



Test report No.: 2350034R-SAUSV01S-A

# SAR Test Report

|   |   |
|---|---|
| Product Name  | Mobile Computer   |
| Trademark   | CIPHERLAB   |
| Model and /or type reference                              | RK26W6O   |
| Applicant’s name / address                                | CipherLab Co., Ltd.<br>12F, 333, Dunhua S.Rd., Sec.2, Taipei, Taiwan                |
| Manufacturer’s name                                       | CIPHERLAB CO. LTD.  |
| FCC ID  | Q3N-RK26W6O   |
| Applicable Standard                                       | IEEE 1528-2013<br>KDB 447498 D01 v06<br>KDB 865664 D01 v01r04                       |
| Test Result   | Max. SAR Measurement (1g)<br>2.4 GHz: <b>0.237</b> W/kg<br>5 GHz: <b>0.277</b> W/kg |
| Verdict Summary   | IN COMPLIANCE   |
| Documented By<br>(Senior Project Specialist / Joanne Lin) | <i>Joanne Lin</i>   |
| Tested By<br>(Senior Engineer / Luke Cheng)               | <i>Luke Cheng</i>   |
| Approved By<br>(Assistant Manager / San Lin)              | <i>San Lin</i>  |
| Date of Receipt   | 2023/05/03  |
| Date of Issue   | 2023/07/27  |
| Report Version  | V1.0  |

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## Competences and Guarantees

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DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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## General conditions

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1. The test results relate only to the samples tested.
2. The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
3. This report must not be used to claim product endorsement by TAF or any agency of the government.
4. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
5. Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

## Revision History

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| Report No.          | Version | Description              | Issued Date |
|---------------------|---------|--------------------------|-------------|
| 2350034R-SAUSV01S-A | V1.0    | Initial issue of report. | 2023/07/27  |

## 1. General Information

### 1.1 EUT Description

|                              |  |
|------------------------------|--|
| Product Name                 | Mobile Computer  |
| Trademark                    | CIPHERLAB  |
| Model and /or type reference | RK26W6O  |
| FCC ID                       | Q3N-RK26W6O  |
| Frequency Range              | WLAN 2.4 GHz: 2412-2462MHz<br>WLAN 5 GHz: 5180-5240MHz, 5260-5320MHz, 5500-5720MHz, 5745-5825MHz<br>BT: 2402-2480MHz |
| Type of Modulation           | 802.11b: DSSS<br>802.11a/g/n/ac/ax: OFDM, OFDMA<br>GFSK(1Mbps) / $\pi$ /4DQPSK(2Mbps) / 8DPSK(3Mbps)                 |
| Antenna Type                 | PIFA   |
| Device Category              | Portable   |
| RF Exposure Environment      | Uncontrolled   |

| Summary of test result – Reported Head/Body 1g SAR (W/kg)         |       |       |         |
|---|-------|-------|---------|
| Test configuration  | DTS   | NII   | DSS(BT) |
| Head  | 0.237 | 0.277 | 0.029   |
| Body  | 0.230 | 0.221 | 0.025   |
| Simultaneous  | 0.418 |       |         |
| Summary of test result – Reported Product Specific 10g SAR (W/kg) |       |       |         |
| Test configuration  | DTS   | NII   | DSS(BT) |
| Product Specific  | 0.489 | 0.437 | 0.059   |
| Simultaneous  | 0.646 |       |         |

### 1.2 Antenna List

| No. | Manufacturer | Part No.             | Antenna Type |
|-----|--------------|----------------------|--------------|
| 1   | Auden        | BRK26REH00001 (Main) | PIFA         |
|     |              | BRK26REH00001 (Aux)  |              |

Note: The above EUT information by host manufacturer.

### 1.3 SAR Test Exclusion Calculation

Referring to KDB 941225 D06, when the distance from the antenna to the edge is > 25mm, SAR is not required.

| Antenna | Distance from the antenna to the edge |        |           |            |        |        |
|---------|---------------------------------------|--------|-----------|------------|--------|--------|
|         | Front                                 | Back   | Left-side | Right-side | Top    | Bottom |
| Main    | < 25mm                                | < 25mm | > 25mm    | < 25mm     | < 25mm | > 25mm |
|         | Yes                                   | Yes    | No        | Yes        | Yes    | No     |
| Aux     | < 25mm                                | < 25mm | < 25mm    | > 25mm     | < 25mm | > 25mm |
|         | Yes                                   | Yes    | Yes       | No         | No     | No     |

## 1.4 Test Environment

Ambient conditions in the laboratory:

Test Date: 2023/06/19 - 2023/07/14

| Items            | Required | Actual  |
|------------------|----------|---------|
| Temperature (°C) | 18-25    | 23 ± 2  |
| Humidity (%RH)   | 30-70    | 50 ± 20 |

|        |   |
|--------|---|
| USA    | FCC Registration Number: TW0033                       |
| Canada | CAB Identifier Number: TW3023 / Company Number: 26930 |

|                  |                         |
|------------------|-------------------------|
| Site Description | Accredited by TAF       |
|                  | Accredited Number: 3023 |

|                    |  |
|--------------------|--|
| Test Laboratory    | DEKRA Testing and Certification Co., Ltd.                                  |
|                    | Linkou Laboratory  |
| Address            | No.5-22, Ruishukeng Linkou District, New Taipei City, 24451, Taiwan, R.O.C |
| Performed Location | No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan, R.O.C.  |
| Phone Number       | +886-3-275-7255  |
| Fax Number         | +886-3-327-8031  |

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## 1.5 Measurement procedures

IEEE 1528-2013

47CFR § 2.1093

KDB 248227 D01 v02r02

KDB 447498 D01 v06

KDB 648474 D04 v01r03

KDB 865664 D01 v01r04

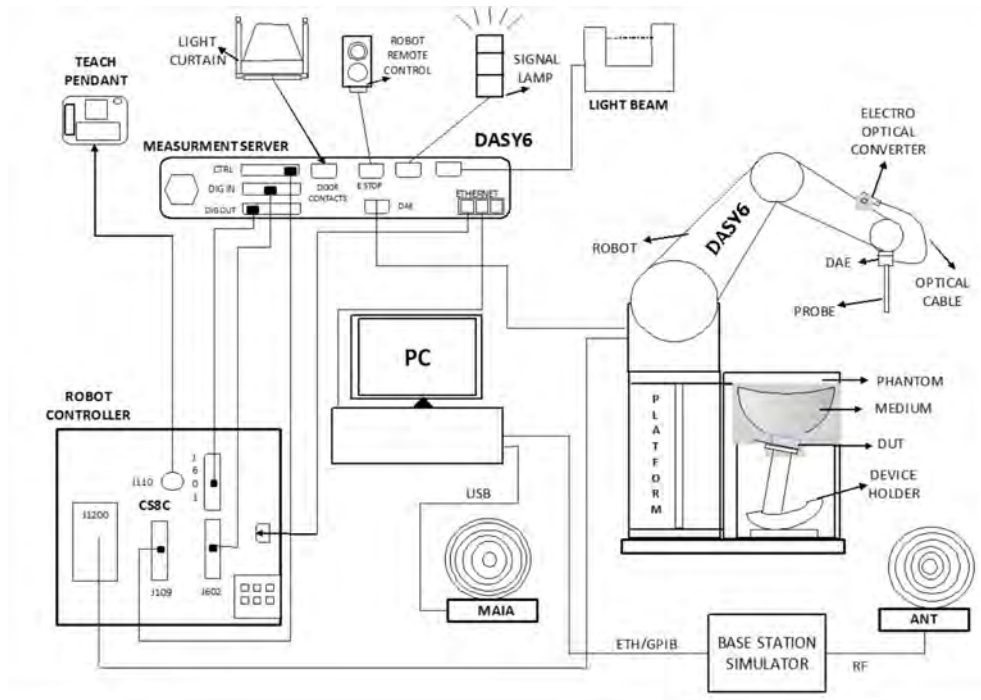
KDB 941225 D06 v02r01



## 2. SAR Measurement System

### 2.1 DASY System Description

SAR Configurations is shown below:



The DASY system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win7/8/10 and the DASY software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

## 2.2 Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for utilize a 10mm<sup>2</sup> step integral, with 1mm interpolation used to locate the peak SAR area used for zoom scan assessments.

When an Area Scan has measured all reachable points, it computes the field maxima found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing.

### 2.2.1 Zoom Scan (Cube Scan Averaging)

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. A density of 1000 kg/m<sup>3</sup> is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1 g cube is 10mm, with the side length of the 10 g cube 21,5mm.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications utilize a physical step of 5x5x7 (8mmx8mmx5mm) providing a volume of 32mm in the X & Y axis, and 30mm in the Z axis.

### 2.2.2 SAR measurement drifts

Before an area scan and after the zoom scan, single point SAR measurements are performed at defined locations to estimate the SAR measurement drift due to device output power variations. If a device is known to drift randomly, additional single point drift reference measurements should be performed at regular intervals throughout the area and zoom scan test durations. The SAR drift shall be kept within  $\pm 5\%$ , whether there are substantial drifts or not. The field difference will be calculated in dB units in the DASY software.

### 2.2.3 Uncertainty of Inter-/Extrapolation and Averaging

In order to evaluate the uncertainty of the interpolation, extrapolation and averaged SAR calculation algorithms of the Postprocessor, DASY allows the generation of measurement grids which are artificially predefined by analytically based test functions. Therefore, the grids of area scans and zoom scans can be filled with uncertainty test data, according to the SAR benchmark functions.


### 2.3 DASY E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. 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.

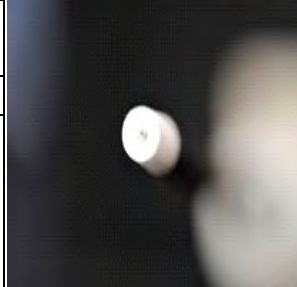
SPEAG conducts the probe calibration in compliance with international and national standards under ISO 17025.

The calibration data are in Appendix D.

#### Isotropic E-Field Probe Specification

|                      |  |   |
|----------------------|--|---|
| <b>Model</b>         | Ex3DV4   |   |
| <b>Construction</b>  | Symmetrical design with triangular core Built-in shielding against static charges<br>PEEK enclosure material (resistant to organic solvents, e.g., DGBE)   |   |
| <b>Frequency</b>     | 4 MHz – 10 GHz<br>Linearity: $\pm 0.2$ dB (30 MHz to 10 GHz)   |  |
| <b>Directivity</b>   | $\pm 0.1$ dB in TSL (rotation around probe axis)<br>$\pm 0.3$ dB in TSL (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>Application</b>   | High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%. |   |

### E-Field mm-Wave Probe Specification

|                           |   |   |
|---------------------------|---|---|
| <b>Model</b>              | EUmmWVx   |   |
| <b>Construction</b>       | Two dipoles optimally arranged to obtain pseudo-vector information<br>Minimum three measurements/point, 120° rotated around probe axis<br>Sensors (0.8 mm length) printed on glass substrate protected by high density foam |   |
| <b>Frequency</b>          | 750 MHz to 110 GHz  |  |
| <b>Dynamic Range</b>      | < 20 V/m to 10000 V/m with PRE-10<br>(min < 20 V/m to 2000 V/m)   |   |
| <b>Position Precision</b> | < 0.2 mm  |   |
| <b>Dimensions</b>         | Overall length: 337 mm (tip: 20 mm)<br>Tip diameter: encapsulation 8 mm<br>(internal sensor < 1mm)<br>Distance from probe tip to dipole centers:<br>< 2 mm<br>Sensor displacement to probe's calibration point: < 0.3 mm    |   |
| <b>Application</b>        | E-field measurements of 5G devices and other mm-wave transmitters operating above 10GHz in < 2 mm distance from device (free-space)<br>Power density, H-field, and far-field analysis using total field reconstruction      |   |

### 2.4 DATA Acquisition Electronics (DAE) and Measurement Server

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit.

Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The input impedance of the DAE4 is 200M Ohm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.



## 2.5 Robot

The DASY system uses the high precision robots TX90 XL type out of the newer series from Stäubli SA (France). For the 6-axis controller DASY system, the CS8C robot controller version from Stäubli is used.

The XL robot series have many features that are important for our application:

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



## 2.6 Device Holder

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR).

Thus the device needs no repositioning when changing the angles.

The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity  $\epsilon_r = 3$  and loss tangent  $\delta = 0.02$ . The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



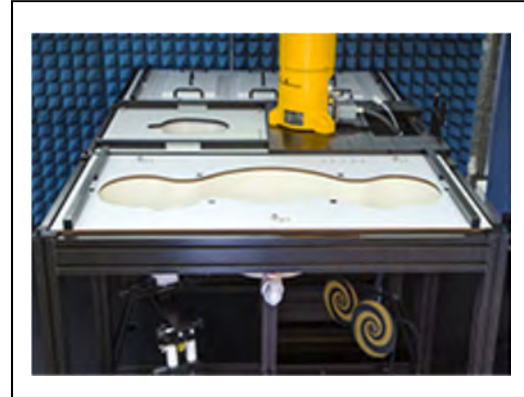
## 2.7 Phantom

### 2.7.1 SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm).

It has three measurement areas:

- Left head
- Right head
- Flat phantom



The device holder positions are adjusted to the standard measurement positions in the three sections. A cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

### 3. Tissue Simulating Liquid

#### 3.1 The composition of the tissue simulating liquid

**Description:** Aqueous solution with surfactants and inhibitors

**Declarable, or hazardous components:**

|  |  |        |
|--|--|--------|
| CAS: 107-21-1<br>EINECS: 203-473-3<br>Reg.nr.: 01-2119456816-28-0000   | <b>Ethenediol</b><br>STOT RE 2, H373;<br>Acute Tox. 4, H302  | < 5.2% |
| CAS: 68608-26-4<br>EINECS: 271-781-5<br>Reg.nr.: 01-2119527859-22-0000 | <b>Sodium petroleum sulfonate</b><br>Eye Irrit. 2, H319  | < 2.9% |
| CAS: 107-41-5<br>EINECS: 203-489-0<br>Reg.nr.: 01-2119539582-35-0000   | <b>Hexylene Glycol / 2-Methyl-pentane-2,4-diol</b><br>Skin Irrit. 2, H315; Eye Irrit. 2, H319                          | < 2.9% |
| CAS: 68920-66-1<br>NLP: 500-236-9<br>Reg.nr.: 01-2119489407-26-0000    | <b>Alkoxylated alcohol, &gt; C<sub>16</sub></b><br>Aquatic Chronic 2, H411;<br>Skin Irrit. 2, H315; Eye Irrit. 2, H319 | < 2.0% |

#### 3.2 Tissue Calibration Result

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

| Date      | Tissue Type | Frequency (MHz) | Relative Permittivity ( $\epsilon_r$ ) |        |           | Conductivity ( $\sigma$ ) |        |           | Tissue Temp. (°C) |
|-----------|-------------|-----------------|--|--------|-----------|---------------------------|--------|-----------|-------------------|
|           |             |                 | Measured                               | Target | Delta (%) | Measured                  | Target | Delta (%) |                   |
| 2023/7/14 | Head        | 2450            | 40.05                                  | 39.20  | 2.17      | 1.79                      | 1.80   | -0.56     | 21.8              |
|           |             | 2412            | 40.19                                  | 39.28  | 2.32      | 1.74                      | 1.77   | -1.69     |                   |
|           |             | 2437            | 40.10                                  | 39.23  | 2.22      | 1.77                      | 1.79   | -1.12     |                   |
|           |             | 2440            | 40.08                                  | 39.22  | 2.19      | 1.77                      | 1.79   | -1.12     |                   |
|           |             | 2462            | 40.00                                  | 39.18  | 2.09      | 1.80                      | 1.81   | -0.55     |                   |

| Date      | Tissue Type | Frequency (MHz) | Relative Permittivity ( $\epsilon_r$ ) |        |           | Conductivity ( $\sigma$ ) |        |           | Tissue Temp. (°C) |
|-----------|-------------|-----------------|--|--------|-----------|---------------------------|--------|-----------|-------------------|
|           |             |                 | Measured                               | Target | Delta (%) | Measured                  | Target | Delta (%) |                   |
| 2023/6/19 | Head        | 5250            | 36.08                                  | 35.95  | 0.36      | 4.66                      | 4.71   | -1.06     | 21.6              |
|           |             | 5210            | 36.19                                  | 35.99  | 0.56      | 4.61                      | 4.67   | -1.28     |                   |
|           |             | 5290            | 35.97                                  | 35.91  | 0.17      | 4.72                      | 4.75   | -0.63     |                   |
|           |             | 5600            | 35.11                                  | 35.50  | -1.10     | 5.14                      | 5.07   | 1.38      |                   |
|           |             | 5530            | 35.31                                  | 35.61  | -0.84     | 5.05                      | 5.00   | 1.00      |                   |
|           |             | 5610            | 35.09                                  | 35.49  | -1.13     | 5.15                      | 5.08   | 1.38      |                   |
|           |             | 5690            | 34.87                                  | 35.41  | -1.52     | 5.25                      | 5.16   | 1.74      |                   |
|           |             | 5800            | 34.56                                  | 35.30  | -2.10     | 5.40                      | 5.27   | 2.47      |                   |
|           |             | 5775            | 34.63                                  | 35.33  | -1.98     | 5.37                      | 5.25   | 2.29      |                   |
| 2023/6/21 | Head        | 5250            | 36.06                                  | 35.95  | 0.31      | 4.61                      | 4.71   | -2.12     | 21.5              |
|           |             | 5290            | 35.95                                  | 35.91  | 0.11      | 4.67                      | 4.75   | -1.68     |                   |
|           |             | 5600            | 35.09                                  | 35.50  | -1.15     | 5.09                      | 5.07   | 0.39      |                   |
|           |             | 5530            | 35.28                                  | 35.61  | -0.93     | 4.99                      | 5.00   | -0.20     |                   |
|           |             | 5610            | 35.07                                  | 35.49  | -1.18     | 5.10                      | 5.08   | 0.39      |                   |
|           |             | 5690            | 34.85                                  | 35.41  | -1.58     | 5.21                      | 5.16   | 0.97      |                   |
|           |             | 5800            | 34.54                                  | 35.30  | -2.15     | 5.35                      | 5.27   | 1.52      |                   |
|           |             | 5775            | 34.62                                  | 35.33  | -2.01     | 5.32                      | 5.25   | 1.33      |                   |



### 3.3 Tissue Dielectric Parameters for Head and Head Phantoms

The head tissue dielectric parameters recommended by the IEC/IEEE 62209-1528 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 tissue parameters that have not been specified are interpolated according to the head parameters specified in IEC/IEEE 62209-1528.

| Target Frequency<br>(MHz) | Head         |                |
|---------------------------|--------------|----------------|
|                           | $\epsilon_r$ | $\sigma$ (S/m) |
| 450                       | 43.5         | 0.87           |
| 750                       | 41.9         | 0.89           |
| 835                       | 41.5         | 0.90           |
| 900                       | 41.5         | 0.97           |
| 1450                      | 40.5         | 1.20           |
| 1640                      | 40.2         | 1.31           |
| 1750                      | 40.1         | 1.37           |
| 1800 – 2000               | 40.0         | 1.40           |
| 2450                      | 39.2         | 1.80           |
| 3000                      | 38.5         | 2.40           |
| 5000                      | 36.2         | 4.45           |
| 5200                      | 36.0         | 4.66           |
| 5400                      | 35.8         | 4.86           |
| 5600                      | 35.3         | 5.27           |
| 5800                      | 35.3         | 5.27           |
| 6000                      | 35.1         | 5.48           |
| 6500                      | 34.5         | 6.07           |
| 7000                      | 33.9         | 6.65           |
| 7500                      | 33.3         | 7.24           |

## 4. Measurement Procedure

### 4.1 SAR System Check

#### 4.1.1 Dipoles



The SAR dipoles are optimized symmetrical dipole with  $\lambda/4$  balun matched to a Flat phantom section filled with tissue simulating liquids. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC signals. They are available for the variety of frequencies between 300MHz and 10 GHz. The provided tripod is used to hold the dipole below the phantom. As the distance between the dipole center and the TSL is critical, a spacer is placed between the dipole and the phantom. The spacing distance is frequency dependent.

### 4.1.2 SAR System Check Result

1. Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %.
2. Below 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 and the plots can be referred to Appendix A of this report.

| Date      | Frequency (MHz) | Input Power (mW) | Measured 1g SAR (W/kg) | Targeted 1g SAR (W/kg) | Normalized 1g SAR (W/kg) | Delta 1g ±10 (%) | Measured 10g SAR (W/kg) | Targeted 10g SAR (W/kg) | Normalized 10g SAR (W/kg) | Delta 10g ±10 (%) | Tissue Temp. (°C) |
|-----------|-----------------|------------------|------------------------|------------------------|--------------------------|------------------|-------------------------|-------------------------|---------------------------|-------------------|-------------------|
| 2023/7/14 | 2450            | 250              | 12.50                  | 52.40                  | 50                       | -4.58            | 5.70                    | 24.60                   | 22.8                      | -7.32             | 21.8              |
| 2023/6/19 | 5250            | 100              | 8.23                   | 80.80                  | 82.3                     | 1.86             | 2.30                    | 23.20                   | 23                        | -0.86             | 21.6              |
|           | 5600            | 100              | 8.94                   | 84.20                  | 89.4                     | 6.18             | 2.48                    | 23.80                   | 24.8                      | 4.2               |                   |
|           | 5800            | 100              | 7.95                   | 81.80                  | 79.5                     | -2.81            | 2.20                    | 23.00                   | 22                        | -4.35             |                   |
| 2023/6/21 | 5250            | 100              | 8.46                   | 80.80                  | 84.6                     | 4.70             | 2.39                    | 23.20                   | 23.9                      | 3.02              | 21.5              |
|           | 5600            | 100              | 8.12                   | 84.20                  | 81.2                     | -3.56            | 2.27                    | 23.80                   | 22.7                      | -4.62             |                   |
|           | 5800            | 100              | 7.72                   | 81.80                  | 77.2                     | -5.62            | 2.17                    | 23.00                   | 21.7                      | -5.65             |                   |

## 4.2 SAR Measurement Procedure

The Dasy calculates SAR using the following equation,

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

Where :

$\sigma$ : represents the simulated tissue conductivity

$\rho$ : represents the tissue density

E :RMS electric field strength (V/m)

The SAR / APD measurements for the EUT should be performed on the channel that produces the highest rated output power of each transmitting antenna.

Pre-scans are made on the device to establish the location for the transmitting antenna, using a large area scan in either air or tissue simulation fluid.

The EUT is placed against the Universal Phantom where the maximum area scan dimensions are larger than the physical size of the resonating antenna. When the scan size is not large enough to cover the peak SAR / APD distribution, it is modified by either extending the area scan size in both the X and Y directions, or the device is shifted within the predefined area.

The area scan is then run to establish the peak SAR / APD location (interpolated resolution set at 1mm<sup>2</sup>) which is then used to orient the center of the zoom scan. The zoom scan is then executed and the 1g and 10g averages are derived from the zoom scan volume (interpolated resolution set at 1mm<sup>3</sup>).

## 5. RF Exposure Limits

SAR assessments have been made in line with the requirements of IEEE-1528, RSS-102 Issue 5, and comply with ANSI/IEEE C95.1-1992 “Uncontrolled Environments” limits. These limits apply to a location which is deemed as “Uncontrolled Environment” which can be described as a situation where the general public may be exposed to an RF source with no prior knowledge or control over their exposure.

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

| Type Exposure  | Uncontrolled Environment Limit |
|--|--------------------------------|
| Spatial Peak SAR (1g cube tissue for brain or body)      | <b>1.60 W/kg</b>               |
| Spatial Average SAR (whole body)                         | <b>0.08 W/kg</b>               |
| Spatial Peak SAR (10g for hands, feet, ankles and wrist) | <b>4.00 W/kg</b>               |
| Power density <sup>1</sup>                               | <b>1 mW/cm<sup>2</sup></b>     |

Note: 1 mW/cm<sup>2</sup> = 10 W/m<sup>2</sup>

## 6. Test Equipment List

| Instrument                  | Manufacturer | Model No.     | Serial No.    | Last Calibration | Next Calibration |
|-----------------------------|--------------|---------------|---------------|------------------|------------------|
| Reference Dipole 2450MHz    | Speag        | D2450V2       | 930           | 2022/11/21       | 2025/11/20       |
| Reference Dipole 5GHz       | Speag        | D5GHzV2       | 1321          | 2021/02/05       | 2024/02/04       |
| Device Holder               | Speag        | N/A           | N/A           | N/A              | N/A              |
| Data Acquisition Electronic | Speag        | DAE4          | 1425          | 2022/11/23       | 2023/11/22       |
| E-Field Probe               | Speag        | EX3DV4        | 3979          | 2022/11/23       | 2023/11/22       |
| SAR Software                | Speag        | DASY52        | V52.10.4.1535 | N/A              | N/A              |
| Power Amplifier             | Mini-Circuit | ZVE-8G+       | 447202211     | N/A              | N/A              |
| Directional Coupler         | Agilent      | 87300C        | MY44300353    | N/A              | N/A <sup>1</sup> |
| Attenuator                  | Woken        | WATT-218FS-10 | N/A           | N/A              | N/A <sup>1</sup> |
| Attenuator                  | Mini-Circuit | BW-S20W2+     | N/A           | N/A              | N/A <sup>1</sup> |
| Vector Network Analyzer     | Agilent      | E5071C        | MY46108013    | 2023/03/09       | 2024/03/07       |
| Signal Generator            | Anritsu      | MG3694A       | 041902        | 2022/08/30       | 2023/08/29       |
| Power Meter                 | Anritsu      | ML2487A       | 6K00001447    | 2022/10/31       | 2023/10/30       |
| Power Sensor                | Anritsu      | MA2411B       | 1339194       | 2022/10/31       | 2023/10/30       |

Note: 1. System Check, the path loss measured by the network analyzer, includes the signal generator, amplifier, cable, attenuator and directional coupler.

Note:

Per KDB 865664 D01 requirements for dipole calibration, the following are recommended FCC procedures for SAR dipole calibration.

1. After a dipole is damaged and properly repaired to meet required specifications.
2. When the measured SAR deviates from the calibrated SAR value by more than 10% due to changes in physical, mechanical, electrical or other relevant dipole conditions.
3. When the most recent return-loss, measured at least annually, deviates by more than 20% from the previous measurement (i.e. 0.2 of the dB value) or not meeting the required -20 dB return-loss specification.

|             | Frequency | Tissue | Return loss | Limit      | Verified Date |
|-------------|-----------|--------|-------------|------------|---------------|
| Calibration | 5250 MHz  | Head   | -39.2       | Within 20% | 2021/2/5      |
| Measurement | 5250 MHz  | Head   | -39.38      |            | 2022/2/7      |
| Measurement | 5250 MHz  | Head   | -39.31      |            | 2023/2/2      |

|             | Frequency | Tissue | Return loss | Limit      | Verified Date |
|-------------|-----------|--------|-------------|------------|---------------|
| Calibration | 5600 MHz  | Head   | -27.4       | Within 20% | 2021/2/5      |
| Measurement | 5600 MHz  | Head   | -26.91      |            | 2022/2/7      |
| Measurement | 5600 MHz  | Head   | -26.6       |            | 2023/2/2      |

|             | Frequency | Tissue | Return loss | Limit      | Verified Date |
|-------------|-----------|--------|-------------|------------|---------------|
| Calibration | 5800 MHz  | Head   | -23.6       | Within 20% | 2021/2/5      |
| Measurement | 5800 MHz  | Head   | -26.92      |            | 2022/2/7      |
| Measurement | 5800 MHz  | Head   | -23.6       |            | 2023/2/2      |

4. When the most recent measurement of the real or imaginary parts of the impedance, measured at least annually, deviates by more than 5 Ω from the previous measurement.

|             | Frequency | Tissue | Impedance | Limit     | Verified Date |
|-------------|-----------|--------|-----------|-----------|---------------|
| Calibration | 5250 MHz  | Head   | 50.8      | Within 5Ω | 2021/2/5      |
| Measurement | 5250 MHz  | Head   | 50.86     |           | 2022/2/7      |
| Measurement | 5250 MHz  | Head   | 49.95     |           | 2023/2/2      |

|             | Frequency | Tissue | Impedance | Limit     | Verified Date |
|-------------|-----------|--------|-----------|-----------|---------------|
| Calibration | 5600 MHz  | Head   | 52.9      | Within 5Ω | 2021/2/5      |
| Measurement | 5600 MHz  | Head   | 50.99     |           | 2022/2/7      |
| Measurement | 5600 MHz  | Head   | 50.11     |           | 2023/2/2      |

|             | Frequency | Tissue | Impedance | Limit     | Verified Date |
|-------------|-----------|--------|-----------|-----------|---------------|
| Calibration | 5800 MHz  | Head   | 53.0      | Within 5Ω | 2021/2/5      |
| Measurement | 5800 MHz  | Head   | 51.12     |           | 2022/2/7      |
| Measurement | 5800 MHz  | Head   | 51.06     |           | 2023/2/2      |



## 7. Measurement Uncertainty

| Measurement uncertainty for 300 MHz to 3 GHz |               |             |       |         |          |                |                 |
|--|---------------|-------------|-------|---------|----------|----------------|-----------------|
| Error Description                            | Uncert. value | Prob. Dist. | Div.  | (ci) 1g | (ci) 10g | Std. Unc. (1g) | Std. Unc. (10g) |
| <b>Measurement System Errors</b>             |               |             |       |         |          |                |                 |
| Probe Calibration                            | ±12.0%        | N           | 2     | 1       | 1        | ±6.0%          | ±6.0%           |
| Probe Calibration Drift                      | ±1.7%         | R           | 1.732 | 1       | 1        | ±1.0%          | ±1.0%           |
| Probe Linearity                              | ±4.7%         | R           | 1.732 | 1       | 1        | ±2.7%          | ±2.7%           |
| Broadband Signal                             | ±2.8%         | R           | 1.732 | 1       | 1        | ±1.6%          | ±1.6%           |
| Probe Isotropy                               | ±7.6%         | R           | 1.732 | 1       | 1        | ±4.4%          | ±4.4%           |
| Other Probe+Electronic                       | ±0.8%         | N           | 1     | 1       | 1        | ±0.8%          | ±0.8%           |
| RF Ambient                                   | ±1.8%         | N           | 1     | 1       | 1        | ±1.8%          | ±1.8%           |
| Probe Positioning                            | ±0.006 mm     | N           | 1     | 0.14    | 0.14     | ±0.1%          | ±0.1%           |
| Data Processing                              | ±1.2%         | N           | 1     | 1       | 1        | ±1.2%          | ±1.2%           |
| <b>Phantom and Device Errors</b>             |               |             |       |         |          |                |                 |
| Conductivity (meas.)                         | ±2.5%         | N           | 1     | 0.78    | 0.71     | ±2.0%          | ±1.8%           |
| Conductivity (temp.)                         | ±3.3%         | R           | 1.732 | 0.78    | 0.71     | ±1.5%          | ±1.4%           |
| Phantom Permittivity                         | ±14.0%        | R           | 1.732 | 0       | 0        | ±0.0%          | ±0.0%           |
| Distance DUT - TSL                           | ±2.0%         | N           | 1     | 2       | 2        | ±4.0%          | ±4.0%           |
| Device Positioning                           | ±1.0%         | N           | 1     | 1       | 1        | ±1.0%          | ±1.0%           |
| Device Holder                                | ±3.6%         | N           | 1     | 1       | 1        | ±3.6%          | ±3.6%           |
| DUT Modulation                               | ±2.4%         | R           | 1.732 | 1       | 1        | ±1.4%          | ±1.4%           |
| Time-average SAR                             | ±1.7%         | R           | 1.732 | 1       | 1        | ±1.0%          | ±1.0%           |
| DUT drift                                    | ±2.5%         | N           | 1     | 1       | 1        | ±2.5%          | ±2.5%           |
| Val Antenna Unc.                             | ±0.0%         | N           | 1     | 1       | 1        | ±0.0%          | ±0.0%           |
| Unc. Input Power                             | ±0.0%         | N           | 1     | 1       | 1        | ±0.0%          | ±0.0%           |
| <b>Correction to the SAR results</b>         |               |             |       |         |          |                |                 |
| Deviation to Target                          | ±1.9%         | N           | 1     | 1       | 0.84     | ±1.9%          | ±1.6%           |
| SAR scaling                                  | ±0.0%         | R           | 1.732 | 1       | 1        | ±0.0%          | ±0.0%           |
| <b>Combined Uncertainty</b>                  |               |             |       |         |          | ±11.0%         | ±10.9%          |
| <b>Expanded Uncertainty</b>                  |               |             |       |         |          | ±21.9%         | ±21.7%          |

| Measurement uncertainty for 3 GHz to 6 GHz |               |             |       |         |          |                |                 |
|--|---------------|-------------|-------|---------|----------|----------------|-----------------|
| Error Description                          | Uncert. value | Prob. Dist. | Div.  | (ci) 1g | (ci) 10g | Std. Unc. (1g) | Std. Unc. (10g) |
| <b>Measurement System Errors</b>           |               |             |       |         |          |                |                 |
| Probe Calibration                          | ±14.0%        | N           | 2     | 1       | 1        | ±7.0%          | ±7.0%           |
| Probe Calibration Drift                    | ±1.7%         | R           | 1.732 | 1       | 1        | ±1.0%          | ±1.0%           |
| Probe Linearity                            | ±4.7%         | R           | 1.732 | 1       | 1        | ±2.7%          | ±2.7%           |
| Broadband Signal                           | ±2.6%         | R           | 1.732 | 1       | 1        | ±1.5%          | ±1.5%           |
| Probe Isotropy                             | ±7.6%         | R           | 1.732 | 1       | 1        | ±4.4%          | ±4.4%           |
| Other Probe+Electronic                     | ±1.2%         | N           | 1     | 1       | 1        | ±1.2%          | ±1.2%           |
| RF Ambient                                 | ±1.8%         | N           | 1     | 1       | 1        | ±1.8%          | ±1.8%           |
| Probe Positioning                          | ±0.005 mm     | N           | 1     | 0.29    | 0.29     | ±0.2%          | ±0.2%           |
| Data Processing                            | ±2.3%         | N           | 1     | 1       | 1        | ±2.3%          | ±2.3%           |
| <b>Phantom and Device Errors</b>           |               |             |       |         |          |                |                 |
| Conductivity (meas.)                       | ±2.5%         | N           | 1     | 0.78    | 0.71     | ±2.0%          | ±1.8%           |
| Conductivity (temp.)                       | ±3.4%         | R           | 1.732 | 0.78    | 0.71     | ±1.5%          | ±1.4%           |
| Phantom Permittivity                       | ±14.0%        | R           | 1.732 | 0.25    | 0.25     | ±2.0%          | ±2.0%           |
| Distance DUT - TSL                         | ±2.0%         | N           | 1     | 2       | 2        | ±4.0%          | ±4.0%           |
| Device Positioning                         | ±1.0%         | N           | 1     | 1       | 1        | ±1.0%          | ±1.0%           |
| Device Holder                              | ±3.6%         | N           | 1     | 1       | 1        | ±3.6%          | ±3.6%           |
| DUT Modulation                             | ±2.4%         | R           | 1.732 | 1       | 1        | ±1.4%          | ±1.4%           |
| Time-average SAR                           | ±1.7%         | R           | 1.732 | 1       | 1        | ±1.0%          | ±1.0%           |
| DUT drift                                  | ±2.5%         | N           | 1     | 1       | 1        | ±2.5%          | ±2.5%           |
| Val Antenna Unc.                           | ±0.0%         | N           | 1     | 1       | 1        | ±0.0%          | ±0.0%           |
| Unc. Input Power                           | ±0.0%         | N           | 1     | 1       | 1        | ±0.0%          | ±0.0%           |
| <b>Correction to the SAR results</b>       |               |             |       |         |          |                |                 |
| Deviation to Target                        | ±1.9%         | N           | 1     | 1       | 0.84     | ±1.9%          | ±1.6%           |
| SAR scaling                                | ±0.0%         | R           | 1.732 | 1       | 1        | ±0.0%          | ±0.0%           |
| <b>Combined Uncertainty</b>                |               |             |       |         |          | ±11.9%         | ±11.8%          |
| <b>Expanded Uncertainty</b>                |               |             |       |         |          | ±23.8%         | ±23.6%          |

### 8. Conducted Power Measurement (Including tolerance allowed for production unit)

| WLAN 2.4G 2TX SISO   |           |      |    |                |          |           |               |          |           |
|--|-----------|------|----|----------------|----------|-----------|---------------|----------|-----------|
| DSSS/OFDM mode specified maximum output power at an antenna port | Frequency | Mode | BW | SISO-Main(TX1) |          |           | SISO-Aux(TX2) |          |           |
|  |           |      |    | CH             | AV Power | AV Target | CH            | AV Power | AV Target |
| WLAN 2.4GHz  | b         | 20   | 1  | 16.67          | 17       | 1         | 16.63         | 17       |           |
|  |           |      | 6  | 14.96          | 15       | 6         | 14.95         | 15       |           |
|  |           |      | 11 | 14.66          | 15       | 11        | 14.88         | 15       |           |
|  |           | g    | 20 | 1              | 13.46    | 13.5      | 1             | 13.44    | 13.5      |
|  |           |      |    | 6              | 16.62    | 17        | 6             | 16.56    | 17        |
|  |           |      |    | 11             | 13.31    | 13.5      | 11            | 13.35    | 13.5      |
|  | n (HT)    | 20   | 1  | 10.41          | 10.5     | 1         | 10.36         | 10.5     |           |
|  |           |      | 6  | 16.56          | 17       | 6         | 16.48         | 17       |           |
|  |           |      | 11 | 11.25          | 11.5     | 11        | 11.22         | 11.5     |           |
|  | ax (HE)   | 20   | 1  | 10.28          | 10.5     | 1         | 10.17         | 10.5     |           |
|  |           |      | 6  | 16.41          | 17       | 6         | 16.34         | 17       |           |
|  |           |      | 11 | 11.14          | 11.5     | 11        | 11.38         | 11.5     |           |

| WLAN 5G 2TX SISO  |                            |             |       |                |          |           |               |                           |           |                            |       |       |                |          |           |               |          |           |
|---|----------------------------|-------------|-------|----------------|----------|-----------|---------------|---------------------------|-----------|----------------------------|-------|-------|----------------|----------|-----------|---------------|----------|-----------|
|   | Frequency                  | Mode        | BW    | SISO-Main(TX1) |          |           | SISO-Aux(TX2) |                           |           | Frequency                  | Mode  | BW    | SISO-Main(TX1) |          |           | SISO-Aux(TX2) |          |           |
|   |                            |             |       | CH             | AV Power | AV Target | CH            | AV Power                  | AV Target |                            |       |       | CH             | AV Power | AV Target | CH            | AV Power | AV Target |
| OFDM mode specified maximum output power at an antenna port | U-NII-1<br>(5150-5250MHz)  | a           | 20    | 36             | 12.26    | 12.5      | 36            | 12.08                     | 12.5      | U-NII-2C<br>(5470-5725MHz) | a     | 20    | 100            | 12.26    | 12.5      | 100           | 12.18    | 12.5      |
|   |                            |             |       | 40             | 12.12    | 12.5      | 40            | 12.12                     | 12.5      |                            |       |       | 112            | 12.19    | 12.5      | 112           | 12.17    | 12.5      |
|   |                            |             |       | 44             | 12.28    | 12.5      | 44            | 12.09                     | 12.5      |                            |       |       | 116            | 12.23    | 12.5      | 116           | 12.11    | 12.5      |
|   |                            |             |       | 48             | 12.21    | 12.5      | 48            | 12.11                     | 12.5      |                            |       |       | 128            | 12.21    | 12.5      | 128           | 12.18    | 12.5      |
|   |                            | n<br>(HT)   | 20    | 36             | 12.27    | 12.5      | 36            | 12.19                     | 12.5      |                            |       | 132   | 12.22          | 12.5     | 132       | 12.17         | 12.5     |           |
|   |                            |             |       | 40             | 12.11    | 12.5      | 40            | 12.17                     | 12.5      |                            |       | 100   | 12.26          | 12.5     | 100       | 12.18         | 12.5     |           |
|   |                            |             |       | 44             | 12.26    | 12.5      | 44            | 12.18                     | 12.5      |                            |       | 112   | 12.15          | 12.5     | 112       | 12.16         | 12.5     |           |
|   |                            |             |       | 48             | 12.28    | 12.5      | 48            | 12.11                     | 12.5      |                            |       | 116   | 12.19          | 12.5     | 116       | 12.06         | 12.5     |           |
|   |                            | 40          | 38    | 12.19          | 12.5     | 38        | 12.11         | 12.5                      | 128       |                            |       | 12.30 | 12.5           | 128      | 12.12     | 12.5          |          |           |
|   |                            |             | 46    | 12.13          | 12.5     | 46        | 12.10         | 12.5                      | 132       |                            |       | 12.16 | 12.5           | 132      | 12.15     | 12.5          |          |           |
|   |                            | ac(VHT)     | 80    | 42             | 12.32    | 12.5      | 42            | 12.24                     | 12.5      |                            |       | 102   | 12.29          | 12.5     | 102       | 12.17         | 12.5     |           |
|   |                            | ax<br>(HE)  | 20    | 36             | 12.24    | 12.5      | 36            | 12.11                     | 12.5      |                            |       | 110   | 12.18          | 12.5     | 110       | 12.19         | 12.5     |           |
|   | 40                         |             |       | 12.29          | 12.5     | 40        | 12.15         | 12.5                      | 118       | 12.26                      | 12.5  | 118   | 12.18          | 12.5     |           |               |          |           |
|   | 44                         |             |       | 12.27          | 12.5     | 44        | 12.17         | 12.5                      | 126       | 12.21                      | 12.5  | 126   | 12.17          | 12.5     |           |               |          |           |
|   | 48                         |             |       | 12.28          | 12.5     | 48        | 12.13         | 12.5                      | 134       | 12.18                      | 12.5  | 134   | 12.12          | 12.5     |           |               |          |           |
|   | 40                         |             | 38    | 12.28          | 12.5     | 38        | 12.09         | 12.5                      | 20        | 144                        | 12.28 | 12.5  | 144            | 12.17    | 12.5      |               |          |           |
|   |                            |             | 46    | 12.29          | 12.5     | 46        | 12.13         | 12.5                      | 40        | 142                        | 12.24 | 12.5  | 142            | 12.15    | 12.5      |               |          |           |
|   | 80                         |             | 42    | 12.28          | 12.5     | 42        | 12.11         | 12.5                      | 80        | 138                        | 12.31 | 12.5  | 138            | 12.21    | 12.5      |               |          |           |
|   | U-NII-2A<br>(5250-5350MHz) |             | a     | 20             | 52       | 12.29     | 12.5          | 52                        | 12.03     | 12.5                       | 80    | 106   | 12.32          | 12.5     | 106       | 12.27         | 12.5     |           |
|   |                            | 56          |       |                | 12.25    | 12.5      | 56            | 12.05                     | 12.5      | 122                        | 12.41 | 12.5  | 122            | 12.43    | 12.5      |               |          |           |
|   |                            | 60          |       |                | 12.13    | 12.5      | 60            | 12.09                     | 12.5      | 160                        | 114   | N/A   | N/A            | 114      | N/A       | N/A           |          |           |
|   |                            | 64          |       |                | 12.12    | 12.5      | 64            | 12.13                     | 12.5      | ax<br>(HE)                 | 20    | 100   | 12.30          | 12.5     | 100       | 12.16         | 12.5     |           |
|   |                            | 52          | 12.27 | 12.5           | 52       | 12.19     | 12.5          | 112                       | 12.27     |                            |       | 12.5  | 112            | 12.12    | 12.5      |               |          |           |
|   |                            | 56          | 12.24 | 12.5           | 56       | 12.05     | 12.5          | 116                       | 12.25     |                            |       | 12.5  | 116            | 12.20    | 12.5      |               |          |           |
|   |                            | 60          | 12.25 | 12.5           | 60       | 12.03     | 12.5          | 128                       | 12.23     |                            |       | 12.5  | 128            | 12.18    | 12.5      |               |          |           |
|   |                            | 40          | 64    | 12.19          | 12.5     | 64        | 12.13         | 12.5                      | 132       |                            | 12.21 | 12.5  | 132            | 12.19    | 12.5      |               |          |           |
|   |                            |             | 54    | 12.24          | 12.5     | 54        | 12.20         | 12.5                      | 144       |                            | 12.29 | 12.5  | 144            | 12.13    | 12.5      |               |          |           |
|   |                            | ac<br>(VHT) | 80    | 58             | 12.40    | 12.5      | 58            | 12.36                     | 12.5      |                            | 102   | 12.19 | 12.5           | 102      | 12.14     | 12.5          |          |           |
|   |                            |             |       | 160            | 50       | N/A       | N/A           | 50                        | N/A       |                            | N/A   | 110   | 12.23          | 12.5     | 110       | 12.20         | 12.5     |           |
|   |                            | ax<br>(HE)  | 20    | 52             | 12.23    | 12.5      | 52            | 12.14                     | 12.5      |                            | 118   | 12.29 | 12.5           | 118      | 12.16     | 12.5          |          |           |
|   | 56                         |             |       | 12.26          | 12.5     | 56        | 12.18         | 12.5                      | 126       |                            | 12.25 | 12.5  | 126            | 12.19    | 12.5      |               |          |           |
|   | 60                         |             |       | 12.25          | 12.5     | 60        | 12.20         | 12.5                      | 134       |                            | 12.16 | 12.5  | 134            | 12.13    | 12.5      |               |          |           |
|   | 64                         |             |       | 12.29          | 12.5     | 64        | 12.19         | 12.5                      | 142       |                            | 12.23 | 12.5  | 142            | 12.11    | 12.5      |               |          |           |
|   | 40                         |             | 54    | 12.27          | 12.5     | 54        | 12.16         | 12.5                      | 80        | 106                        | 12.19 | 12.5  | 106            | 12.13    | 12.5      |               |          |           |
|   |                            |             | 62    | 12.22          | 12.5     | 62        | 12.19         | 12.5                      | 122       | 12.22                      | 12.5  | 122   | 12.09          | 12.5     |           |               |          |           |
|   | 80                         |             | 58    | 12.29          | 12.5     | 58        | 12.14         | 12.5                      | 160       | 114                        | N/A   | N/A   | 114            | N/A      | N/A       |               |          |           |
| 160   | 50                         |             | N/A   | N/A            | 50       | N/A       | N/A           | U-NII-3<br>(5725-5850MHz) | a         | 20                         | 149   | 12.24 | 12.5           | 149      | 12.18     | 12.5          |          |           |
| 160   | 50                         | N/A         | N/A   | 50             | N/A      | N/A       | 157           |                           |           |                            | 12.29 | 12.5  | 157            | 12.09    | 12.5      |               |          |           |
| n<br>(HT)   | 20                         | 165         | 12.28 | 12.5           | 165      | 12.13     | 12.5          |                           |           |                            | 149   | 12.14 | 12.5           | 149      | 12.17     | 12.5          |          |           |
|   |                            | 157         | 12.27 | 12.5           | 157      | 12.19     | 12.5          |                           |           |                            | 165   | 12.25 | 12.5           | 165      | 12.18     | 12.5          |          |           |
|   |                            | 165         | 12.25 | 12.5           | 165      | 12.18     | 12.5          |                           |           | 151                        | 12.20 | 12.5  | 151            | 12.19    | 12.5      |               |          |           |
|   |                            | 151         | 12.20 | 12.5           | 151      | 12.19     | 12.5          |                           |           | 159                        | 12.15 | 12.5  | 159            | 12.13    | 12.5      |               |          |           |
| ac(VHT)   | 80                         | 155         | 12.40 | 12.5           | 155      | 12.37     | 12.5          |                           |           | ax<br>(HE)                 | 20    | 149   | 12.23          | 12.5     | 149       | 12.15         | 12.5     |           |
|   |                            | 149         | 12.23 | 12.5           | 149      | 12.15     | 12.5          |                           |           |                            |       | 157   | 12.21          | 12.5     | 157       | 12.17         | 12.5     |           |
| 157   | 12.21                      | 12.5        | 157   | 12.17          | 12.5     | 165       | 12.21         |                           |           |                            |       | 12.5  | 165            | 12.19    | 12.5      |               |          |           |
| 165   | 12.21                      | 12.5        | 165   | 12.19          | 12.5     | 151       | 12.13         |                           |           |                            |       | 12.5  | 151            | 12.18    | 12.5      |               |          |           |
| 40  | 151                        | 12.13       | 12.5  | 151            | 12.18    | 12.5      | 159           |                           |           |                            | 12.22 | 12.5  | 159            | 12.16    | 12.5      |               |          |           |
|   | 159                        | 12.22       | 12.5  | 159            | 12.16    | 12.5      | 138           |                           |           |                            | 12.27 | 12.5  | 138            | 12.16    | 12.5      |               |          |           |
| 80  | 138                        | 12.27       | 12.5  | 138            | 12.16    | 12.5      | 155           | 12.17                     | 12.5      |                            | 155   | 12.15 | 12.5           |          |           |               |          |           |
| 155   | 12.17                      | 12.5        | 155   | 12.15          | 12.5     |           |               |                           |           |                            |       |       |                |          |           |               |          |           |

| BT                                  |           |      |            |                |          |           |
|-------------------------------------|-----------|------|------------|----------------|----------|-----------|
| Bluetooth mode maximum output power | Frequency | Mode | Modulation | SISO-Main(TX1) |          |           |
|                                     |           |      |            | CH             | AV Power | AV Target |
|                                     | BT 2.4GHz | BR   | GFSK       | 0              | 1.27     | 1.5       |
|                                     |           |      |            | 39             | 2.86     | 3.0       |
|                                     |           |      |            | 78             | 1.10     | 1.5       |
|                                     |           | EDR  | 8DPSK      | 0              | -0.09    | 0.0       |
|                                     |           |      |            | 39             | 1.37     | 1.5       |
|                                     |           |      |            | 78             | 3.45     | 3.5       |
|                                     |           | BLE  | GFSK       | 0              | 6.79     | 7.0       |
|                                     |           |      |            | 19             | 7.21     | 7.5       |
|                                     |           |      |            | 39             | 5.57     | 6.0       |

## 9. Test Results

### 9.1 Test Results Summary

| Head SAR                                  |            |           |      |                       |                            |            |              |          |
|---|------------|-----------|------|-----------------------|----------------------------|------------|--------------|----------|
| SAR MEASUREMENT                           |            |           |      |                       |                            |            |              |          |
| Ambient Temperature (°C): 22.9 ±2         |            |           |      |                       | Relative Humidity (%): 53% |            |              |          |
| Liquid Temperature (°C): 21.8 ±2          |            |           |      |                       | Depth of Liquid (cm): >15  |            |              |          |
| Test Position                             | Dist. (mm) | Frequency |      | Conducted Power (dBm) |                            | SAR (W/kg) |              | Plot No. |
|   |            | Ch.       | MHz  | Meas.                 | Tune-Up Limit              | Meas-1g    | Scaled-1g    |          |
| Test Mode: WLAN2.4GHz_802.11b-1M_Ant Main |            |           |      |                       |                            |            |              |          |
| Left-Cheek                                | 0          | 1         | 2412 | 16.67                 | 17                         | 0.213      | <b>0.237</b> | 9        |
| Left-Cheek                                | 0          | 6         | 2437 | 14.96                 | 15                         | 0.115      | 0.120        |          |
| Left-Cheek                                | 0          | 11        | 2462 | 14.66                 | 15                         | 0.126      | 0.140        |          |
| Left-Tilt                                 | 0          | 1         | 2412 | 16.67                 | 17                         | 0.190      | 0.211        |          |
| Right-Cheek                               | 0          | 1         | 2412 | 16.67                 | 17                         | 0.141      | 0.157        |          |
| Right-Tilt                                | 0          | 1         | 2412 | 16.67                 | 17                         | 0.167      | 0.186        |          |
| Test Mode: WLAN2.4GHz_802.11b-1M_Ant Aux  |            |           |      |                       |                            |            |              |          |
| Left-Cheek                                | 0          | 1         | 2412 | 16.63                 | 17                         | 0.135      | 0.152        |          |
| Left-Tilt                                 | 0          | 1         | 2412 | 16.63                 | 17                         | 0.072      | 0.081        |          |
| Right-Cheek                               | 0          | 1         | 2412 | 16.63                 | 17                         | 0.170      | 0.191        |          |
| Right-Tilt                                | 0          | 1         | 2412 | 16.63                 | 17                         | 0.088      | 0.098        |          |
| Test Mode: Bluetooth_BLE-1M_Ant Main      |            |           |      |                       |                            |            |              |          |
| Left-Cheek                                | 0          | 19        | 2440 | 7.21                  | 7.5                        | 0.021      | 0.029        | 126      |
| Left-Tilt                                 | 0          | 19        | 2440 | 7.21                  | 7.5                        | 0.020      | 0.028        |          |
| Right-Cheek                               | 0          | 19        | 2440 | 7.21                  | 7.5                        | 0.014      | 0.019        |          |
| Right-Tilt                                | 0          | 19        | 2440 | 7.21                  | 7.5                        | 0.018      | 0.025        |          |

Note:

1. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg, SAR is not required.
2. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is  $\leq 0.8$  W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

| Body SAR                                  |            |           |      |                       |                            |            |              |          |
|---|------------|-----------|------|-----------------------|----------------------------|------------|--------------|----------|
| SAR MEASUREMENT                           |            |           |      |                       |                            |            |              |          |
| Ambient Temperature (°C): 22.9 ±2         |            |           |      |                       | Relative Humidity (%): 53% |            |              |          |
| Liquid Temperature (°C): 21.8 ±2          |            |           |      |                       | Depth of Liquid (cm): >15  |            |              |          |
| Test Position                             | Dist. (mm) | Frequency |      | Conducted Power (dBm) |                            | SAR (W/kg) |              | Plot No. |
|   |            | Ch.       | MHz  | Meas.                 | Tune-Up Limit              | Meas-1g    | Scaled-1g    |          |
| Test Mode: WLAN2.4GHz_802.11b-1M_Ant Main |            |           |      |                       |                            |            |              |          |
| Front                                     | 10         | 1         | 2412 | 16.67                 | 17                         | 0.081      | 0.090        |          |
| Back                                      | 10         | 1         | 2412 | 16.67                 | 17                         | 0.098      | 0.109        |          |
| Right-side                                | 10         | 1         | 2412 | 16.67                 | 17                         | 0.076      | 0.084        |          |
| Top                                       | 10         | 1         | 2412 | 16.67                 | 17                         | 0.207      | <b>0.230</b> | 115      |
| Top                                       | 10         | 6         | 2437 | 14.96                 | 15                         | 0.102      | 0.106        |          |
| Top                                       | 10         | 11        | 2462 | 14.66                 | 15                         | 0.114      | 0.127        |          |
| Test Mode: WLAN2.4GHz_802.11b-1M_Ant Aux  |            |           |      |                       |                            |            |              |          |
| Front                                     | 10         | 1         | 2412 | 16.63                 | 17                         | 0.037      | 0.042        |          |
| Back                                      | 10         | 1         | 2412 | 16.63                 | 17                         | 0.054      | 0.061        |          |
| Left-side                                 | 10         | 1         | 2412 | 16.63                 | 17                         | 0.100      | 0.112        |          |
| Top                                       | 10         | 1         | 2412 | 16.63                 | 17                         | 0.055      | 0.062        |          |
| Test Mode: Bluetooth_BLE-1M_Ant Main      |            |           |      |                       |                            |            |              |          |
| Front                                     | 10         | 19        | 2440 | 7.21                  | 7.5                        | 0.00504    | 0.007        |          |
| Back                                      | 10         | 19        | 2440 | 7.21                  | 7.5                        | 0.00707    | 0.010        |          |
| Right-side                                | 10         | 19        | 2440 | 7.21                  | 7.5                        | 0.00108    | 0.001        |          |
| Top                                       | 10         | 19        | 2440 | 7.21                  | 7.5                        | 0.018      | 0.025        | 118      |

Note:

1. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required.
2. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

| Product Specific 10g (Extremity)          |            |           |      |                       |                            |            |              |          |
|---|------------|-----------|------|-----------------------|----------------------------|------------|--------------|----------|
| Ambient Temperature (°C): 22.9 ±2         |            |           |      |                       | Relative Humidity (%): 53% |            |              |          |
| Liquid Temperature (°C): 21.8 ±2          |            |           |      |                       | Depth of Liquid (cm): >15  |            |              |          |
| Test Position                             | Dist. (mm) | Frequency |      | Conducted Power (dBm) |                            | SAR (W/kg) |              | Plot No. |
|   |            | Ch.       | MHz  | Meas.                 | Tune-Up Limit              | Meas-10g   | Scaled-10g   |          |
| Test Mode: WLAN2.4GHz_802.11b-1M_Ant Main |            |           |      |                       |                            |            |              |          |
| Front                                     | 0          | 1         | 2412 | 16.67                 | 17                         | 0.133      | 0.148        |          |
| Back                                      | 0          | 1         | 2412 | 16.67                 | 17                         | 0.099      | 0.110        |          |
| Right-side                                | 0          | 1         | 2412 | 16.67                 | 17                         | 0.142      | 0.158        |          |
| Top                                       | 0          | 1         | 2412 | 16.67                 | 17                         | 0.440      | <b>0.489</b> | 114      |
| Top                                       | 0          | 6         | 2437 | 14.96                 | 15                         | 0.249      | 0.259        |          |
| Top                                       | 0          | 11        | 2462 | 14.66                 | 15                         | 0.308      | 0.343        |          |
| Test Mode: WLAN2.4GHz_802.11b-1M_Ant Aux  |            |           |      |                       |                            |            |              |          |
| Front                                     | 0          | 1         | 2412 | 16.63                 | 17                         | 0.092      | 0.103        |          |
| Back                                      | 0          | 1         | 2412 | 16.63                 | 17                         | 0.063      | 0.071        |          |
| Left-side                                 | 0          | 1         | 2412 | 16.63                 | 17                         | 0.257      | 0.289        |          |
| Top                                       | 0          | 1         | 2412 | 16.63                 | 17                         | 0.087      | 0.098        |          |
| Test Mode: Bluetooth_BLE-1M_Ant Main      |            |           |      |                       |                            |            |              |          |
| Front                                     | 0          | 19        | 2440 | 7.21                  | 7.5                        | 0.0092     | 0.013        |          |
| Back                                      | 0          | 19        | 2440 | 7.21                  | 7.5                        | 0.00817    | 0.011        |          |
| Right-side                                | 0          | 19        | 2440 | 7.21                  | 7.5                        | 0.012      | 0.017        |          |
| Top                                       | 0          | 19        | 2440 | 7.21                  | 7.5                        | 0.043      | 0.059        | 119      |

Note:

1. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 3 W/kg, SAR is not required.
2. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 2 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.



| Head SAR                                     |            |           |      |                            |               |            |              |          |
|--|------------|-----------|------|----------------------------|---------------|------------|--------------|----------|
| SAR MEASUREMENT                              |            |           |      |                            |               |            |              |          |
| Ambient Temperature (°C): 22.7 ±2            |            |           |      | Relative Humidity (%): 51% |               |            |              |          |
| Liquid Temperature (°C): 21.5 ±2             |            |           |      | Depth of Liquid (cm): >15  |               |            |              |          |
| Test Position                                | Dist. (mm) | Frequency |      | Conducted Power (dBm)      |               | SAR (W/kg) |              | Plot No. |
|  |            | Ch.       | MHz  | Meas.                      | Tune-Up Limit | Meas-1g    | Scaled-1g    |          |
| Test Mode: WLAN5GHz_802.11ac80-VHT0_Ant Main |            |           |      |                            |               |            |              |          |
| Left-Cheek                                   | 0          | 58        | 5290 | 12.40                      | 12.5          | 0.140      | 0.152        |          |
| Left-Cheek                                   | 0          | 122       | 5610 | 12.41                      | 12.5          | 0.100      | 0.109        |          |
| Left-Cheek                                   | 0          | 155       | 5775 | 12.40                      | 12.5          | 0.110      | 0.120        |          |
| Left-Tilt                                    | 0          | 58        | 5290 | 12.40                      | 12.5          | 0.184      | 0.200        |          |
| Left-Tilt                                    | 0          | 122       | 5610 | 12.41                      | 12.5          | 0.112      | 0.122        |          |
| Left-Tilt                                    | 0          | 155       | 5775 | 12.40                      | 12.5          | 0.156      | 0.170        |          |
| Right-Cheek                                  | 0          | 58        | 5290 | 12.40                      | 12.5          | 0.199      | 0.217        |          |
| Right-Cheek                                  | 0          | 122       | 5610 | 12.41                      | 12.5          | 0.181      | 0.197        | 36       |
| Right-Cheek                                  | 0          | 155       | 5775 | 12.40                      | 12.5          | 0.101      | 0.110        |          |
| Right-Tilt                                   | 0          | 58        | 5290 | 12.40                      | 12.5          | 0.254      | <b>0.277</b> | 23       |
| Right-Tilt                                   | 0          | 106       | 5530 | 12.32                      | 12.5          | 0.177      | 0.196        |          |
| Right-Tilt                                   | 0          | 122       | 5610 | 12.41                      | 12.5          | 0.177      | 0.192        |          |
| Right-Tilt                                   | 0          | 138       | 5690 | 12.31                      | 12.5          | 0.164      | 0.182        |          |
| Right-Tilt                                   | 0          | 155       | 5775 | 12.40                      | 12.5          | 0.179      | 0.195        | 25       |
| Test Mode: WLAN5GHz_802.11ac80-VHT0_Ant Aux  |            |           |      |                            |               |            |              |          |
| Left-Cheek                                   | 0          | 58        | 5290 | 12.36                      | 12.5          | 0.023      | 0.025        |          |
| Left-Cheek                                   | 0          | 122       | 5610 | 12.43                      | 12.5          | 0.060      | 0.065        |          |
| Left-Cheek                                   | 0          | 155       | 5775 | 12.37                      | 12.5          | 0.048      | 0.053        |          |
| Left-Tilt                                    | 0          | 58        | 5290 | 12.36                      | 12.5          | 0.011      | 0.012        |          |
| Left-Tilt                                    | 0          | 122       | 5610 | 12.43                      | 12.5          | 0.052      | 0.057        |          |
| Left-Tilt                                    | 0          | 155       | 5775 | 12.37                      | 12.5          | 0.039      | 0.042        |          |
| Right-Cheek                                  | 0          | 58        | 5290 | 12.36                      | 12.5          | 0.037      | 0.040        |          |
| Right-Cheek                                  | 0          | 122       | 5610 | 12.43                      | 12.5          | 0.042      | 0.046        |          |
| Right-Cheek                                  | 0          | 155       | 5775 | 12.37                      | 12.5          | 0.037      | 0.041        |          |
| Right-Tilt                                   | 0          | 58        | 5290 | 12.36                      | 12.5          | 0.017      | 0.019        |          |
| Right-Tilt                                   | 0          | 122       | 5610 | 12.43                      | 12.5          | 0.037      | 0.040        |          |
| Right-Tilt                                   | 0          | 155       | 5775 | 12.37                      | 12.5          | 0.027      | 0.029        |          |

Note:

1. When multiple transmission modes have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected
2. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in that exposure configuration.
3. When the reported SAR of the highest measured maximum U-NII-2A for the exposure configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band.

| Body SAR                                     |            |           |      |                       |                            |            |              |          |
|--|------------|-----------|------|-----------------------|----------------------------|------------|--------------|----------|
| SAR MEASUREMENT                              |            |           |      |                       |                            |            |              |          |
| Ambient Temperature (°C): 22.8 ±2            |            |           |      |                       | Relative Humidity (%): 50% |            |              |          |
| Liquid Temperature (°C): 21.6 ±2             |            |           |      |                       | Depth of Liquid (cm): >15  |            |              |          |
| Test Position                                | Dist. (mm) | Frequency |      | Conducted Power (dBm) |                            | SAR (W/kg) |              | Plot No. |
|  |            | Ch.       | MHz  | Meas.                 | Tune-Up Limit              | Meas-1g    | Scaled-1g    |          |
| Test Mode: WLAN5GHz_802.11ac80-VHT0_Ant Main |            |           |      |                       |                            |            |              |          |
| Front  | 10         | 42        | 5210 | 12.32                 | 12.5                       | 0.029      | 0.032        |          |
| Front  | 10         | 58        | 5290 | 12.40                 | 12.5                       | 0.045      | 0.049        |          |
| Front  | 10         | 122       | 5610 | 12.41                 | 12.5                       | 0.018      | 0.019        |          |
| Front  | 10         | 155       | 5775 | 12.40                 | 12.5                       | 0.026      | 0.028        |          |
| Back   | 10         | 42        | 5210 | 12.32                 | 12.5                       | 0.061      | 0.068        |          |
| Back   | 10         | 58        | 5290 | 12.40                 | 12.5                       | 0.077      | 0.084        |          |
| Back   | 10         | 122       | 5610 | 12.41                 | 12.5                       | 0.084      | 0.091        |          |
| Back   | 10         | 155       | 5775 | 12.40                 | 12.5                       | 0.087      | 0.094        |          |
| Right-side                                   | 10         | 42        | 5210 | 12.32                 | 12.5                       | 0.072      | 0.080        |          |
| Right-side                                   | 10         | 58        | 5290 | 12.40                 | 12.5                       | 0.091      | 0.100        |          |
| Right-side                                   | 10         | 122       | 5610 | 12.41                 | 12.5                       | 0.040      | 0.044        |          |
| Right-side                                   | 10         | 155       | 5775 | 12.40                 | 12.5                       | 0.067      | 0.073        |          |
| Top  | 10         | 42        | 5210 | 12.32                 | 12.5                       | 0.159      | 0.176        |          |
| Top  | 10         | 58        | 5290 | 12.40                 | 12.5                       | 0.200      | 0.218        | 65       |
| Top  | 10         | 106       | 5530 | 12.32                 | 12.5                       | 0.174      | 0.193        |          |
| Top  | 10         | 122       | 5610 | 12.41                 | 12.5                       | 0.169      | 0.184        |          |
| Top  | 10         | 138       | 5690 | 12.31                 | 12.5                       | 0.199      | <b>0.221</b> | 73       |
| Top  | 10         | 155       | 5775 | 12.40                 | 12.5                       | 0.176      | 0.192        | 67       |
| Test Mode: WLAN5GHz_802.11ac80-VHT0_Ant Aux  |            |           |      |                       |                            |            |              |          |
| Front  | 10         | 42        | 5210 | 12.24                 | 12.5                       | 0.00767    | 0.009        |          |
| Front  | 10         | 58        | 5290 | 12.36                 | 12.5                       | 0.0067     | 0.007        |          |
| Front  | 10         | 122       | 5610 | 12.43                 | 12.5                       | 0.015      | 0.016        |          |
| Front  | 10         | 155       | 5775 | 12.37                 | 12.5                       | 0.018      | 0.019        |          |
| Back   | 10         | 42        | 5210 | 12.24                 | 12.5                       | 0.020      | 0.023        |          |
| Back   | 10         | 58        | 5290 | 12.36                 | 12.5                       | 0.013      | 0.015        |          |
| Back   | 10         | 122       | 5610 | 12.43                 | 12.5                       | 0.089      | 0.096        |          |
| Back   | 10         | 155       | 5775 | 12.37                 | 12.5                       | 0.091      | 0.100        |          |
| Left-side                                    | 10         | 42        | 5210 | 12.24                 | 12.5                       | 0.063      | 0.071        |          |
| Left-side                                    | 10         | 58        | 5290 | 12.36                 | 12.5                       | 0.052      | 0.057        |          |
| Left-side                                    | 10         | 122       | 5610 | 12.43                 | 12.5                       | 0.161      | 0.174        | 62       |
| Left-side                                    | 10         | 155       | 5775 | 12.37                 | 12.5                       | 0.139      | 0.152        |          |
| Top  | 10         | 42        | 5210 | 12.24                 | 12.5                       | 0.00732    | 0.008        |          |
| Top  | 10         | 58        | 5290 | 12.36                 | 12.5                       | 0.0076     | 0.008        |          |
| Top  | 10         | 122       | 5610 | 12.43                 | 12.5                       | 0.031      | 0.033        |          |
| Top  | 10         | 155       | 5775 | 12.37                 | 12.5                       | 0.033      | 0.037        |          |

Note:

1. When multiple transmission modes have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected
2. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in that exposure configuration.
3. When the reported SAR of the highest measured maximum U-NII-2A for the exposure configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band.

| Product Specific 10g (Extremity)             |            |           |      |                       |                            |            |              |          |
|--|------------|-----------|------|-----------------------|----------------------------|------------|--------------|----------|
| SAR MEASUREMENT                              |            |           |      |                       |                            |            |              |          |
| Ambient Temperature (°C): 22.8 ±2            |            |           |      |                       | Relative Humidity (%): 50% |            |              |          |
| Liquid Temperature (°C): 21.6 ±2             |            |           |      |                       | Depth of Liquid (cm): >15  |            |              |          |
| Test Position                                | Dist. (mm) | Frequency |      | Conducted Power (dBm) |                            | SAR (W/kg) |              | Plot No. |
|  |            | Ch.       | MHz  | Meas.                 | Tune-Up Limit              | Meas-10g   | Scaled-10g   |          |
| Test Mode: WLAN5GHz_802.11ac80-VHT0_Ant Main |            |           |      |                       |                            |            |              |          |
| Front  | 0          | 58        | 5290 | 12.40                 | 12.5                       | 0.067      | 0.073        |          |
| Front  | 0          | 122       | 5610 | 12.41                 | 12.5                       | 0.043      | 0.047        |          |
| Front  | 0          | 155       | 5775 | 12.40                 | 12.5                       | 0.054      | 0.059        |          |
| Back   | 0          | 58        | 5290 | 12.40                 | 12.5                       | 0.082      | 0.089        |          |
| Back   | 0          | 122       | 5610 | 12.41                 | 12.5                       | 0.041      | 0.045        |          |
| Back   | 0          | 155       | 5775 | 12.40                 | 12.5                       | 0.063      | 0.069        |          |
| Right-side                                   | 0          | 58        | 5290 | 12.40                 | 12.5                       | 0.136      | 0.148        |          |
| Right-side                                   | 0          | 122       | 5610 | 12.41                 | 12.5                       | 0.108      | 0.117        |          |
| Right-side                                   | 0          | 155       | 5775 | 12.40                 | 12.5                       | 0.098      | 0.107        |          |
| Top  | 0          | 58        | 5290 | 12.40                 | 12.5                       | 0.401      | <b>0.437</b> | 75       |
| Top  | 0          | 106       | 5530 | 12.32                 | 12.5                       | 0.256      | 0.284        |          |
| Top  | 0          | 122       | 5610 | 12.41                 | 12.5                       | 0.262      | 0.285        |          |
| Top  | 0          | 138       | 5690 | 12.31                 | 12.5                       | 0.292      | 0.325        | 100      |
| Top  | 0          | 155       | 5775 | 12.40                 | 12.5                       | 0.347      | 0.378        | 76       |
| Test Mode: WLAN5GHz_802.11ac80-VHT0_Ant Aux  |            |           |      |                       |                            |            |              |          |
| Front  | 0          | 58        | 5290 | 12.36                 | 12.5                       | 0.00801    | 0.009        |          |
| Front  | 0          | 122       | 5610 | 12.43                 | 12.5                       | 0.017      | 0.018        |          |
| Front  | 0          | 155       | 5775 | 12.37                 | 12.5                       | 0.013      | 0.014        |          |
| Back   | 0          | 58        | 5290 | 12.36                 | 12.5                       | 0.011      | 0.013        |          |
| Back   | 0          | 122       | 5610 | 12.43                 | 12.5                       | 0.074      | 0.079        |          |
| Back   | 0          | 155       | 5775 | 12.37                 | 12.5                       | 0.073      | 0.080        |          |
| Left-side                                    | 0          | 58        | 5290 | 12.36                 | 12.5                       | 0.105      | 0.115        |          |
| Left-side                                    | 0          | 122       | 5610 | 12.43                 | 12.5                       | 0.263      | 0.284        |          |
| Left-side                                    | 0          | 155       | 5775 | 12.37                 | 12.5                       | 0.284      | 0.311        |          |
| Top  | 0          | 58        | 5290 | 12.36                 | 12.5                       | 0.00613    | 0.007        |          |
| Top  | 0          | 122       | 5610 | 12.43                 | 12.5                       | 0.032      | 0.035        |          |
| Top  | 0          | 155       | 5775 | 12.37                 | 12.5                       | 0.039      | 0.043        |          |

Note:

1. When multiple transmission modes have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected
2. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 2 W/kg, no further SAR testing is required in that exposure configuration.
3. When the reported SAR of the highest measured maximum U-NII-2A for the exposure configuration is ≤ 3 W/kg, SAR is not required for U-NII-1 band.

## 9.2 Simultaneous Transmission

| Simultaneous Transmission Configurations |   |
|--|---|
| 1  | WLAN 2.4GHz Main + WLAN 2.4GHz Aux + BT |
| 2  | WLAN 5GHz Main + WLAN 5GHz Aux          |

### 9.2.1 Simultaneous transmission test exclusion considerations

#### Head Exposure Conditions

##### Simultaneous Transmission Summation Scenario

| Test Position | 1                                | 2                               | 3                              | 4                             | 5            | 1+2+5            | 3+4              |
|---------------|----------------------------------|---------------------------------|--------------------------------|-------------------------------|--------------|------------------|------------------|
|               | WLAN2.4GHz<br>ANT Main<br>(W/kg) | WLAN2.4GHz<br>ANT Aux<br>(W/kg) | WLAN5GHz<br>ANT Main<br>(W/kg) | WLAN5GHz<br>ANT Aux<br>(W/kg) | BT<br>(W/kg) | $\Sigma$ 1-g SAR | $\Sigma$ 1-g SAR |
| Left-Cheek    | 0.237                            | 0.152                           | 0.152                          | 0.065                         | 0.029        | 0.418            | 0.217            |
| Left-Tilt     | 0.211                            | 0.081                           | 0.200                          | 0.057                         | 0.028        | 0.320            | 0.257            |
| Right-Cheek   | 0.157                            | 0.191                           | 0.217                          | 0.046                         | 0.019        | 0.367            | 0.263            |
| Right-Tilt    | 0.186                            | 0.098                           | 0.277                          | 0.040                         | 0.025        | 0.309            | 0.317            |

Note: The sum of value is less than 1.6 W/Kg, thus simultaneous SAR testing is not need.

#### Hotspot & Body-worn Exposure Conditions

##### Simultaneous Transmission Summation Scenario

| Test Position | 1                                | 2                               | 3                              | 4                             | 5            | 1+2+5            | 3+4              |
|---------------|----------------------------------|---------------------------------|--------------------------------|-------------------------------|--------------|------------------|------------------|
|               | WLAN2.4GHz<br>ANT Main<br>(W/kg) | WLAN2.4GHz<br>ANT Aux<br>(W/kg) | WLAN5GHz<br>ANT Main<br>(W/kg) | WLAN5GHz<br>ANT Aux<br>(W/kg) | BT<br>(W/kg) | $\Sigma$ 1-g SAR | $\Sigma$ 1-g SAR |
| Front         | 0.090                            | 0.042                           | 0.049                          | 0.019                         | 0.007        | 0.139            | 0.068            |
| Back          | 0.109                            | 0.061                           | 0.094                          | 0.100                         | 0.010        | 0.180            | 0.194            |
| Left-side     | --                               | 0.112                           | --                             | 0.174                         | --           | 0.112            | 0.174            |
| Right-side    | 0.084                            | --                              | 0.100                          | --                            | 0.001        | 0.085            | 0.100            |
| Top           | 0.230                            | 0.062                           | 0.221                          | 0.037                         | 0.025        | 0.317            | 0.258            |

Note: The sum of value is less than 1.6 W/Kg, thus simultaneous SAR testing is not need.

### Product Specific 10g (Extremity) Exposure Conditions

#### Simultaneous Transmission Summation Scenario

| Test Position | 1                                | 2                               | 3                              | 4                             | 5            | 1+2+5             | 3+4               |
|---------------|----------------------------------|---------------------------------|--------------------------------|-------------------------------|--------------|-------------------|-------------------|
|               | WLAN2.4GHz<br>ANT Main<br>(W/kg) | WLAN2.4GHz<br>ANT Aux<br>(W/kg) | WLAN5GHz<br>ANT Main<br>(W/kg) | WLAN5GHz<br>ANT Aux<br>(W/kg) | BT<br>(W/kg) | $\Sigma$ 10-g SAR | $\Sigma$ 10-g SAR |
| Front         | 0.148                            | 0.103                           | 0.073                          | 0.018                         | 0.013        | 0.264             | 0.091             |
| Back          | 0.111                            | 0.071                           | 0.089                          | 0.080                         | 0.011        | 0.192             | 0.169             |
| Left-side     | --                               | 0.289                           | --                             | 0.311                         | -            | 0.289             | 0.311             |
| Right-side    | 0.158                            | --                              | 0.148                          | --                            | 0.017        | 0.175             | 0.148             |
| Top           | 0.489                            | 0.098                           | 0.437                          | 0.043                         | 0.059        | 0.646             | 0.480             |

Note: The sum of value is less than 4 W/Kg, thus simultaneous SAR testing is not need.

## 10. SAR measurement variability

- 1) Repeated measurement is not required when the original highest measured SAR is  $< 0.80$  W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is  $\geq 0.80$  W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only 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 (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .

| Frequency |     | SAR 1g (W/kg) |                |       |                 |       |                |       |
|-----------|-----|---------------|----------------|-------|-----------------|-------|----------------|-------|
| Channel   | MHz | Original      | First Repeated |       | Second Repeated |       | Third Repeated |       |
|           |     |               | Value          | Ratio | Value           | Ratio | Value          | Ratio |
| N/A       | N/A | N/A           | N/A            | N/A   | N/A             | N/A   | N/A            | N/A   |

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**Appendix**

**Appendix A. System Check Data**

**Appendix B. Highest measurement Data**

**Appendix C. Test Setup Photographs**

**Appendix D. Probe Calibration Data**

**Appendix E. Dipole Calibration Data**

**Appendix F. Product Photos-Please refer to the file: 2350034R-Product Photos**

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## Appendix A. System Check Data



Test Laboratory: DEKRA

Date: 2023/07/14

**System Performance Check\_2450MHz-Head****DUT: Dipole 2450 MHz; Type: D2450V2**

Communication System: UID 0, CW; Frequency: 2450 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.79$  S/m;  $\epsilon_r = 40.05$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(7.58, 7.58, 7.58); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/2450MHz-Head/Area Scan (8x9x1):** Measurement grid: dx=12mm, dy=12mm  
Maximum value of SAR (measured) = 19.7 W/kg**Configuration/2450MHz-Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 111.8 V/m; Power Drift = 0.18 dB

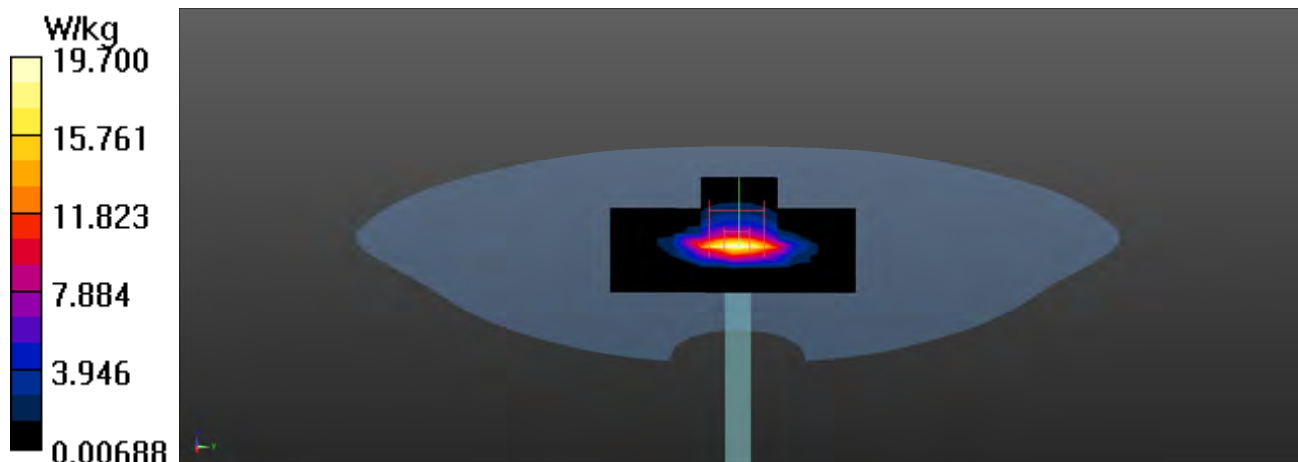
Peak SAR (extrapolated) = 23.6 W/kg

**SAR(1 g) = 12.5 W/kg; SAR(10 g) = 5.7 W/kg**

Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 47.1%

Maximum value of SAR (measured) = 21.1 W/kg



Test Laboratory: DEKRA

Date: 2023/06/19

**System Performance Check\_5250MHz-Head****DUT: Dipole 5GHz; Type: D5GHzV2**

Communication System: UID 0, CW; Frequency: 5250 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5250$  MHz;  $\sigma = 4.66$  S/m;  $\epsilon_r = 36.08$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.8, 4.8, 4.8); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/5250MHz-Head/Area Scan (8x8x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 13.1 W/kg**Configuration/5250MHz-Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 74.24 V/m; Power Drift = 0.15 dB

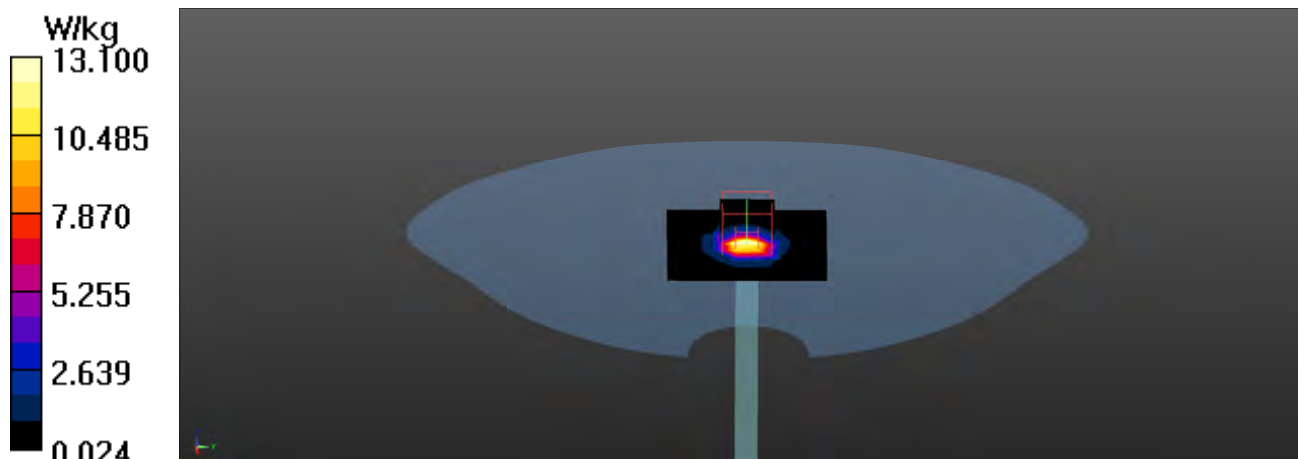
Peak SAR (extrapolated) = 29.9 W/kg

**SAR(1 g) = 8.23 W/kg; SAR(10 g) = 2.3 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 63.2%

Maximum value of SAR (measured) = 21.4 W/kg



Test Laboratory: DEKRA

Date: 2023/06/21

**System Performance Check\_5250MHz-Head****DUT: Dipole 5GHz; Type: D5GHzV2**

Communication System: UID 0, CW; Frequency: 5250 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5250$  MHz;  $\sigma = 4.61$  S/m;  $\epsilon_r = 36.06$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.8, 4.8, 4.8); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASYS2, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/5250MHz-Head/Area Scan (8x8x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 12.2 W/kg**Configuration/5250MHz-Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 76.00 V/m; Power Drift = 0.01 dB

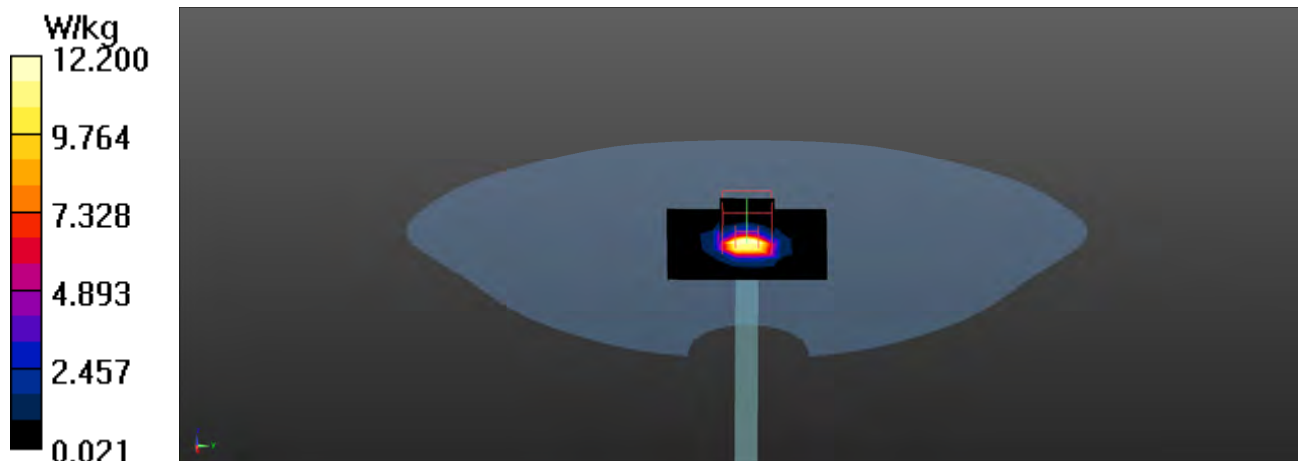
Peak SAR (extrapolated) = 30.8 W/kg

**SAR(1 g) = 8.46 W/kg; SAR(10 g) = 2.39 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 64.2%

Maximum value of SAR (measured) = 21.8 W/kg



Test Laboratory: DEKRA

Date: 2023/06/19

**System Performance Check\_5600MHz-Head****DUT: Dipole 5GHz; Type: D5GHzV2**

Communication System: UID 0, CW; Frequency: 5600 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.14$  S/m;  $\epsilon_r = 35.11$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.42, 4.42, 4.42); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/5600MHz-Head/Area Scan (8x8x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 14.4 W/kg**Configuration/5600MHz-Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 75.22 V/m; Power Drift = 0.08 dB

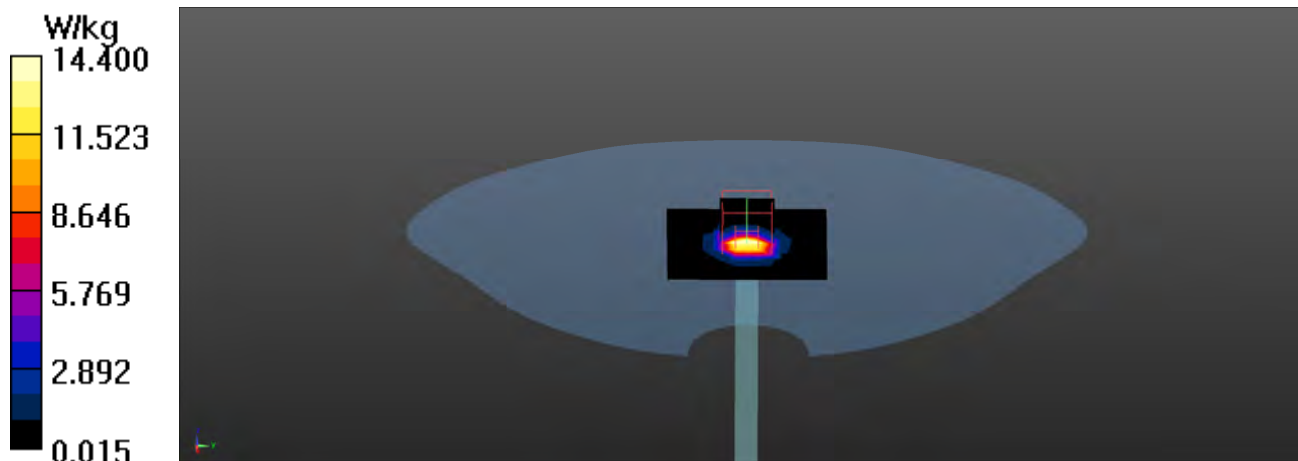
Peak SAR (extrapolated) = 34.7 W/kg

**SAR(1 g) = 8.94 W/kg; SAR(10 g) = 2.48 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 60.3%

Maximum value of SAR (measured) = 24.0 W/kg



Test Laboratory: DEKRA

Date: 2023/06/21

## System Performance Check\_5600MHz-Head

**DUT: Dipole 5GHz; Type: D5GHzV2**

Communication System: UID 0, CW; Frequency: 5600 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.09$  S/m;  $\epsilon_r = 35.09$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.42, 4.42, 4.42); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/5600MHz-Head/Area Scan (8x8x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 15.6 W/kg

**Configuration/5600MHz-Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 69.48 V/m; Power Drift = 0.12 dB

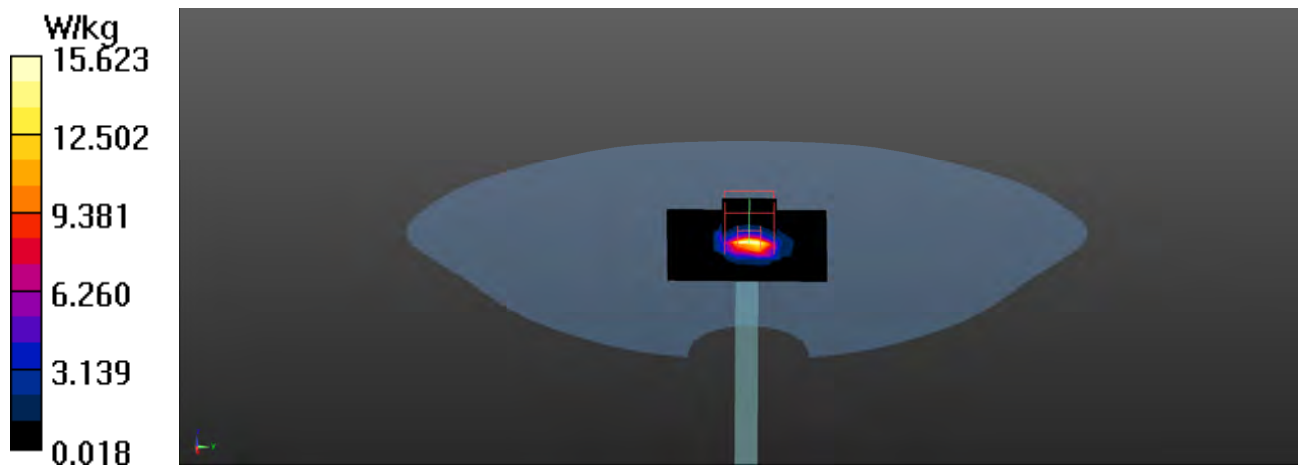
Peak SAR (extrapolated) = 30.5 W/kg

**SAR(1 g) = 8.12 W/kg; SAR(10 g) = 2.27 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 61.7%

Maximum value of SAR (measured) = 21.5 W/kg



Test Laboratory: DEKRA

Date: 2023/06/19

**System Performance Check\_5800MHz-Head****DUT: Dipole 5GHz; Type: D5GHzV2**

Communication System: UID 0, CW; Frequency: 5800 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5800$  MHz;  $\sigma = 5.4$  S/m;  $\epsilon_r = 34.56$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.4, 4.4, 4.4); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/5800MHz-Head/Area Scan (8x8x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 13.1 W/kg**Configuration/5800MHz-Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 69.63 V/m; Power Drift = 0.12 dB

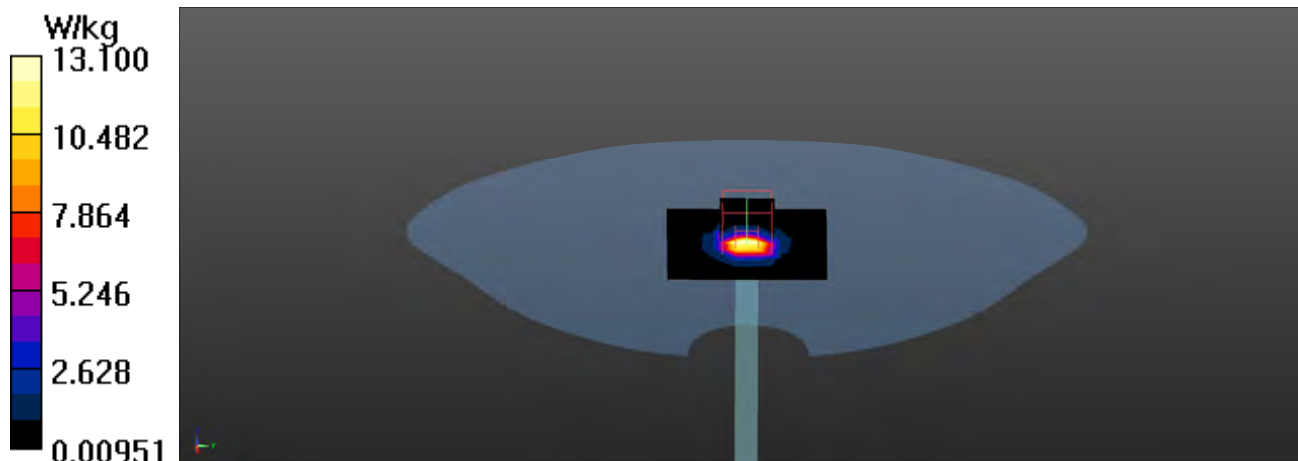
Peak SAR (extrapolated) = 31.2 W/kg

**SAR(1 g) = 7.95 W/kg; SAR(10 g) = 2.2 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 58.5%

Maximum value of SAR (measured) = 21.8 W/kg



Test Laboratory: DEKRA

Date: 2023/06/21

**System Performance Check\_5800MHz-Head****DUT: Dipole 5GHz; Type: D5GHzV2**

Communication System: UID 0, CW; Frequency: 5800 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5800$  MHz;  $\sigma = 5.35$  S/m;  $\epsilon_r = 34.54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.4, 4.4, 4.4); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASYS2, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/5800MHz-Head/Area Scan (8x8x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 13.4 W/kg**Configuration/5800MHz-Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 69.65 V/m; Power Drift = 0.08 dB

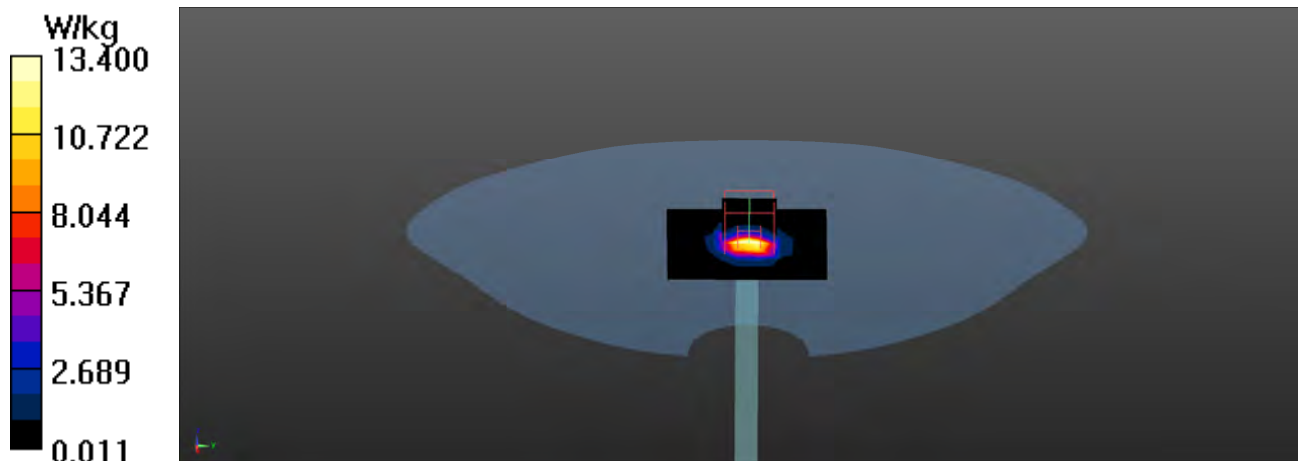
Peak SAR (extrapolated) = 30.7 W/kg

**SAR(1 g) = 7.72 W/kg; SAR(10 g) = 2.17 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.4 mm

Ratio of SAR at M2 to SAR at M1 = 60.1%

Maximum value of SAR (measured) = 20.9 W/kg



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## Appendix B. Highest Measurement Data



Test Laboratory: DEKRA

Date: 2023/07/14

**9\_WLAN2.4GHz\_802.11b-1M\_CH1\_Left-Cheek\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, WLAN 2.4G; Frequency: 2412 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.74$  S/m;  $\epsilon_r = 40.19$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(7.58, 7.58, 7.58); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Head/Area Scan (9x16x1):** Measurement grid: dx=12mm, dy=12mm  
Maximum value of SAR (measured) = 0.346 W/kg**Configuration/Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.80 V/m; Power Drift = -0.04 dB

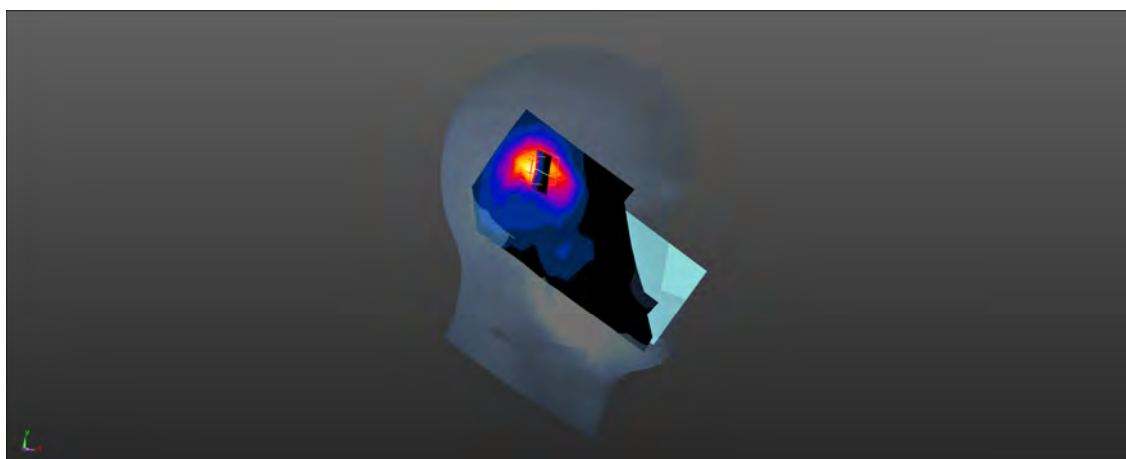
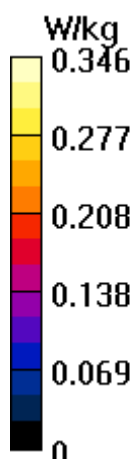
Peak SAR (extrapolated) = 0.452 W/kg

**SAR(1 g) = 0.213 W/kg; SAR(10 g) = 0.105 W/kg**

Smallest distance from peaks to all points 3 dB below = 11.4 mm

Ratio of SAR at M2 to SAR at M1 = 47.5%

Maximum value of SAR (measured) = 0.350 W/kg



Test Laboratory: DEKRA

Date: 2023/07/14

**126\_Bluetooth\_BLE-1M\_CH19\_Left-Cheek\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, BT 1M&amp;3M&amp;BLE; Frequency: 2440 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 2440$  MHz;  $\sigma = 1.77$  S/m;  $\epsilon_r = 40.08$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(7.58, 7.58, 7.58); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Head/Area Scan (9x17x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.0344 W/kg

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

Reference Value = 4.525 V/m; Power Drift = 0.18 dB

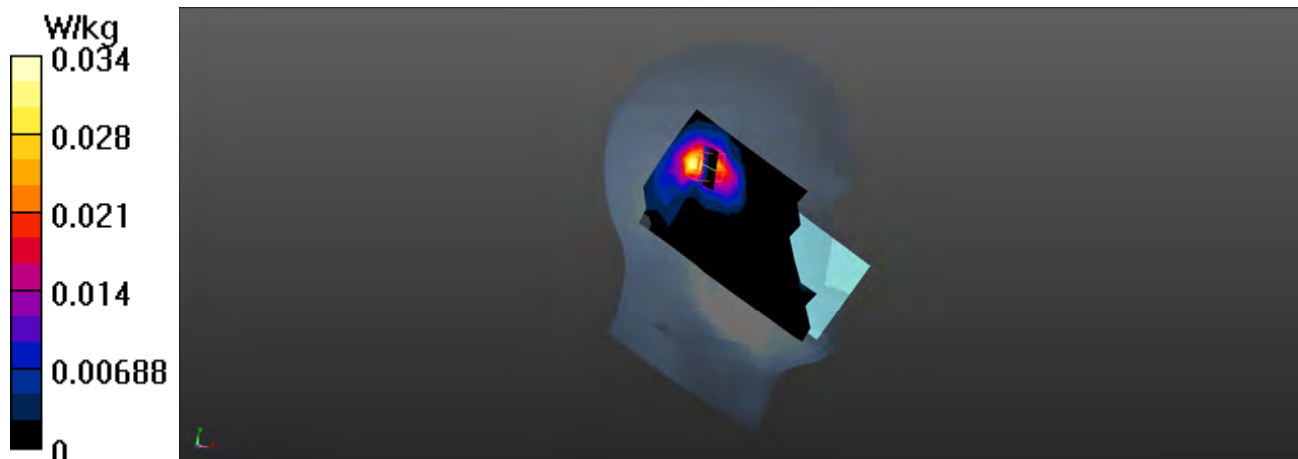
Peak SAR (extrapolated) = 0.0490 W/kg

**SAR(1 g) = 0.021 W/kg; SAR(10 g) = 0.00901 W/kg**

Smallest distance from peaks to all points 3 dB below: Larger than measurement grid (&gt; 15 mm)

Ratio of SAR at M2 to SAR at M1 = 42%

Maximum value of SAR (measured) = 0.0370 W/kg



Test Laboratory: DEKRA

Date: 2023/07/14

**115\_WLAN2.4GHz\_802.11b-1M\_CH1\_Top\_10mm\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, WLAN 2.4G; Frequency: 2412 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.74$  S/m;  $\epsilon_r = 40.19$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(7.58, 7.58, 7.58); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Flat/Area Scan (8x10x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.291 W/kg

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

Reference Value = 13.81 V/m; Power Drift = 0.16 dB

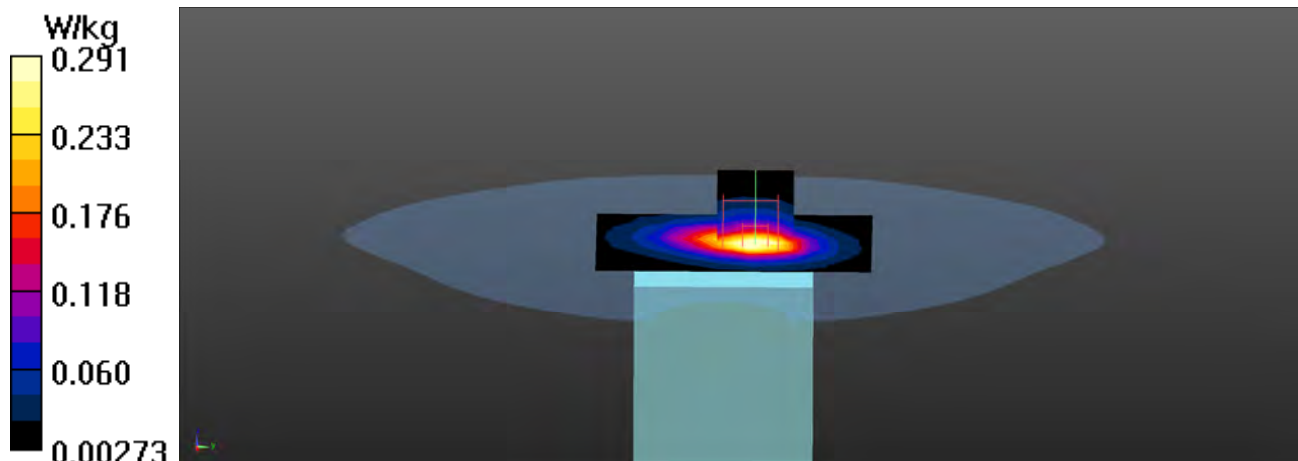
Peak SAR (extrapolated) = 0.433 W/kg

**SAR(1 g) = 0.207 W/kg; SAR(10 g) = 0.106 W/kg**

Smallest distance from peaks to all points 3 dB below = 14.4 mm

Ratio of SAR at M2 to SAR at M1 = 46.9%

Maximum value of SAR (measured) = 0.342 W/kg



Test Laboratory: DEKRA

Date: 2023/07/14

**118\_Bluetooth\_BLE-1M\_CH19\_Top\_10mm\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, BT 1M&amp;3M&amp;BLE; Frequency: 2440 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 2440$  MHz;  $\sigma = 1.77$  S/m;  $\epsilon_r = 40.08$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(7.58, 7.58, 7.58); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Flat/Area Scan (8x10x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.0301 W/kg

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

Reference Value = 4.191 V/m; Power Drift = 0.06 dB

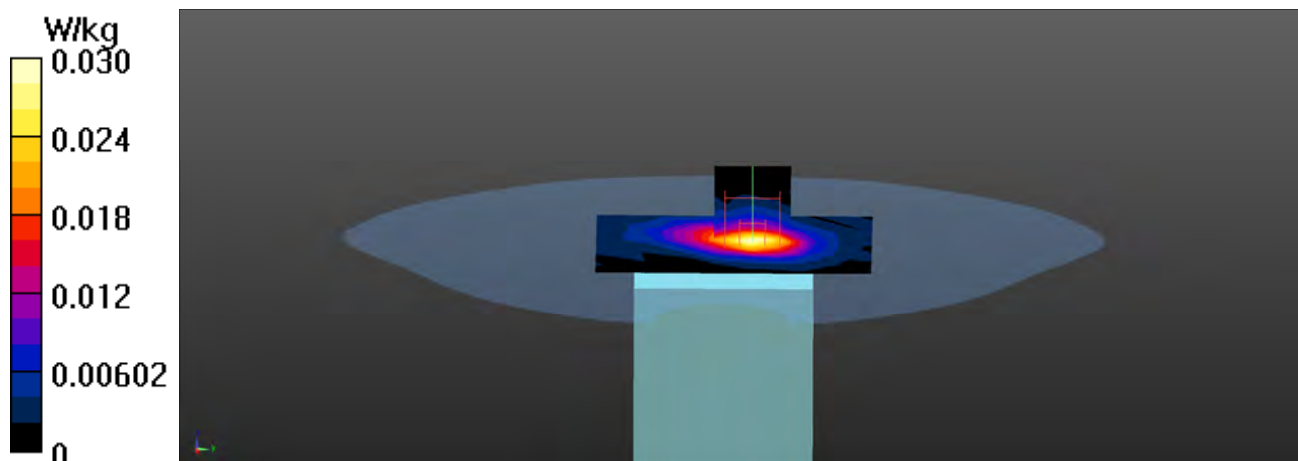
Peak SAR (extrapolated) = 0.0400 W/kg

**SAR(1 g) = 0.018 W/kg; SAR(10 g) = 0.00906 W/kg**

Smallest distance from peaks to all points 3 dB below: Larger than measurement grid (&gt; 15 mm)

Ratio of SAR at M2 to SAR at M1 = 43.8%

Maximum value of SAR (measured) = 0.0308 W/kg



Test Laboratory: DEKRA

Date: 2023/07/14

**114\_WLAN2.4GHz\_802.11b-1M\_CH1\_Top\_0mm\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, WLAN 2.4G; Frequency: 2412 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.74$  S/m;  $\epsilon_r = 40.19$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(7.58, 7.58, 7.58); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Flat/Area Scan (8x10x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 1.31 W/kg

**Configuration/Flat/Zoom Scan (7x8x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.47 V/m; Power Drift = 0.12 dB

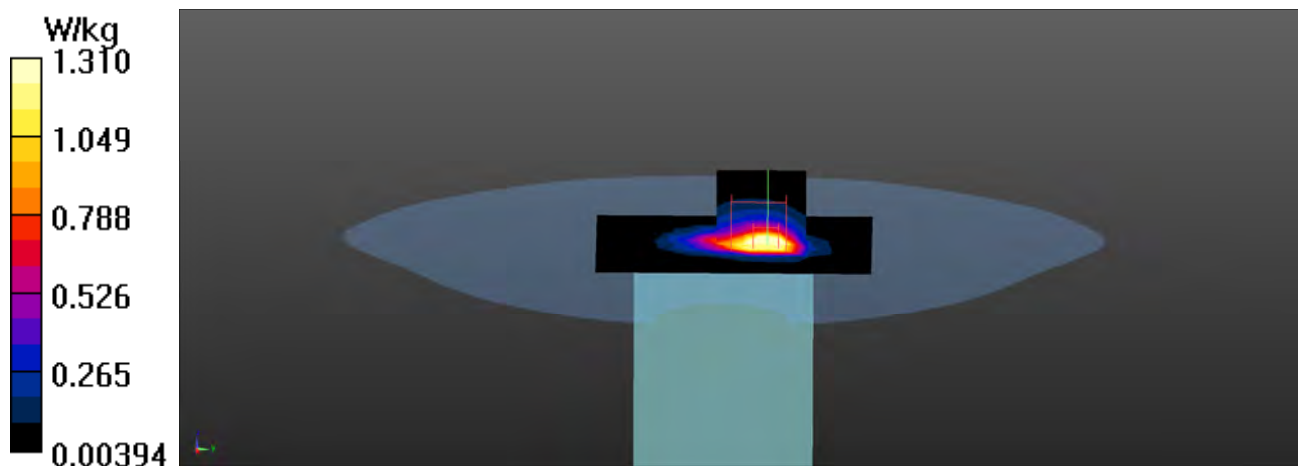
Peak SAR (extrapolated) = 2.94 W/kg

**SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.440 W/kg**

Smallest distance from peaks to all points 3 dB below = 8.2 mm

Ratio of SAR at M2 to SAR at M1 = 48.5%

Maximum value of SAR (measured) = 2.17 W/kg



Test Laboratory: DEKRA

Date: 2023/07/14

**119\_Bluetooth\_BLE-1M\_CH19\_Top\_0mm\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, BT 1M&amp;3M&amp;BLE; Frequency: 2440 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 2440$  MHz;  $\sigma = 1.77$  S/m;  $\epsilon_r = 40.08$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(7.58, 7.58, 7.58); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with left table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Flat/Area Scan (8x10x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.171 W/kg

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

Reference Value = 8.873 V/m; Power Drift = -0.13 dB

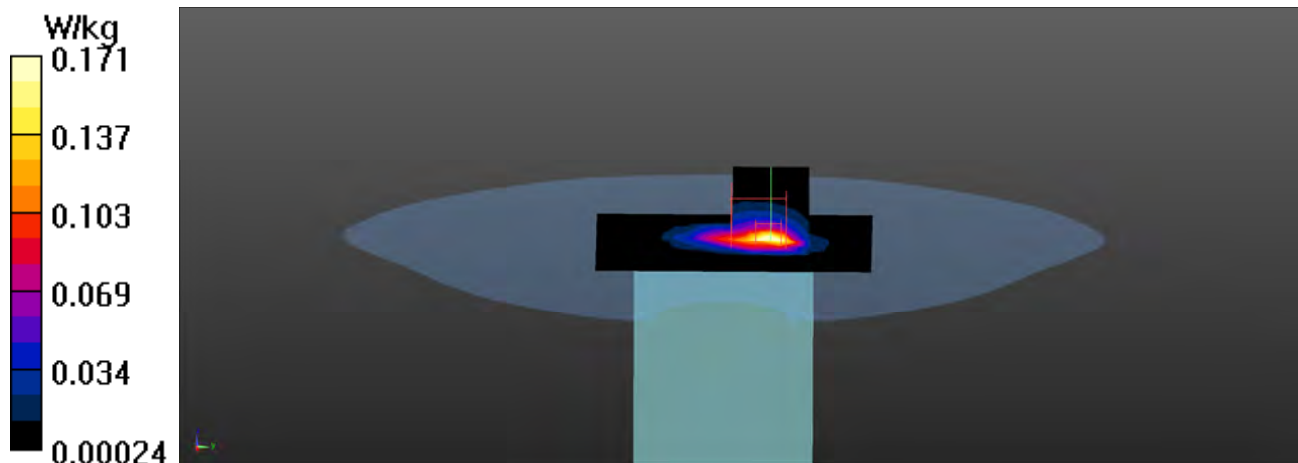
Peak SAR (extrapolated) = 0.291 W/kg

**SAR(1 g) = 0.107 W/kg; SAR(10 g) = 0.043 W/kg**

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

Ratio of SAR at M2 to SAR at M1 = 46.8%

Maximum value of SAR (measured) = 0.212 W/kg



Test Laboratory: DEKRA

Date: 2023/06/21

**36\_WLAN5GHz\_802.11ac80-VHT0\_CH122\_Right-Cheek\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, WLAN 5G; Frequency: 5610 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5610$  MHz;  $\sigma = 5.1$  S/m;  $\epsilon_r = 35.07$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.42, 4.42, 4.42); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Head/Area Scan (11x20x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.373 W/kg**Configuration/Head/Zoom Scan (9x11x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 5.166 V/m; Power Drift = 0.13 dB

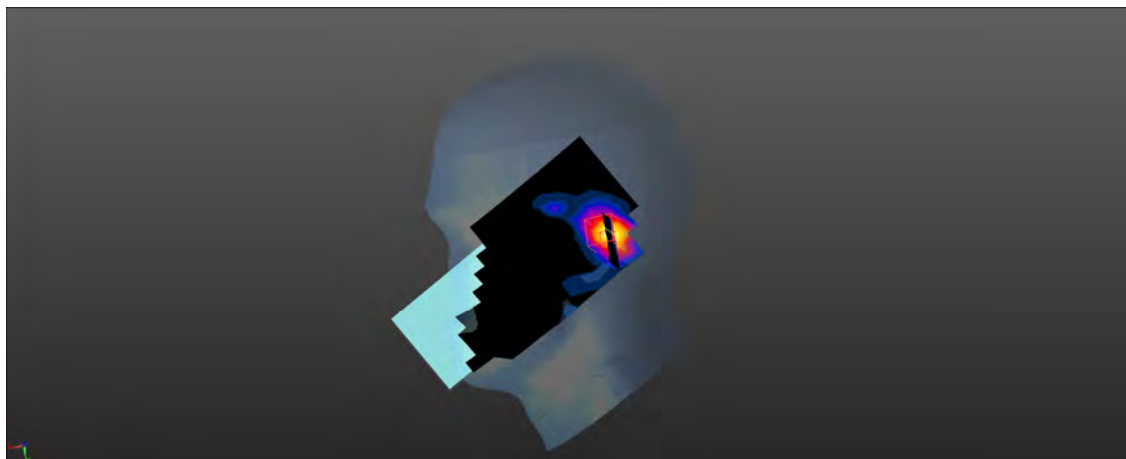
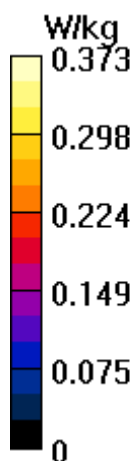
Peak SAR (extrapolated) = 0.627 W/kg

**SAR(1 g) = 0.181 W/kg; SAR(10 g) = 0.065 W/kg**

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

Ratio of SAR at M2 to SAR at M1 = 75.7%

Maximum value of SAR (measured) = 0.422 W/kg





Test Laboratory: DEKRA

Date: 2023/06/21

**23\_WLAN5GHz\_802.11ac80-VHT0\_CH58\_Right-Tilt\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, WLAN 5G; Frequency: 5290 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5290$  MHz;  $\sigma = 4.67$  S/m;  $\epsilon_r = 35.95$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.8, 4.8, 4.8); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Head/Area Scan (11x20x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.527 W/kg**Configuration/Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 2.286 V/m; Power Drift = 0.02 dB

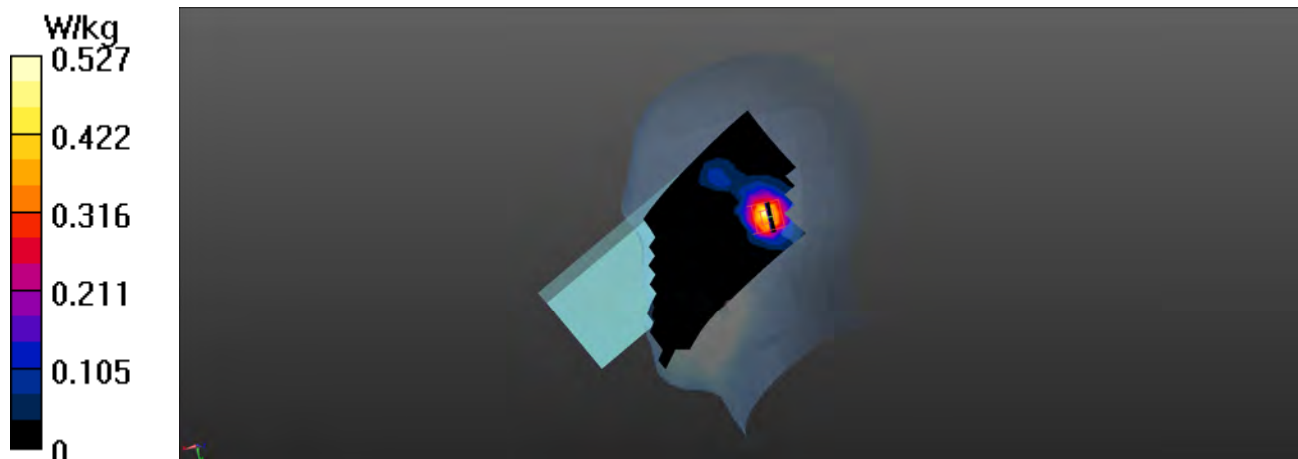
Peak SAR (extrapolated) = 0.879 W/kg

**SAR(1 g) = 0.254 W/kg; SAR(10 g) = 0.087 W/kg**

Smallest distance from peaks to all points 3 dB below = 8.6 mm

Ratio of SAR at M2 to SAR at M1 = 64.3%

Maximum value of SAR (measured) = 0.559 W/kg





Test Laboratory: DEKRA

Date: 2023/06/21

**25\_WLAN5GHz\_802.11ac80-VHT0\_CH155\_Right-Tilt\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, WLAN 5G; Frequency: 5775 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5775$  MHz;  $\sigma = 5.32$  S/m;  $\epsilon_r = 34.62$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.4, 4.4, 4.4); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Head/Area Scan (11x20x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.375 W/kg**Configuration/Head/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 4.631 V/m; Power Drift = 0.19 dB

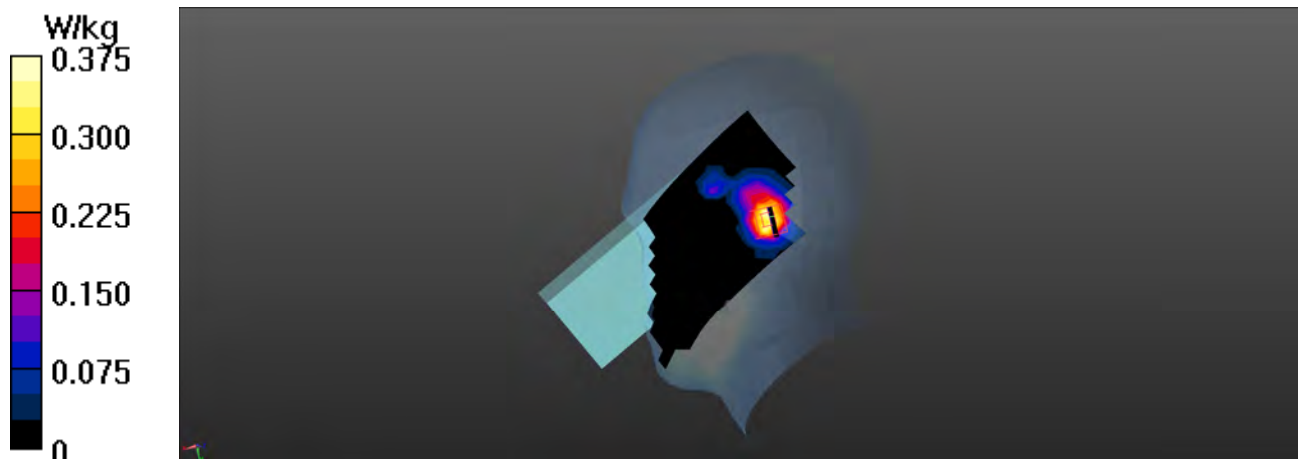
Peak SAR (extrapolated) = 0.698 W/kg

**SAR(1 g) = 0.179 W/kg; SAR(10 g) = 0.060 W/kg**

Smallest distance from peaks to all points 3 dB below = 11.2 mm

Ratio of SAR at M2 to SAR at M1 = 60.3%

Maximum value of SAR (measured) = 0.438 W/kg



Test Laboratory: DEKRA

Date: 2023/06/19

**65\_WLAN5GHz\_802.11ac80-VHT0\_CH58\_Top\_10mm\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, WLAN 5G; Frequency: 5290 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5290$  MHz;  $\sigma = 4.72$  S/m;  $\epsilon_r = 35.97$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.8, 4.8, 4.8); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Flat/Area Scan (9x11x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.415 W/kg

**Configuration/Flat/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 11.33 V/m; Power Drift = -0.19 dB

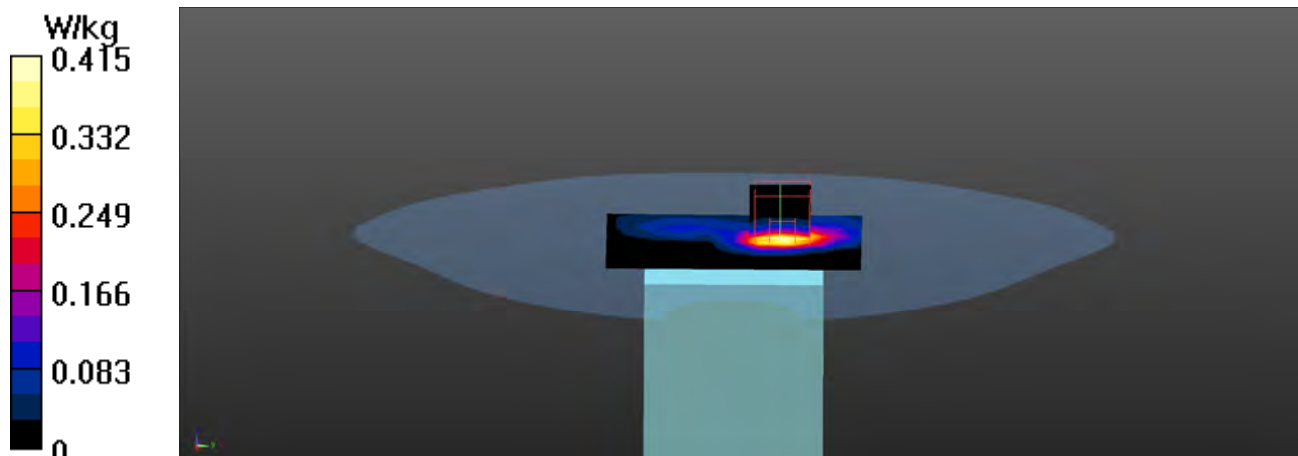
Peak SAR (extrapolated) = 0.836 W/kg

**SAR(1 g) = 0.200 W/kg; SAR(10 g) = 0.072 W/kg**

Smallest distance from peaks to all points 3 dB below = 10.1 mm

Ratio of SAR at M2 to SAR at M1 = 61.8%

Maximum value of SAR (measured) = 0.477 W/kg



Test Laboratory: DEKRA

Date: 2023/06/19

**73\_WLAN5GHz\_802.11ac80-VHT0\_CH138\_Top\_10mm\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, WLAN 5G; Frequency: 5690 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5690$  MHz;  $\sigma = 5.25$  S/m;  $\epsilon_r = 34.87$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.42, 4.42, 4.42); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Flat/Area Scan (9x11x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.461 W/kg**Configuration/Flat/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm,  
dz=1.4mm

Reference Value = 10.26 V/m; Power Drift = 0.05 dB

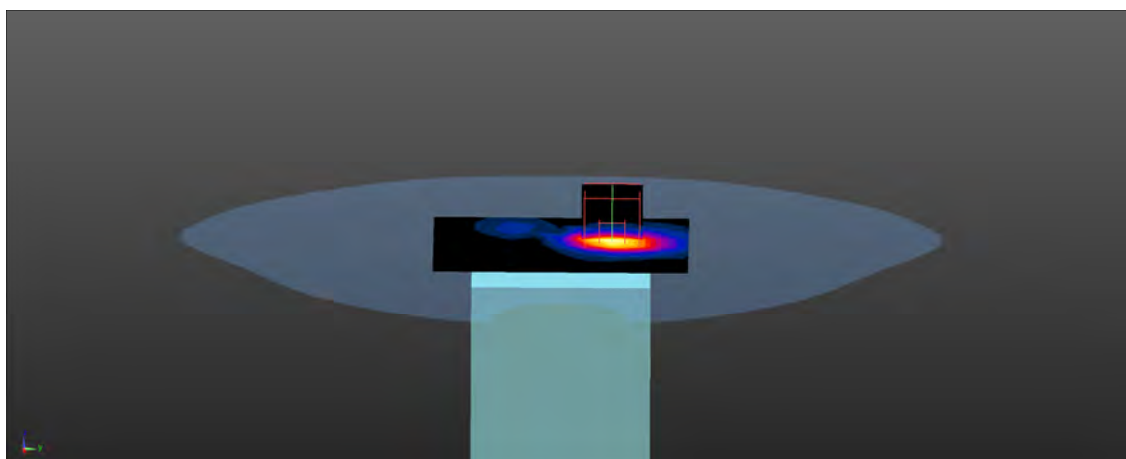
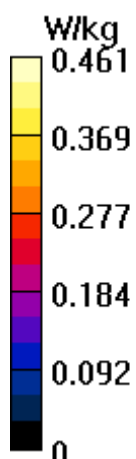
Peak SAR (extrapolated) = 0.880 W/kg

**SAR(1 g) = 0.199 W/kg; SAR(10 g) = 0.074 W/kg**

Smallest distance from peaks to all points 3 dB below = 11.5 mm

Ratio of SAR at M2 to SAR at M1 = 58%

Maximum value of SAR (measured) = 0.488 W/kg



Test Laboratory: DEKRA

Date: 2023/06/19

**67\_WLAN5GHz\_802.11ac80-VHT0\_CH155\_Top\_10mm\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, WLAN 5G; Frequency: 5775 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5775$  MHz;  $\sigma = 5.37$  S/m;  $\epsilon_r = 34.63$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.4, 4.4, 4.4); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Flat/Area Scan (9x11x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.416 W/kg

**Configuration/Flat/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 3.760 V/m; Power Drift = 0.04 dB

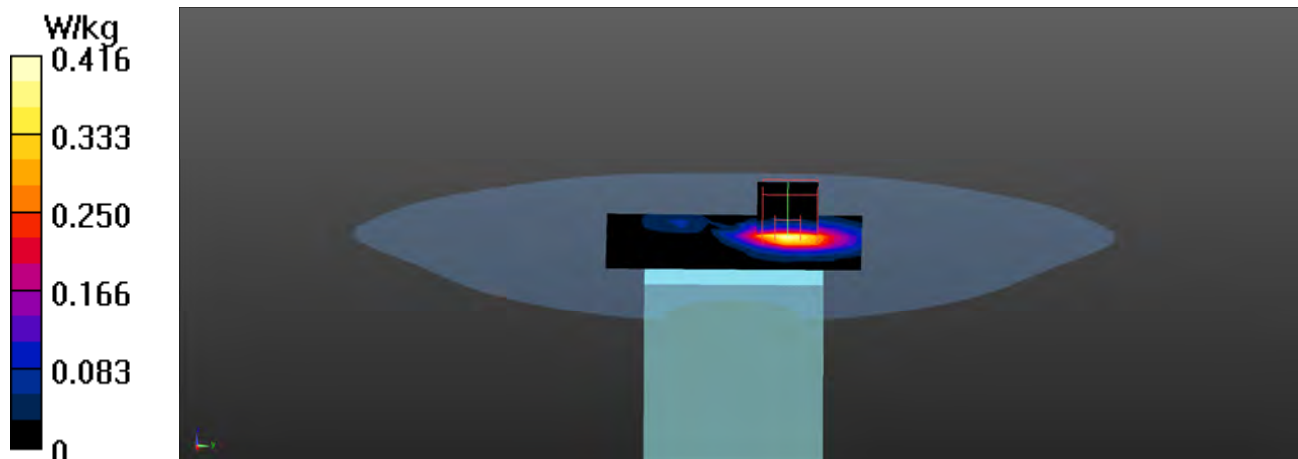
Peak SAR (extrapolated) = 0.781 W/kg

**SAR(1 g) = 0.176 W/kg; SAR(10 g) = 0.067 W/kg**

Smallest distance from peaks to all points 3 dB below = 11.3 mm

Ratio of SAR at M2 to SAR at M1 = 57.2%

Maximum value of SAR (measured) = 0.421 W/kg



Test Laboratory: DEKRA

Date: 2023/06/19

**75\_WLAN5GHz\_802.11ac80-VHT0\_CH58\_Top\_0mm\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, WLAN 5G; Frequency: 5290 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5290$  MHz;  $\sigma = 4.72$  S/m;  $\epsilon_r = 35.97$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.8, 4.8, 4.8); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Flat/Area Scan (9x11x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 3.15 W/kg**Configuration/Flat/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm,  
dz=1.4mm

Reference Value = 31.70 V/m; Power Drift = -0.18 dB

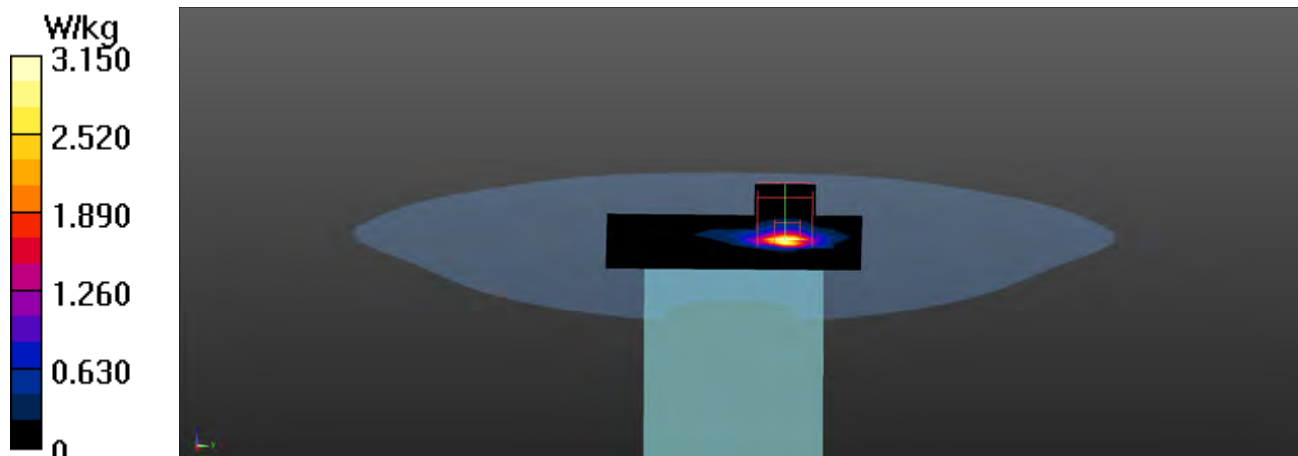
Peak SAR (extrapolated) = 6.99 W/kg

**SAR(1 g) = 1.45 W/kg; SAR(10 g) = 0.401 W/kg**

Smallest distance from peaks to all points 3 dB below = 6.1 mm

Ratio of SAR at M2 to SAR at M1 = 60.2%

Maximum value of SAR (measured) = 3.92 W/kg



Test Laboratory: DEKRA

Date: 2023/06/19

**100\_WLAN5GHz\_802.11ac80-VHT0\_CH138\_Top\_0mm\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, WLAN 5G; Frequency: 5690 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5690$  MHz;  $\sigma = 5.25$  S/m;  $\epsilon_r = 34.87$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.42, 4.42, 4.42); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Flat/Area Scan (9x11x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 2.62 W/kg**Configuration/Flat/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm,  
dz=1.4mm

Reference Value = 27.10 V/m; Power Drift = -0.12 dB

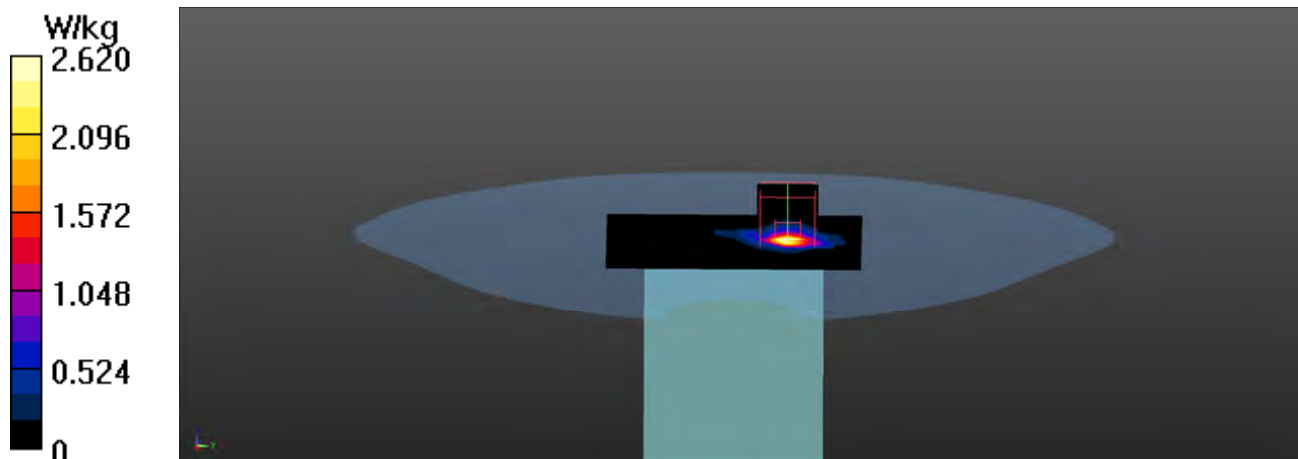
Peak SAR (extrapolated) = 6.24 W/kg

**SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.292 W/kg**

Smallest distance from peaks to all points 3 dB below = 6.1 mm

Ratio of SAR at M2 to SAR at M1 = 57.1%

Maximum value of SAR (measured) = 3.30 W/kg



Test Laboratory: DEKRA

Date: 2023/06/19

**76\_WLAN5GHz\_802.11ac80-VHT0\_CH155\_Top\_0mm\_ANT Main****DUT: Mobile Computer; Type: RK26W60**

Communication System: UID 0, WLAN 5G; Frequency: 5775 MHz

Communication System PAR: 0dB

Medium parameters used:  $f = 5775$  MHz;  $\sigma = 5.37$  S/m;  $\epsilon_r = 34.63$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY5 Configuration:

- Probe: EX3DV4 - SN3979; ConvF(4.4, 4.4, 4.4); Calibrated: 2022/11/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1425; Calibrated: 2022/11/23
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

**Configuration/Flat/Area Scan (9x11x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 3.01 W/kg**Configuration/Flat/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm,  
dz=1.4mm

Reference Value = 29.60 V/m; Power Drift = -0.11 dB

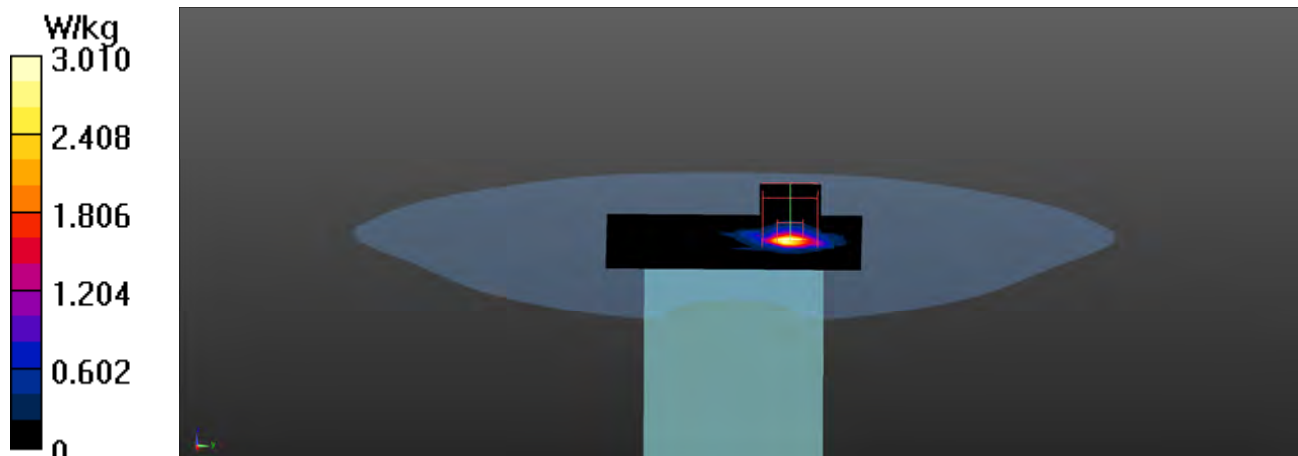
Peak SAR (extrapolated) = 7.47 W/kg

**SAR(1 g) = 1.32 W/kg; SAR(10 g) = 0.347 W/kg**

Smallest distance from peaks to all points 3 dB below = 5.8 mm

Ratio of SAR at M2 to SAR at M1 = 56.6%

Maximum value of SAR (measured) = 3.84 W/kg



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## Appendix D. Probe Calibration





Accredited by the Swiss Accreditation Service (SAS)  
**The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates**

Accreditation No.: **SCS 0108**

Client **DEKRA (Auden)**

Certificate No **EX-3979\_Nov22**

**CALIBRATION CERTIFICATE**

Object **EX3DV4 - SN:3979**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v6, QA CAL-23.v5, QA CAL-25.v7  
 Calibration procedure for dosimetric E-field probes**

Calibration date **November 23, 2022**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3) °C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID               | Cal Date (Certificate No.)        | Scheduled Calibration |
|----------------------------|------------------|-----------------------------------|-----------------------|
| Power meter NRP            | SN: 104778       | 04-Apr-22 (No. 217-03525/03524)   | Apr-23                |
| Power sensor NRP-Z91       | SN: 103244       | 04-Apr-22 (No. 217-03524)         | Apr-23                |
| OCP DAK-3.5 (weighted)     | SN: 1249         | 20-Oct-22 (OCP-DAK3.5-1249_Oct22) | Oct-23                |
| OCP DAK-12                 | SN: 1016         | 20-Oct-22 (OCP-DAK12-1016_Oct22)  | Oct-23                |
| Reference 20 dB Attenuator | SN: CC2552 (20x) | 04-Apr-22 (No. 217-03527)         | Apr-23                |
| DAE4                       | SN: 660          | 10-Oct-22 (No. DAE4-660_Oct22)    | Oct-23                |
| Reference Probe ES3DV2     | SN: 3013         | 27-Dec-21 (No. ES3-3013_Dec21)    | Dec-22                |

| Secondary Standards     | ID               | Check Date (in house)             | Scheduled Check        |
|-------------------------|------------------|-----------------------------------|------------------------|
| Power meter E4419B      | SN: GB41293874   | 06-Apr-16 (in house check Jun-22) | In house check: Jun-24 |
| Power sensor E4412A     | SN: MY41498087   | 06-Apr-16 (in house check Jun-22) | In house check: Jun-24 |
| Power sensor E4412A     | SN: 000110210    | 06-Apr-16 (in house check Jun-22) | In house check: Jun-24 |
| RF generator HP 8648C   | SN: US3642U01700 | 04-Aug-99 (in house check Jun-22) | In house check: Jun-24 |
| Network Analyzer E8358A | SN: US41080477   | 31-Mar-14 (in house check Oct-22) | In house check: Oct-24 |

|               | Name            | Function              | Signature |
|---------------|-----------------|-----------------------|-----------|
| Calibrated by | Jeffrey Katzman | Laboratory Technician |           |
| Approved by   | Sven Kühn       | Technical Manager     |           |

Issued: November 23, 2022

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## Calibration Laboratory of

Schmid & Partner  
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland



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The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

## Glossary

|                          |  |
|--------------------------|--|
| TSL                      | tissue simulating liquid   |
| NORM <sub>x,y,z</sub>    | sensitivity in free space  |
| ConvF                    | sensitivity in TSL / NORM <sub>x,y,z</sub>   |
| DCP                      | diode compression point  |
| CF                       | crest factor (1/duty_cycle) of the RF signal   |
| A, B, C, D               | modulation dependent linearization parameters  |
| Polarization $\varphi$   | $\varphi$ rotation around probe axis   |
| Polarization $\vartheta$ | $\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis |
| Connector Angle          | information used in DASY system to align probe sensor X to the robot coordinate system   |

## Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices – Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

## Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub> = NORM<sub>x,y,z</sub> \* frequency\_response** (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; D<sub>x,y,z</sub>; VR<sub>x,y,z</sub>**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM<sub>x</sub> (no uncertainty required).

## Parameters of Probe: EX3DV4 - SN:3979

### Basic Calibration Parameters

|   | Sensor X | Sensor Y | Sensor Z | Unc (k = 2)  |
|---|----------|----------|----------|--------------|
| Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup> | 0.46     | 0.49     | 0.47     | $\pm 10.1\%$ |
| DCP (mV) <sup>B</sup>                                     | 103.0    | 101.0    | 103.4    | $\pm 4.7\%$  |

### Calibration Results for Modulation Response

| UID | Communication System Name |   | A<br>dB | B<br>dB $\sqrt{\mu\text{V}}$ | C    | D<br>dB | VR<br>mV | Max<br>dev. | Max<br>Unc <sup>E</sup><br>k = 2 |
|-----|---------------------------|---|---------|------------------------------|------|---------|----------|-------------|----------------------------------|
| 0   | CW                        | X | 0.00    | 0.00                         | 1.00 | 0.00    | 163.8    | $\pm 1.7\%$ | $\pm 4.7\%$                      |
|     |                           | Y | 0.00    | 0.00                         | 1.00 |         | 165.4    |             |                                  |
|     |                           | Z | 0.00    | 0.00                         | 1.00 |         | 158.1    |             |                                  |

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%.

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the  $E^2$ -field uncertainty inside TSL (see Page 5).

<sup>B</sup> Linearization parameter uncertainty for maximum specified field strength.

<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

**Parameters of Probe: EX3DV4 - SN:3979****Other Probe Parameters**

|   |            |
|---|------------|
| Sensor Arrangement                            | Triangular |
| Connector Angle                               | 136.0°     |
| Mechanical Surface Detection Mode             | enabled    |
| Optical Surface Detection Mode                | disabled   |
| Probe Overall Length                          | 337 mm     |
| Probe Body Diameter                           | 10 mm      |
| Tip Length                                    | 9 mm       |
| Tip Diameter                                  | 2.5 mm     |
| Probe Tip to Sensor X Calibration Point       | 1 mm       |
| Probe Tip to Sensor Y Calibration Point       | 1 mm       |
| Probe Tip to Sensor Z Calibration Point       | 1 mm       |
| Recommended Measurement Distance from Surface | 1.4 mm     |

Note: Measurement distance from surface can be increased to 3–4 mm for an *Area Scan* job.

## Parameters of Probe: EX3DV4 - SN:3979

### Calibration Parameter Determined in Head Tissue Simulating Media

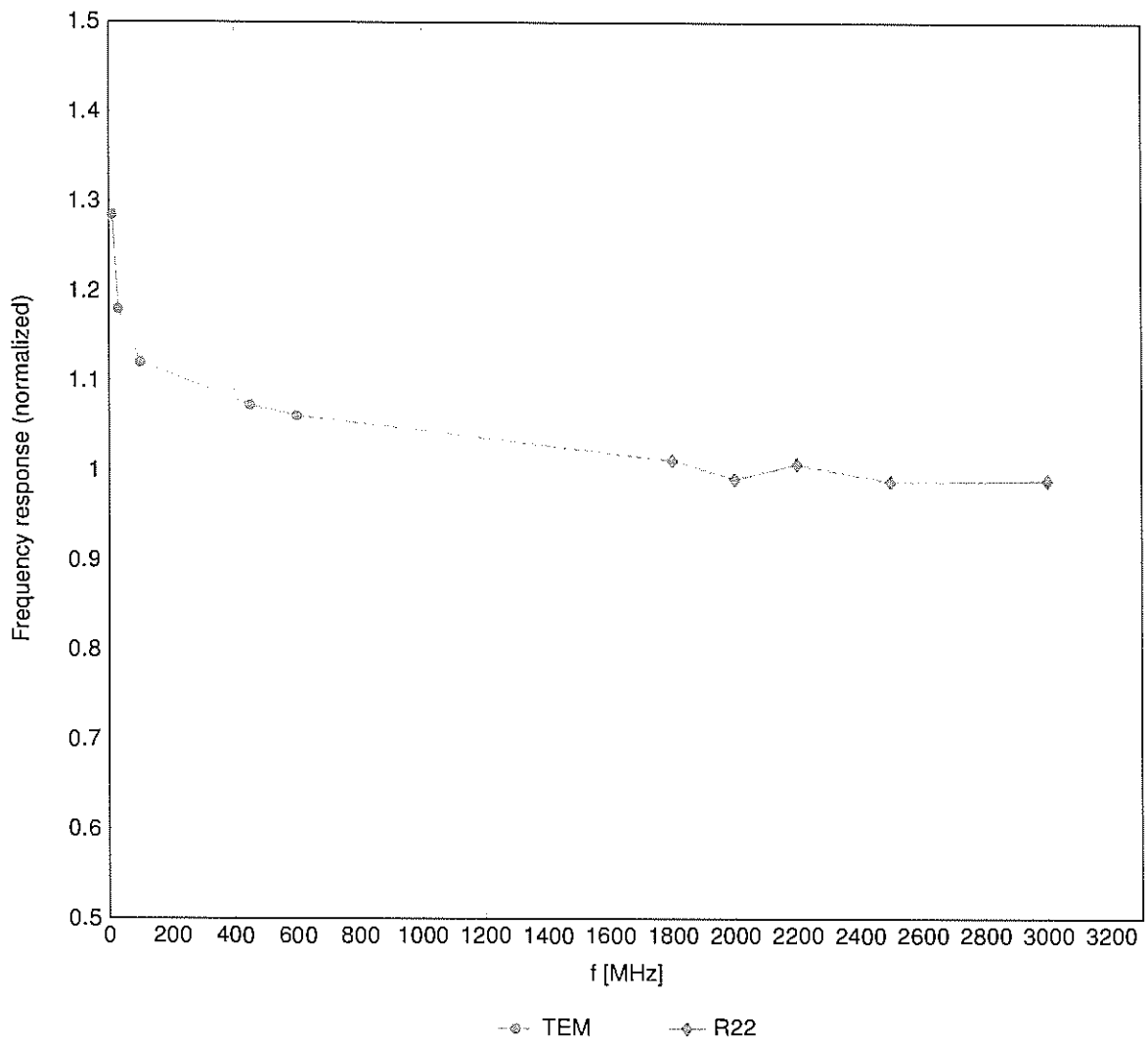
| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity <sup>F</sup> (S/m) | ConvF X | ConvF Y | ConvF Z | Alpha <sup>G</sup> | Depth <sup>G</sup> (mm) | Unc (k = 2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|-------------|
| 450                  | 43.5                               | 0.87                            | 10.79   | 10.79   | 10.79   | 0.16               | 1.30                    | ±13.3%      |
| 750                  | 41.9                               | 0.89                            | 10.47   | 10.47   | 10.47   | 0.54               | 0.80                    | ±12.0%      |
| 835                  | 41.5                               | 0.90                            | 10.05   | 10.05   | 10.05   | 0.53               | 0.80                    | ±12.0%      |
| 900                  | 41.5                               | 0.97                            | 9.73    | 9.73    | 9.73    | 0.49               | 0.80                    | ±12.0%      |
| 1450                 | 40.5                               | 1.20                            | 8.47    | 8.47    | 8.47    | 0.54               | 0.80                    | ±12.0%      |
| 1640                 | 40.2                               | 1.31                            | 8.48    | 8.48    | 8.48    | 0.38               | 0.86                    | ±12.0%      |
| 1750                 | 40.1                               | 1.37                            | 8.34    | 8.34    | 8.34    | 0.35               | 0.86                    | ±12.0%      |
| 1950                 | 40.0                               | 1.40                            | 8.12    | 8.12    | 8.12    | 0.39               | 0.86                    | ±12.0%      |
| 2300                 | 39.5                               | 1.67                            | 7.87    | 7.87    | 7.87    | 0.31               | 0.90                    | ±12.0%      |
| 2450                 | 39.2                               | 1.80                            | 7.58    | 7.58    | 7.58    | 0.34               | 0.90                    | ±12.0%      |
| 2600                 | 39.0                               | 1.96                            | 7.38    | 7.38    | 7.38    | 0.41               | 0.90                    | ±12.0%      |
| 3300                 | 38.2                               | 2.71                            | 6.92    | 6.92    | 6.92    | 0.40               | 1.30                    | ±13.1%      |
| 3500                 | 37.9                               | 2.91                            | 6.85    | 6.85    | 6.85    | 0.40               | 1.30                    | ±13.1%      |
| 3700                 | 37.7                               | 3.12                            | 6.82    | 6.82    | 6.82    | 0.35               | 1.30                    | ±13.1%      |
| 5250                 | 35.9                               | 4.71                            | 4.80    | 4.80    | 4.80    | 0.40               | 1.80                    | ±13.1%      |
| 5600                 | 35.5                               | 5.07                            | 4.42    | 4.42    | 4.42    | 0.40               | 1.80                    | ±13.1%      |
| 5800                 | 35.3                               | 5.27                            | 4.40    | 4.40    | 4.40    | 0.40               | 1.80                    | ±13.1%      |

<sup>C</sup> Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4–9 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

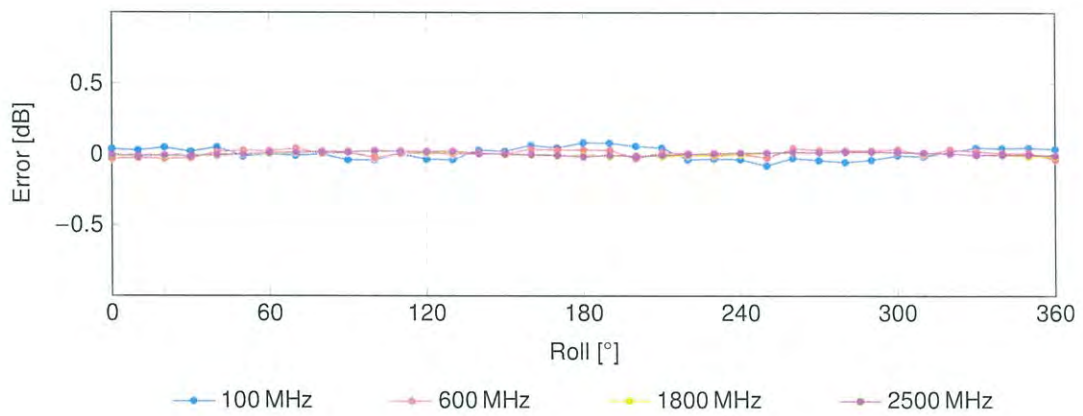
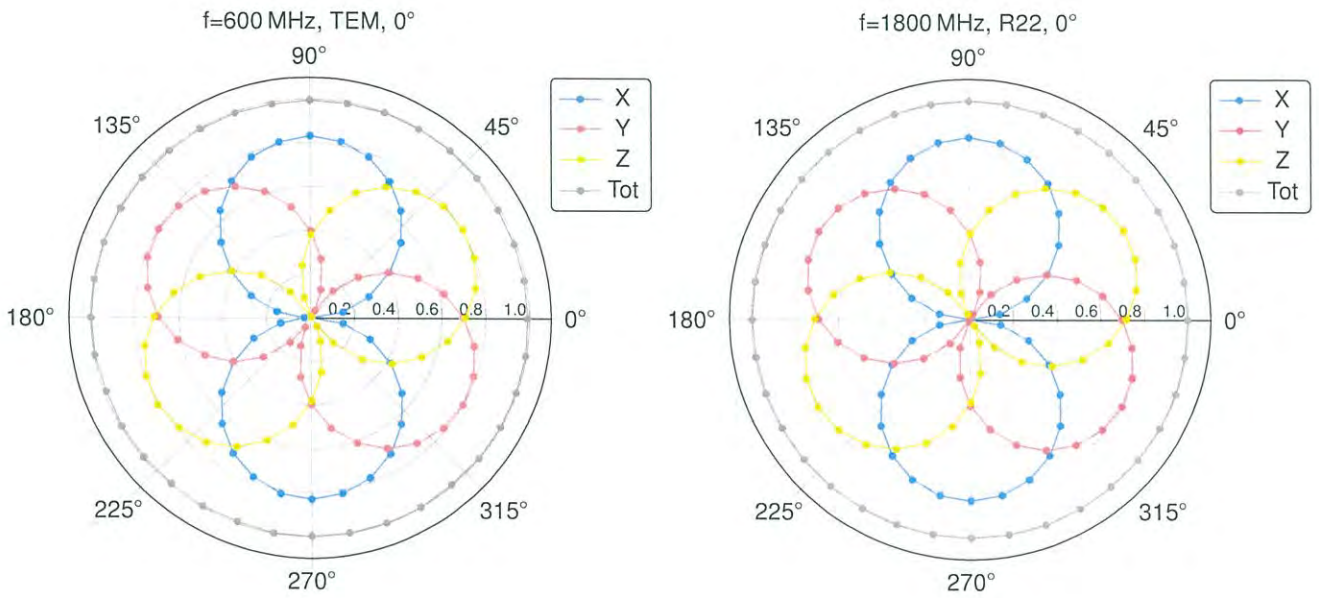
<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz and below ±2% for frequencies between 3–6 GHz at any distance larger than half the probe tip diameter from the boundary.

### Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide:R22)



Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

### Receiving Pattern ( $\phi$ ), $\vartheta = 0^\circ$

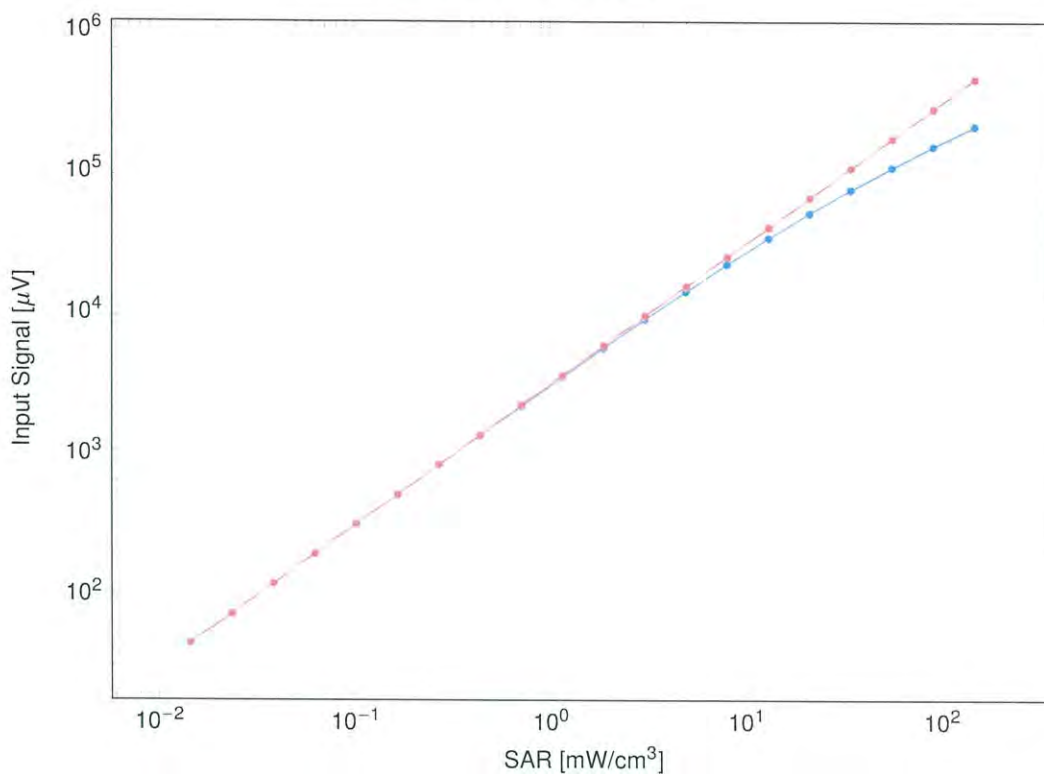


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

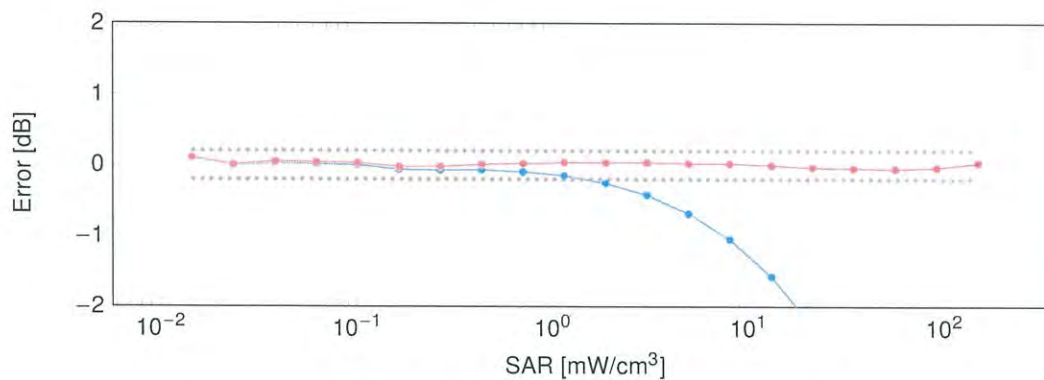


### Dynamic Range f(SAR<sub>head</sub>)

(TEM cell, f<sub>eval</sub> = 1900 MHz)



—•— not compensated      —•— compensated

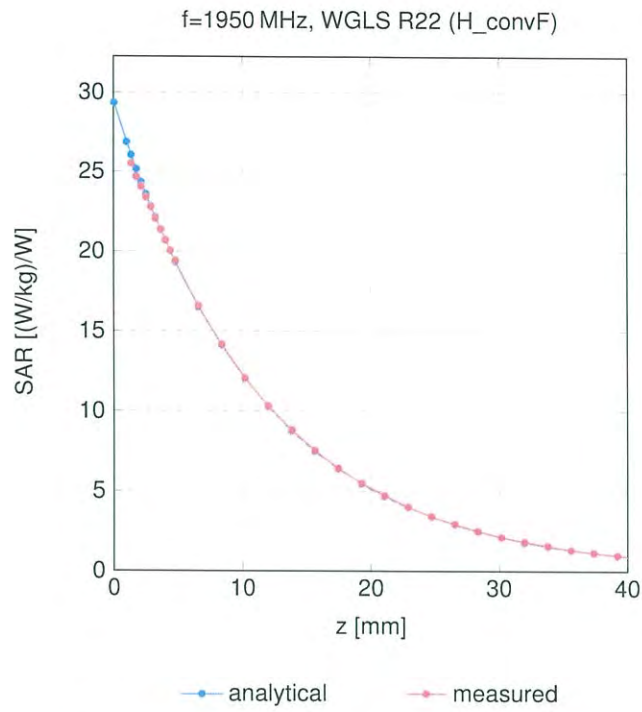


—•— not compensated      —•— compensated

Uncertainty of Linearity Assessment: ±0.6% (k=2)

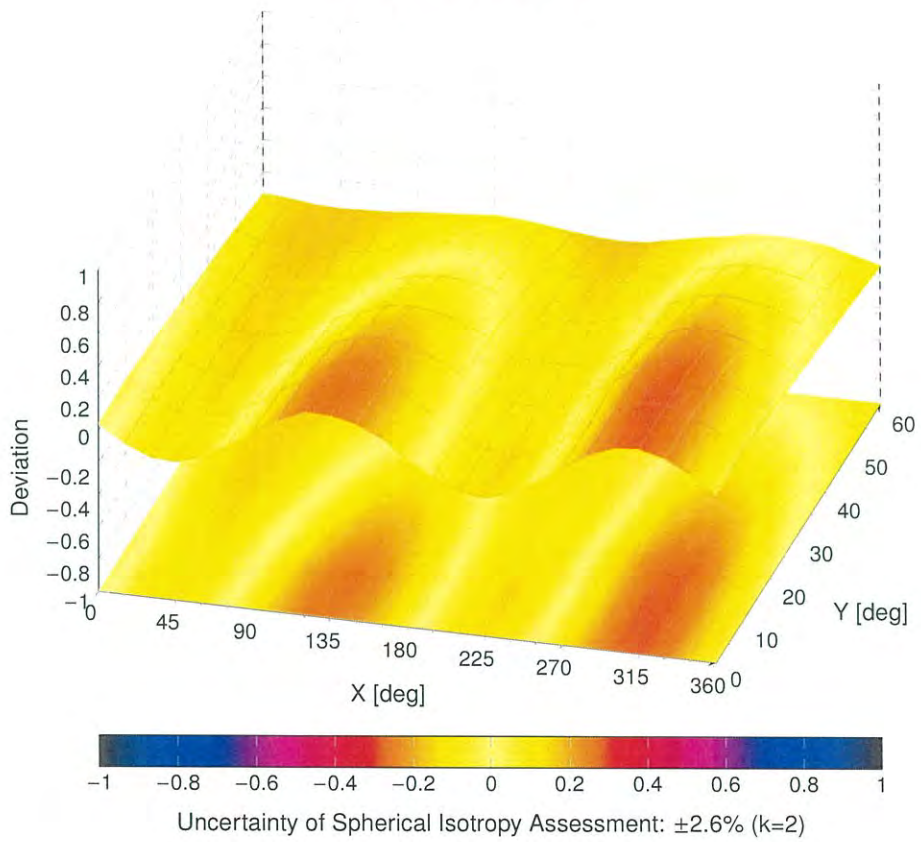


### Conversion Factor Assessment



### Deviation from Isotropy in Liquid

Error ( $\phi, \theta$ ), f = 900 MHz



---

## Appendix E. Dipole & Source Calibration



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **DEKRA (Auden)**

Certificate No: **D2450V2-930\_Nov22**

## CALIBRATION CERTIFICATE

Object **D2450V2 - SN:930**

Calibration procedure(s) **QA CAL-05.v11  
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz**

Calibration date: **November 21, 2022**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature ( $22 \pm 3$ )°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards           | ID #               | Cal Date (Certificate No.)      | Scheduled Calibration |
|-----------------------------|--------------------|---------------------------------|-----------------------|
| Power meter NRP             | SN: 104778         | 04-Apr-22 (No. 217-03525/03524) | Apr-23                |
| Power sensor NRP-Z91        | SN: 103244         | 04-Apr-22 (No. 217-03524)       | Apr-23                |
| Power sensor NRP-Z91        | SN: 103245         | 04-Apr-22 (No. 217-03525)       | Apr-23                |
| Reference 20 dB Attenuator  | SN: BH9394 (20k)   | 04-Apr-22 (No. 217-03527)       | Apr-23                |
| Type-N mismatch combination | SN: 310982 / 06327 | 04-Apr-22 (No. 217-03528)       | Apr-23                |
| Reference Probe EX3DV4      | SN: 7349           | 31-Dec-21 (No. EX3-7349_Dec21)  | Dec-22                |
| DAE4                        | SN: 601            | 31-Aug-22 (No. DAE4-601_Aug22)  | Aug-23                |

| Secondary Standards             | ID #           | Check Date (in house)             | Scheduled Check        |
|---------------------------------|----------------|-----------------------------------|------------------------|
| Power meter E4419B              | SN: GB39512475 | 30-Oct-14 (in house check Oct-22) | In house check: Oct-24 |
| Power sensor HP 8481A           | SN: US37292783 | 07-Oct-15 (in house check Oct-22) | In house check: Oct-24 |
| Power sensor HP 8481A           | SN: MY41093315 | 07-Oct-15 (in house check Oct-22) | In house check: Oct-24 |
| RF generator R&S SMT-06         | SN: 100972     | 15-Jun-15 (in house check Oct-22) | In house check: Oct-24 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-22) | In house check: Oct-24 |

|                |                               |                                   |               |
|----------------|-------------------------------|-----------------------------------|---------------|
| Calibrated by: | Name<br><b>Jeton Kastrati</b> | Function<br>Laboratory Technician | Signature<br> |
| Approved by:   | Name<br><b>Sven Kühn</b>      | Technical Manager                 |               |

Issued: November 22, 2022

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

### Glossary:

|       |                                 |
|-------|---------------------------------|
| TSL   | tissue simulating liquid        |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A   | not applicable or not measured  |

### Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### Additional Documentation:

- DASY System Handbook

### Methods Applied and Interpretation of Parameters:

- Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:* The source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- SAR measured:* SAR measured at the stated antenna input power.
- SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%.

## Measurement Conditions

DASY system configuration, as far as not given on page 1.

|                              |                        |             |
|------------------------------|------------------------|-------------|
| DASY Version                 | DASY52                 | V52.10.4    |
| Extrapolation                | Advanced Extrapolation |             |
| Phantom                      | Modular Flat Phantom   |             |
| Distance Dipole Center - TSL | 10 mm                  | with Spacer |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm      |             |
| Frequency                    | 2450 MHz $\pm$ 1 MHz   |             |

## Head TSL parameters

The following parameters and calculations were applied.

|   | Temperature         | Permittivity   | Conductivity         |
|---|---------------------|----------------|----------------------|
| Nominal Head TSL parameters             | 22.0 °C             | 39.2           | 1.80 mho/m           |
| Measured Head TSL parameters            | (22.0 $\pm$ 0.2) °C | 38.4 $\pm$ 6 % | 1.87 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | < 0.5 °C            | ----           | ----                 |

## SAR result with Head TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |  |
|---|--------------------|--|
| SAR measured  | 250 mW input power | 13.4 W/kg                                      |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>52.4 W/kg <math>\pm</math> 17.0 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |  |
|---|--------------------|--|
| SAR measured  | 250 mW input power | 6.24 W/kg                                      |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>24.6 W/kg <math>\pm</math> 16.5 % (k=2)</b> |

## Appendix (Additional assessments outside the scope of SCS 0108)

### Antenna Parameters with Head TSL

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.7 $\Omega$ + 2.9 j $\Omega$ |
| Return Loss                          | - 26.8 dB                      |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.157 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

|                 |       |
|-----------------|-------|
| Manufactured by | SPEAG |
|-----------------|-------|

## DASY5 Validation Report for Head TSL

Date: 21.11.2022

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:930**

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.87$  S/m;  $\epsilon_r = 38.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96) @ 2450 MHz; Calibrated: 31.12.2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 31.08.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

### Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 115.6 V/m; Power Drift = 0.00 dB

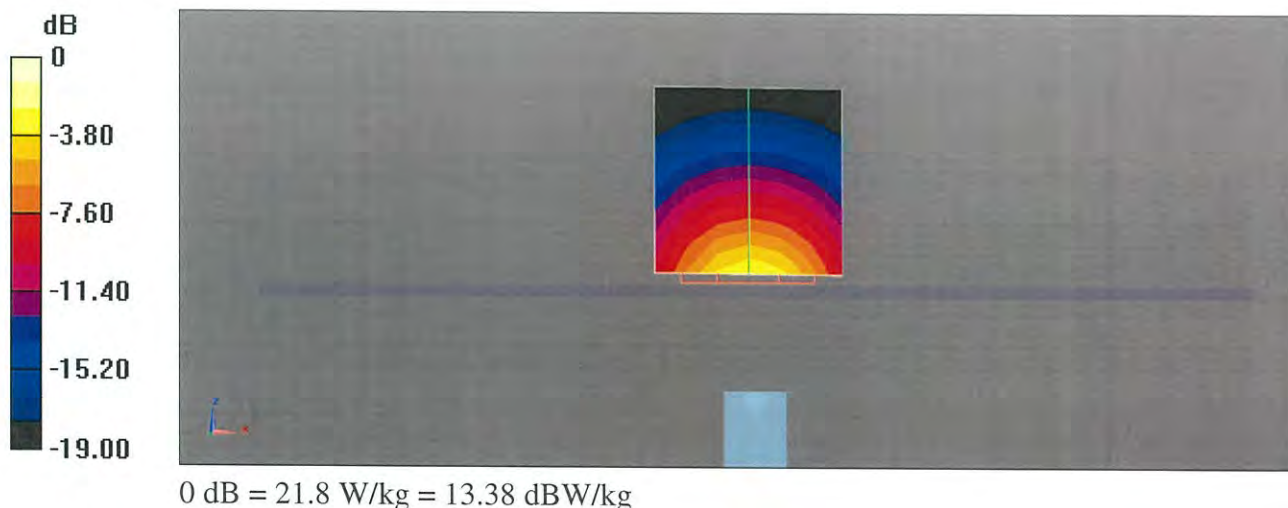
Peak SAR (extrapolated) = 25.9 W/kg

**SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.24 W/kg**

Smallest distance from peaks to all points 3 dB below = 9 mm

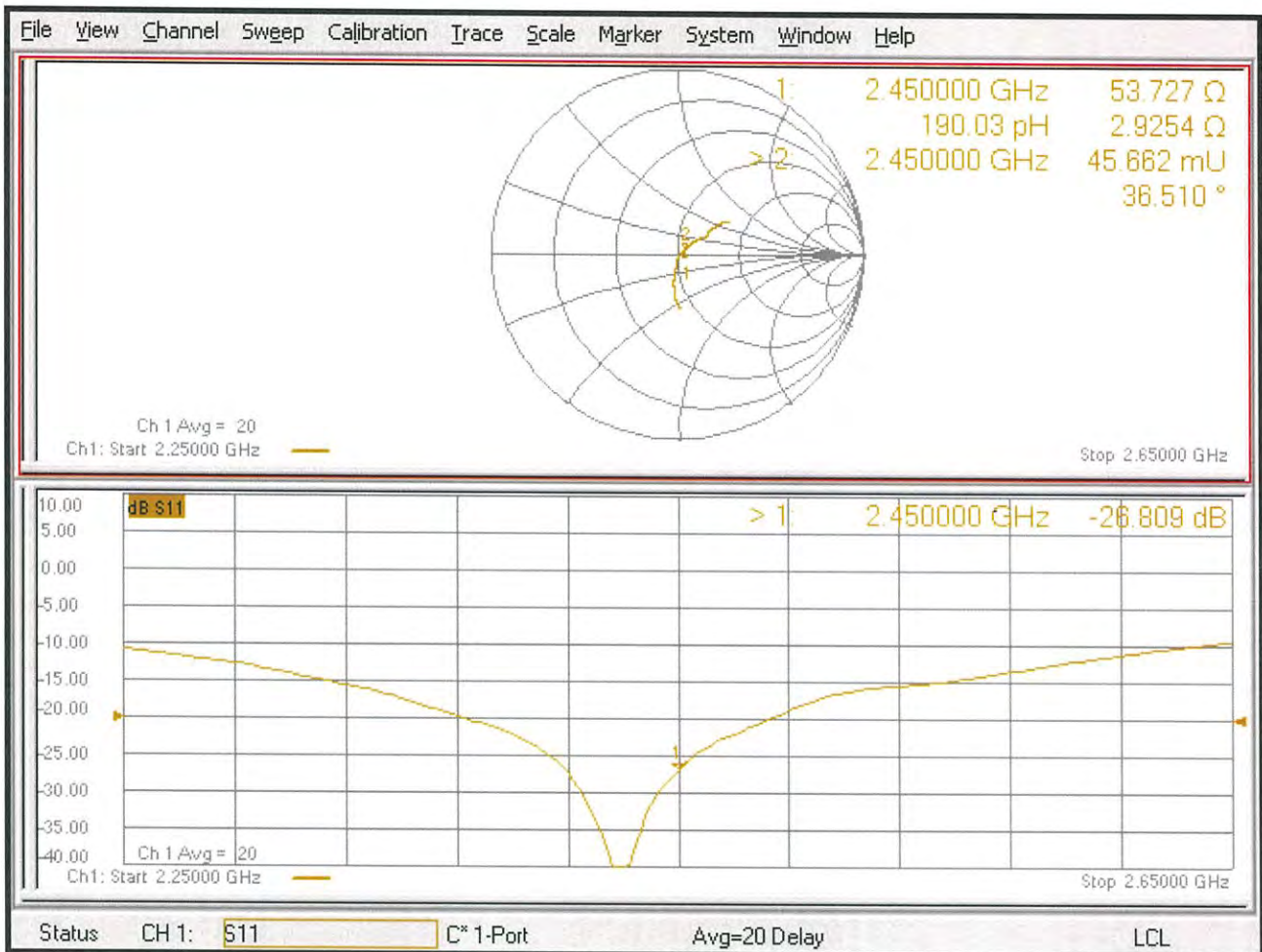
Ratio of SAR at M2 to SAR at M1 = 51.7%

Maximum value of SAR (measured) = 21.8 W/kg





# Impedance Measurement Plot for Head TSL







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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **Dekra-TW (Auden)**

Certificate No: **D5GHzV2-1321\_Feb21**

## CALIBRATION CERTIFICATE

Object **D5GHzV2 - SN:1321**

Calibration procedure(s) **QA CAL-22.v6  
Calibration Procedure for SAR Validation Sources between 3-10 GHz**

Calibration date: **February 05, 2021**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature ( $22 \pm 3$ )°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards           | ID #               | Cal Date (Certificate No.)      | Scheduled Calibration |
|-----------------------------|--------------------|---------------------------------|-----------------------|
| Power meter NRP             | SN: 104778         | 01-Apr-20 (No. 217-03100/03101) | Apr-21                |
| Power sensor NRP-Z91        | SN: 103244         | 01-Apr-20 (No. 217-03100)       | Apr-21                |
| Power sensor NRP-Z91        | SN: 103245         | 01-Apr-20 (No. 217-03101)       | Apr-21                |
| Reference 20 dB Attenuator  | SN: BH9394 (20k)   | 31-Mar-20 (No. 217-03106)       | Apr-21                |
| Type-N mismatch combination | SN: 310982 / 06327 | 31-Mar-20 (No. 217-03104)       | Apr-21                |
| Reference Probe EX3DV4      | SN: 3503           | 30-Dec-20 (No. EX3-3503_Dec20)  | Dec-21                |
| DAE4                        | SN: 601            | 02-Nov-20 (No. DAE4-601_Nov20)  | Nov-21                |

| Secondary Standards             | ID #           | Check Date (in house)             | Scheduled Check        |
|---------------------------------|----------------|-----------------------------------|------------------------|
| Power meter E4419B              | SN: GB39512475 | 30-Oct-14 (in house check Oct-20) | In house check: Oct-22 |
| Power sensor HP 8481A           | SN: US37292783 | 07-Oct-15 (in house check Oct-20) | In house check: Oct-22 |
| Power sensor HP 8481A           | SN: MY41092317 | 07-Oct-15 (in house check Oct-20) | In house check: Oct-22 |
| RF generator R&S SMT-06         | SN: 100972     | 15-Jun-15 (in house check Oct-20) | In house check: Oct-22 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-20) | In house check: Oct-21 |

Calibrated by: **Claudio Leubler**      Name: Claudio Leubler      Function: Laboratory Technician

Signature

Approved by: **Katja Pokovic**      Name: Katja Pokovic      Function: Technical Manager

Issued: February 5, 2021

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.





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Accreditation No.: **SCS 0108**

### Glossary:

|       |                                 |
|-------|---------------------------------|
| TSL   | tissue simulating liquid        |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A   | not applicable or not measured  |

### Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "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)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### Additional Documentation:

- DASY4/5 System Handbook

### Methods Applied and Interpretation of Parameters:

- Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:* SAR measured at the stated antenna input power.
- SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%.



## Measurement Conditions

DASY system configuration, as far as not given on page 1.

|                              |  |                                  |
|------------------------------|--|----------------------------------|
| DASY Version                 | DASY5  | V52.10.4                         |
| Extrapolation                | Advanced Extrapolation                                   |                                  |
| Phantom                      | Modular Flat Phantom V5.0                                |                                  |
| Distance Dipole Center - TSL | 10 mm  | with Spacer                      |
| Zoom Scan Resolution         | dx, dy = 10.0 mm, dz = 10.0 mm                           | Graded Ratio = 1.4 (Z direction) |
| Frequency                    | 5250 MHz ± 1 MHz<br>5600 MHz ± 1 MHz<br>5800 MHz ± 1 MHz |                                  |

## Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

|   | Temperature     | Permittivity | Conductivity     |
|---|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 35.9         | 4.71 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 34.7 ± 6 %   | 4.54 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        | ----         | ----             |

## SAR result with Head TSL at 5250 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                                 |
|---|--------------------|---------------------------------|
| SAR measured  | 100 mW input power | 8.14 W/kg                       |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>80.8 W/kg ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                                 |
|---|--------------------|---------------------------------|
| SAR measured  | 100 mW input power | 2.34 W/kg                       |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>23.2 W/kg ± 19.5 % (k=2)</b> |

## Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

|   | Temperature     | Permittivity | Conductivity     |
|---|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 35.5         | 5.07 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 34.2 ± 6 %   | 4.88 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        | ----         | ----             |

## SAR result with Head TSL at 5600 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                                 |
|---|--------------------|---------------------------------|
| SAR measured  | 100 mW input power | 8.50 W/kg                       |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>84.2 W/kg ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                                 |
|---|--------------------|---------------------------------|
| SAR measured  | 100 mW input power | 2.41 W/kg                       |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>23.8 W/kg ± 19.5 % (k=2)</b> |

### Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

|   | Temperature     | Permittivity | Conductivity     |
|---|-----------------|--------------|------------------|
| Nominal Head TSL parameters             | 22.0 °C         | 35.3         | 5.27 mho/m       |
| Measured Head TSL parameters            | (22.0 ± 0.2) °C | 33.9 ± 6 %   | 5.09 mho/m ± 6 % |
| Head TSL temperature change during test | < 0.5 °C        | ----         | ----             |

### SAR result with Head TSL at 5800 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                                 |
|---|--------------------|---------------------------------|
| SAR measured  | 100 mW input power | 8.26 W/kg                       |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>81.8 W/kg ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                                 |
|---|--------------------|---------------------------------|
| SAR measured  | 100 mW input power | 2.33 W/kg                       |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>23.0 W/kg ± 19.5 % (k=2)</b> |

## Appendix (Additional assessments outside the scope of SCS 0108)

### Antenna Parameters with Head TSL at 5250 MHz

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 50.8 $\Omega$ - 0.8 $j\Omega$ |
| Return Loss                          | - 39.2 dB                     |

### Antenna Parameters with Head TSL at 5600 MHz

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 52.9 $\Omega$ + 3.3 $j\Omega$ |
| Return Loss                          | - 27.4 dB                     |

### Antenna Parameters with Head TSL at 5800 MHz

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 53.0 $\Omega$ + 6.1 $j\Omega$ |
| Return Loss                          | - 23.6 dB                     |

### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.200 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

|                 |       |
|-----------------|-------|
| Manufactured by | SPEAG |
|-----------------|-------|



Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1321**

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz  
Medium parameters used:  $f = 5250$  MHz;  $\sigma = 4.54$  S/m;  $\epsilon_r = 34.7$ ;  $\rho = 1000$  kg/m<sup>3</sup> ,  
Medium parameters used:  $f = 5600$  MHz;  $\sigma = 4.88$  S/m;  $\epsilon_r = 34.2$ ;  $\rho = 1000$  kg/m<sup>3</sup> ,  
Medium parameters used:  $f = 5800$  MHz;  $\sigma = 5.09$  S/m;  $\epsilon_r = 33.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.5, 5.5, 5.5) @ 5250 MHz, ConvF(5.1, 5.1, 5.1) @ 5600 MHz, ConvF(5.01, 5.01, 5.01) @ 5800 MHz; Calibrated: 30.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan,**

**dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 78.25 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 27.6 W/kg

**SAR(1 g) = 8.14 W/kg; SAR(10 g) = 2.34 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 70.4%

Maximum value of SAR (measured) = 18.4 W/kg

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan,**

**dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 78.32 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 31.4 W/kg

**SAR(1 g) = 8.50 W/kg; SAR(10 g) = 2.41 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 67.8%

Maximum value of SAR (measured) = 19.7 W/kg

**Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan,**

**dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 75.73 V/m; Power Drift = 0.01 dB

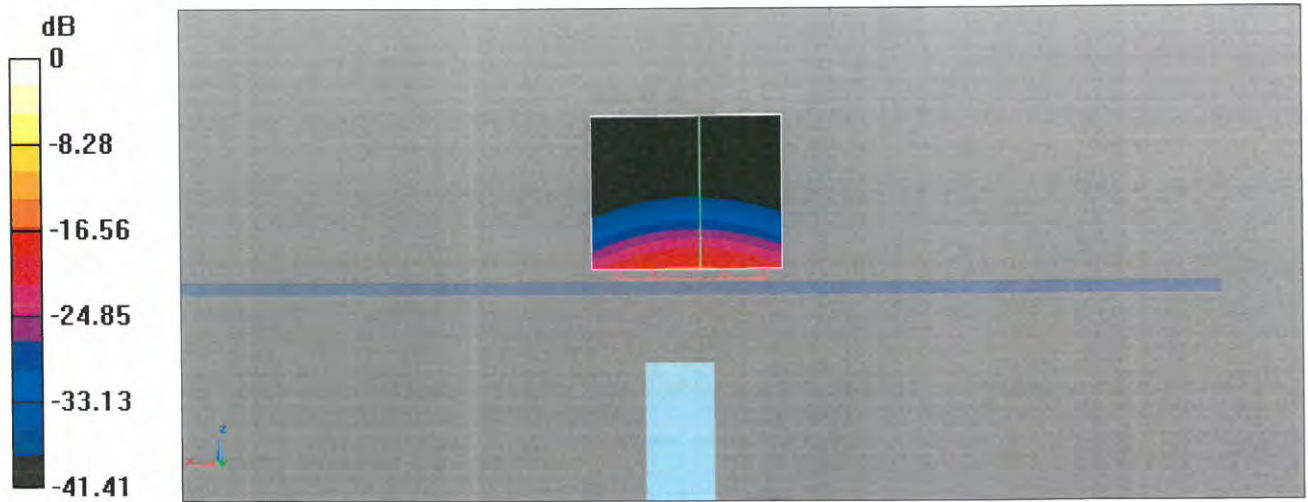
Peak SAR (extrapolated) = 32.3 W/kg

**SAR(1 g) = 8.26 W/kg; SAR(10 g) = 2.33 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 66.3%

Maximum value of SAR (measured) = 19.4 W/kg



0 dB = 19.7 W/kg = 12.94 dBW/kg

# Impedance Measurement Plot for Head TSL

