

# FCC SAR TEST REPORT

**Product Name:** Video Baby Monitor

**Trade Mark:** VTech

**Model No.:** VM929HQ PU

VM929-2HQ PU, 928 Plus PU, 928 Plus

**Add. Model No.:** Twin PU, Advanced HQ Max PU,  
Advanced HQ Max Twin PU

**Report Number:** 24070512494SAR-1

**Test Standards:** FCC 47 CFR Part 2 §2.1093

ANSI/IEEE C95.1-1992

IEEE Std 1528-2013

**FCC ID:** EW780-3467-01

**Test Result:** PASS

**Date of Issue:** December 4, 2024

Prepared for:

**VTech Telecommunications Ltd.**

**23/F, Tai Ping Industrial Centre, Block 1, 57 Ting Kok Road, Tai Po,  
Hong Kong.**

Prepared by:

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**

**16/F, Block A, Building 6th, Baoneng Science and Technology Park,  
Longhua Street, Longhua District, Shenzhen, China**

**TEL: +86-755-2823 0888**

**FAX: +86-755-2823 0886**

Prepared by:



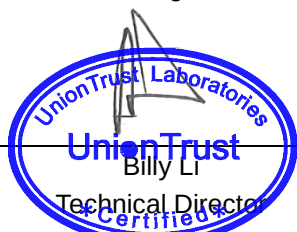
Curry Xue  
Test Engineer

Reviewed by:



Robben Chen  
Assistant Manager

Approved by:



Date:

December 4, 2024

Version

| Version No. | Date             | Description     |
|-------------|------------------|-----------------|
| V1.0        | December 4, 2024 | Original Report |



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### 1. GENERAL INFORMATION

#### 1.1. STATEMENT OF COMPLIANCE

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

| Equipment Class | Mode     | Highest Reported Body SAR <sub>1g</sub> (0 cm Gap) (W/kg) |
|-----------------|----------|-----------------------------------------------------------|
| DTS             | 2.4G SRD | 0.747                                                     |

#### 1.2. CLIENT INFORMATION

|                                 |                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------|
| <b>Applicant:</b>               | VTech Telecommunications Ltd.                                                         |
| <b>Address of Applicant:</b>    | 23/F, Tai Ping Industrial Centre, Block 1, 57 Ting Kok Road, Tai Po, Hong Kong.       |
| <b>Manufacturer:</b>            | VTech (Dongguan) Telecommunications Limited.                                          |
| <b>Address of Manufacturer:</b> | VTech Science Park, Xia Ling Bei Management Zone, Liaobu, Dongguan, Guangdong, China. |

#### 1.3. EUT INFORMATION

##### 1.3.1. General Description of EUT

|                                                                                                                                                                                                                       |                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| <b>Product Name:</b>                                                                                                                                                                                                  | Video Baby Monitor                                                                       |
| <b>Trade Mark:</b>                                                                                                                                                                                                    | VTech                                                                                    |
| <b>Model No.:</b>                                                                                                                                                                                                     | VM929HQ PU                                                                               |
| <b>Add. Model No.:</b>                                                                                                                                                                                                | VM929-2HQ PU, 928 Plus PU, 928 Plus Twin PU, Advanced HQ Max PU, Advanced HQ Max Twin PU |
| <b>FCC ID:</b>                                                                                                                                                                                                        | EW780-3467-01                                                                            |
| <b>DUT Stage:</b>                                                                                                                                                                                                     | Production Unit                                                                          |
| <b>Sample Number:</b>                                                                                                                                                                                                 | S202406283775-ZJA01/2                                                                    |
| <b>Sample Received Date:</b>                                                                                                                                                                                          | June 28, 2024                                                                            |
| <b>Sample Tested Date:</b>                                                                                                                                                                                            | August 15, 2024 to August 16, 2024                                                       |
| <b>Note:</b> The additional model VM929-2HQ PU, 928 Plus PU, 928 Plus Twin PU, Advanced HQ Max PU, Advanced HQ Max Twin PU is identical with the test model VM929HQ PU except the model number for marketing purpose. |                                                                                          |

##### 1.3.2. Description of Accessories

| Adapter           |                       |
|-------------------|-----------------------|
| <b>Model No.:</b> | VT07EUS05200          |
| <b>Input:</b>     | 100-240V~50/60Hz 0.5A |
| <b>Output:</b>    | 5.0V===2.0A 10.0W     |

| Battery                |                                          |
|------------------------|------------------------------------------|
| <b>Model No.:</b>      | GSP806090-5Ah-3.7V-1S1P                  |
| <b>Battery Type:</b>   | Rechargeable Lithium-ion Polymer Battery |
| <b>Rated Voltage:</b>  | 3.7 Vdc                                  |
| <b>Rated Capacity:</b> | 5000 mAh 18.5Wh                          |

##### 1.3.3. EUT Tx Frequency Bands

| Band     | Tx Frequency Range (Unit: MHz) |
|----------|--------------------------------|
| 2.4 GHz: | 2405 - 2475                    |



### 1.3.4. Wireless Technologies

|                 |                        |
|-----------------|------------------------|
| General 2.4G    | GFSK                   |
| Antenna Type    | Fixed External Antenna |
| Power Reduction | Not Support            |
| Dynamic Antenna | Not Support            |

### 1.4. MAXIMUM CONDUCTED POWER

The maximum conducted average power including tune-up tolerance is shown as below.

| Mode        | Maximum Conducted Power (dBm) |
|-------------|-------------------------------|
| 2406 - 2475 | 18.0                          |

### 1.5. OTHER INFORMATION

None.

### 1.6. TEST LOCATION

#### Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6th, Baoneng Science and Technology Park, Longhua Street, Longhua District, Shenzhen, China

Telephone: +86 (0) 755 2823 0888

Fax: +86 (0) 755 2823 0886

### 1.7. TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

#### Shenzhen UnionTrust Quality and Technology Co., Ltd.

##### CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

##### A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

##### ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

##### FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

## 1.8. GUIDANCE STANDARD

The tests documented in this report were performed in accordance with FCC 47 CFR Part 2 §2.1093, IEEE Std 1528-2013, ANSI/IEEE C95.1-1992, the following FCC Published RF exposure KDB procedures:

KDB 865664 D01 v01r04

KDB 865664 D02 v01r02

KDB 447498 D04 v01

KDB 616217 D04 v01r02



## 2. SPECIFIC ABSORPTION RATE (SAR)

### 2.1. 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, by appropriate techniques, to produce specific absorption rates (SARs) as averaged over the whole-body, any 1 g or any 10 g of tissue (defined as a tissue volume in the shape of a cube). All SAR values are to be averaged over any six-minute period. When portable device was used within 20 cm of the user's body, SAR evaluation of the device will be required. The SAR limit in chapter 2.3.

### 2.2. SAR DEFINITION

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

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

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

SAR measurement can be related to the electrical field in the tissue by

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

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

### 2.3. SAR LIMITS

Limits for Occupational/Controlled Exposure (W/kg)

| Whole-Body | Partial-Body | Hands, Wrists, Feet and Ankles |
|------------|--------------|--------------------------------|
| 0.4        | 8.0          | 20.0                           |

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

| Whole-Body | Partial-Body | Hands, Wrists, Feet and Ankles |
|------------|--------------|--------------------------------|
| 0.08       | 1.6          | 4.0                            |

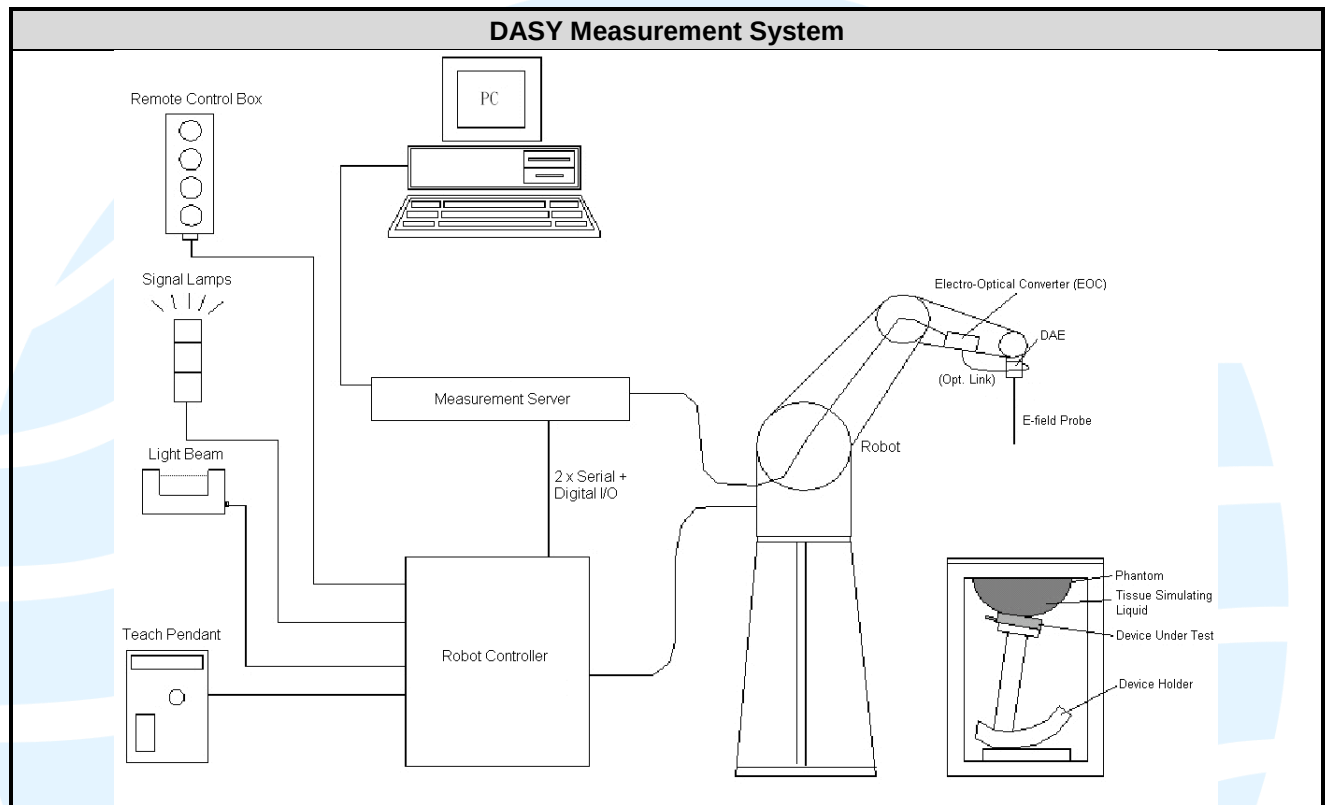
**Note:**

- 1) Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.
- 2) At frequencies above 6.0 GHz, SAR limits are not applicable and MPE limits for power density should be applied at 5 cm or more from the transmitting device.
- 3) The SAR limit is specified in FCC 47 CFR Part 2 §2.1093, ANSI/IEEE C95.1-1992.

### 3. SAR MEASUREMENT SYSTEM

#### 3.1. SPEAG DASY SYSTEM

DASY system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY5 software defined. The DASY software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC.



##### 3.1.1. Robot

The DASY system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY4: CS7MB) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability  $\pm 0.02$  mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

### 3.1.2. Probe

The SAR measurement is conducted with the dosimetric probe. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

|                      |                                                                                                                                                          |                                                                                     |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Model</b>         | EX3DV4                                                                                                                                                   |  |
| <b>Construction</b>  | Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE). |                                                                                     |
| <b>Frequency</b>     | 10 MHz to 6 GHz<br>Linearity: $\pm 0.2$ dB                                                                                                               |                                                                                     |
| <b>Directivity</b>   | $\pm 0.3$ dB in HSL (rotation around probe axis)<br>$\pm 0.5$ dB in tissue material (rotation normal to probe axis)                                      |                                                                                     |
| <b>Dynamic Range</b> | 10 $\mu$ W/g to 100 mW/g<br>Linearity: $\pm 0.2$ dB (noise: typically $< 1$ $\mu$ W/g)                                                                   |                                                                                     |
| <b>Dimensions</b>    | Overall length: 337 mm (Tip: 20 mm)<br>Tip diameter: 2.5 mm (Body: 12 mm)<br>Typical distance from probe tip to dipole centers: 1 mm                     |                                                                                     |

|                      |                                                                                                                                                                               |                                                                                      |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>Model</b>         | ES3DV3                                                                                                                                                                        |  |
| <b>Construction</b>  | Symmetrical design with triangular core. Interleaved sensors. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE). |                                                                                      |
| <b>Frequency</b>     | 10 MHz to 4 GHz<br>Linearity: $\pm 0.2$ dB                                                                                                                                    |                                                                                      |
| <b>Directivity</b>   | $\pm 0.2$ dB in HSL (rotation around probe axis)<br>$\pm 0.3$ dB in tissue material (rotation normal to probe axis)                                                           |                                                                                      |
| <b>Dynamic Range</b> | 5 $\mu$ W/g to 100 mW/g<br>Linearity: $\pm 0.2$ dB                                                                                                                            |                                                                                      |
| <b>Dimensions</b>    | Overall length: 337 mm (Tip: 20 mm)<br>Tip diameter: 3.9 mm (Body: 12 mm)<br>Distance from probe tip to dipole centers: 2.0 mm                                                |                                                                                      |

### 3.1.3. Data Acquisition Electronics (DAE)

|                                    |                                                                                                                                                                                                                                                      |                                                                                       |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Model</b>                       | DAE3, DAE4                                                                                                                                                                                                                                           |  |
| <b>Construction</b>                | Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY embedded system (fully remote controlled). Two step probe touch detectors for mechanical surface detection and emergency robot stop. |                                                                                       |
| <b>Measurement Range</b>           | -100 to +300 mV (16-bit resolution and two range settings: 4mV, 400mV)                                                                                                                                                                               |                                                                                       |
| <b>Input Voltage</b> <b>Offset</b> | $< 5\mu$ V (with auto zero)                                                                                                                                                                                                                          |                                                                                       |
| <b>Input Bias Current</b>          | $< 50$ fA                                                                                                                                                                                                                                            |                                                                                       |
| <b>Dimensions</b>                  | 60 x 60 x 68 mm                                                                                                                                                                                                                                      |                                                                                       |

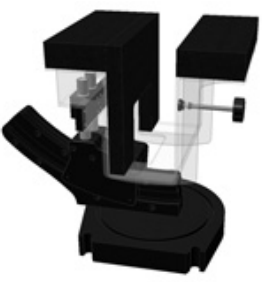
### 3.1.4. Phantom

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Model</b>           | Twin SAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| <b>Construction</b>    | The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot. |                                                                                     |
| <b>Material</b>        | Vinylester, glass fiber reinforced (VE-GF)                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                     |
| <b>Shell Thickness</b> | $2 \pm 0.2$ mm ( $6 \pm 0.2$ mm at ear point)                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                     |
| <b>Dimensions</b>      | Length: 1000 mm<br>Width: 500 mm<br>Height: adjustable feet                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                     |
| <b>Filling Volume</b>  | approx. 25 liters                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                     |

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                      |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>Model</b>           | ELI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Construction</b>    | Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles. |                                                                                      |
| <b>Material</b>        | Vinylester, glass fiber reinforced (VE-GF)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                      |
| <b>Shell Thickness</b> | $2.0 \pm 0.2$ mm (bottom plate)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                      |
| <b>Dimensions</b>      | Major axis: 600 mm<br>Minor axis: 400 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                      |
| <b>Filling Volume</b>  | approx. 30 liters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                      |

### 3.1.5. Device Holder

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                     |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Model</b>        | Mounting Device                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <b>Construction</b> | In combination with the Twin SAM Phantom or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). |                                                                                     |
| <b>Material</b>     | POM                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                     |

|                     |                                                                                                                                                                                                                                                                                         |                                                                                     |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Model</b>        | Laptop Extensions Kit                                                                                                                                                                                                                                                                   |  |
| <b>Construction</b> | Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.). It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner. |                                                                                     |
| <b>Material</b>     | POM, Acrylic glass, Foam                                                                                                                                                                                                                                                                |                                                                                     |

### 3.1.6. System Validation Dipoles

|                         |                                                                                                                                                                      |                                                                                       |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Model</b>            | D-Serial                                                                                                                                                             |  |
| <b>Construction</b>     | Symmetrical dipole with 1/4 balun. Enables measurement of feed point impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions. |                                                                                       |
| <b>Frequency</b>        | 750 MHz to 5800 MHz                                                                                                                                                  |                                                                                       |
| <b>Return Loss</b>      | > 20 dB                                                                                                                                                              |                                                                                       |
| <b>Power Capability</b> | > 100 W ( $f < 1\text{GHz}$ ), > 40 W ( $f > 1\text{GHz}$ )                                                                                                          |                                                                                       |

## 3.2. SAR SCAN PROCEDURE

### 3.2.1. SAR Reference Measurement (drift)

Prior to the SAR test, local SAR shall be measured at a stationary reference point where the SAR exceeds the lower detection limit of the measurement system.

### 3.2.2. Area Scan

Measurement procedures for evaluating the SAR of wireless device start with a coarse measurement grid to determine the approximate location of the local peak SAR values. This is known as the area-scan procedure. All antennas and radiating structures that may contribute to the measured SAR or influence the SAR distribution must be included in the area scan. The area scan measurement resolution must enable the extrapolation algorithms of the SAR system to correctly identify the peak SAR location(s) for subsequent zoom scan measurements to correctly determine the 1-g SAR. Area scans are performed at a constant distance from the phantom surface, determined by the measurement frequencies. When a measured peak is closer than  $\frac{1}{2}$  the zoom scan volume dimension (x, y) from the edge of the area scan region, unless the entire peak and gram-averaging volume are both captured within the zoom scan volume, the area scan must be repeated by shifting and expanding the area scan region to ensure all peaks are away from the area scan boundary. The area scan resolutions specified in the table below must be applied to the SAR measurements.

|                                                                                                        | $\leq 3$ GHz                                                                                                                                                                                                                                                           | $> 3$ GHz                                               |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface | 5 mm $\pm$ 1 mm                                                                                                                                                                                                                                                        | $\frac{1}{2} \cdot \delta \cdot \ln(2)$ mm $\pm$ 0.5 mm |
| Maximum probe angle from probe axis to phantom surface normal at the measurement location              | 30° $\pm$ 1°                                                                                                                                                                                                                                                           | 20° $\pm$ 1°                                            |
| Maximum area scans spatial resolution: $\Delta x_{Area}$ , $\Delta y_{Area}$                           | $\leq 2$ GHz: $\leq 15$ mm<br>2 – 3 GHz: $\leq 12$ mm                                                                                                                                                                                                                  | 3 – 4 GHz: $\leq 12$ mm<br>4 – 6 GHz: $\leq 10$ mm      |
|                                                                                                        | When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device. |                                                         |

### 3.2.3. Zoom Scan

To evaluate the peak spatial-average SAR values with respect to 1 g or 10 g cubes, fine resolution volume scans, called zoom scans, are performed at the peak SAR locations identified during the area scan. If the cube volume within the zoom scan chosen to calculate the peak spatial-average SAR touches any boundary of the zoom-scan volume, the zoom scan shall be repeated with the center of the zoom-scan volume shifted to the new maximum SAR location. For any secondary peaks found in the area scan that are within 2 dB of the maximum peak and are not within this zoom scan, the zoom scan shall be performed for such peaks, unless the peak spatial-average SAR at the location of the maximum peak is more than 2 dB below the applicable SAR limit (i.e., 1 W/kg for a 1.6 W/kg 1 g limit, or 1.26 W/kg for a 2 W/kg 10 g limit). The zoom scan resolutions specified in the table below must be applied to the SAR measurements.

|                                                                                                                                                                                                                                                                                                           |                                    |                                                                                      | $\leq 3$ GHz                                         | $> 3$ GHz                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------------------|
| Maximum zoom scan spatial resolution: $\Delta x_{Zoom}, \Delta y_{Zoom}$                                                                                                                                                                                                                                  |                                    |                                                                                      | $\leq 2$ GHz: $\leq 8$ mm<br>2 – 3 GHz: $\leq 5$ mm* | 3 – 4 GHz: $\leq 5$ mm*<br>4 – 6 GHz: $\leq 4$ mm*                            |
| Maximum zoom Scan spatial resolution, normal to phantom surface                                                                                                                                                                                                                                           | uniform grid: $\Delta Z_{Zoom}(n)$ |                                                                                      | $\leq 5$ mm                                          | 3 – 4 GHz: $\leq 4$ mm<br>4 – 5 GHz: $\leq 3$ mm<br>5 – 6 GHz: $\leq 2$ mm    |
|                                                                                                                                                                                                                                                                                                           | graded grid                        | $\Delta Z_{Zoom}(1)$ : between 1 <sup>ST</sup> two points closest to phantom surface | $\leq 4$ mm                                          | 3 – 4 GHz: $\leq 3$ mm<br>4 – 5 GHz: $\leq 2.5$ mm<br>5 – 6 GHz: $\leq 2$ mm  |
|                                                                                                                                                                                                                                                                                                           |                                    | $\Delta Z_{Zoom}(n>1)$ : between subsequent points                                   | $\leq 1.5 \cdot \Delta Z_{Zoom}(n-1)$ mm             |                                                                               |
| Minimum zoom scan volume                                                                                                                                                                                                                                                                                  | x, y, z                            |                                                                                      | $\geq 30$ mm                                         | 3 – 4 GHz: $\geq 28$ mm<br>4 – 5 GHz: $\geq 25$ mm<br>5 – 6 GHz: $\geq 22$ mm |
| Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.                                                                                                                                                                     |                                    |                                                                                      |                                                      |                                                                               |
| * When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB Publication 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz. |                                    |                                                                                      |                                                      |                                                                               |

### 3.2.4. SAR Drift Measurement

The local SAR (or conducted power) shall be measured at exactly the same location as in 3.2.1 section. The absolute value of the measurement drift (the difference between the SAR measured in 3.2.1 and 3.2.4 section) shall be recorded. The SAR drift shall be kept within  $\pm 5\%$ .

### 3.3. EQUIPMENT LIST

| Equipment                    | Manufacturer                                    | Model   | S/N             | Cal. Date     | Cal. Interval |
|------------------------------|-------------------------------------------------|---------|-----------------|---------------|---------------|
| System Validation Dipole     | SPEAG                                           | D2450V2 | 883             | Jan. 02, 2024 | 3 Year        |
| Data Acquisition Electronics | SPEAG                                           | DAE4    | 662             | Mar. 18, 2024 | 1 Year        |
| Dosimetric E-Field Probe     | SPEAG                                           | ES3DV3  | 3090            | Mar. 26, 2024 | 1 Year        |
| ENA Series Network Analyzer  | Agilent                                         | 8753ES  | US39170317      | Oct. 31, 2023 | 1 Year        |
| Dielectric Assessment Kit    | SPEAG                                           | DAK-3.5 | 1070            | N/A           | N/A           |
| USB/GPIB Interface           | Agilent                                         | 82357B  | N10149          | N/A           | N/A           |
| Twin Phantom                 | SPEAG                                           | SAM     | TP-1376         | N/A           | N/A           |
| Twin Phantom                 | SPEAG                                           | SAM     | TP-1378         | N/A           | N/A           |
| Robot controller             | STAUBLI                                         | CS7MB   | F05/511KA1/A/01 | N/A           | N/A           |
| Robot                        | STAUBLI                                         | RX90BL  | F05/511KA1/A/01 | N/A           | N/A           |
| Signal Generator             | R&S                                             | SMB100A | 103718          | Mar. 29, 2024 | 1 Year        |
| POWER METER                  | R&S                                             | NRP     | 101293          | Oct. 27, 2023 | 1 Year        |
| Thermometer                  | Shanghai Gao Zhi Precision Instrument Co., Ltd. | HB6801  | 18022507        | Oct. 29, 2023 | 1 Year        |
| Dual Directional Coupler     | Agilent                                         | 778D    | MY52180234      | Oct. 27, 2023 | 1 Year        |
| Amplifier                    | Mini-Circuit                                    | ZHL42   | QA1252001       | Mar. 29, 2024 | 1 Year        |
| DC Source                    | Agilent                                         | 66319B  | MY43000795      | Oct. 31, 2023 | 1 Year        |

### 3.4. MEASUREMENT UNCERTAINTY

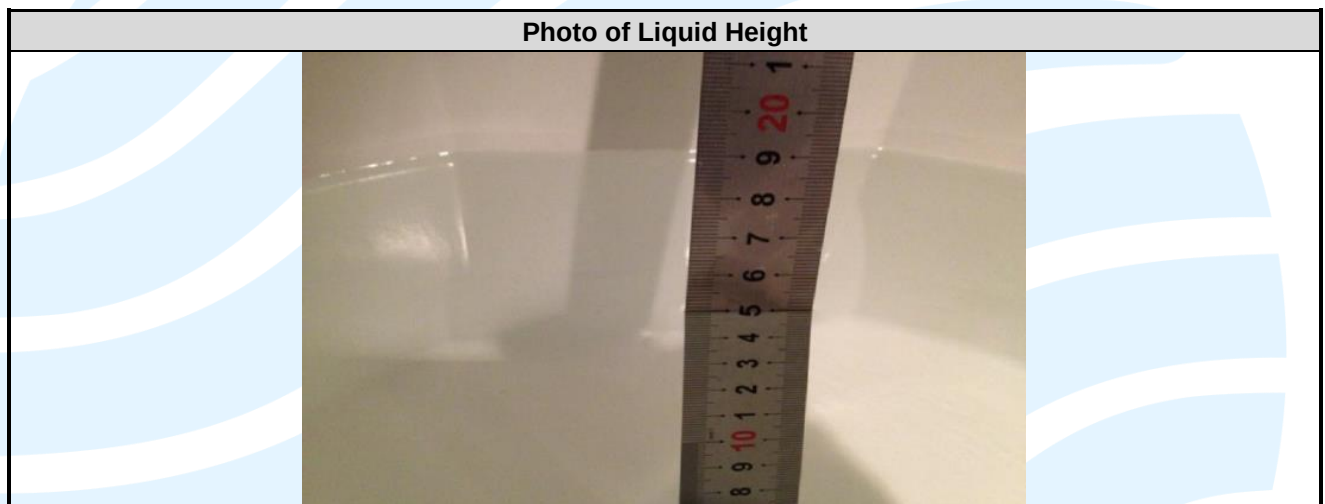
Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

### 3.5. TISSUE DIELECTRIC PARAMETER MEASUREMENT & SYSTEM VERIFICATION

#### 3.5.1. Tissue Simulating Liquids

The temperature of the tissue-equivalent medium used during measurement must also be within 18 °C to 25 °C and within  $\pm 2$  °C of the temperature when the tissue parameters are characterized. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 - 4 days of use; or earlier if the dielectric parameters can become out of tolerance.

The depth of tissue-equivalent liquid in a phantom must be  $\geq 15.0$  cm with  $\leq \pm 0.5$  cm variation for SAR measurements  $\leq 3$  GHz and  $\geq 10.0$  cm with  $\leq \pm 0.5$  cm variation for measurements  $> 3$  GHz. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in Table-3.1.



| Tissue Dielectric Parameters for Head and Body |              |                |              |                |
|------------------------------------------------|--------------|----------------|--------------|----------------|
| Target Frequency<br>(MHz)                      | Head         |                | Body         |                |
|                                                | $\epsilon_r$ | $\sigma$ (S/m) | $\epsilon_r$ | $\sigma$ (S/m) |
| 750                                            | 41.9         | 0.89           | 55.5         | 0.96           |
| 835                                            | 41.5         | 0.90           | 55.2         | 0.97           |
| 900                                            | 41.5         | 0.97           | 55.0         | 1.05           |
| 1450                                           | 40.5         | 1.20           | 54.0         | 1.30           |
| 1640                                           | 40.3         | 1.29           | 53.8         | 1.40           |
| 1750                                           | 40.1         | 1.37           | 53.4         | 1.49           |
| 1800                                           | 40.0         | 1.40           | 53.3         | 1.52           |
| 1900                                           | 40.0         | 1.40           | 53.3         | 1.52           |
| 2000                                           | 40.0         | 1.40           | 53.3         | 1.52           |
| 2300                                           | 39.5         | 1.67           | 52.9         | 1.81           |
| 2450                                           | 39.2         | 1.80           | 52.7         | 1.95           |
| 2600                                           | 39.0         | 1.96           | 52.5         | 2.16           |
| 3500                                           | 37.9         | 2.91           | 51.3         | 3.31           |
| 5200                                           | 36.0         | 4.66           | 49.0         | 5.30           |
| 5300                                           | 35.9         | 4.76           | 48.9         | 5.42           |
| 5500                                           | 35.6         | 4.96           | 48.6         | 5.65           |
| 5600                                           | 35.5         | 5.07           | 48.5         | 5.77           |
| 5800                                           | 35.3         | 5.27           | 48.2         | 6.00           |

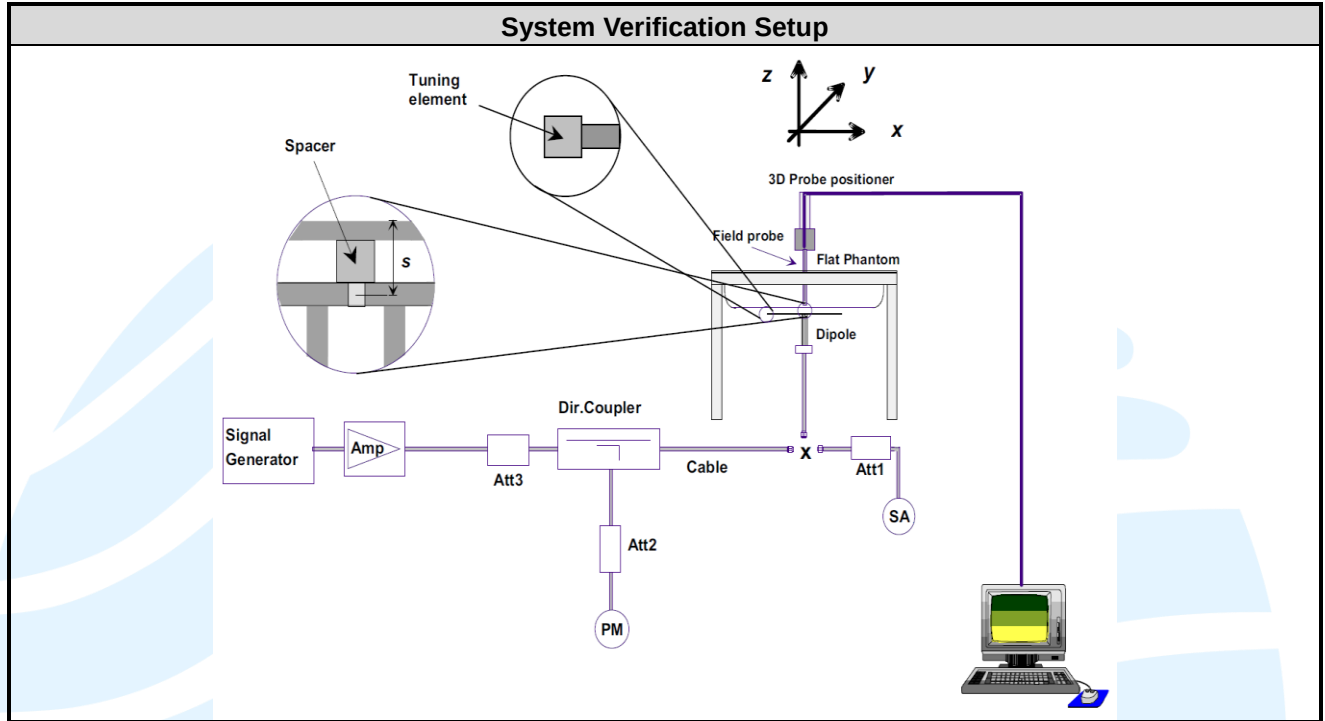
(  $\epsilon_r$  = relative permittivity,  $\sigma$  = conductivity and  $\rho = 1000$  kg/m<sup>3</sup>)

The following table gives the recipes for tissue simulating liquids.

| Recipes of Tissue Simulating Liquid |             |      |     |      |         |              |       |                                   |
|-------------------------------------|-------------|------|-----|------|---------|--------------|-------|-----------------------------------|
| Tissue Type                         | Bactericide | DGBE | HEC | NaCl | Sucrose | Triton X-100 | Water | Diethylene Glycol Mono-hexylether |
| H750                                | 0.2         | -    | 0.2 | 1.4  | 57.0    | -            | 41.1  | -                                 |
| H835                                | 0.1         | -    | 1.0 | 1.4  | 57.0    | -            | 40.5  | -                                 |
| H900                                | 0.1         | -    | 1.0 | 1.5  | 56.5    | -            | 40.9  | -                                 |
| H1450                               | -           | 45.5 | -   | 0.7  | -       | -            | 53.8  | -                                 |
| H1640                               | -           | 45.8 | -   | 0.5  | -       | -            | 53.7  | -                                 |
| H1750                               | -           | 44.5 | -   | 0.3  | -       | -            | 55.2  | -                                 |
| H1800                               | -           | 44.9 | -   | 0.2  | -       | -            | 54.9  | -                                 |
| H1900                               | -           | 44.9 | -   | 0.2  | -       | -            | 54.9  | -                                 |
| H2000                               | -           | 50   | -   | -    | -       | -            | 50    | -                                 |
| H2300                               | -           | 44.9 | -   | 0.1  | -       | -            | 55.0  | -                                 |
| H2450                               | -           | 45.0 | -   | 0.1  | -       | -            | 54.9  | -                                 |
| H2600                               | -           | 45.1 | -   | 0.1  | -       | -            | 54.8  | -                                 |
| H3500                               | -           | 8.0  | -   | 0.2  | -       | 20.0         | 71.8  | -                                 |
| H5G                                 | -           | -    | -   | -    | -       | 17.2         | 65.52 | 17.3                              |
| B750                                | 0.2         | -    | 0.2 | 0.8  | 48.8    | -            | 50.0  | -                                 |
| B835                                | 0.2         | -    | 0.2 | 0.9  | 48.5    | -            | 50.2  | -                                 |
| B900                                | 0.2         | -    | 0.2 | 0.9  | 48.2    | -            | 50.5  | -                                 |
| B1450                               | -           | 34.0 | -   | 0.3  | -       | -            | 65.7  | -                                 |
| B1640                               | -           | 32.5 | -   | 0.3  | -       | -            | 67.2  | -                                 |
| B1750                               | -           | 29.4 | -   | 0.4  | -       | -            | 70.2  | -                                 |
| B1800                               | -           | 29.5 | -   | 0.4  | -       | -            | 70.1  | -                                 |
| B1900                               | -           | 29.5 | -   | 0.3  | -       | -            | 70.2  | -                                 |
| B2000                               | -           | 30.0 | -   | 0.2  | -       | -            | 69.8  | -                                 |
| B2300                               | -           | 31.0 | -   | 0.1  | -       | -            | 68.9  | -                                 |
| B2450                               | -           | 31.4 | -   | 0.1  | -       | -            | 68.5  | -                                 |
| B2600                               | -           | 31.8 | -   | 0.1  | -       | -            | 68.1  | -                                 |
| B3500                               | -           | 28.8 | -   | 0.1  | -       | -            | 71.1  | -                                 |
| B5G                                 | -           | -    | -   | -    | -       | 10.7         | 78.6  | 10.7                              |

### 3.5.2. System Check Description

The system check procedure provides a simple, fast, and reliable test method that can be performed daily or before every SAR measurement. The objective here is to ascertain that the measurement system has acceptable accuracy and repeatability. This test requires a flat phantom and a radiating source. The system verification setup is shown as below.



### 3.5.3. Tissue Verification

The measuring results for tissue simulating liquid are shown as below.

| Test Date     | Tissue Type | Frequency (MHz) | Liquid Temp. (°C) | Measured Conductivity ( $\sigma$ ) | Measured Permittivity ( $\epsilon_r$ ) | Target Conductivity ( $\sigma$ ) | Target Permittivity ( $\epsilon_r$ ) | Conductivity Deviation (%) | Permittivity Deviation (%) |
|---------------|-------------|-----------------|-------------------|------------------------------------|----------------------------------------|----------------------------------|--------------------------------------|----------------------------|----------------------------|
| Aug. 15, 2024 | Head        | 2450            | 21.3              | 1.868                              | 38.860                                 | 1.80                             | 39.20                                | 3.78                       | -0.87                      |

Note:

The dielectric properties of the tissue simulating liquid must be measured within 24 hours before the SAR testing and within  $\pm 5\%$  of the target values. The variation of the liquid temperature must be within  $\pm 2^\circ\text{C}$  during the test.

### 3.5.4. System Validation

The SAR measurement system was validated according to procedures in KDB 865664 D01. The validation status in tabulated summary is as below.

| Test Date     | Probe S/N | Calibration Point |      | Measured Conductivity ( $\sigma$ ) | Measured Permittivity ( $\epsilon_r$ ) | Validation for CW |                 |                | Validation for Modulation |             |      |
|---------------|-----------|-------------------|------|------------------------------------|----------------------------------------|-------------------|-----------------|----------------|---------------------------|-------------|------|
|               |           |                   |      |                                    |                                        | Sensitivity Range | Probe Linearity | Probe Isotropy | Modulation Type           | Duty Factor | PAR  |
| Aug. 15, 2024 | 3090      | Head              | 2450 | 1.868                              | 38.860                                 | Pass              | Pass            | Pass           | OFDM                      | N/A         | Pass |

### 3.5.5. System Verification

The measuring result for system verification is tabulated as below.

| Test Date     | Tissue Type | Frequency (MHz) | 1W Target SAR-1g (W/kg) | Measured SAR-1g (W/kg) | Normalized to 1W SAR-1g (W/kg) | Deviation (%) | Dipole S/N | Probe S/N | DAE S/N |
|---------------|-------------|-----------------|-------------------------|------------------------|--------------------------------|---------------|------------|-----------|---------|
| Aug. 15, 2024 | Head        | 2450            | 53.70                   | 13.900                 | 55.60                          | 3.54          | 883        | 3090      | 662     |

Note:

Comparing to the reference SAR value, the validation data should be within its specification of 10%. The result indicates the system check can meet the variation criterion and the plots can be referred to Appendix A of this report.

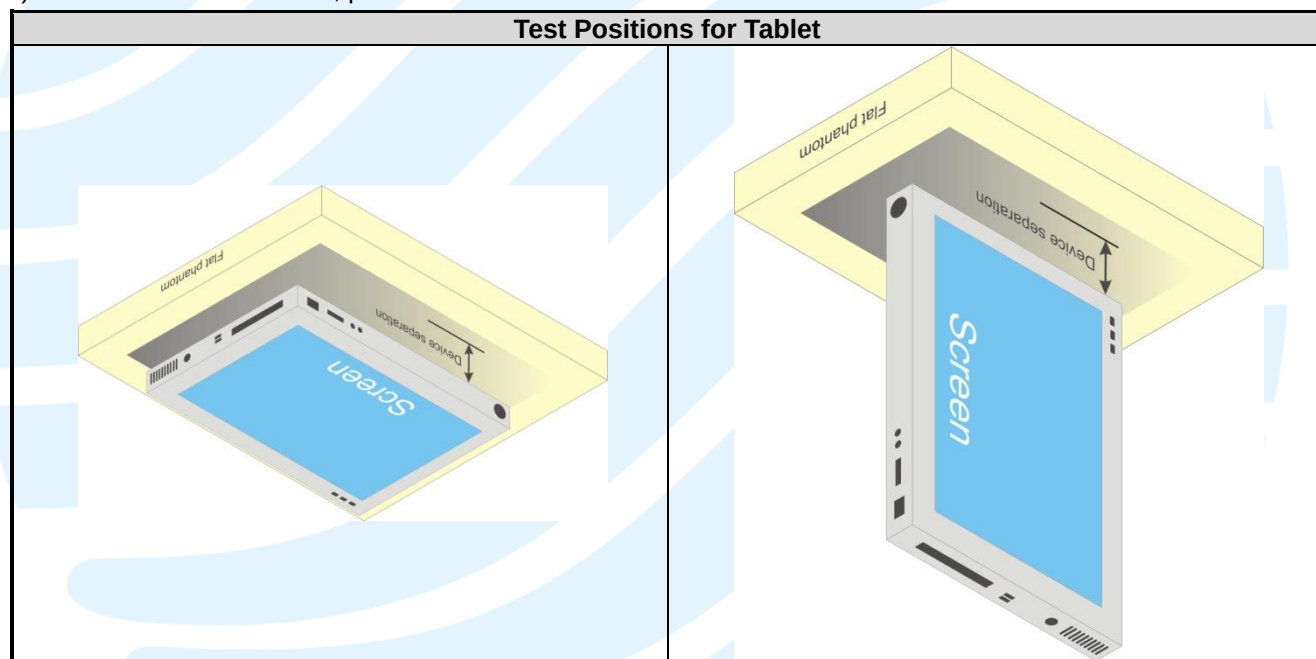
## 4. SAR MEASUREMENT EVALUATION

### 4.1. EUT TESTING POSITION

| RF Exposure Conditions | Test Position | Separation Distance | SAR test exclusion |
|------------------------|---------------|---------------------|--------------------|
| Body                   | Rear Face     | 0 cm                | Note 4             |
|                        | Left Side     |                     |                    |
|                        | Right Side    |                     |                    |
|                        | Top Side      |                     |                    |
|                        | Bottom Side   |                     |                    |

Note:

- Exposures from antennas through the front surface of the display section of a tablet are generally limited to the user's hands. Exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR evaluation for the front surface of tablet display screens are generally not necessary.
- When voice mode is supported on a tablet and it is limited to speaker mode or headset operations only, additional SAR testing for this type of voice use is not required.
- Next to the ear operation is generally not expected for tablets with overall diagonal dimension > 20 cm. However, when next to the ear voice mode is supported, regardless of the overall dimension, phablets must be tested according to the requirements described in KDB Publication 648474 D04.
- For SAR test exclusion, please refer to section 4.4



### 4.2. MEASURED CONDUCTED POWER RESULT

The measuring conducted average power is shown as below.

| Band   | Frequency (MHz) | Average Power (dBm) |
|--------|-----------------|---------------------|
| 2.4GHz | 2405            | 17.47               |
|        | 2442            | 15.11               |
|        | 2475            | 15.11               |

### 4.3. SAR TEST EXCLUSION EVALUATIONS

#### 4.3.1. Standalone SAR Test Exclusion Considerations

According to KDB 447498 D04, SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P<sub>th</sub> is given by Formula (B.2).

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B.1})$$

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B.2})$$

where

$$x = -\log_{10} \left( \frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

f is in GHz, d is the separation distance (cm), and ERP<sub>20cm</sub> is per Formula (B.1).

Table B.2—Example Power Thresholds (mW)

| Frequency (MHz) | Distance (mm) |    |    |    |     |     |     |     |     |     |     |
|-----------------|---------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|
|                 |               | 5  | 10 | 15 | 20  | 25  | 30  | 35  | 40  | 45  | 50  |
|                 | 300           | 39 | 65 | 88 | 110 | 129 | 148 | 166 | 184 | 201 | 217 |
|                 | 450           | 22 | 44 | 67 | 89  | 112 | 135 | 158 | 180 | 203 | 226 |
|                 | 835           | 9  | 25 | 44 | 66  | 90  | 116 | 145 | 175 | 207 | 240 |
|                 | 1900          | 3  | 12 | 26 | 44  | 66  | 92  | 122 | 157 | 195 | 236 |
|                 | 2450          | 3  | 10 | 22 | 38  | 59  | 83  | 111 | 143 | 179 | 219 |
|                 | 3600          | 2  | 8  | 18 | 32  | 49  | 71  | 96  | 125 | 158 | 195 |
|                 | 5800          | 1  | 6  | 14 | 25  | 40  | 58  | 80  | 106 | 136 | 169 |

#### Antenna Closed Mode:

| Max. Tune-up Power (dBm) | Max. Tune-up Power (mW) | Left Side            |                        |                      | Right Side           |                        |                      | Bottom Side          |                        |                      |
|--------------------------|-------------------------|----------------------|------------------------|----------------------|----------------------|------------------------|----------------------|----------------------|------------------------|----------------------|
|                          |                         | Ant. to Surface (cm) | Calculated Result (mW) | Require SAR Testing? | Ant. to Surface (cm) | Calculated Result (mW) | Require SAR Testing? | Ant. to Surface (cm) | Calculated Result (mW) | Require SAR Testing? |
| 18.0                     | 63.10                   | 9.8                  | 786.58                 | No                   | 2.0                  | 38.14                  | Yes                  | 9.7                  | 771.37                 | No                   |

#### Antenna Opened Mode:

| Max. Tune-up Power (dBm) | Max. Tune-up Power (mW) | Left Side            |                        |                      | Right Side           |                        |                      | Bottom Side          |                        |                      |
|--------------------------|-------------------------|----------------------|------------------------|----------------------|----------------------|------------------------|----------------------|----------------------|------------------------|----------------------|
|                          |                         | Ant. to Surface (cm) | Calculated Result (mW) | Require SAR Testing? | Ant. to Surface (cm) | Calculated Result (mW) | Require SAR Testing? | Ant. to Surface (cm) | Calculated Result (mW) | Require SAR Testing? |
| 18.0                     | 63.10                   | 16.9                 | 2220.40                | No                   | 2.0                  | 38.14                  | Yes                  | 9.7                  | 771.37                 | No                   |

#### Note:

- 1) Based on the antenna location shown on appendix D of this report for SAR test exclusion.
- 2) The 1 mW Blanket Exemption applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

### 4.3.2. Estimated SAR Calculation

According to KDB 447498 D04, when an antenna qualifies for test exemption in single transmitter/antenna mode, its actual SAR value may not be available, because it was not required to be measured. In this case, the SAR contribution of that antenna to simultaneous transmission must be estimated relative to the SAR or MPE based exemption criteria for the applicable terms in the equation of § 1.1307(b)(3)(ii)(B) (see also Appendix C), by multiplying the corresponding ratio by the SAR limit of 1.6 W/kg for 1-g SAR. This is referred to as estimated SAR.

For instance, a given antenna may qualify for a SAR-based exemption according to Section B.4, with  $P_{ant} < P_{th}$ , where  $P_{ant}$  is maximum time-averaged power or effective radiated power (ERP), whichever is greater, and  $P_{th}$  is defined in Formula (B.2). Then, per the preceding paragraph, the estimated SAR is computed as  $SAR_{est} = 1.6 \cdot P_{ant} / P_{th} [W/kg]$ .

#### Antenna Closed Mode:

| Mode / Band  | Frequency (MHz) | $P_{ant}$ (mW) | Ant. to Surface (cm) | $P_{th}$ (mW) | Test Position | Estimated 1g SAR (W/kg) |
|--------------|-----------------|----------------|----------------------|---------------|---------------|-------------------------|
| DTS / 2.4GHz | 2475            | 63.10          | 9.8                  | 786.58        | Left Side     | 0.128                   |
| DTS / 2.4GHz | 2475            | 63.10          | 2.0                  | 38.14         | Right Side    | 2.647                   |
| DTS / 2.4GHz | 2475            | 63.10          | 9.7                  | 771.37        | Bottom Side   | 0.131                   |

#### Antenna Opened Mode:

| Mode / Band  | Frequency (MHz) | $P_{ant}$ (mW) | Ant. to Surface (cm) | $P_{th}$ (mW) | Test Position | Estimated 1g SAR (W/kg) |
|--------------|-----------------|----------------|----------------------|---------------|---------------|-------------------------|
| DTS / 2.4GHz | 2475            | 63.10          | 16.9                 | 2220.40       | Left Side     | 0.045                   |
| DTS / 2.4GHz | 2475            | 63.10          | 2.0                  | 38.14         | Right Side    | 2.647                   |
| DTS / 2.4GHz | 2475            | 63.10          | 9.7                  | 771.37        | Bottom Side   | 0.131                   |

## 4.4. SAR TESTING RESULTS

### 4.4.1. SAR Test Reduction Considerations

#### KDB 447498 D01 General RF Exposure Guidance

Testing of other required channels within the operating mode of a frequency band is not required when the reported SAR for the mid-band or highest output power channel is:

- $\leq 0.8$  W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
- $\leq 0.6$  W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
- $\leq 0.4$  W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz

### 4.4.2. SAR Results for Body Exposure Condition (Separation Distance is 0 cm)

| Plot No. | Band | Test Position | Freq. (MHz) | Duty Cycle (%) | Antenna | Max. Tune-up Power (dBm) | Measured Conducted Power (dBm) | Power Drift (dB) | Measured SAR-1g (W/kg) | Measured SAR-10g (W/kg) | Scaling Factor | Scaled SAR-1g (W/kg) |
|----------|------|---------------|-------------|----------------|---------|--------------------------|--------------------------------|------------------|------------------------|-------------------------|----------------|----------------------|
|          | 2.4G | Front Face    | 2405        | 41%            | Close   | 18.0                     | 17.47                          | 0.05             | 0.102                  | 0.0417                  | 1.13           | 0.115                |
|          | 2.4G | Rear Face     | 2405        | 41%            | Close   | 18.0                     | 17.47                          | 0.05             | 0.602                  | 0.26                    | 1.13           | 0.680                |
|          | 2.4G | Left Side     | 2405        | 41%            | Close   | 18.0                     | 17.47                          | 0.03             | 0.0034                 | 0.00204                 | 1.13           | 0.004                |
|          | 2.4G | Right Side    | 2405        | 41%            | Close   | 18.0                     | 17.47                          | 0.05             | 0.0226                 | 0.0123                  | 1.13           | 0.026                |
|          | 2.4G | Top Side      | 2405        | 41%            | Close   | 18.0                     | 17.47                          | 0.04             | 0.19                   | 0.0932                  | 1.13           | 0.215                |
| 1        | 2.4G | Rear Face     | 2441        | 41%            | Close   | 18.0                     | 15.11                          | 0.03             | 0.384                  | 0.162                   | 1.95           | <b>0.747</b>         |
|          | 2.4G | Rear Face     | 2475        | 41%            | Close   | 18.0                     | 15.11                          | 0.11             | 0.285                  | 0.12                    | 1.95           | 0.554                |
|          | 2.4G | Front Face    | 2405        | 41%            | Open    | 18.0                     | 17.47                          | 0.15             | 0.224                  | 0.0951                  | 1.13           | 0.253                |
|          | 2.4G | Rear Face     | 2405        | 41%            | Open    | 18.0                     | 17.47                          | 0.15             | 0.345                  | 0.161                   | 1.13           | 0.390                |
|          | 2.4G | Right Side    | 2405        | 41%            | Open    | 18.0                     | 17.47                          | 0.16             | 0.0215                 | 0.0124                  | 1.13           | 0.024                |
|          | 2.4G | Top Side      | 2405        | 41%            | Open    | 18.0                     | 17.47                          | 0.02             | 0.00761                | 0.00448                 | 1.13           | 0.009                |
|          | 2.4G | Rear Face     | 2441        | 41%            | Open    | 18.0                     | 15.11                          | 0.17             | 0.331                  | 0.149                   | 1.95           | 0.644                |
| 2        | 2.4G | Rear Face     | 2475        | 41%            | Open    | 18.0                     | 15.11                          | 0.10             | 0.343                  | 0.151                   | 1.95           | <b>0.667</b>         |

#### Note:

The manufacturer claims that the maximum duty cycle of the product in actual use does not exceed 41%

## 4.5. SAR MEASUREMENT VARIABILITY

### 4.5.1. Repeated Measurement

According to KDB 865664 D01, SAR measurement variability was assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are  $\leq 1.45$  W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is  $\leq 1.10$ , the highest SAR configuration for either head or body tissue-equivalent medium may be used to perform the repeated measurement. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR repeated measurement procedure:

- 1) When the highest measured SAR is  $< 0.80$  W/kg, repeated measurement is not required.
- 2) When the highest measured SAR is  $\geq 0.80$  W/kg, repeat that measurement once.
- 3) If the ratio of largest to smallest SAR for the original and first repeated measurements is  $> 1.20$ , or when the original or repeated measurement is  $\geq 1.45$  W/kg, perform a second repeated measurement.
- 4) If the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ , and the original, first or second repeated measurement is  $\geq 1.5$  W/kg, perform a third repeated measurement.

All the measured SAR are less than 0.8 W/kg, so the repeated measurement is not required.

\*\*\* End of Report \*\*\*

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The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.

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## APPENDIX A. SAR PLOTS OF SYSTEM VERIFICATION

The plots for system verification with largest deviation for each SAR system combination are shown as follows.

Test Laboratory: UnionTrust

Date: 2024/8/15

### System Check\_H2450\_24dBm

DUT: Dipole 2450 MHz

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: H2450 Medium parameters used :  $f = 2450$  MHz;  $\sigma = 1.868$  S/m;  $\epsilon_r = 38.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3090; ConvF(4.63, 4.63, 4.63) @ 2450 MHz; Calibrated: 2024/3/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn662; Calibrated: 2024/3/18
- Phantom: SAM 1; Type: QD 000 P40 CB; Serial: TP/1378
- Postprocessing SW: SEMCAD, V1.8 Build 186

System check/Area Scan (61x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 18.8 W/kg

System check/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 43.07 V/m; Power Drift = 0.08 dB

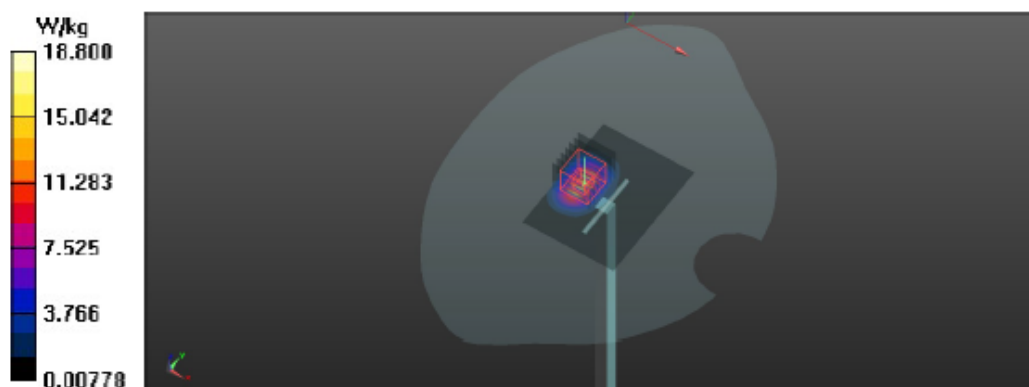
Peak SAR (extrapolated) = 28.2 W/kg

SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.45 W/kg

Smallest distance from peaks to all points 3 dB below = 9.5 mm

Ratio of SAR at M2 to SAR at M1 = 50.4%

Maximum value of SAR (measured) = 18.2 W/kg



## APPENDIX B. SAR PLOTS OF SAR MEASUREMENT

The SAR plots for highest measured SAR in each exposure configuration, wireless mode and frequency band combination, and measured SAR > 1.5 W/kg are shown as follows.

Test Laboratory: UnionTrust

Date: 2024/8/15

### 2.4GHz\_Rear Face\_0MM\_2441

DUT: EUT

Communication System: UID 0, 2.4GHz; Frequency: 2441 MHz; Duty Cycle: 1:1

Medium: H2450 Medium parameters used :  $f = 2441$  MHz;  $\sigma = 1.85$  S/m;  $\epsilon_r = 38.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3090; ConvF(4.63, 4.63, 4.63) @ 2441 MHz; Calibrated: 2024/3/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn662; Calibrated: 2024/3/18
- Phantom: SAM 1; Type: QD 000 P40 CB; Serial: TP/1378
- Postprocessing SW: SEMCAD, V1.8 Build 186

Area Scan (51x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.621 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.8040 V/m; Power Drift = 0.03 dB

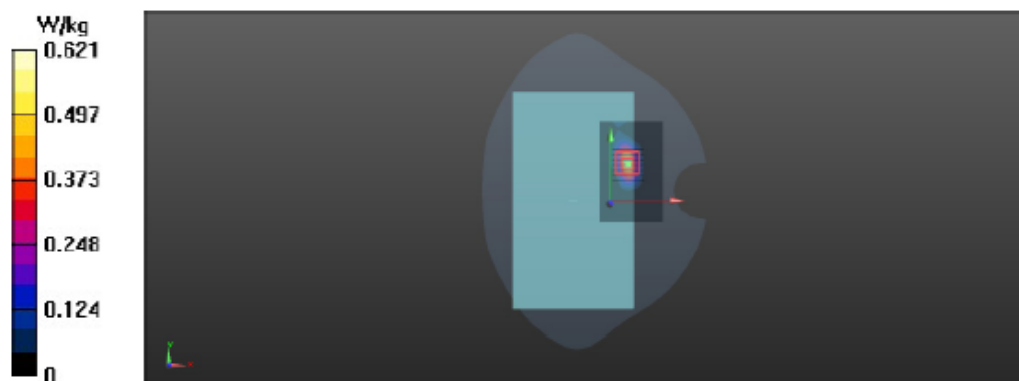
Peak SAR (extrapolated) = 0.958 W/kg

SAR(1 g) = 0.384 W/kg; SAR(10 g) = 0.162 W/kg

Smallest distance from peaks to all points 3 dB below = 7 mm

Ratio of SAR at M2 to SAR at M1 = 42.4%

Maximum value of SAR (measured) = 0.528 W/kg



Test Laboratory: UnionTrust

Date: 2024/8/15

## 2.4GHz\_Rear Face\_0MM\_2475

### DUT: EUT

Communication System: UID 0, 2.4GHz; Frequency: 2475 MHz; Duty Cycle: 1:1

Medium: H2450 Medium parameters used:  $f = 2475$  MHz;  $\sigma = 1.883$  S/m;  $\epsilon_r = 38.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

### DASY4 Configuration:

- Probe: ES3DV3 - SN3090; ConvF(4.63, 4.63, 4.63) @ 2475 MHz; Calibrated: 2024/3/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn662; Calibrated: 2024/3/18
- Phantom: SAM 1; Type: QD 000 P40 CB; Serial: TP/1378
- Postprocessing SW: SEMCAD, V1.8 Build 186

**Area Scan (71x71x1):** Interpolated grid:  $dx=1.200$  mm,  $dy=1.200$  mm

Maximum value of SAR (interpolated) = 0.556 W/kg

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 7.500 V/m; Power Drift = 0.10 dB

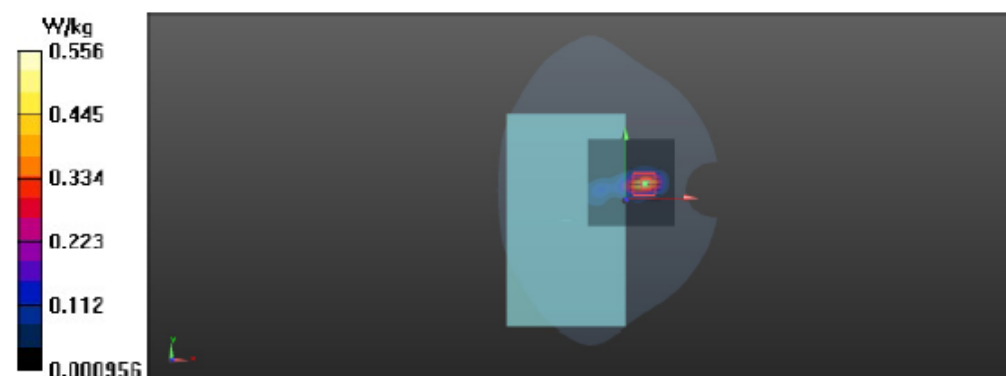
Peak SAR (extrapolated) = 0.839 W/kg

SAR(1 g) = 0.343 W/kg; SAR(10 g) = 0.151 W/kg

Smallest distance from peaks to all points 3 dB below = 7.6 mm

Ratio of SAR at M2 to SAR at M1 = 42.6%

Maximum value of SAR (measured) = 0.462 W/kg



## APPENDIX C. CALIBRATION CERTIFICATE FOR PROBE AND DIPOLE

The calibration certificates are shown as follows.



## **APPENDIX D. PHOTOGRAPHS OF EUT AND SETUP**

The photographs of EUT and setup are shown as follow

