequency                                 | 1800 MHz                                     |
| Input power                               | 20 dBm                                       |
| Liquid Temperature                        | 20 +/- 1 °C                                  |
| Lab Temperature                           | 20 +/- 1 °C                                  |
| Lab Humidity                              | 30-70 %                                      |

| Frequency MHz | 1 g SAR (W/kg/W) | 10 g SAR (W/kg/W) |
|---------------|------------------|-------------------|
|               | measured         | measured          |
| 1800          | 39.54 (3.95)     | 20.63 (2.06)      |



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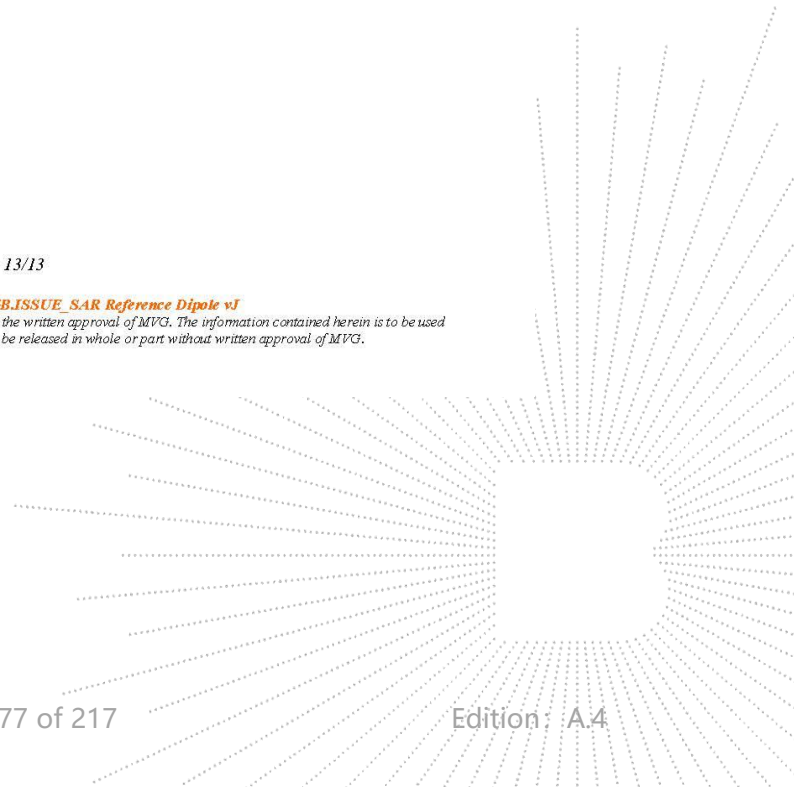

**8 LIST OF EQUIPMENT**

| Equipment Summary Sheet            |                         |                    |   |   |
|------------------------------------|-------------------------|--------------------|---|---|
| Equipment Description              | Manufacturer / Model    | Identification No. | Current Calibration Date                      | Next Calibration Date                         |
| SAM Phantom                        | MVG                     | SN 13/09 SAM68     | Validated. No cal required.                   | Validated. No cal required.                   |
| COMOSAR Test Bench                 | Version 3               | NA                 | Validated. No cal required.                   | Validated. No cal required.                   |
| Network Analyzer                   | Rohde & Schwarz ZVM     | 100203             | 08/2021                                       | 08/2024                                       |
| Network Analyzer                   | Agilent 8753ES          | MY40003210         | 10/2019                                       | 10/2022                                       |
| Network Analyzer – Calibration kit | Rohde & Schwarz ZV-Z235 | 101223             | 05/2019                                       | 05/2022                                       |
| Network Analyzer – Calibration kit | HP 85033D               | 3423A08186         | 06/2021                                       | 06/2027                                       |
| Calipers                           | Mitutoyo                | SN 0009732         | 10/2019                                       | 10/2022                                       |
| Reference Probe                    | MVG                     | SN 41/18 EPGO333   | 10/2021                                       | 10/2022                                       |
| Multimeter                         | Keithley 2000           | 1160271            | 02/2020                                       | 02/2023                                       |
| Signal Generator                   | Rohde & Schwarz SMB     | 106589             | 04/2019                                       | 04/2022                                       |
| Amplifier                          | MVG                     | MODU-023-C-0002    | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Power Meter                        | NI-USB 5680             | 170100013          | 06/2021                                       | 06/2024                                       |
| Power Meter                        | Rohde & Schwarz NRVD    | 832839-056         | 11/2019                                       | 11/2022                                       |
| Directional Coupler                | Krytar 158020           | 131467             | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Temperature / Humidity Sensor      | Testo 184 H1            | 44225320           | 06/2021                                       | 06/2024                                       |

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**SAR Reference Dipole Calibration Report**

Ref : ACR.329.13.21.BES.A

**SHENZHEN BCTC TECHNOLOGY CO., LTD.**  
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INDUSTRIAL PARK, FUYUAN 1ST ROAD,  
TANGWEI COMMUNITY, FUHAI STREET, BAO'AN  
DISTRICT, SHENZHEN, GUANGDONG, CHINA  
**MVG COMOSAR REFERENCE DIPOLE**  
FREQUENCY: 2100 MHZ  
SERIAL NO.: SN 47/21 DIP 2G100-625

Calibrated at MVG  
Z.I. de la pointe du diable  
Technopôle Brest Iroise – 295 avenue Alexis de Rochon  
29280 PLOUZANE - FRANCE

Calibration date: 11/25/2021



Accreditations #2-6789 and #2-6814  
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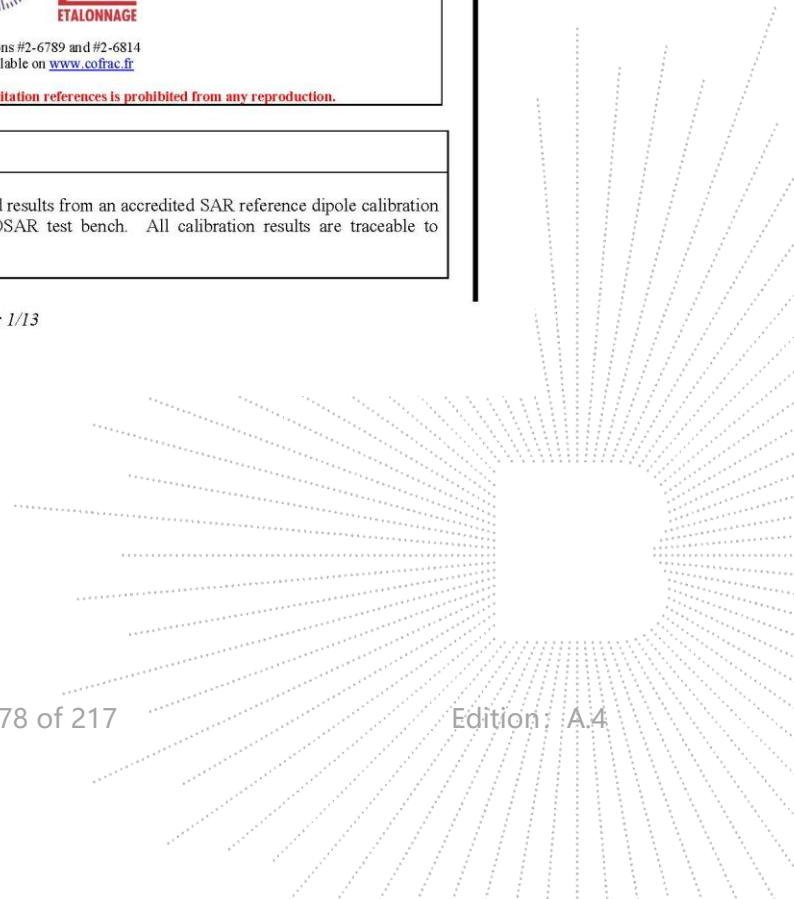
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*Summary:*

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

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**SAR REFERENCE DIPOLE CALIBRATION REPORT**

Ref: ACR.329.13.21.BES.A

|                      | <i>Name</i>  | <i>Function</i>     | <i>Date</i> | <i>Signature</i>    |
|----------------------|--------------|---------------------|-------------|---------------------|
| <i>Prepared by :</i> | Jérôme Luc   | Technical Manager   | 11/25/2021  | <i>JS</i>           |
| <i>Checked by :</i>  | Jérôme Luc   | Technical Manager   | 11/25/2021  | <i>JS</i>           |
| <i>Approved by :</i> | Yann Toutain | Laboratory Director | 11/25/2021  | <i>Yann TOUTAIN</i> |

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|-----------------------|--|
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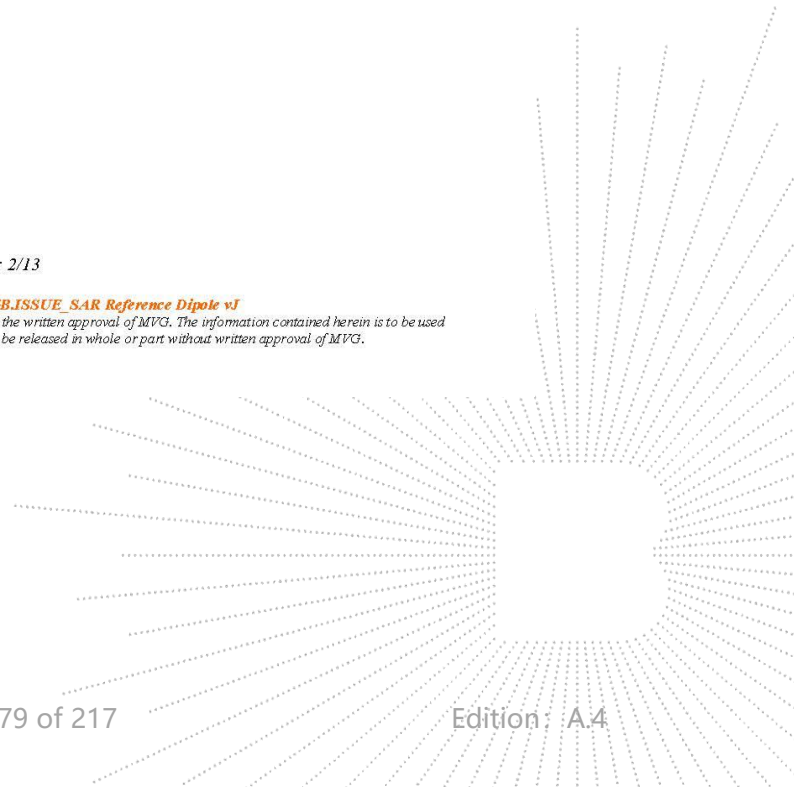
| <i>Issue</i> | <i>Name</i> | <i>Date</i> | <i>Modifications</i> |
|--------------|-------------|-------------|----------------------|
| A            | Jérôme Luc  | 11/25/2021  | Initial release      |
|              |             |             |                      |
|              |             |             |                      |
|              |             |             |                      |



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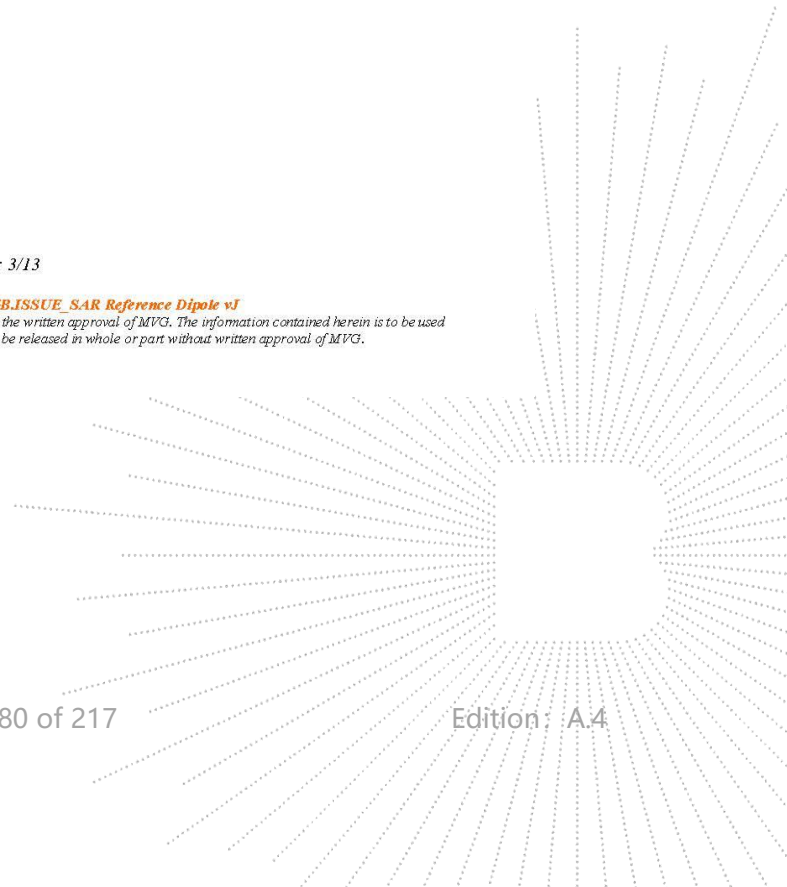
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## 1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

## 2 DEVICE UNDER TEST

| Device Under Test              |                                   |
|--------------------------------|-----------------------------------|
| Device Type                    | COMOSAR 2100 MHz REFERENCE DIPOLE |
| Manufacturer                   | MVG                               |
| Model                          | SID2100                           |
| Serial Number                  | SN 47/21 DIP 2G100-625            |
| Product Condition (new / used) | New                               |

## 3 PRODUCT DESCRIPTION

### 3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards. The product is designed for use with the COMOSAR test bench only.



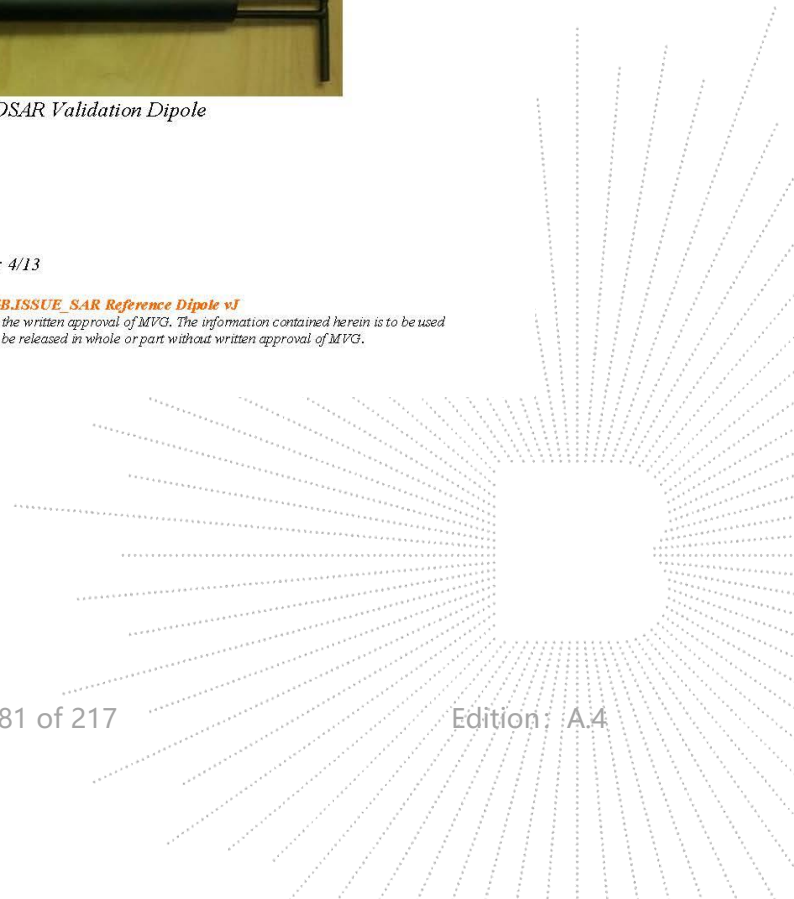
**Figure 1** – MVG COMOSAR Validation Dipole

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#### 4 MEASUREMENT METHOD

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

##### 4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. A direct method is used with a network analyser and its calibration kit, both with a valid ISO17025 calibration.

##### 4.2 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards specify the mechanical components and dimensions of the validation dipoles, with the dimension's frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness. A direct method is used with a ISO17025 calibrated caliper.

#### 5 MEASUREMENT UNCERTAINTY

All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

##### 5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

| Frequency band | Expanded Uncertainty on Return Loss |
|----------------|-------------------------------------|
| 400-6000MHz    | 0.08 LIN                            |

##### 5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

| Length (mm) | Expanded Uncertainty on Length |
|-------------|--------------------------------|
| 0 - 300     | 0.20 mm                        |
| 300 - 450   | 0.44 mm                        |

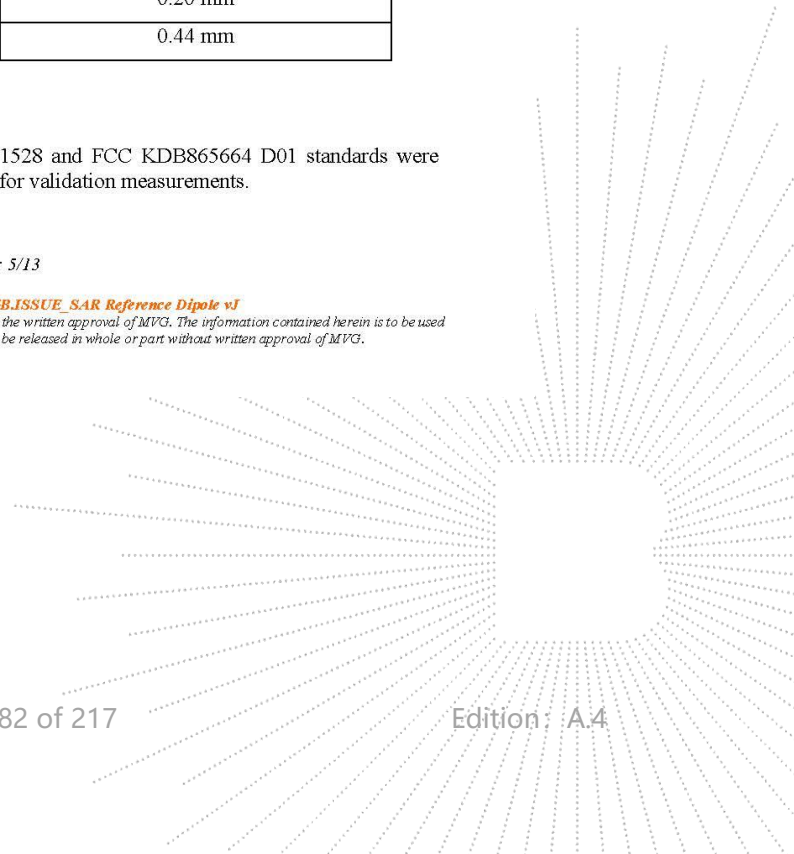
##### 5.3 VALIDATION MEASUREMENT

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

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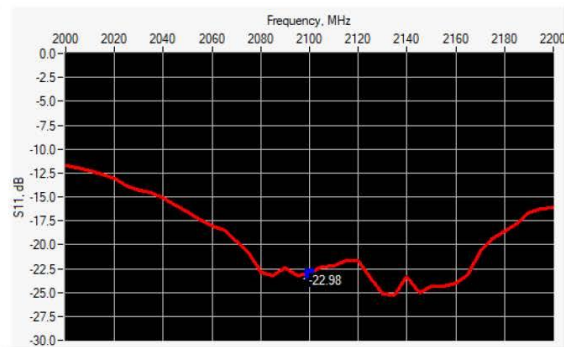




| Scan Volume | Expanded Uncertainty |
|-------------|----------------------|
| 1 g         | 19 % (SAR)           |
| 10 g        | 19 % (SAR)           |

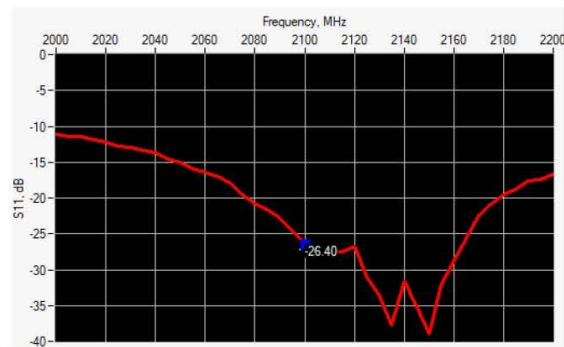
## 6 CALIBRATION MEASUREMENT RESULTS

### 6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



| Frequency (MHz) | Return Loss (dB) | Requirement (dB) | Impedance                   |
|-----------------|------------------|------------------|-----------------------------|
| 2100            | -22.98           | -20              | $48.9 \Omega + 7.0 j\Omega$ |

### 6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



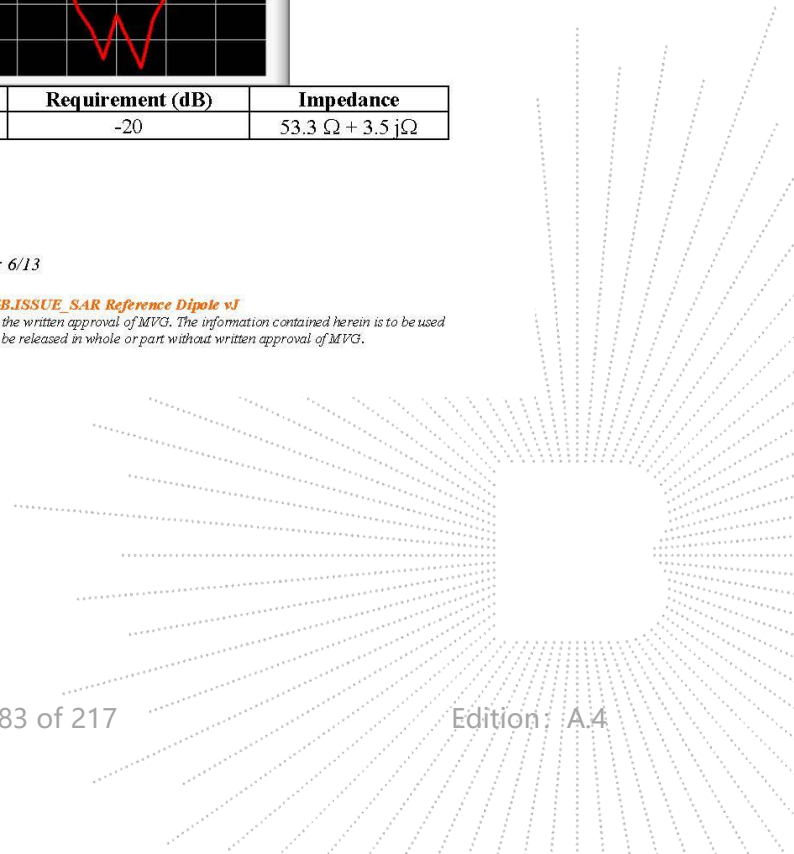
| Frequency (MHz) | Return Loss (dB) | Requirement (dB) | Impedance                   |
|-----------------|------------------|------------------|-----------------------------|
| 2100            | -26.40           | -20              | $53.3 \Omega + 3.5 j\Omega$ |

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 6.3 MECHANICAL DIMENSIONS

| Frequency MHz | L mm       |          | h mm       |          | d mm      |          |
|---------------|------------|----------|------------|----------|-----------|----------|
|               | required   | measured | required   | measured | required  | measured |
| 300           | 420.0 ±1 % |          | 250.0 ±1 % |          | 6.35 ±1 % |          |
| 450           | 290.0 ±1 % |          | 166.7 ±1 % |          | 6.35 ±1 % |          |
| 750           | 176.0 ±1 % |          | 100.0 ±1 % |          | 6.35 ±1 % |          |
| 835           | 161.0 ±1 % |          | 89.8 ±1 %  |          | 3.6 ±1 %  |          |
| 900           | 149.0 ±1 % |          | 83.3 ±1 %  |          | 3.6 ±1 %  |          |
| 1450          | 89.1 ±1 %  |          | 51.7 ±1 %  |          | 3.6 ±1 %  |          |
| 1500          | 86.2 ±1 %  |          | 50.0 ±1 %  |          | 3.6 ±1 %  |          |
| 1640          | 79.0 ±1 %  |          | 45.7 ±1 %  |          | 3.6 ±1 %  |          |
| 1750          | 75.2 ±1 %  |          | 42.9 ±1 %  |          | 3.6 ±1 %  |          |
| 1800          | 72.0 ±1 %  |          | 41.7 ±1 %  |          | 3.6 ±1 %  |          |
| 1900          | 68.0 ±1 %  |          | 39.5 ±1 %  |          | 3.6 ±1 %  |          |
| 1950          | 66.3 ±1 %  |          | 38.5 ±1 %  |          | 3.6 ±1 %  |          |
| 2000          | 64.5 ±1 %  |          | 37.5 ±1 %  |          | 3.6 ±1 %  |          |
| 2100          | 61.0 ±1 %  | 60.73    | 35.7 ±1 %  | 35.97    | 3.6 ±1 %  | 3.62     |
| 2300          | 55.5 ±1 %  |          | 32.6 ±1 %  |          | 3.6 ±1 %  |          |
| 2450          | 51.5 ±1 %  |          | 30.4 ±1 %  |          | 3.6 ±1 %  |          |
| 2600          | 48.5 ±1 %  |          | 28.8 ±1 %  |          | 3.6 ±1 %  |          |
| 3000          | 41.5 ±1 %  |          | 25.0 ±1 %  |          | 3.6 ±1 %  |          |
| 3300          | -          |          | -          |          | -         |          |
| 3500          | 37.0 ±1 %  |          | 26.4 ±1 %  |          | 3.6 ±1 %  |          |
| 3700          | 34.7 ±1 %  |          | 26.4 ±1 %  |          | 3.6 ±1 %  |          |
| 3900          | -          |          | -          |          | -         |          |
| 4200          | -          |          | -          |          | -         |          |
| 4600          | -          |          | -          |          | -         |          |
| 4900          | -          |          | -          |          | -         |          |

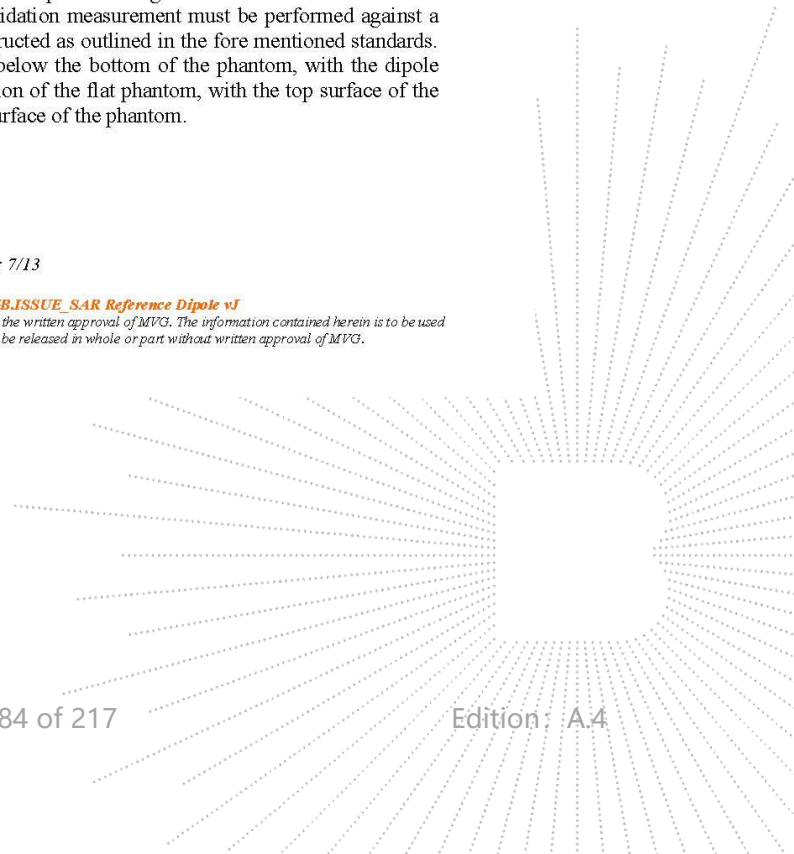
 7 VALIDATION MEASUREMENT

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

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 7.1 HEAD LIQUID MEASUREMENT

| Frequency<br>MHz | Relative permittivity ( $\epsilon_r$ ) |          | Conductivity ( $\sigma$ ) S/m |          |
|------------------|--|----------|-------------------------------|----------|
|                  | required                               | measured | required                      | measured |
| 300              | 45.3 $\pm$ 10 %                        |          | 0.87 $\pm$ 10 %               |          |
| 450              | 43.5 $\pm$ 10 %                        |          | 0.87 $\pm$ 10 %               |          |
| 750              | 41.9 $\pm$ 10 %                        |          | 0.89 $\pm$ 10 %               |          |
| 835              | 41.5 $\pm$ 10 %                        |          | 0.90 $\pm$ 10 %               |          |
| 900              | 41.5 $\pm$ 10 %                        |          | 0.97 $\pm$ 10 %               |          |
| 1450             | 40.5 $\pm$ 10 %                        |          | 1.20 $\pm$ 10 %               |          |
| 1500             | 40.4 $\pm$ 10 %                        |          | 1.23 $\pm$ 10 %               |          |
| 1640             | 40.2 $\pm$ 10 %                        |          | 1.31 $\pm$ 10 %               |          |
| 1750             | 40.1 $\pm$ 10 %                        |          | 1.37 $\pm$ 10 %               |          |
| 1800             | 40.0 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 1900             | 40.0 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 1950             | 40.0 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 2000             | 40.0 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 2100             | 39.8 $\pm$ 10 %                        | 37.7     | 1.49 $\pm$ 10 %               | 1.61     |
| 2300             | 39.5 $\pm$ 10 %                        |          | 1.67 $\pm$ 10 %               |          |
| 2450             | 39.2 $\pm$ 10 %                        |          | 1.80 $\pm$ 10 %               |          |
| 2600             | 39.0 $\pm$ 10 %                        |          | 1.96 $\pm$ 10 %               |          |
| 3000             | 38.5 $\pm$ 10 %                        |          | 2.40 $\pm$ 10 %               |          |
| 3300             | 38.2 $\pm$ 10 %                        |          | 2.71 $\pm$ 10 %               |          |
| 3500             | 37.9 $\pm$ 10 %                        |          | 2.91 $\pm$ 10 %               |          |
| 3700             | 37.7 $\pm$ 10 %                        |          | 3.12 $\pm$ 10 %               |          |
| 3900             | 37.5 $\pm$ 10 %                        |          | 3.32 $\pm$ 10 %               |          |
| 4200             | 37.1 $\pm$ 10 %                        |          | 3.63 $\pm$ 10 %               |          |
| 4600             | 36.7 $\pm$ 10 %                        |          | 4.04 $\pm$ 10 %               |          |
| 4900             | 36.3 $\pm$ 10 %                        |          | 4.35 $\pm$ 10 %               |          |

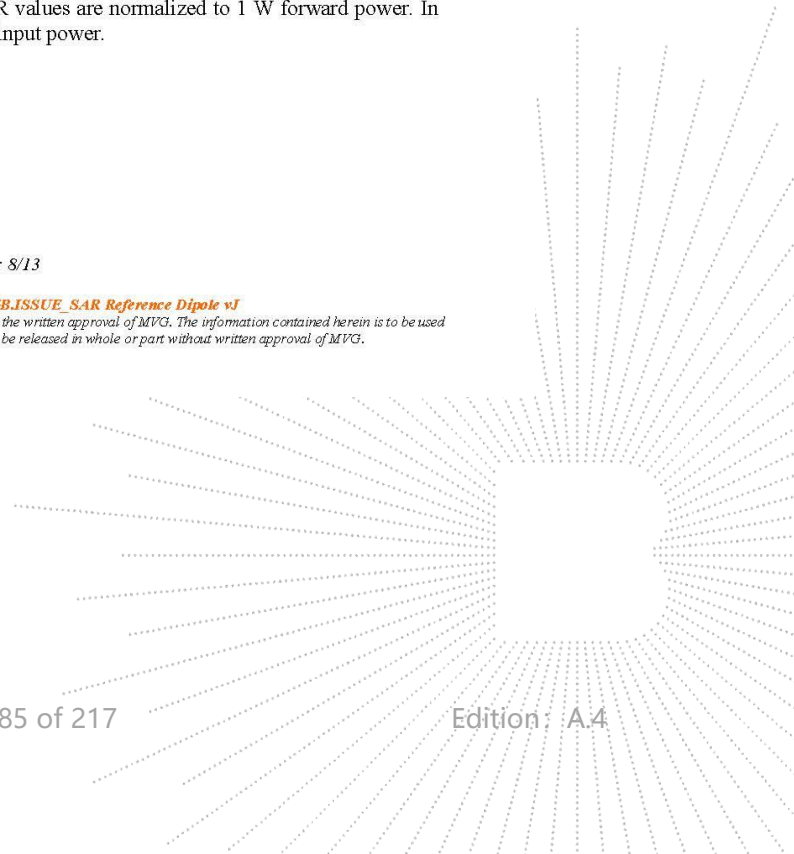
 7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

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**SAR REFERENCE DIPOLE CALIBRATION REPORT**

Ref: ACR.329.13.21.BES.A

|   |  |
|---|--|
| Software                                  | OPENSAR V5   |
| Phantom                                   | SN 13/09 SAM68   |
| Probe                                     | SN 41/18 EPG0333   |
| Liquid                                    | Head Liquid Values: $\epsilon_{ps}^*$ : 37.7 $\sigma$ : 1.61 |
| Distance between dipole center and liquid | 10.0 mm  |
| Area scan resolution                      | $dx=8mm/dy=8mm$  |
| Zoon Scan Resolution                      | $dx=5mm/dy=5mm/dz=5mm$                                       |
| Frequency                                 | 2100 MHz   |
| Input power                               | 20 dBm   |
| Liquid Temperature                        | 20 +/- 1 °C  |
| Lab Temperature                           | 20 +/- 1 °C  |
| Lab Humidity                              | 30-70 %  |

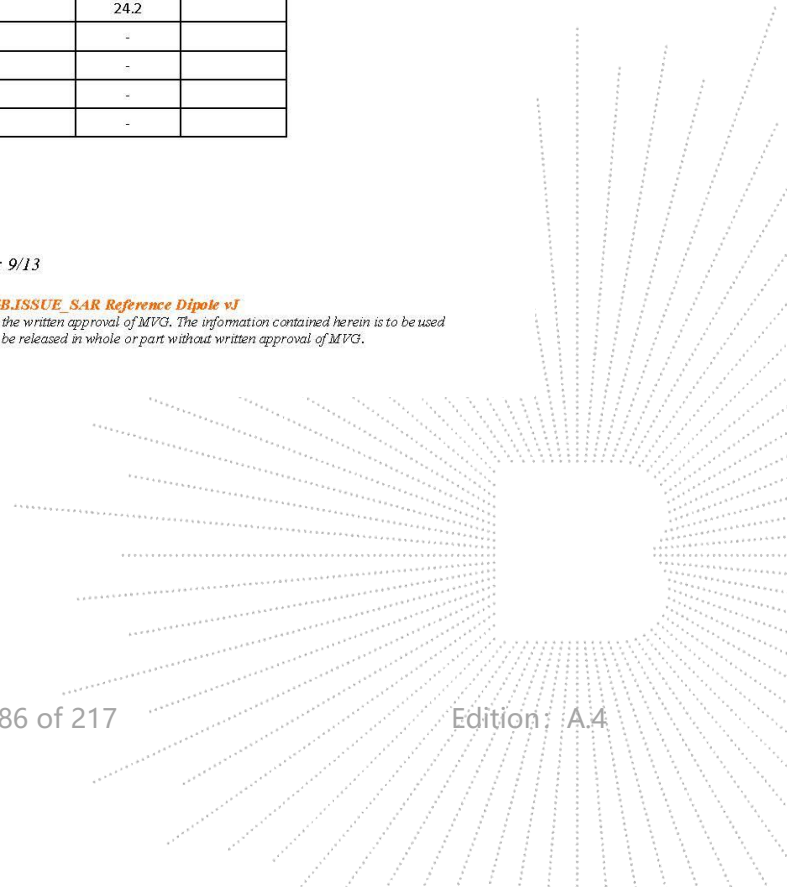
| Frequency<br>MHz | 1 g SAR (W/kg/W) |              | 10 g SAR (W/kg/W) |              |
|------------------|------------------|--------------|-------------------|--------------|
|                  | required         | measured     | required          | measured     |
| 300              | 2.85             |              | 1.94              |              |
| 450              | 4.58             |              | 3.06              |              |
| 750              | 8.49             |              | 5.55              |              |
| 835              | 9.56             |              | 6.22              |              |
| 900              | 10.9             |              | 6.99              |              |
| 1450             | 29               |              | 16                |              |
| 1500             | 30.5             |              | 16.8              |              |
| 1640             | 34.2             |              | 18.4              |              |
| 1750             | 36.4             |              | 19.3              |              |
| 1800             | 38.4             |              | 20.1              |              |
| 1900             | 39.7             |              | 20.5              |              |
| 1950             | 40.5             |              | 20.9              |              |
| 2000             | 41.1             |              | 21.1              |              |
| 2100             | 43.6             | 45.63 (4.56) | 21.9              | 21.80 (2.18) |
| 2300             | 48.7             |              | 23.3              |              |
| 2450             | 52.4             |              | 24                |              |
| 2600             | 55.3             |              | 24.6              |              |
| 3000             | 63.8             |              | 25.7              |              |
| 3300             | -                |              | -                 |              |
| 3500             | 67.1             |              | 25                |              |
| 3700             | 67.4             |              | 24.2              |              |
| 3900             | -                |              | -                 |              |
| 4200             | -                |              | -                 |              |
| 4600             | -                |              | -                 |              |
| 4900             | -                |              | -                 |              |

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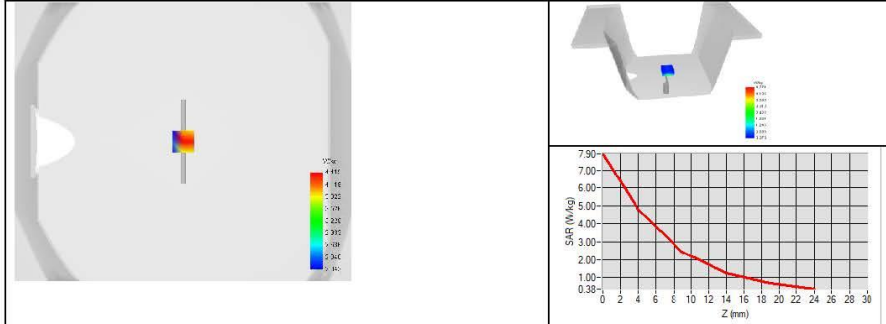
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**SAR REFERENCE DIPOLE CALIBRATION REPORT**

Ref: ACR.329.13.21.BES.A

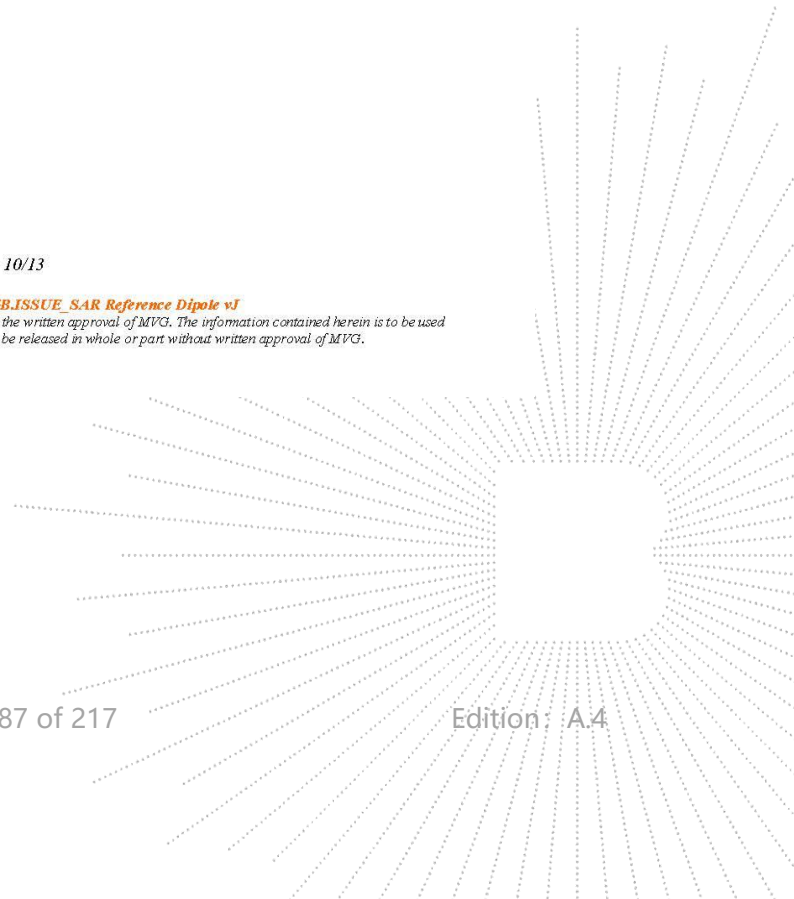


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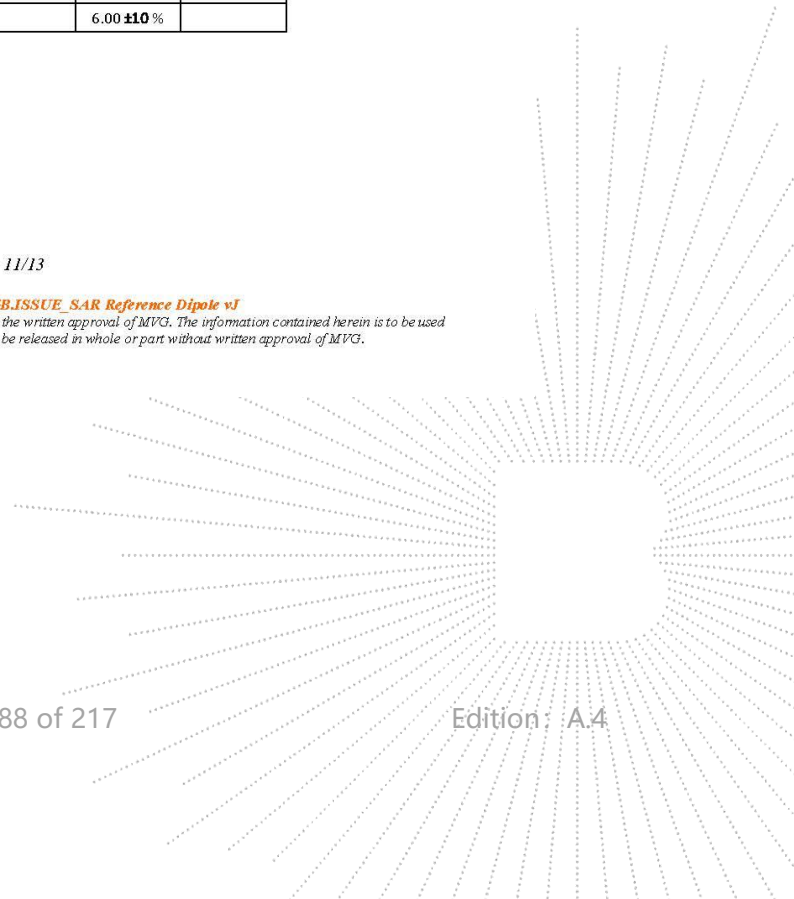

 7.3 BODY LIQUID MEASUREMENT

| Frequency<br>MHz | Relative permittivity ( $\epsilon_r$ ) |          | Conductivity ( $\sigma$ ) S/m |          |
|------------------|--|----------|-------------------------------|----------|
|                  | required                               | measured | required                      | measured |
| 150              | 61.9 $\pm$ 10 %                        |          | 0.80 $\pm$ 10 %               |          |
| 300              | 58.2 $\pm$ 10 %                        |          | 0.92 $\pm$ 10 %               |          |
| 450              | 56.7 $\pm$ 10 %                        |          | 0.94 $\pm$ 10 %               |          |
| 750              | 55.5 $\pm$ 10 %                        |          | 0.96 $\pm$ 10 %               |          |
| 835              | 55.2 $\pm$ 10 %                        |          | 0.97 $\pm$ 10 %               |          |
| 900              | 55.0 $\pm$ 10 %                        |          | 1.05 $\pm$ 10 %               |          |
| 915              | 55.0 $\pm$ 10 %                        |          | 1.06 $\pm$ 10 %               |          |
| 1450             | 54.0 $\pm$ 10 %                        |          | 1.30 $\pm$ 10 %               |          |
| 1610             | 53.8 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 1800             | 53.3 $\pm$ 10 %                        |          | 1.52 $\pm$ 10 %               |          |
| 1900             | 53.3 $\pm$ 10 %                        |          | 1.52 $\pm$ 10 %               |          |
| 2000             | 53.3 $\pm$ 10 %                        |          | 1.52 $\pm$ 10 %               |          |
| 2100             | 53.2 $\pm$ 10 %                        | 55.1     | 1.62 $\pm$ 10 %               | 1.77     |
| 2300             | 52.9 $\pm$ 10 %                        |          | 1.81 $\pm$ 10 %               |          |
| 2450             | 52.7 $\pm$ 10 %                        |          | 1.95 $\pm$ 10 %               |          |
| 2600             | 52.5 $\pm$ 10 %                        |          | 2.16 $\pm$ 10 %               |          |
| 3000             | 52.0 $\pm$ 10 %                        |          | 2.73 $\pm$ 10 %               |          |
| 3300             | 51.6 $\pm$ 10 %                        |          | 3.08 $\pm$ 10 %               |          |
| 3500             | 51.3 $\pm$ 10 %                        |          | 3.31 $\pm$ 10 %               |          |
| 3700             | 51.0 $\pm$ 10 %                        |          | 3.55 $\pm$ 10 %               |          |
| 3900             | 50.8 $\pm$ 10 %                        |          | 3.78 $\pm$ 10 %               |          |
| 4200             | 50.4 $\pm$ 10 %                        |          | 4.13 $\pm$ 10 %               |          |
| 4600             | 49.8 $\pm$ 10 %                        |          | 4.60 $\pm$ 10 %               |          |
| 4900             | 49.4 $\pm$ 10 %                        |          | 4.95 $\pm$ 10 %               |          |
| 5200             | 49.0 $\pm$ 10 %                        |          | 5.30 $\pm$ 10 %               |          |
| 5300             | 48.9 $\pm$ 10 %                        |          | 5.42 $\pm$ 10 %               |          |
| 5400             | 48.7 $\pm$ 10 %                        |          | 5.53 $\pm$ 10 %               |          |
| 5500             | 48.6 $\pm$ 10 %                        |          | 5.65 $\pm$ 10 %               |          |
| 5600             | 48.5 $\pm$ 10 %                        |          | 5.77 $\pm$ 10 %               |          |
| 5800             | 48.2 $\pm$ 10 %                        |          | 6.00 $\pm$ 10 %               |          |

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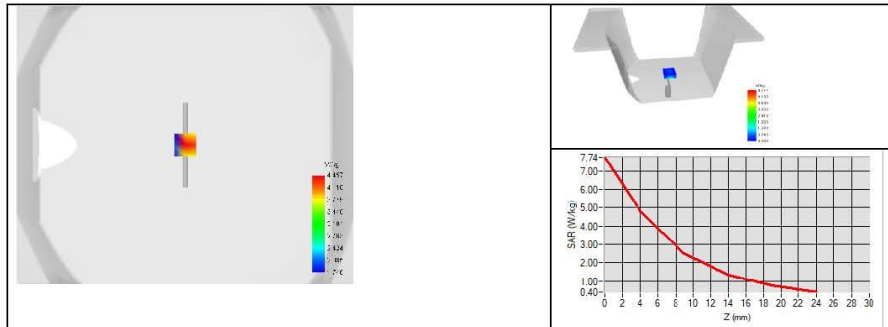




## 7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

|   |  |
|---|--|
| Software                                  | OPENSAR V5                                   |
| Phantom                                   | SN 13/09 SAM68                               |
| Probe                                     | SN 41/18 EPGO333                             |
| Liquid                                    | Body Liquid Values: eps' : 55.1 sigma : 1.77 |
| Distance between dipole center and liquid | 10.0 mm                                      |
| Area scan resolution                      | dx=8mm/dy=8mm                                |
| Zoon Scan Resolution                      | dx=5mm/dy=5mm/dz=5mm                         |
| Frequency                                 | 2100 MHz                                     |
| Input power                               | 20 dBm                                       |
| Liquid Temperature                        | 20 +/- 1 °C                                  |
| Lab Temperature                           | 20 +/- 1 °C                                  |
| Lab Humidity                              | 30-70 %                                      |

| Frequency MHz | 1 g SAR (W/kg/W) | 10 g SAR (W/kg/W) |
|---------------|------------------|-------------------|
|               | measured         | measured          |
| 2100          | 45.05 (4.51)     | 21.33 (2.13)      |



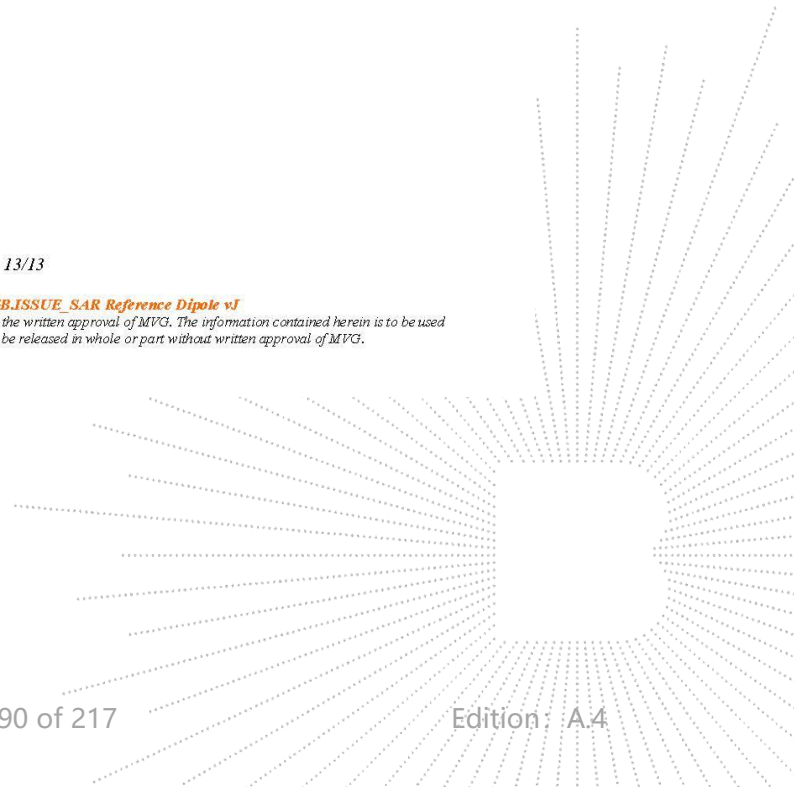

**8 LIST OF EQUIPMENT**

| Equipment Summary Sheet            |                         |                    |   |   |
|------------------------------------|-------------------------|--------------------|---|---|
| Equipment Description              | Manufacturer / Model    | Identification No. | Current Calibration Date                      | Next Calibration Date                         |
| SAM Phantom                        | MVG                     | SN 13/09 SAM68     | Validated. No cal required.                   | Validated. No cal required.                   |
| COMOSAR Test Bench                 | Version 3               | NA                 | Validated. No cal required.                   | Validated. No cal required.                   |
| Network Analyzer                   | Rohde & Schwarz ZVM     | 100203             | 08/2021                                       | 08/2024                                       |
| Network Analyzer                   | Agilent 8753ES          | MY40003210         | 10/2019                                       | 10/2022                                       |
| Network Analyzer – Calibration kit | Rohde & Schwarz ZV-Z235 | 101223             | 05/2019                                       | 05/2022                                       |
| Network Analyzer – Calibration kit | HP 85033D               | 3423A08186         | 06/2021                                       | 06/2027                                       |
| Calipers                           | Mitutoyo                | SN 0009732         | 10/2019                                       | 10/2022                                       |
| Reference Probe                    | MVG                     | SN 41/18 EPGO333   | 10/2021                                       | 10/2022                                       |
| Multimeter                         | Keithley 2000           | 1160271            | 02/2020                                       | 02/2023                                       |
| Signal Generator                   | Rohde & Schwarz SMB     | 106589             | 04/2019                                       | 04/2022                                       |
| Amplifier                          | MVG                     | MODU-023-C-0002    | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Power Meter                        | NI-USB 5680             | 170100013          | 06/2021                                       | 06/2024                                       |
| Power Meter                        | Rohde & Schwarz NRVD    | 832839-056         | 11/2019                                       | 11/2022                                       |
| Directional Coupler                | Krytar 158020           | 131467             | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Temperature / Humidity Sensor      | Testo 184 H1            | 44225320           | 06/2021                                       | 06/2024                                       |

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**SAR Reference Dipole Calibration Report**

Ref : ACR.329.15.21.BES.A

**SHENZHEN BCTC TECHNOLOGY CO., LTD.**  
1 ~2/ F, NO. B FACTORY BUILDING, PENGZHOU  
INDUSTRIAL PARK, FUYUAN 1ST ROAD,  
TANGWEI COMMUNITY, FUHAI STREET, BAO'AN  
DISTRICT, SHENZHEN, GUANGDONG, CHINA  
**MVG COMOSAR REFERENCE DIPOLE**  
FREQUENCY: 2450 MHZ  
SERIAL NO.: SN 47/21 DIP 2G450-627

**Calibrated at MVG**  
Z.I. de la pointe du diable  
Technopôle Brest Iroise – 295 avenue Alexis de Rochon  
29280 PLOUZANE - FRANCE

Calibration date: 11/25/2021



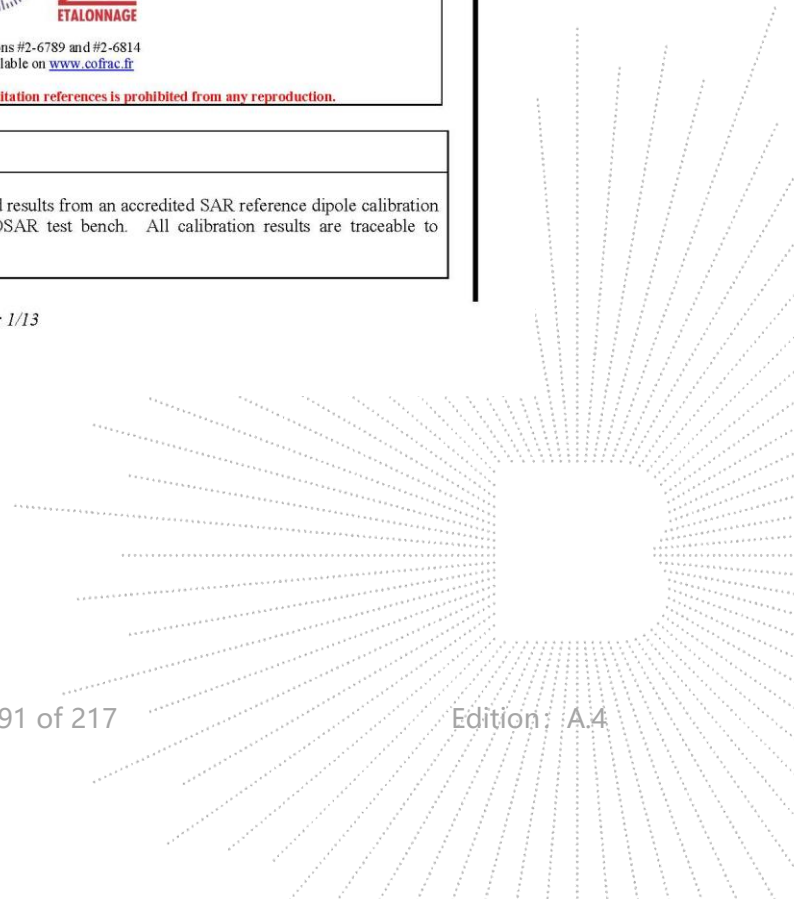
Accreditations #2-6789 and #2-6814  
Scope available on [www.cofrac.fr](http://www.cofrac.fr)

The use of the Cofrac brand and the accreditation references is prohibited from any reproduction.

*Summary:*

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

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**SAR REFERENCE DIPOLE CALIBRATION REPORT**

Ref: ACR.329.15.21.BES.A

|                      | <i>Name</i>  | <i>Function</i>     | <i>Date</i> | <i>Signature</i>                                      |
|----------------------|--------------|---------------------|-------------|---|
| <i>Prepared by :</i> | Jérôme Luc   | Technical Manager   | 11/25/2021  | <i>JS</i>   |
| <i>Checked by :</i>  | Jérôme Luc   | Technical Manager   | 11/25/2021  | <i>JS</i>   |
| <i>Approved by :</i> | Yann Toutain | Laboratory Director | 11/25/2021  | <i>Yann TOUTAIN</i><br>2021.11.25<br>11:56:55 +01'00' |

|                       | <i>Customer Name</i>                     |
|-----------------------|--|
| <i>Distribution :</i> | Shenzhen BCTC<br>Technology Co.,<br>Ltd. |

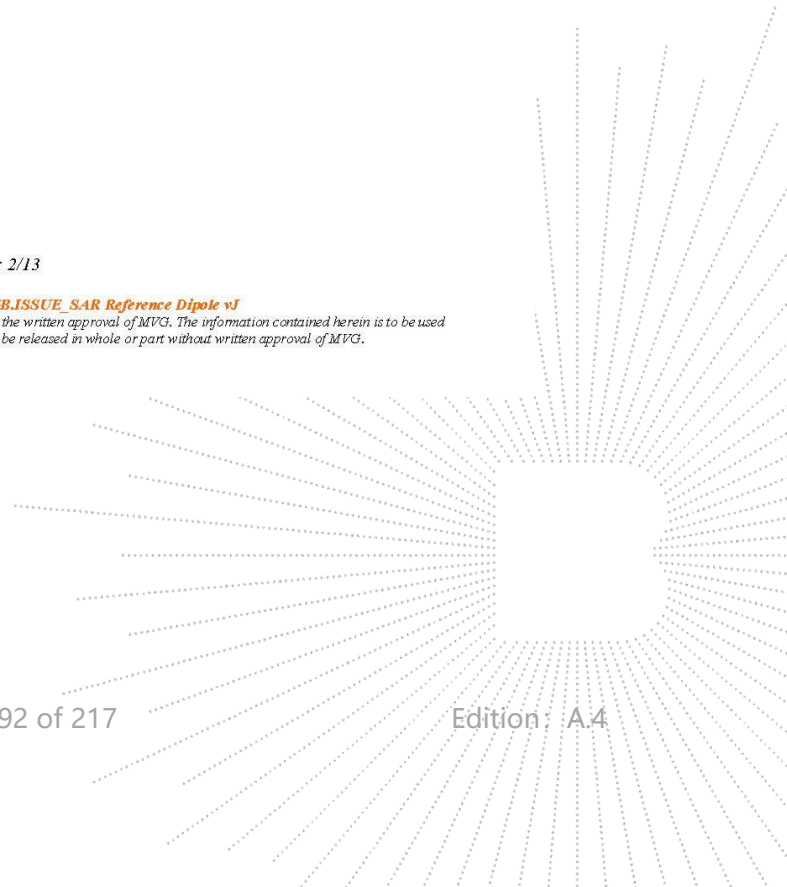
| <i>Issue</i> | <i>Name</i> | <i>Date</i> | <i>Modifications</i> |
|--------------|-------------|-------------|----------------------|
| A            | Jérôme Luc  | 11/25/2021  | Initial release      |
|              |             |             |                      |
|              |             |             |                      |
|              |             |             |                      |

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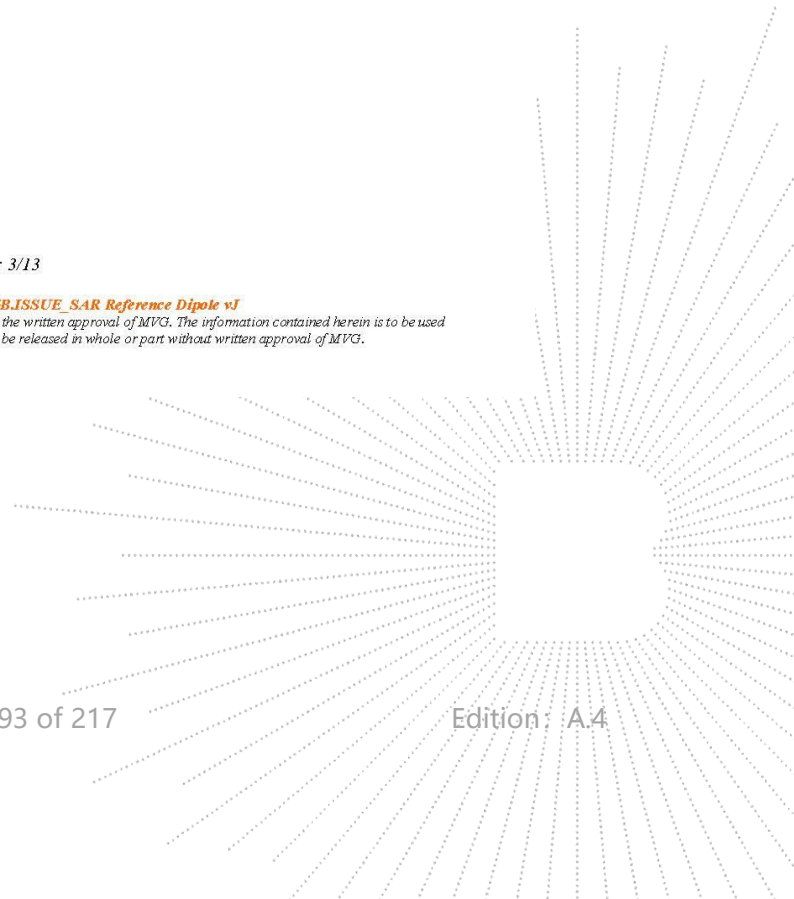

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## 1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

## 2 DEVICE UNDER TEST

| Device Under Test              |                                   |
|--------------------------------|-----------------------------------|
| Device Type                    | COMOSAR 2450 MHz REFERENCE DIPOLE |
| Manufacturer                   | MVG                               |
| Model                          | SID2450                           |
| Serial Number                  | SN 47/21 DIP 2G450-627            |
| Product Condition (new / used) | New                               |

## 3 PRODUCT DESCRIPTION

### 3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards. The product is designed for use with the COMOSAR test bench only.



**Figure 1 – MVG COMOSAR Validation Dipole**

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#### 4 MEASUREMENT METHOD

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

##### 4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. A direct method is used with a network analyser and its calibration kit, both with a valid ISO17025 calibration.

##### 4.2 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards specify the mechanical components and dimensions of the validation dipoles, with the dimension's frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness. A direct method is used with a ISO17025 calibrated caliper.

#### 5 MEASUREMENT UNCERTAINTY

All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

##### 5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

| Frequency band | Expanded Uncertainty on Return Loss |
|----------------|-------------------------------------|
| 400-6000MHz    | 0.08 LIN                            |

##### 5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

| Length (mm) | Expanded Uncertainty on Length |
|-------------|--------------------------------|
| 0 - 300     | 0.20 mm                        |
| 300 - 450   | 0.44 mm                        |

##### 5.3 VALIDATION MEASUREMENT

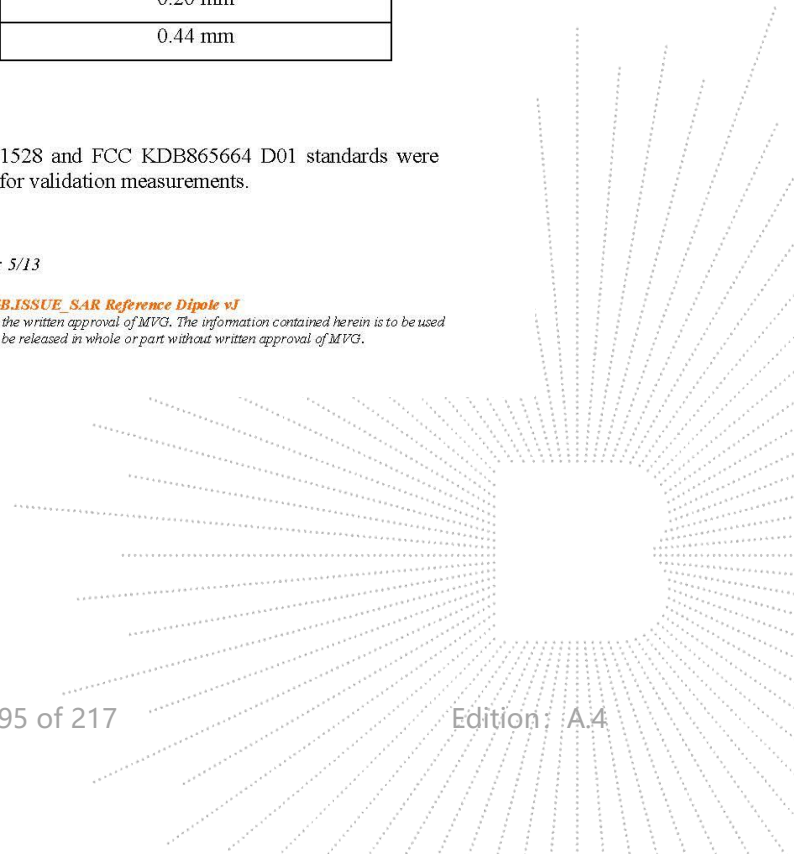
The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

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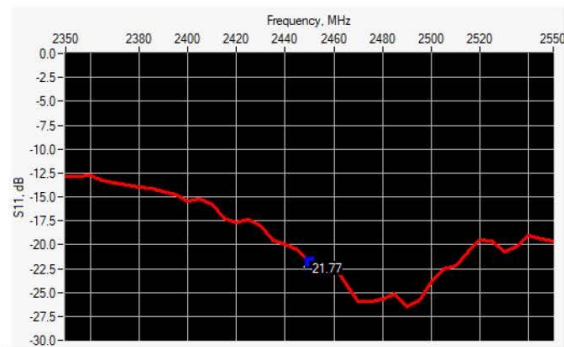




| Scan Volume | Expanded Uncertainty |
|-------------|----------------------|
| 1 g         | 19 % (SAR)           |
| 10 g        | 19 % (SAR)           |

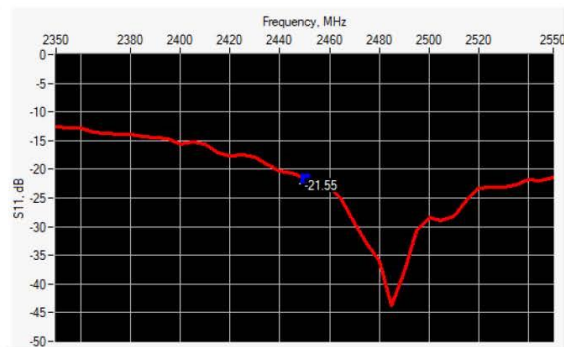
## 6 CALIBRATION MEASUREMENT RESULTS

### 6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



| Frequency (MHz) | Return Loss (dB) | Requirement (dB) | Impedance                      |
|-----------------|------------------|------------------|--------------------------------|
| 2450            | -21.77           | -20              | 49.1 $\Omega$ + 8.1 j $\Omega$ |

### 6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



| Frequency (MHz) | Return Loss (dB) | Requirement (dB) | Impedance                      |
|-----------------|------------------|------------------|--------------------------------|
| 2450            | -21.55           | -20              | 54.7 $\Omega$ + 6.8 j $\Omega$ |

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## 6.3 MECHANICAL DIMENSIONS

| Frequency MHz | L mm       |          | h mm       |          | d mm      |          |
|---------------|------------|----------|------------|----------|-----------|----------|
|               | required   | measured | required   | measured | required  | measured |
| 300           | 420.0 ±1 % |          | 250.0 ±1 % |          | 6.35 ±1 % |          |
| 450           | 290.0 ±1 % |          | 166.7 ±1 % |          | 6.35 ±1 % |          |
| 750           | 176.0 ±1 % |          | 100.0 ±1 % |          | 6.35 ±1 % |          |
| 835           | 161.0 ±1 % |          | 89.8 ±1 %  |          | 3.6 ±1 %  |          |
| 900           | 149.0 ±1 % |          | 83.3 ±1 %  |          | 3.6 ±1 %  |          |
| 1450          | 89.1 ±1 %  |          | 51.7 ±1 %  |          | 3.6 ±1 %  |          |
| 1500          | 86.2 ±1 %  |          | 50.0 ±1 %  |          | 3.6 ±1 %  |          |
| 1640          | 79.0 ±1 %  |          | 45.7 ±1 %  |          | 3.6 ±1 %  |          |
| 1750          | 75.2 ±1 %  |          | 42.9 ±1 %  |          | 3.6 ±1 %  |          |
| 1800          | 72.0 ±1 %  |          | 41.7 ±1 %  |          | 3.6 ±1 %  |          |
| 1900          | 68.0 ±1 %  |          | 39.5 ±1 %  |          | 3.6 ±1 %  |          |
| 1950          | 66.3 ±1 %  |          | 38.5 ±1 %  |          | 3.6 ±1 %  |          |
| 2000          | 64.5 ±1 %  |          | 37.5 ±1 %  |          | 3.6 ±1 %  |          |
| 2100          | 61.0 ±1 %  |          | 35.7 ±1 %  |          | 3.6 ±1 %  |          |
| 2300          | 55.5 ±1 %  |          | 32.6 ±1 %  |          | 3.6 ±1 %  |          |
| 2450          | 51.5 ±1 %  | 51.37    | 30.4 ±1 %  | 30.45    | 3.6 ±1 %  | 3.60     |
| 2600          | 48.5 ±1 %  |          | 28.8 ±1 %  |          | 3.6 ±1 %  |          |
| 3000          | 41.5 ±1 %  |          | 25.0 ±1 %  |          | 3.6 ±1 %  |          |
| 3300          | -          |          | -          |          | -         |          |
| 3500          | 37.0 ±1 %  |          | 26.4 ±1 %  |          | 3.6 ±1 %  |          |
| 3700          | 34.7 ±1 %  |          | 26.4 ±1 %  |          | 3.6 ±1 %  |          |
| 3900          | -          |          | -          |          | -         |          |
| 4200          | -          |          | -          |          | -         |          |
| 4600          | -          |          | -          |          | -         |          |
| 4900          | -          |          | -          |          | -         |          |

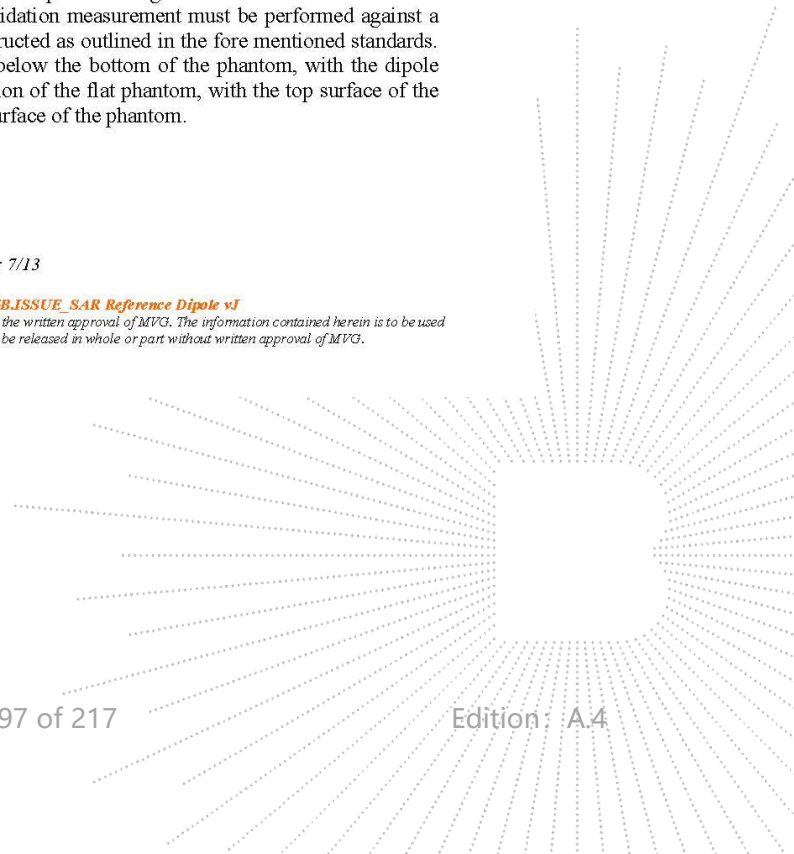
## 7 VALIDATION MEASUREMENT

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

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 7.1 HEAD LIQUID MEASUREMENT

| Frequency<br>MHz | Relative permittivity ( $\epsilon_r$ ) |          | Conductivity ( $\sigma$ ) S/m |          |
|------------------|--|----------|-------------------------------|----------|
|                  | required                               | measured | required                      | measured |
| 300              | 45.3 $\pm$ 10 %                        |          | 0.87 $\pm$ 10 %               |          |
| 450              | 43.5 $\pm$ 10 %                        |          | 0.87 $\pm$ 10 %               |          |
| 750              | 41.9 $\pm$ 10 %                        |          | 0.89 $\pm$ 10 %               |          |
| 835              | 41.5 $\pm$ 10 %                        |          | 0.90 $\pm$ 10 %               |          |
| 900              | 41.5 $\pm$ 10 %                        |          | 0.97 $\pm$ 10 %               |          |
| 1450             | 40.5 $\pm$ 10 %                        |          | 1.20 $\pm$ 10 %               |          |
| 1500             | 40.4 $\pm$ 10 %                        |          | 1.23 $\pm$ 10 %               |          |
| 1640             | 40.2 $\pm$ 10 %                        |          | 1.31 $\pm$ 10 %               |          |
| 1750             | 40.1 $\pm$ 10 %                        |          | 1.37 $\pm$ 10 %               |          |
| 1800             | 40.0 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 1900             | 40.0 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 1950             | 40.0 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 2000             | 40.0 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 2100             | 39.8 $\pm$ 10 %                        |          | 1.49 $\pm$ 10 %               |          |
| 2300             | 39.5 $\pm$ 10 %                        |          | 1.67 $\pm$ 10 %               |          |
| 2450             | 39.2 $\pm$ 10 %                        | 36.4     | 1.80 $\pm$ 10 %               | 1.96     |
| 2600             | 39.0 $\pm$ 10 %                        |          | 1.96 $\pm$ 10 %               |          |
| 3000             | 38.5 $\pm$ 10 %                        |          | 2.40 $\pm$ 10 %               |          |
| 3300             | 38.2 $\pm$ 10 %                        |          | 2.71 $\pm$ 10 %               |          |
| 3500             | 37.9 $\pm$ 10 %                        |          | 2.91 $\pm$ 10 %               |          |
| 3700             | 37.7 $\pm$ 10 %                        |          | 3.12 $\pm$ 10 %               |          |
| 3900             | 37.5 $\pm$ 10 %                        |          | 3.32 $\pm$ 10 %               |          |
| 4200             | 37.1 $\pm$ 10 %                        |          | 3.63 $\pm$ 10 %               |          |
| 4600             | 36.7 $\pm$ 10 %                        |          | 4.04 $\pm$ 10 %               |          |
| 4900             | 36.3 $\pm$ 10 %                        |          | 4.35 $\pm$ 10 %               |          |

 7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

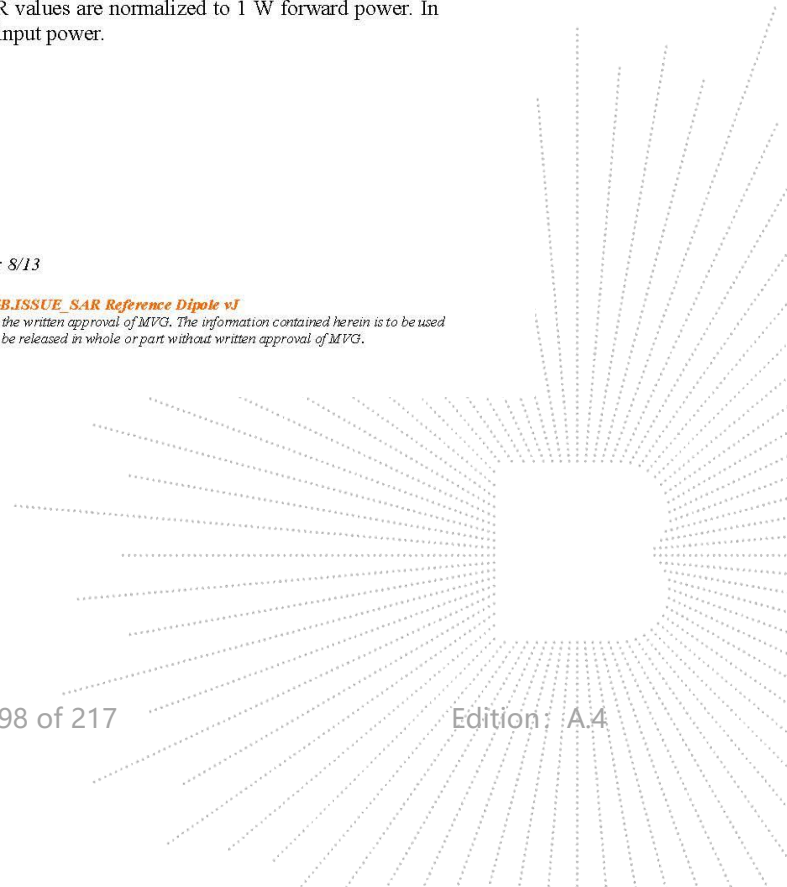
The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

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**SAR REFERENCE DIPOLE CALIBRATION REPORT**

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|   |  |
|---|--|
| Software                                  | OPENSAR V5   |
| Phantom                                   | SN 13/09 SAM68   |
| Probe                                     | SN 41/18 EPG0333   |
| Liquid                                    | Head Liquid Values: $\epsilon_{ps}^*$ : 36.4 $\sigma$ : 1.96 |
| Distance between dipole center and liquid | 10.0 mm  |
| Area scan resolution                      | $dx=8mm/dy=8mm$  |
| Zoon Scan Resolution                      | $dx=5mm/dy=5mm/dz=5mm$                                       |
| Frequency                                 | 2450 MHz   |
| Input power                               | 20 dBm   |
| Liquid Temperature                        | 20 +/- 1 °C  |
| Lab Temperature                           | 20 +/- 1 °C  |
| Lab Humidity                              | 30-70 %  |

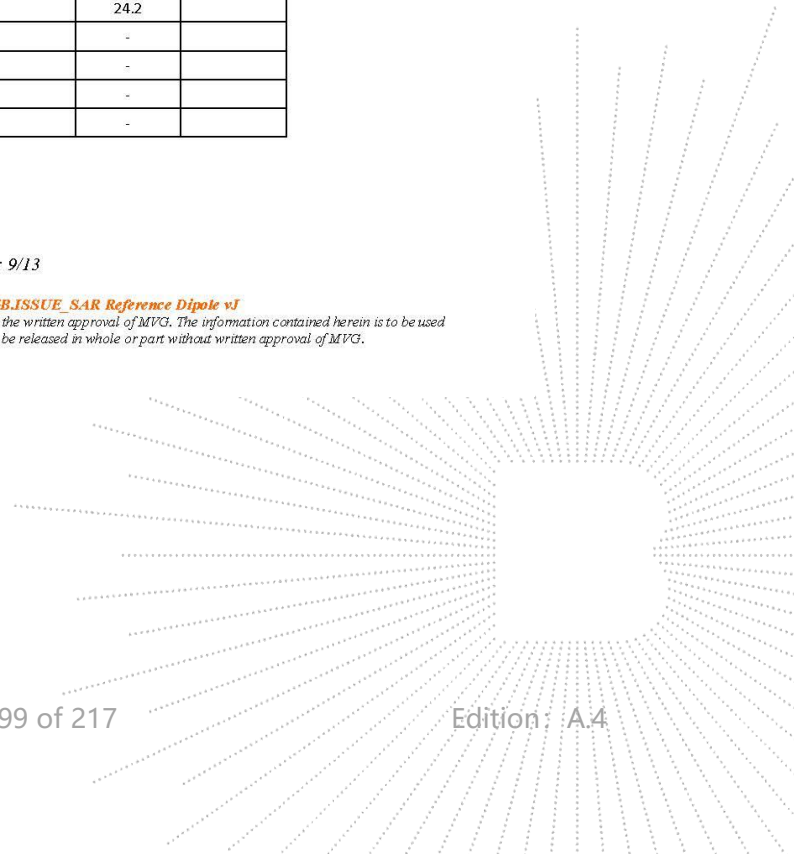
| Frequency<br>MHz | 1 g SAR (W/kg/W) |              | 10 g SAR (W/kg/W) |              |
|------------------|------------------|--------------|-------------------|--------------|
|                  | required         | measured     | required          | measured     |
| 300              | 2.85             |              | 1.94              |              |
| 450              | 4.58             |              | 3.06              |              |
| 750              | 8.49             |              | 5.55              |              |
| 835              | 9.56             |              | 6.22              |              |
| 900              | 10.9             |              | 6.99              |              |
| 1450             | 29               |              | 16                |              |
| 1500             | 30.5             |              | 16.8              |              |
| 1640             | 34.2             |              | 18.4              |              |
| 1750             | 36.4             |              | 19.3              |              |
| 1800             | 38.4             |              | 20.1              |              |
| 1900             | 39.7             |              | 20.5              |              |
| 1950             | 40.5             |              | 20.9              |              |
| 2000             | 41.1             |              | 21.1              |              |
| 2100             | 43.6             |              | 21.9              |              |
| 2300             | 48.7             |              | 23.3              |              |
| 2450             | 52.4             | 55.16 (5.52) | 24                | 24.15 (2.41) |
| 2600             | 55.3             |              | 24.6              |              |
| 3000             | 63.8             |              | 25.7              |              |
| 3300             | -                |              | -                 |              |
| 3500             | 67.1             |              | 25                |              |
| 3700             | 67.4             |              | 24.2              |              |
| 3900             | -                |              | -                 |              |
| 4200             | -                |              | -                 |              |
| 4600             | -                |              | -                 |              |
| 4900             | -                |              | -                 |              |

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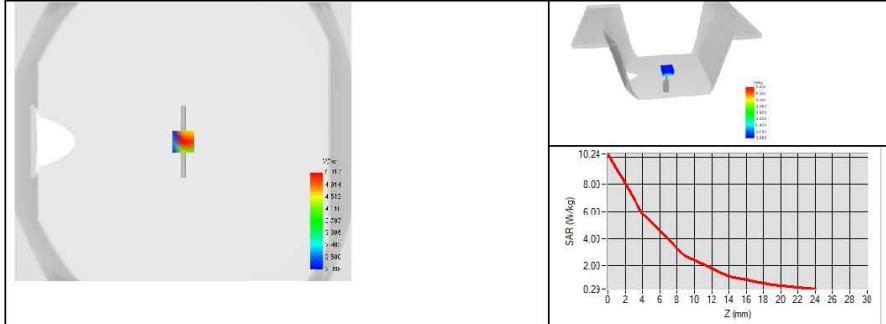
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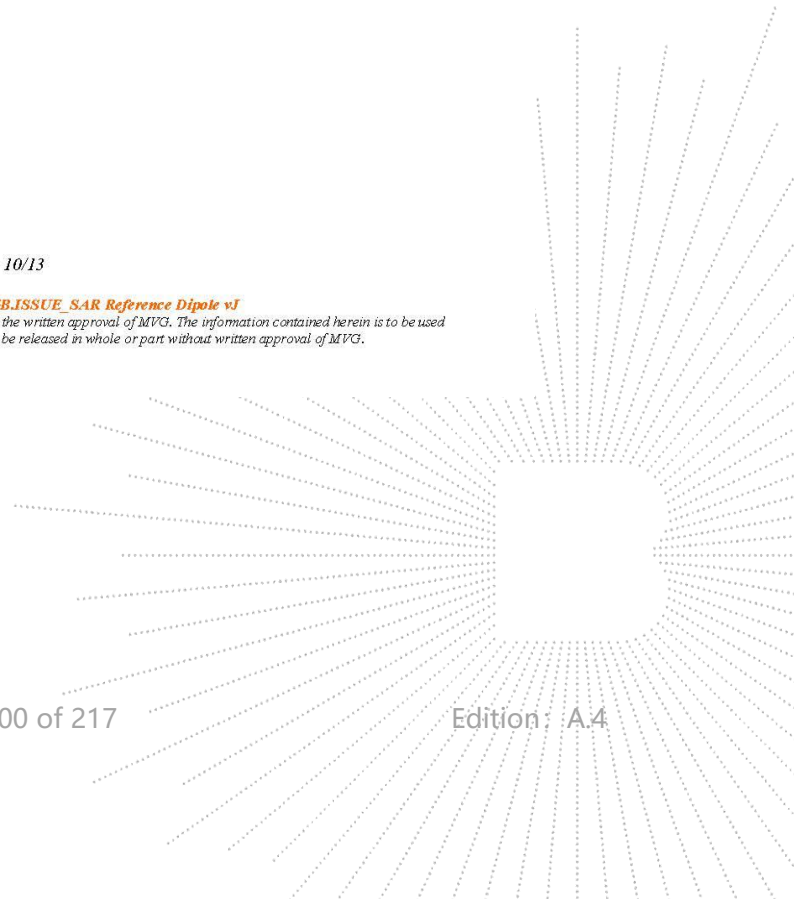
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 7.3 BODY LIQUID MEASUREMENT

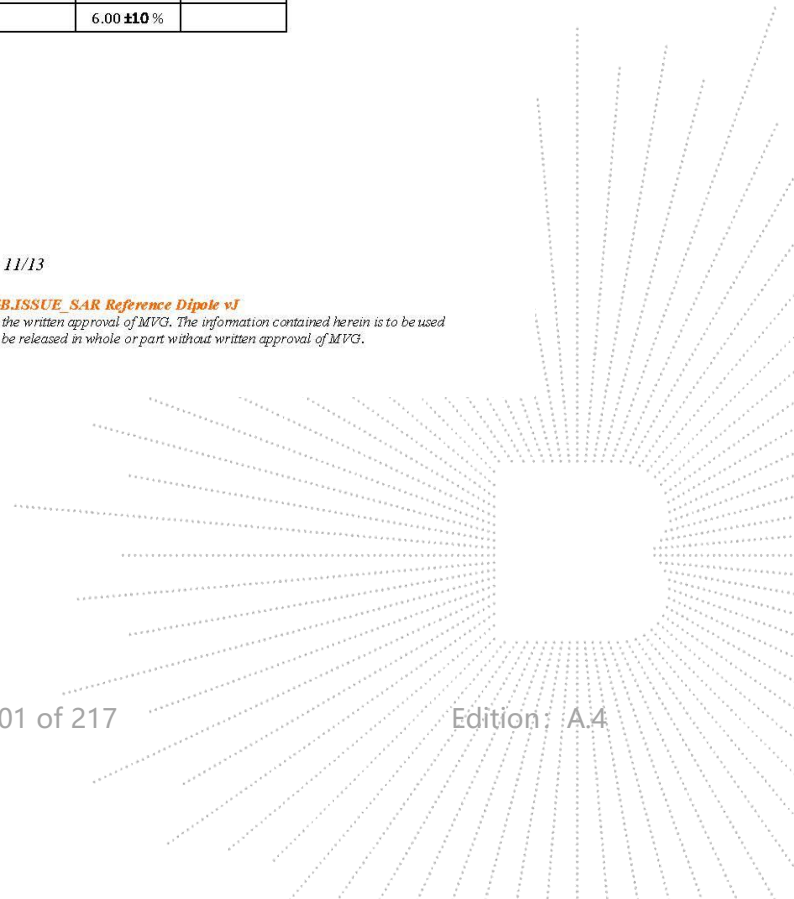
| Frequency<br>MHz | Relative permittivity ( $\epsilon_r$ ) |          | Conductivity ( $\sigma$ ) S/m |          |
|------------------|--|----------|-------------------------------|----------|
|                  | required                               | measured | required                      | measured |
| 150              | 61.9 $\pm$ 10 %                        |          | 0.80 $\pm$ 10 %               |          |
| 300              | 58.2 $\pm$ 10 %                        |          | 0.92 $\pm$ 10 %               |          |
| 450              | 56.7 $\pm$ 10 %                        |          | 0.94 $\pm$ 10 %               |          |
| 750              | 55.5 $\pm$ 10 %                        |          | 0.96 $\pm$ 10 %               |          |
| 835              | 55.2 $\pm$ 10 %                        |          | 0.97 $\pm$ 10 %               |          |
| 900              | 55.0 $\pm$ 10 %                        |          | 1.05 $\pm$ 10 %               |          |
| 915              | 55.0 $\pm$ 10 %                        |          | 1.06 $\pm$ 10 %               |          |
| 1450             | 54.0 $\pm$ 10 %                        |          | 1.30 $\pm$ 10 %               |          |
| 1610             | 53.8 $\pm$ 10 %                        |          | 1.40 $\pm$ 10 %               |          |
| 1800             | 53.3 $\pm$ 10 %                        |          | 1.52 $\pm$ 10 %               |          |
| 1900             | 53.3 $\pm$ 10 %                        |          | 1.52 $\pm$ 10 %               |          |
| 2000             | 53.3 $\pm$ 10 %                        |          | 1.52 $\pm$ 10 %               |          |
| 2100             | 53.2 $\pm$ 10 %                        |          | 1.62 $\pm$ 10 %               |          |
| 2300             | 52.9 $\pm$ 10 %                        |          | 1.81 $\pm$ 10 %               |          |
| 2450             | 52.7 $\pm$ 10 %                        | 53.4     | 1.95 $\pm$ 10 %               | 2.14     |
| 2600             | 52.5 $\pm$ 10 %                        |          | 2.16 $\pm$ 10 %               |          |
| 3000             | 52.0 $\pm$ 10 %                        |          | 2.73 $\pm$ 10 %               |          |
| 3300             | 51.6 $\pm$ 10 %                        |          | 3.08 $\pm$ 10 %               |          |
| 3500             | 51.3 $\pm$ 10 %                        |          | 3.31 $\pm$ 10 %               |          |
| 3700             | 51.0 $\pm$ 10 %                        |          | 3.55 $\pm$ 10 %               |          |
| 3900             | 50.8 $\pm$ 10 %                        |          | 3.78 $\pm$ 10 %               |          |
| 4200             | 50.4 $\pm$ 10 %                        |          | 4.13 $\pm$ 10 %               |          |
| 4600             | 49.8 $\pm$ 10 %                        |          | 4.60 $\pm$ 10 %               |          |
| 4900             | 49.4 $\pm$ 10 %                        |          | 4.95 $\pm$ 10 %               |          |
| 5200             | 49.0 $\pm$ 10 %                        |          | 5.30 $\pm$ 10 %               |          |
| 5300             | 48.9 $\pm$ 10 %                        |          | 5.42 $\pm$ 10 %               |          |
| 5400             | 48.7 $\pm$ 10 %                        |          | 5.53 $\pm$ 10 %               |          |
| 5500             | 48.6 $\pm$ 10 %                        |          | 5.65 $\pm$ 10 %               |          |
| 5600             | 48.5 $\pm$ 10 %                        |          | 5.77 $\pm$ 10 %               |          |
| 5800             | 48.2 $\pm$ 10 %                        |          | 6.00 $\pm$ 10 %               |          |

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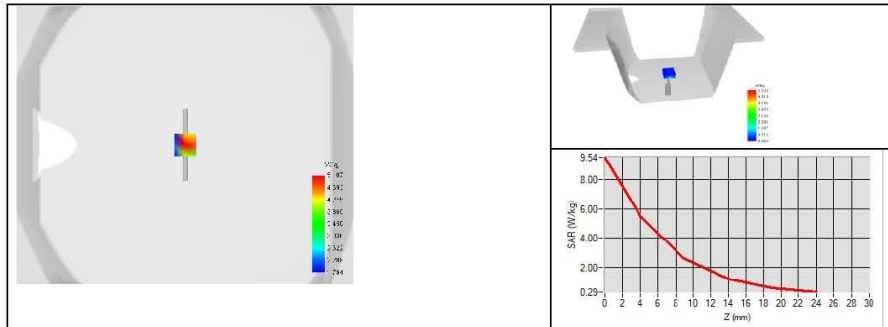




## 7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

|   |  |
|---|--|
| Software                                  | OPENSAR V5                                   |
| Phantom                                   | SN 13/09 SAM68                               |
| Probe                                     | SN 41/18 EPG0333                             |
| Liquid                                    | Body Liquid Values: eps' : 53.4 sigma : 2.14 |
| Distance between dipole center and liquid | 10.0 mm                                      |
| Area scan resolution                      | dx=8mm/dy=8mm                                |
| Zoon Scan Resolution                      | dx=5mm/dy=5mm/dz=5mm                         |
| Frequency                                 | 2450 MHz                                     |
| Input power                               | 20 dBm                                       |
| Liquid Temperature                        | 20 +/- 1 °C                                  |
| Lab Temperature                           | 20 +/- 1 °C                                  |
| Lab Humidity                              | 30-70 %                                      |

| Frequency MHz | 1 g SAR (W/kg/W) | 10 g SAR (W/kg/W) |
|---------------|------------------|-------------------|
|               | measured         | measured          |
| 2450          | 52.28 (5.23)     | 22.68 (2.27)      |



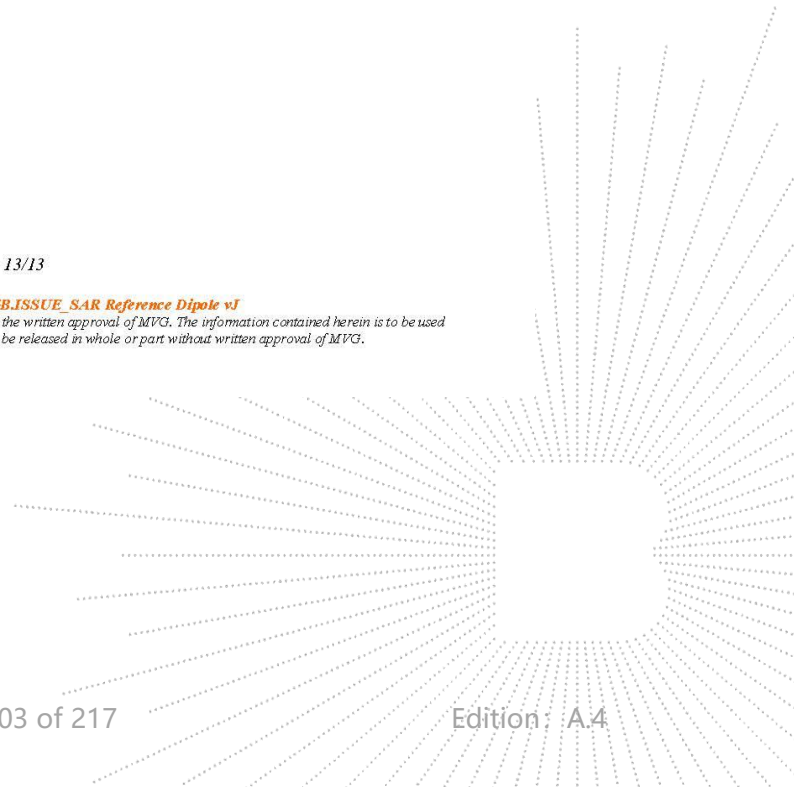

**8 LIST OF EQUIPMENT**

| Equipment Summary Sheet            |                         |                    |   |   |
|------------------------------------|-------------------------|--------------------|---|---|
| Equipment Description              | Manufacturer / Model    | Identification No. | Current Calibration Date                      | Next Calibration Date                         |
| SAM Phantom                        | MVG                     | SN 13/09 SAM68     | Validated. No cal required.                   | Validated. No cal required.                   |
| COMOSAR Test Bench                 | Version 3               | NA                 | Validated. No cal required.                   | Validated. No cal required.                   |
| Network Analyzer                   | Rohde & Schwarz ZVM     | 100203             | 08/2021                                       | 08/2024                                       |
| Network Analyzer                   | Agilent 8753ES          | MY40003210         | 10/2019                                       | 10/2022                                       |
| Network Analyzer – Calibration kit | Rohde & Schwarz ZV-Z235 | 101223             | 05/2019                                       | 05/2022                                       |
| Network Analyzer – Calibration kit | HP 85033D               | 3423A08186         | 06/2021                                       | 06/2027                                       |
| Calipers                           | Mitutoyo                | SN 0009732         | 10/2019                                       | 10/2022                                       |
| Reference Probe                    | MVG                     | SN 41/18 EPGO333   | 10/2021                                       | 10/2022                                       |
| Multimeter                         | Keithley 2000           | 1160271            | 02/2020                                       | 02/2023                                       |
| Signal Generator                   | Rohde & Schwarz SMB     | 106589             | 04/2019                                       | 04/2022                                       |
| Amplifier                          | MVG                     | MODU-023-C-0002    | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Power Meter                        | NI-USB 5680             | 170100013          | 06/2021                                       | 06/2024                                       |
| Power Meter                        | Rohde & Schwarz NRVD    | 832839-056         | 11/2019                                       | 11/2022                                       |
| Directional Coupler                | Krytar 158020           | 131467             | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Temperature / Humidity Sensor      | Testo 184 H1            | 44225320           | 06/2021                                       | 06/2024                                       |

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**SAR Reference Dipole Calibration Report**

Ref : ACR.329.17.21.BES.A

**SHENZHEN BCTC TECHNOLOGY CO., LTD.**  
**1 ~2/ F, NO. B FACTORY BUILDING, PENGZHOU**  
**INDUSTRIAL PARK, FUYUAN 1ST ROAD, TANGWEI**  
**COMMUNITY, FUHAI STREET, BAO'AN DISTRICT,**  
**SHENZHEN, GUANGDONG, CHINAMVG COMOSAR**  
**REFERENCE DIPOLE**  
**FREQUENCY: 5200-5800 MHZ**  
**SERIAL NO.: SN 47/21 DIP 5G000-629**

**Calibrated at MVG**  
**Z.I. de la pointe du diable**  
**Technopôle Brest Iroise – 295 avenue Alexis de Rochon**  
**29280 PLOUZANE - FRANCE**

Calibration date: 11/25/2021



Accreditations #2-6789 and #2-6814  
Scope available on [www.cofrac.fr](http://www.cofrac.fr)

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**Summary:**

This document presents the method and results from an accredited SAR reference dipole calibration performed at MVG, using the COMOSAR test bench. The test results covered by accreditation are traceable to the International System of Units (SI).

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|                      | <i>Name</i>  | <i>Function</i>     | <i>Date</i> | <i>Signature</i>    |
|----------------------|--------------|---------------------|-------------|---------------------|
| <i>Prepared by :</i> | Jérôme Luc   | Technical Manager   | 11/25/2021  | <i>JL</i>           |
| <i>Checked by :</i>  | Jérôme Luc   | Technical Manager   | 11/25/2021  | <i>JL</i>           |
| <i>Approved by :</i> | Yann Toutain | Laboratory Director | 11/25/2021  | <i>Yann TOUTAIN</i> |

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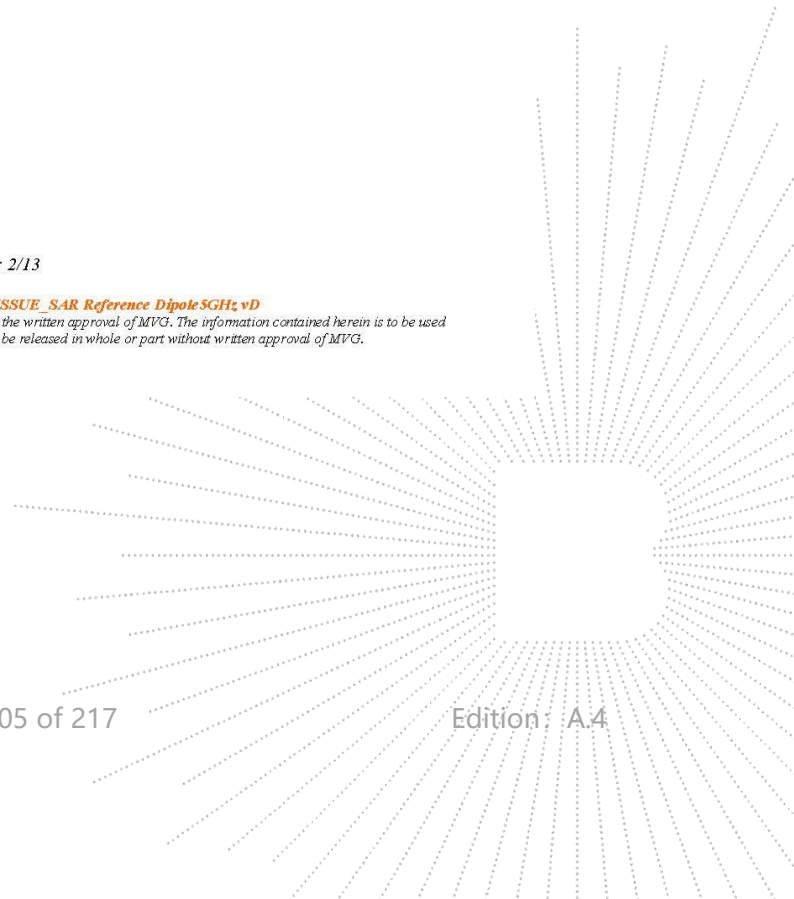
|                       | <i>Customer Name</i>                     |
|-----------------------|--|
| <i>Distribution :</i> | Shenzhen BCTC<br>Technology Co.,<br>Ltd. |

| <i>Issue</i> | <i>Name</i> | <i>Date</i> | <i>Modifications</i> |
|--------------|-------------|-------------|----------------------|
| A            | Jérôme Luc  | 11/25/2021  | Initial release      |
|              |             |             |                      |
|              |             |             |                      |

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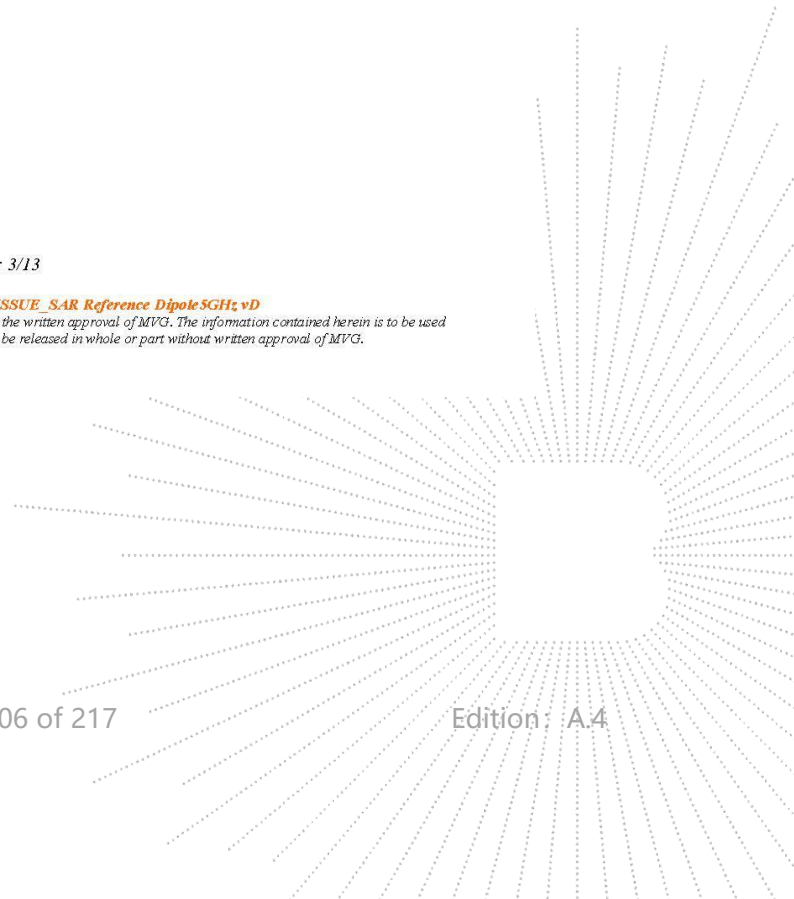
|     |                                       |    |
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## 1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

## 2 DEVICE UNDER TEST

| Device Under Test              |  |
|--------------------------------|--|
| Device Type                    | COMOSAR 5200-5800 MHz REFERENCE DIPOLE |
| Manufacturer                   | MVG                                    |
| Model                          | SID5000                                |
| Serial Number                  | SN 47/21 DIP 5G000-629                 |
| Product Condition (new / used) | New                                    |

## 3 PRODUCT DESCRIPTION

### 3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards. The product is designed for use with the COMOSAR test bench only.



**Figure 1** – MVG COMOSAR Validation Dipole

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#### 4 MEASUREMENT METHOD

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

##### 4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. A direct method is used with a network analyser and its calibration kit, both with a valid ISO17025 calibration.

##### 4.2 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards specify the mechanical components and dimensions of the validation dipoles, with the dimension's frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness. A direct method is used with a ISO17025 calibrated caliper.

#### 5 MEASUREMENT UNCERTAINTY

All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

##### 5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

| Frequency band | Expanded Uncertainty on Return Loss |
|----------------|-------------------------------------|
| 400-6000MHz    | 0.08 LIN                            |

##### 5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

| Length (mm) | Expanded Uncertainty on Length |
|-------------|--------------------------------|
| 0 - 300     | 0.20 mm                        |

##### 5.3 VALIDATION MEASUREMENT

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

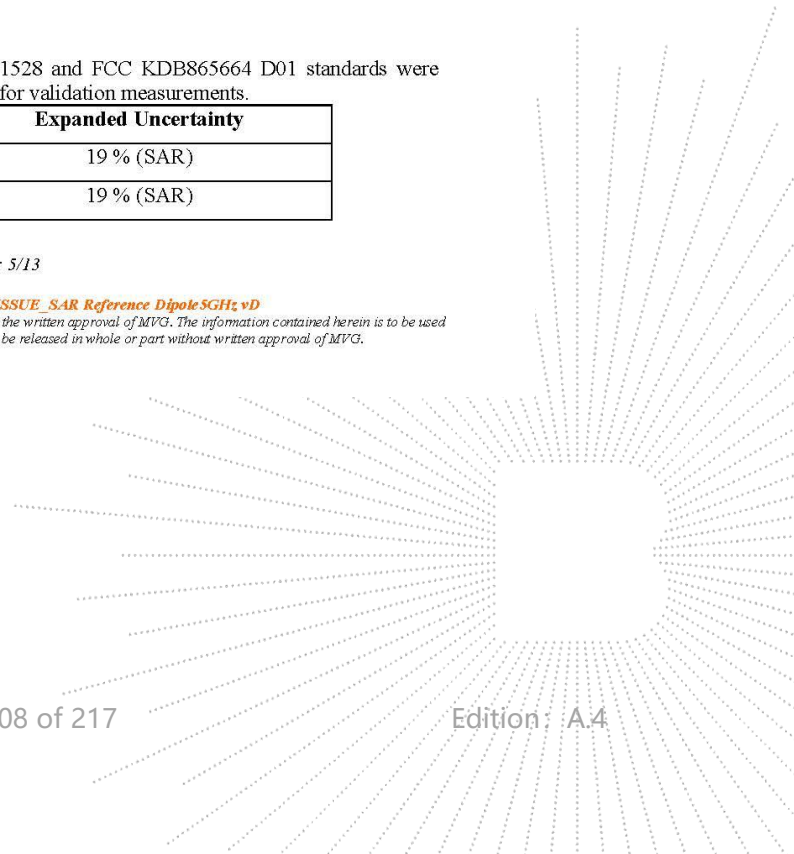
| Scan Volume | Expanded Uncertainty |
|-------------|----------------------|
| 1 g         | 19 % (SAR)           |
| 10 g        | 19 % (SAR)           |

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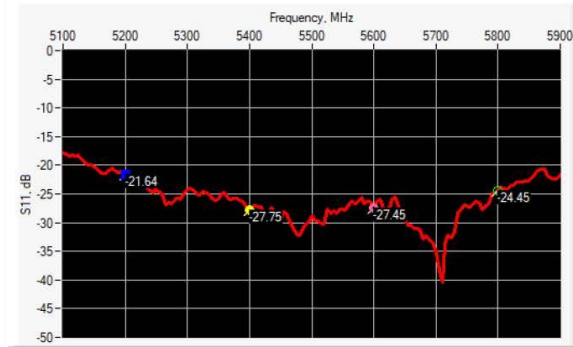






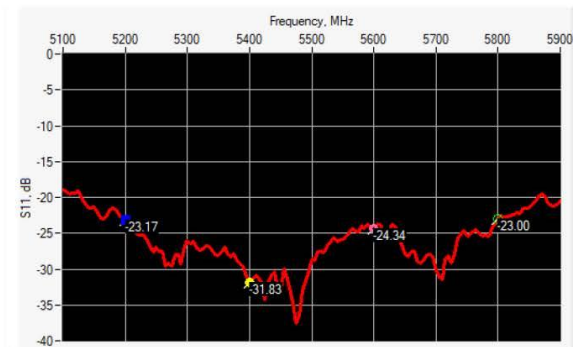
## 6 CALIBRATION MEASUREMENT RESULTS

### 6.1 RETURN LOSS IN HEAD LIQUID



| Frequency (MHz) | Return Loss (dB) | Requirement (dB) | Impedance                        |
|-----------------|------------------|------------------|----------------------------------|
| 5200            | -21.64           | -20              | 54.48 $\Omega$ - 6.92 j $\Omega$ |
| 5400            | -27.75           | -20              | 50.97 $\Omega$ + 3.98 j $\Omega$ |
| 5600            | -27.45           | -20              | 54.05 $\Omega$ + 1.24 j $\Omega$ |
| 5800            | -24.45           | -20              | 45.31 $\Omega$ + 3.71 j $\Omega$ |

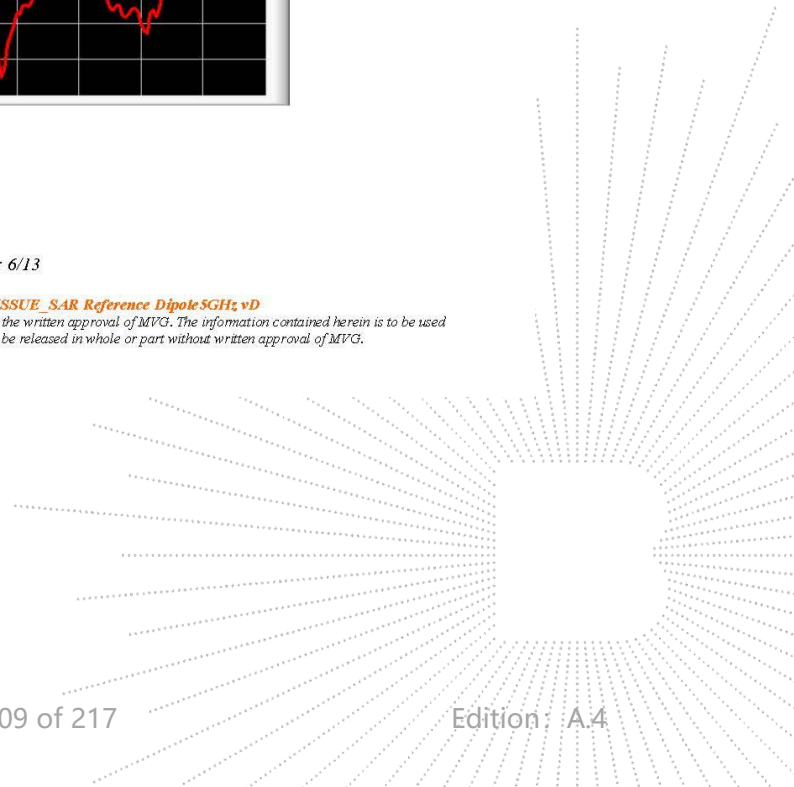
### 6.2 RETURN LOSS IN BODY LIQUID



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| Frequency (MHz) | Return Loss (dB) | Requirement (dB) | Impedance                        |
|-----------------|------------------|------------------|----------------------------------|
| 5200            | -23.17           | -20              | 54.03 $\Omega$ - 5.62 j $\Omega$ |
| 5400            | -31.83           | -20              | 51.01 $\Omega$ + 2.35 j $\Omega$ |
| 5600            | -24.34           | -20              | 55.50 $\Omega$ + 2.51 j $\Omega$ |
| 5800            | -23.00           | -20              | 43.65 $\Omega$ + 3.06 j $\Omega$ |

### 6.3 MECHANICAL DIMENSIONS

| Frequency MHz | L mm           |          | h mm           |          | d mm          |          |
|---------------|----------------|----------|----------------|----------|---------------|----------|
|               | required       | measured | required       | measured | required      | measured |
| 5000 to 6000  | 20.6 $\pm$ 1 % | 20.62    | 40.3 $\pm$ 1 % | 40.45    | 3.6 $\pm$ 1 % | 3.61     |

### 7 VALIDATION MEASUREMENT

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

#### 7.1 HEAD LIQUID MEASUREMENT

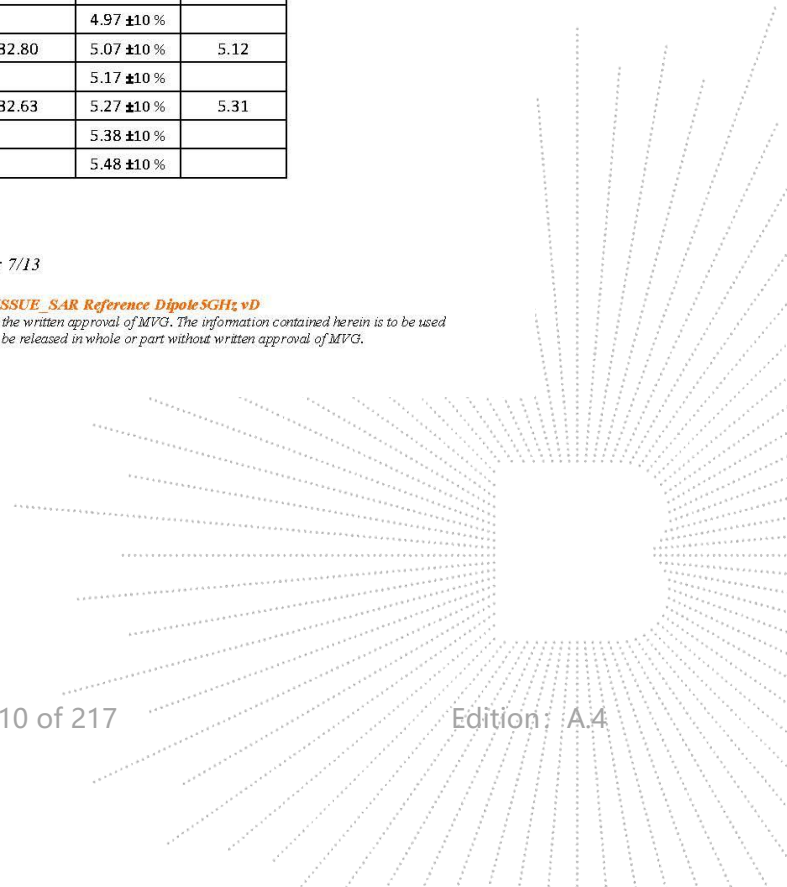
| Frequency MHz | Relative permittivity ( $\epsilon_r$ ) |          | Conductivity ( $\sigma$ ) S/m |          |
|---------------|--|----------|-------------------------------|----------|
|               | required                               | measured | required                      | measured |
| 5000          | 36.2 $\pm$ 10 %                        |          | 4.45 $\pm$ 10 %               |          |
| 5100          | 36.1 $\pm$ 10 %                        |          | 4.56 $\pm$ 10 %               |          |
| 5200          | 36.0 $\pm$ 10 %                        | 34.44    | 4.66 $\pm$ 10 %               | 4.64     |
| 5300          | 35.9 $\pm$ 10 %                        |          | 4.76 $\pm$ 10 %               |          |
| 5400          | 35.8 $\pm$ 10 %                        | 33.63    | 4.86 $\pm$ 10 %               | 4.88     |
| 5500          | 35.6 $\pm$ 10 %                        |          | 4.97 $\pm$ 10 %               |          |
| 5600          | 35.5 $\pm$ 10 %                        | 32.80    | 5.07 $\pm$ 10 %               | 5.12     |
| 5700          | 35.4 $\pm$ 10 %                        |          | 5.17 $\pm$ 10 %               |          |
| 5800          | 35.3 $\pm$ 10 %                        | 32.63    | 5.27 $\pm$ 10 %               | 5.31     |
| 5900          | 35.2 $\pm$ 10 %                        |          | 5.38 $\pm$ 10 %               |          |
| 6000          | 35.1 $\pm$ 10 %                        |          | 5.48 $\pm$ 10 %               |          |

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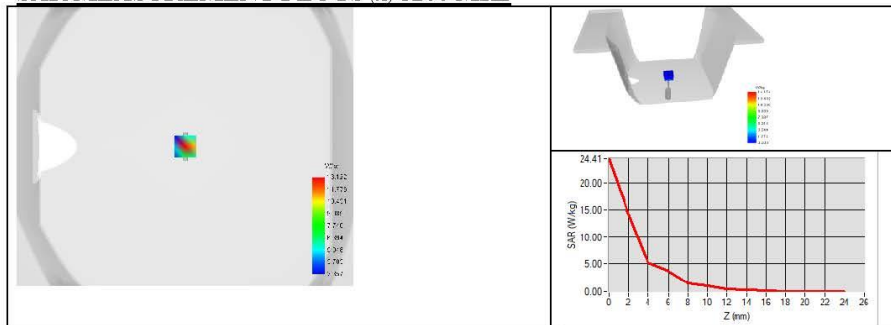



**7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID**

At those frequencies, the target SAR value can not be generic. Hereunder is the target SAR value defined by MVG, within the uncertainty for the system validation. All SAR values are normalized to 1 W net power. In bracket, the measured SAR is given with the used input power.

|                                    |  |
|------------------------------------|--|
| Software                           | OPENSAR V5   |
| Phantom                            | SN 13/09 SAM68   |
| Probe                              | SN 41/18 EPG0333   |
| Liquid                             | Head Liquid Values 5200 MHz: eps' :34.44 sigma : 4.64<br>Head Liquid Values 5400 MHz: eps' :33.63 sigma : 4.88<br>Head Liquid Values 5600 MHz: eps' :32.80 sigma : 5.12<br>Head Liquid Values 5800 MHz: eps' :32.63 sigma : 5.31 |
| Distance between dipole and liquid | 10 mm  |
| Area scan resolution               | dx=8mm/dy=8mm  |
| Zoon Scan Resolution               | dx=4mm/dy=4m/dz=2mm  |
| Frequency                          | 5200 MHz<br>5400 MHz<br>5600 MHz<br>5800 MHz   |
| Input power                        | 20 dBm   |
| Liquid Temperature                 | 20 +/- 1 °C  |
| Lab Temperature                    | 20 +/- 1 °C  |
| Lab Humidity                       | 30-70 %  |

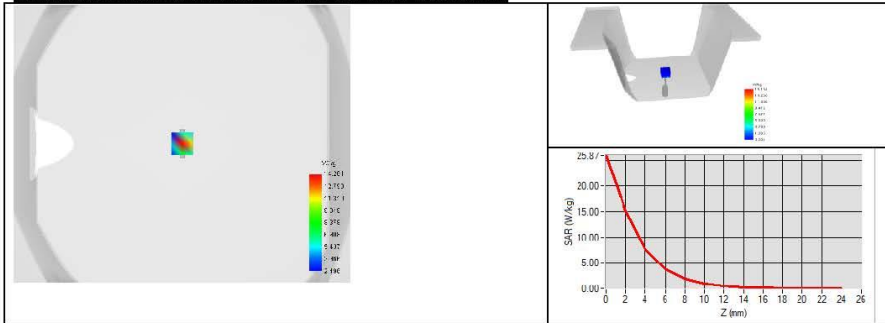
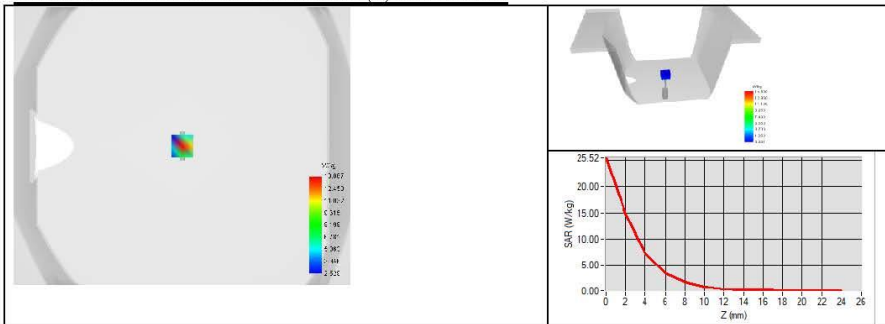
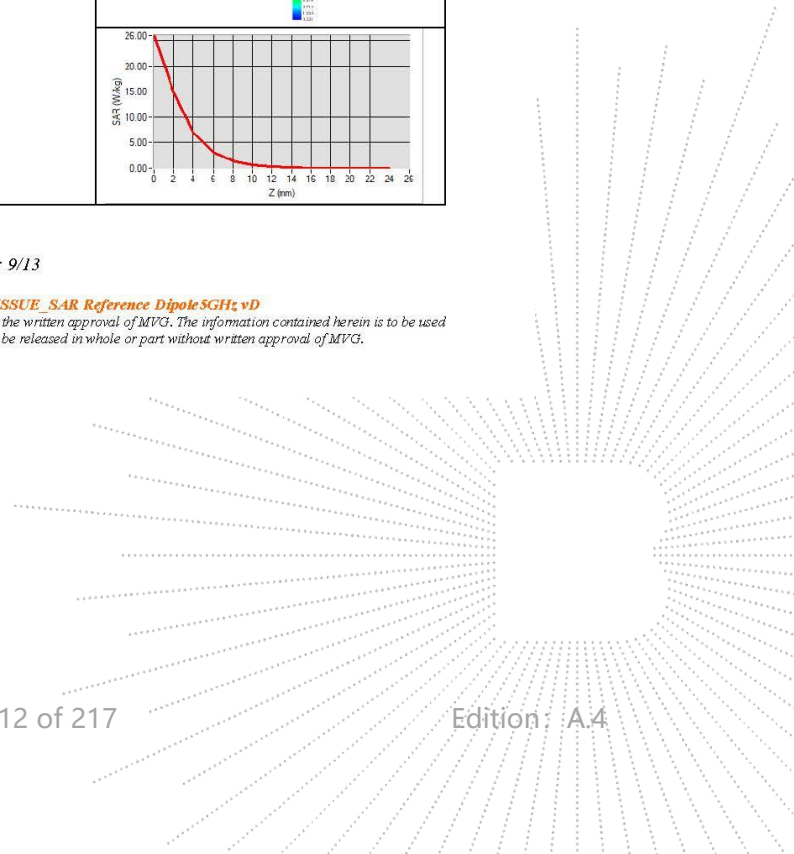
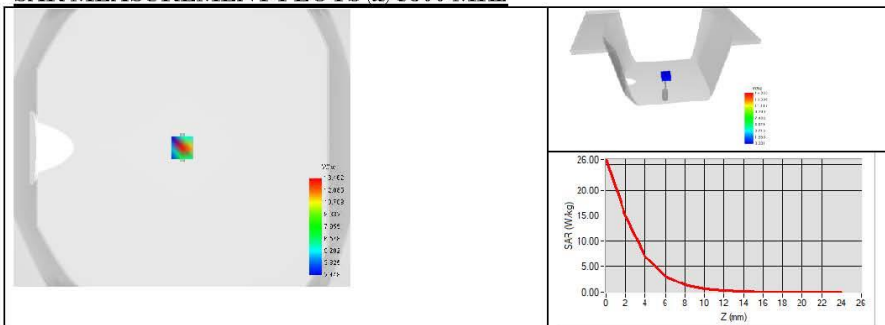
| Frequency (MHz) | 1 g SAR (W/kg) |              | 10 g SAR (W/kg) |              |
|-----------------|----------------|--------------|-----------------|--------------|
|                 | required       | measured     | required        | measured     |
| 5200            | 76.50          | 76.41 (7.64) | 21.60           | 21.86 (2.19) |
| 5400            | -              | 80.52 (8.05) | -               | 22.91 (2.29) |
| 5600            | -              | 79.08 (7.91) | -               | 22.73 (2.27) |
| 5800            | 78.00          | 76.49 (7.65) | 21.90           | 22.03 (2.20) |

**SAR MEASUREMENT PLOTS @ 5200 MHz**


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**SAR MEASUREMENT PLOTS @ 5400 MHz**

**SAR MEASUREMENT PLOTS @ 5600 MHz**

**SAR MEASUREMENT PLOTS @ 5800 MHz**



 7.3 BODY LIQUID MEASUREMENT

| Frequency MHz | Relative permittivity ( $\epsilon_r$ ) |          | Conductivity ( $\sigma$ ) S/m |          |
|---------------|--|----------|-------------------------------|----------|
|               | required                               | measured | required                      | measured |
| 5200          | 49.0 $\pm$ 10 %                        | 45.50    | 5.30 $\pm$ 10 %               | 5.63     |
| 5300          | 48.9 $\pm$ 10 %                        |          | 5.42 $\pm$ 10 %               |          |
| 5400          | 48.7 $\pm$ 10 %                        | 44.78    | 5.53 $\pm$ 10 %               | 5.95     |
| 5500          | 48.6 $\pm$ 10 %                        |          | 5.65 $\pm$ 10 %               |          |
| 5600          | 48.5 $\pm$ 10 %                        | 44.85    | 5.77 $\pm$ 10 %               | 6.26     |
| 5800          | 48.2 $\pm$ 10 %                        | 44.45    | 6.00 $\pm$ 10 %               | 6.58     |

 7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

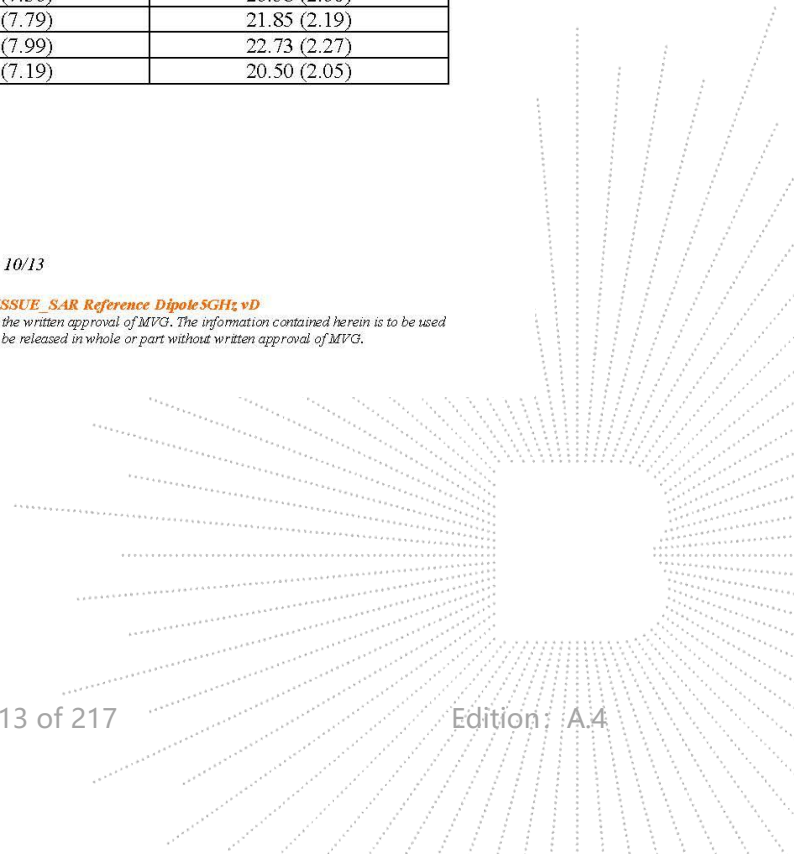
|                                    |  |
|------------------------------------|--|
| Software                           | OPENSAR V5   |
| Phantom                            | SN 13/09 SAM68   |
| Probe                              | SN 41/18 EPG0333   |
| Liquid                             | Body Liquid Values 5200 MHz: $\epsilon_r$ ' :45.50 sigma : 5.63<br>Body Liquid Values 5400 MHz: $\epsilon_r$ ' :44.78 sigma : 5.95<br>Body Liquid Values 5600 MHz: $\epsilon_r$ ' :44.85 sigma : 6.26<br>Body Liquid Values 5800 MHz: $\epsilon_r$ ' :44.45 sigma : 6.58 |
| Distance between dipole and liquid | 10 mm  |
| Area scan resolution               | dx=8mm/dy=8mm  |
| Zoon Scan Resolution               | dx=4mm/dy=4m/dz=2mm  |
| Frequency                          | 5200 MHz<br>5400 MHz<br>5600 MHz<br>5800 MHz   |
| Input power                        | 20 dBm   |
| Liquid Temperature                 | 20 +/- 1 °C  |
| Lab Temperature                    | 20 +/- 1 °C  |
| Lab Humidity                       | 30-70 %  |

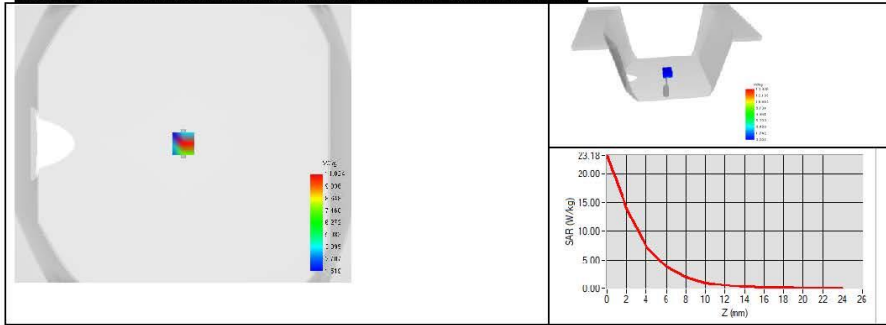
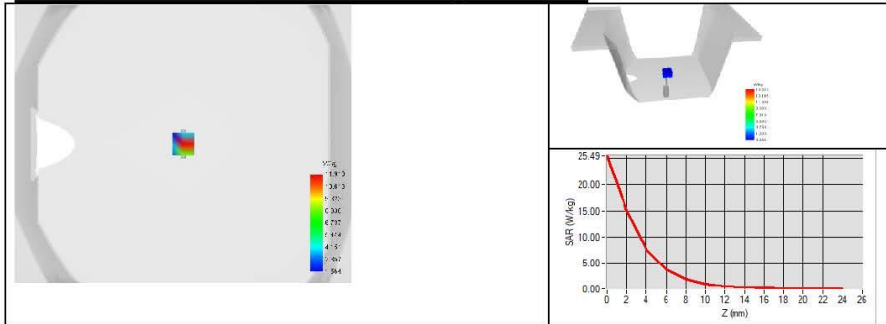
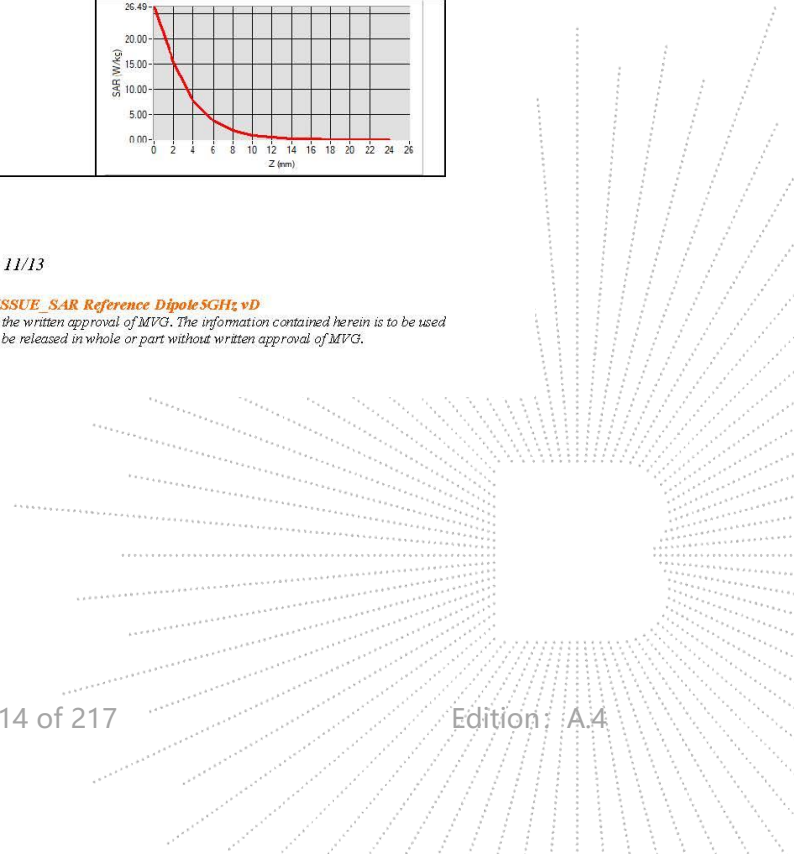
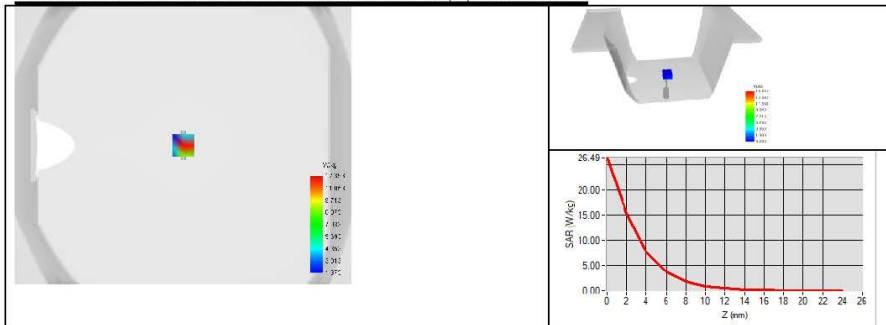
| Frequency (MHz) | 1 g SAR (W/kg) | 10 g SAR (W/kg) |
|-----------------|----------------|-----------------|
|                 | measured       | measured        |
| 5200            | 73.02 (7.30)   | 20.58 (2.06)    |
| 5400            | 77.86 (7.79)   | 21.85 (2.19)    |
| 5600            | 79.90 (7.99)   | 22.73 (2.27)    |
| 5800            | 71.90 (7.19)   | 20.50 (2.05)    |

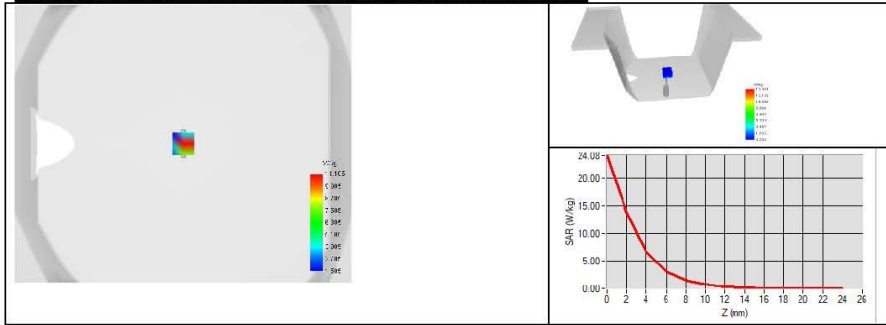
Page: 10/13

**Template\_ACR.DDD.N.YY.MVGB.ISSUE\_SAR Reference Dipole 5GHz vD**

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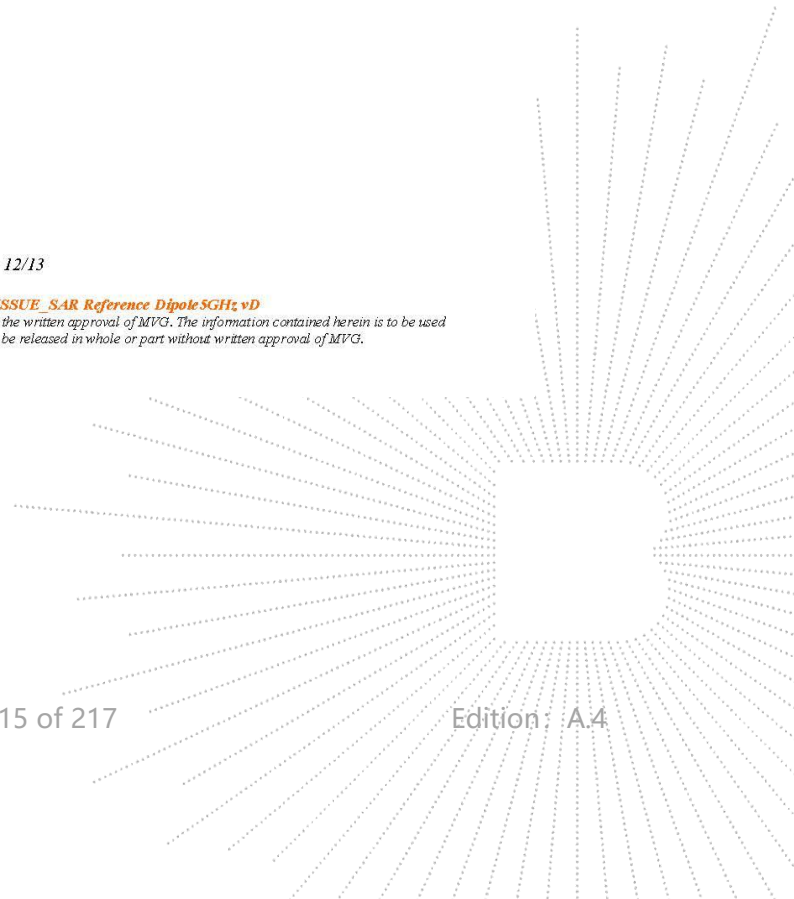

**BODY SAR MEASUREMENT PLOTS @ 5200 MHz**

**BODY SAR MEASUREMENT PLOTS @ 5400 MHz**

**BODY SAR MEASUREMENT PLOTS @ 5600 MHz**



**BODY SAR MEASUREMENT PLOTS @ 5800 MHz**


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**Template\_ACR.DDD.N.YY.MVGB.ISSUE\_SAR Reference Dipole SGHz\_vD**

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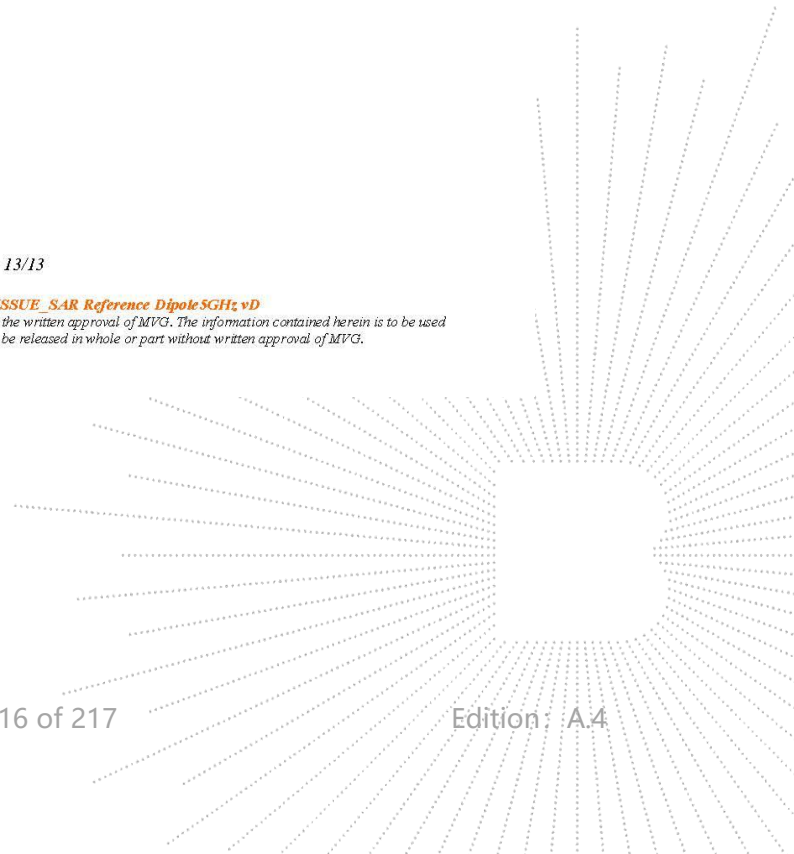

**8 LIST OF EQUIPMENT**

| Equipment Summary Sheet            |                         |                    |   |   |
|------------------------------------|-------------------------|--------------------|---|---|
| Equipment Description              | Manufacturer / Model    | Identification No. | Current Calibration Date                      | Next Calibration Date                         |
| SAM Phantom                        | MVG                     | SN 13/09 SAM68     | Validated. No cal required.                   | Validated. No cal required.                   |
| COMOSAR Test Bench                 | Version 3               | NA                 | Validated. No cal required.                   | Validated. No cal required.                   |
| Network Analyzer                   | Rohde & Schwarz ZVM     | 100203             | 08/2021                                       | 08/2024                                       |
| Network Analyzer                   | Agilent 8753ES          | MY40003210         | 10/2019                                       | 10/2022                                       |
| Network Analyzer – Calibration kit | Rohde & Schwarz ZV-Z235 | 101223             | 05/2019                                       | 05/2022                                       |
| Network Analyzer – Calibration kit | HP 85033D               | 3423A08186         | 06/2021                                       | 06/2027                                       |
| Calipers                           | Mitutoyo                | SN 0009732         | 10/2019                                       | 10/2022                                       |
| Reference Probe                    | MVG                     | SN 41/18 EPGO333   | 10/2021                                       | 10/2022                                       |
| Multimeter                         | Keithley 2000           | 1160271            | 02/2020                                       | 02/2023                                       |
| Signal Generator                   | Rohde & Schwarz SMB     | 106589             | 04/2019                                       | 04/2022                                       |
| Amplifier                          | MVG                     | MODU-023-C-0002    | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Power Meter                        | NI-USB 5680             | 170100013          | 06/2021                                       | 06/2024                                       |
| Power Meter                        | Rohde & Schwarz NRVD    | 832839-056         | 11/2019                                       | 11/2022                                       |
| Directional Coupler                | Krytar 158020           | 131467             | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Temperature / Humidity Sensor      | Testo 184 H1            | 44225320           | 06/2021                                       | 06/2024                                       |

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## STATEMENT

- 1.The equipment lists are traceable to the national reference standards.
- 2.The test report can not be partially copied unless prior written approval is issued from our lab.
- 3.The test report is invalid without stamp of laboratory.
- 4.The test report is invalid without signature of person(s) testing and authorizing.
- 5.The test process and test result is only related to the Unit Under Test.
- 6.The quality system of our laboratory is in accordance with ISO/IEC17025.
- 7.If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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\*\*\*\*\* END \*\*\*\*\*

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