Test report No.: 23C0865R-SAUSV01S-A

Testing Laboratory
3023

# SAR Test Report
# (Class II Permissive Change)

| | |
|---|---|
| Product Name | Intel Wi-Fi 6E AX211 |
| Trademark | Intel |
| Model and /or type reference | AX211D2W |
| Applicant´s name / address | ASUSTeK Computer, Inc<br>1F, No. 15, Lide Rd, Beitou, Taipei, 112 Taiwan |
| Manufacturer´s name | Intel Corporation |
| FCC ID | MSQAX211D2 |
| 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: **0.698** W/kg<br>5 GHz: **1.096** W/kg<br>6 GHz: **1.164** W/kg<br>Max. psPD Measurement (4cm$^2$)<br>6 GHz: **7.037** W/m$^2$ |
| Verdict Summary | IN COMPLIANCE |
| Documented By<br>(Senior Project Specialist / April Chen) | April Chen |
| Tested By<br>(Senior Engineer / Luke Cheng) | Luke Cheng |
| Approved By<br>(Assistant Manager / San Lin) | San Lin |
| Date of Receipt | 2023/12/27 |
| Date of Issue | 2024/03/07 |
| Report Version | V1.0 |

## INDEX

## Competences and Guarantees

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.

**IMPORTANT:** No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

## General conditions

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

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| 23C0865R-SAUSV01S-A | V1.0 | Initial issue of report. | 2024/03/07 |

# 1. General Information

## 1.1 EUT Description

| | |
|---|---|
| Product Name | Intel Wi-Fi 6E AX211 |
| Trademark | Intel |
| Model and /or type reference | AX211D2W |
| Test Sample | S5506M |
| FCC ID | MSQAX211D2 |
| Frequency Range | WLAN 2.4GHz: 2412-2472MHz<br>WLAN 5GHz: 5180-5240MHz, 5260-5320MHz, 5500-5720MHz, 5745-5825MHz, 5845-5885MHz<br>WLAN 6GHz: 5955-7115MHz<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 1g SAR (W/Kg) | | | | |
|---|---|---|---|---|
| Test configuration | DTS | NII | 6XD | DSS(BT) |
| Standalone | 0.698 | 1.096 | 1.164 | 0.182 |
| Simultaneous | 1.352 | 2.340 (SPLSR=0.01) | 2.507 (SPLSR=0.01) | 2.507 (SPLSR=0.01) |
| Summary of test result – Power Density | | | | |
| Test configuration | 6XD | | | |
| APD ($W/m^2$) | 6.870 | | | |
| Reported PD ($W/m^2$) | 7.037 | | | |

Note:

| Host information | | | |
|---|---|---|---|
| Brand | Product Name | Model No. | Difference |
| ASUS | Notebook PC | S5506M | All models are electrically identical, different model names are for marketing purpose. |
| | | K5506M | |
| | | V5506M | |
| | | P5506CM | |
| | | S5606M | |
| | | K5606M | |
| | | V5606M | |
| | | P5606CM | |
| The representative test sample is S5506M. | | | |

## 1.2 Antenna List

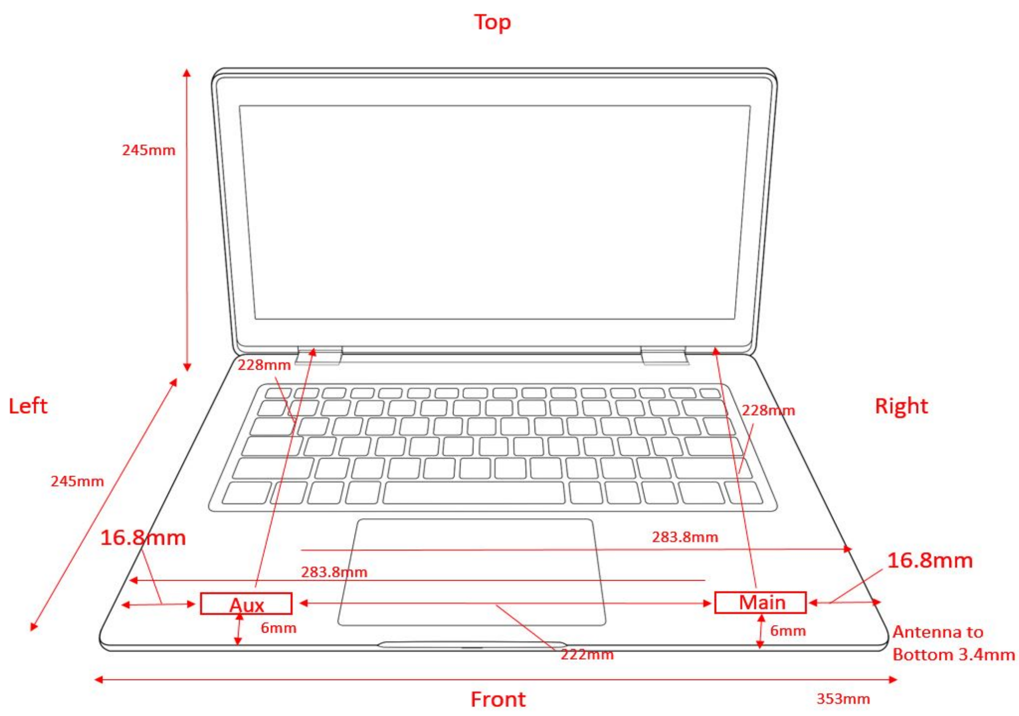
| No. | Manufacturer | Part No. | ASUS Part No. | Antenna Type | Peak Gain |
|---|---|---|---|---|---|
| 1 | Luxshare-ICT | LA9RF570-CS-H (Main) | (14008-05990300) (Main) | PIFA | 1.07 dBi for 2400 MHz<br>3.55 dBi for 5150~5250 MHz<br>3.55 dBi for 5250~5350 MHz<br>4.61 dBi for 5470~5725 MHz<br>4.61 dBi for 5725~5850 MHz<br>2.56 dBi for 5850~5895 MHz<br>4.53 dBi for 5925~6425 MHz<br>2.85 dBi for 6425~6525 MHz<br>2.92 dBi for 6525~6875 MHz<br>4.06 dBi for 6875~7125 MHz |
| | | LA9RF571-CS-H (Aux) | (14008-05990200) (Aux) | | 0.73 dBi for 2400 MHz<br>3.38 dBi for 5150~5250 MHz<br>1.4 dBi for 5250~5350 MHz<br>2.04 dBi for 5470~5725 MHz<br>2.27 dBi for 5725~5850 MHz<br>1.38 dBi for 5850~5895 MHz<br>1.1 dBi for 5925~6425 MHz<br>1.13 dBi for 6425~6525 MHz<br>1.13 dBi for 6525~6875 MHz<br>2.44 dBi for 6875~7125 MHz |

Note: The above EUT information by host manufacturer.

## 1.3 SAR Test Exclusion Calculation

According to KDB Publication 616217 D04, SAR evaluation is required for the bottom surface of the laptop keyboard.

The laptop does not support flip to PAD mode, the antenna is installed on the keyboard, the distance from the bottom is 3.4 mm, and considering that the antenna distance from the front edge is 6 mm, was tested the bottom and front edge of the keyboard.



## 1.4 Test Environment

Ambient conditions in the laboratory:

Test Date: 2024/01/08 - 2024/01/16

| 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 |

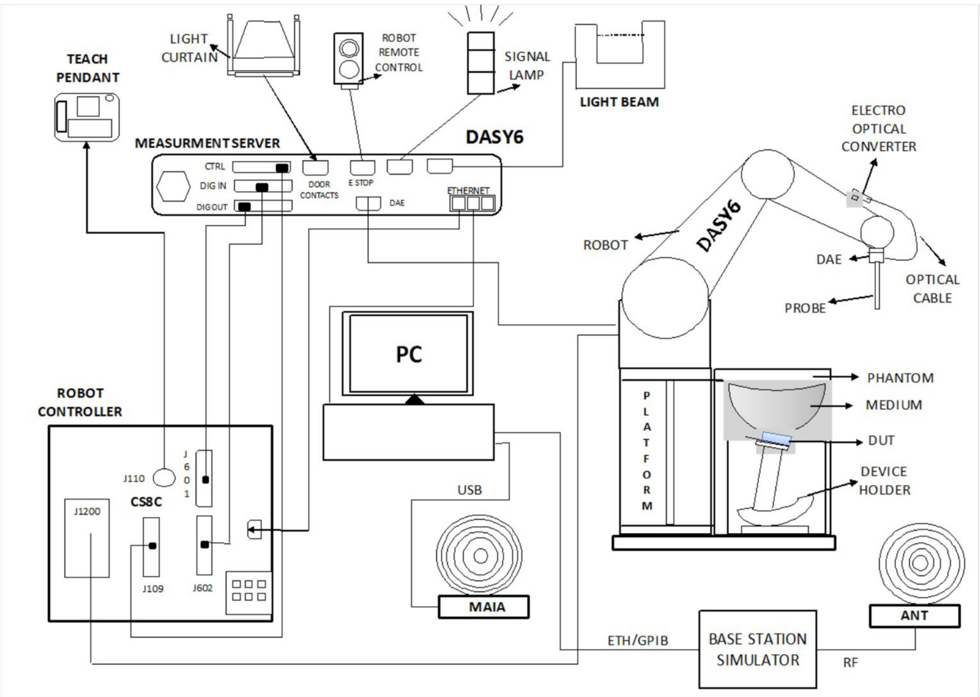
## 1.5 Measurement procedures

IEEE 1528-2013
47CFR § 2.1093
KDB 248227 D01 v02r02
KDB 447498 D01 v06
KDB 616217 D04 v01r02
KDB 865664 D01 v01r04
IEC TR 63170:2018
IEC/IEEE 62209-1528:2020

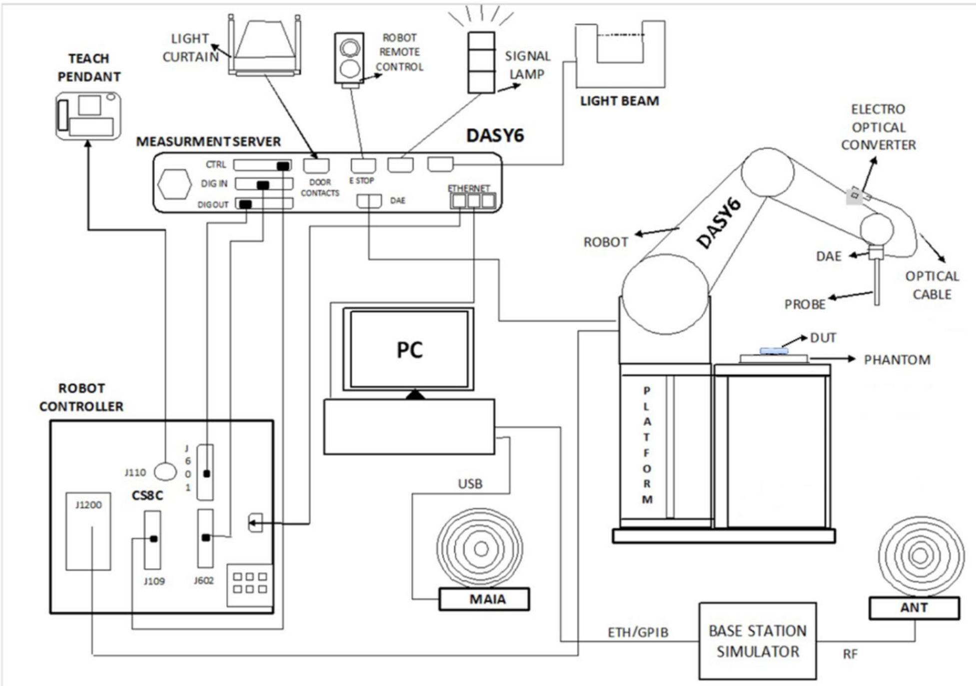
# 2. SAR Measurement System

## 2.1 DASY System Description

SAR Configurations is shown below:




Power Density 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 10mm² 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/m³ 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 ± 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

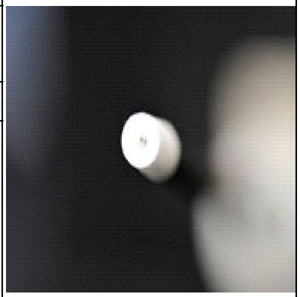
The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

SPEAG conducts the probe calibration in compliance with international and national standards under ISO 17025. The calibration data are in Appendix D.

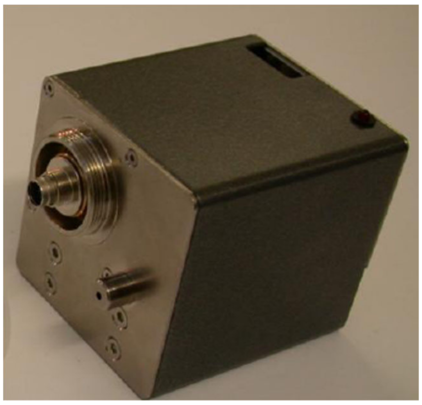
**Isotropic E-Field Probe Specification**

<table>
<tr><td>Model</td><td colspan="2">Ex3DV4</td></tr>
<tr><td>Construction</td><td colspan="2">Symmetrical design with triangular core Built-in shielding against static charges<br>PEEK enclosure material (resistant to organic solvents, e.g., DGBE)</td></tr>
<tr><td>Frequency</td><td>4 MHz – 10 GHz<br>Linearity: ± 0.2 dB (30 MHz to 10 GHz)</td><td rowspan="4"></td></tr>
<tr><td>Directivity</td><td>± 0.1 dB in TSL (rotation around probe axis)<br>± 0.3 dB in TSL (rotation normal to probe axis)</td></tr>
<tr><td>Dynamic Range</td><td>10 µW/g to 100 mW/g<br>Linearity: ± 0.2 dB (noise: typically < 1 µW/g)</td></tr>
<tr><td>Dimensions</td><td>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</td></tr>
<tr><td>Application</td><td colspan="2">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%.</td></tr>
</table>

## E-Field mm-Wave Probe Specification

| | | |
|---|---|---|
| **Model** | EUmmWVx | |
| **Construction** | Two dipoles optimally arranged to obtain pseudo-vector information<br>Minimum three measurements/point, 120º rotated around probe axis<br>Sensors (0.8 mm length) printed on glass substrate protected by high density foam | |
| **Frequency** | 750 MHz to 110 GHz | |
| **Dynamic Range** | < 20 V/m to 10000 V/m with PRE-10<br>(min < 20 V/m to 2000 V/m) |  |
| **Position Precision** | < 0.2 mm | |
| **Dimensions** | 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 | |
| **Application** | 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.

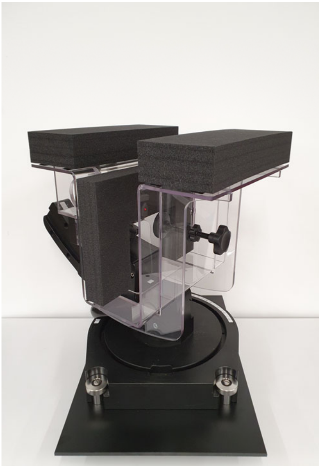
## 2.5 Robot

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.

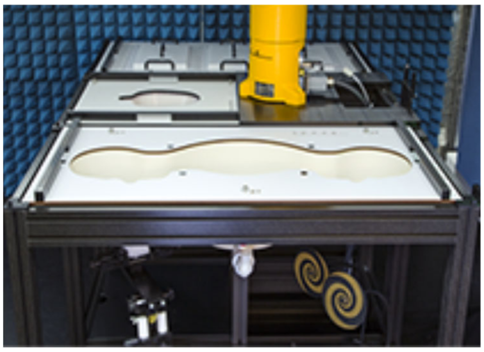
The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity εr = 3 and loss tangent $\delta$ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that 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.

### 2.7.2 mmWave Phantom

The mmWave Phantom approximates free-space conditions, allowing to evaluate not only the antenna side of the device but also the front (screen) side or any opposite-radiating side of wireless devices operating above 10 GHz without distorting the RF field. It consists of a 40 mm thick Rohacell plate used as a test bed, which has a loss tangent ($\tan\delta$) ≤ 0.05 and a relative permittivity ($\varepsilon_r$) ≤ 1.2. High-performance RF absorbers are placed below the foam.

# 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 | **Ethanediol**<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 | **Sodium petroleum sulfonate**<br>Eye Irrit. 2, H319 | < 2.9% |
| CAS: 107-41-5<br>EINECS: 203-489-0<br>Reg.nr.: 01-2119539582-35-0000 | **Hexylene Glycol / 2-Methyl-pentane-2,4-diol**<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 | **Alkoxylated alcohol, > $C_{16}$**<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 (εr) | | | Conductivity (σ) | | | Tissue Temp. (°C) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Measured | Target | Delta (%) | Measured | Target | Delta (%) | |
| 2024/1/8 | Head | 2450 | 40.10 | 39.20 | 2.30 | 1.81 | 1.80 | 0.56 | 21.6 |
| | Head | 2412 | 40.20 | 39.28 | 2.34 | 1.75 | 1.77 | -1.13 | |
| | Head | 2437 | 40.10 | 39.23 | 2.22 | 1.78 | 1.79 | -0.56 | |
| | Head | 2441 | 40.10 | 39.22 | 2.24 | 1.79 | 1.79 | 0.00 | |
| | Head | 2462 | 40.00 | 39.18 | 2.09 | 1.81 | 1.81 | 0.00 | |
| | Head | 5250 | 36.20 | 35.95 | 0.70 | 4.64 | 4.71 | -1.49 | |
| | Head | 5210 | 36.30 | 35.99 | 0.86 | 4.58 | 4.67 | -1.93 | |
| | Head | 5290 | 36.10 | 35.91 | 0.53 | 4.69 | 4.75 | -1.26 | |
| | Head | 5600 | 35.30 | 35.50 | -0.56 | 5.11 | 5.07 | 0.79 | |
| | Head | 5530 | 35.40 | 35.61 | -0.59 | 5.02 | 5.00 | 0.40 | |
| | Head | 5610 | 35.20 | 35.49 | -0.82 | 5.13 | 5.08 | 0.98 | |
| | Head | 5690 | 35.00 | 35.41 | -1.16 | 5.23 | 5.16 | 1.36 | |
| | Head | 5800 | 34.70 | 35.30 | -1.70 | 5.37 | 5.27 | 1.90 | |
| | Head | 5775 | 34.80 | 35.33 | -1.50 | 5.34 | 5.25 | 1.71 | |
| | Head | 5855 | 34.60 | 35.25 | -1.84 | 5.45 | 5.33 | 2.25 | |

| Date | Tissue Type | Frequency (MHz) | Relative Permittivity (εr) | | | Conductivity (σ) | | | Tissue Temp. (°C) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Measured | Target | Delta (%) | Measured | Target | Delta (%) | |
| 2024/1/9 | Head | 6500 | 35.30 | 34.50 | 2.32 | 5.93 | 6.07 | -2.31 | 22.1 |
| | Head | 6025 | 36.10 | 35.07 | 2.94 | 5.37 | 5.51 | -2.54 | |
| | Head | 6185 | 35.80 | 34.88 | 2.64 | 5.56 | 5.70 | -2.46 | |
| | Head | 6505 | 35.20 | 34.49 | 2.05 | 5.94 | 6.08 | -2.30 | |
| | Head | 6825 | 34.70 | 34.11 | 1.73 | 6.32 | 6.45 | -2.02 | |
| | Head | 6985 | 34.40 | 33.92 | 1.42 | 6.51 | 6.63 | -1.81 | |

## 3.3 Tissue Dielectric Parameters for 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 | Head | |
|---|---|---|
| (MHz) | $\varepsilon_r$ | σ (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 | 35.5 | 5.07 |
| 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 |

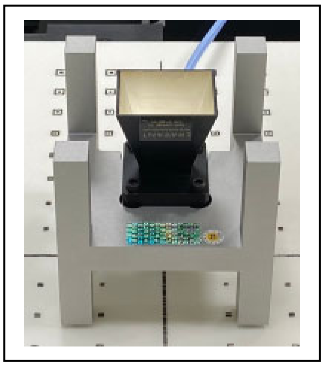
# 4. Measurement Procedure

## 4.1 SAR System Check

### 4.1.1 Dipoles

The SAR dipoles are optimized symmetrical dipole with λ/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 Verification Source



The verification sources apply to system check or verification at specific mmWave frequencies. The sources comprisehorn-antennas and very stable signal generators.

### 4.1.3 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 (%) | Measured 10g SAR (W/kg) | Targeted 10g SAR (W/kg) | Normalized 10g SAR (W/kg) | Delta 10g (%) | Tissue Temp. (°C) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2024/1/8 | 2450 | 250 | 12.30 | 52.40 | 49.2 | -6.11 | 5.80 | 24.60 | 23.2 | -5.69 | 21.6 |
| 2024/1/8 | 5250 | 100 | 8.22 | 80.80 | 82.2 | 1.73 | 2.39 | 23.20 | 23.9 | 3.02 | 21.6 |
| | 5600 | 100 | 8.51 | 84.20 | 85.1 | 1.07 | 2.41 | 23.80 | 24.1 | 1.26 | |
| | 5800 | 100 | 8.27 | 81.80 | 82.7 | 1.10 | 2.33 | 23.00 | 23.3 | 1.30 | |
| 2024/1/9 | 6500 | 100 | 28.90 | 293.00 | 289 | -1.37 | 5.31 | 53.80 | 53.1 | -1.30 | 22.1 |

### 4.1.4 Power Density System Check Result

The system performance check verifies that the system operates within its specifications.

The system check is successful if the difference between the normalized measured local power density and the numerically validated target value is within the reported expanded uncertainty of the measurement system.

The recommended settings for measurement of verification sources are listed in the following:

| Frequency (GHz) | Grid step | Grid extent X/Y (mm) | Measurement points |
|---|---|---|---|
| 10 | 0.125 (λ/8) | 60 / 60 | 18 x 18 |

According to the DASY specification in the user's manual and SPEAG's recommendation, the deviation threshold of ±0.66 dB represents the expanded standard uncertainty for system performance check. The system check is successful if the measured results are within ±0.66 dB tolerances to the target value shown in the calibration certificate of the verification source.

| Date | Frequency (GHz) | Distance (mm) | Input Power (mW) | Measured Avg PD 4 $cm^2$ ($W/m^2$) | Targeted Avg PD 4 $cm^2$ ($W/m^2$) | Deviation (dB) |
|---|---|---|---|---|---|---|
| 2024/1/16 | 10 | 10 | 132 | 177.67 | 172.00 | 0.14 |

Note: The Measured Avg PD was the average of psPDn+, psPDtot+ and psPDmod+, which refers to the demonstration from calibration certificate.

## 4.2 SAR Measurement Procedure

The Dasy calculates SAR using the following equation,

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

Where：

σ: represents the simulated tissue conductivity

ρ: 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$^2$ )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$^3$).

## 4.3 Absorbed Power Density (APD)

Absorbed Power Density (APD) is defined as the energy flow per unit area directly under the body surface that based on Poynting vector. The equation description is as below:

$$S_{ab} = \iint_A \mathrm{Re}[\mathrm{S}] \cdot \frac{ds}{A} = \iint_A \mathrm{Re}[\mathrm{E} \times \mathrm{H}^*] \cdot \frac{ds}{A}$$

Where:

E = electric field strength (V/m)

H = magnetic field strength (A/m)

S = power density (W/m2 or mW/cm2)

APD is expressed in units of Watts per square meter or units of milliwatt per square centimeter.

## 4.4 Power Density Measurement Procedure

The power density for an electromagnetic field represents the rate of energy transfer per unit area. The local power density (i.e. Poynting vector) at a given spatial point is deduced from electromagnetic fields by the following formula:

$$\mathrm{S} = \frac{1}{2}\mathrm{Re}[E \times \mathrm{H}^*] \cdot \vec{n}$$

Where: E is the complex electric field peak phasor and H is the complex conjugate magnetic field peak phasor.

The spatial-average power density distribution on the evaluation surface is determined per the IEC TR 63170. The spatial area, A is specified by the applicable exposure limit or regulatory requirements. The circular shape was used.

$$\mathrm{S_{av}} = \frac{1}{2A}\Re\left(\int \mathrm{E} \times \mathrm{H} \cdot \hat{\mathrm{n}}\, \mathrm{dA}\right)$$

## 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) | **1.60 W/kg** |
| Spatial Average SAR (whole body) | **0.08 W/kg** |
| Spatial Peak SAR (10g for hands, feet, ankles and wrist) | **4.00 W/kg** |
| Power density[1] | **1 $mW/cm^2$** |

Note: 1 $mW/cm^2$ = 10 $W/m^2$

## 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 |
| Reference Dipole 6.5GHz | Speag | D6.5GHzV2 | 1021 | 2021/02/09 | 2024/02/08 |
| Verification Source Antenna 10GHz | Speag | 5G Verification Source 10GHz | 2006 | 2023/04/25 | 2024/04/24 |
| Device Holder | Speag | N/A | N/A | N/A | N/A |
| Data Acquisition Electronic | Speag | DAE4 | 1651 | 2023/02/22 | 2024/02/21 |
| Data Acquisition Electronic | Speag | DAE4 | 1791 | 2023/02/01 | 2024/01/31 |
| E-Field Probe | Speag | EX3DV4 | 7784 | 2023/02/01 | 2024/01/31 |
| mmWave E-field Probe | Speag | EUmmWV4 | 9546 | 2023/04/18 | 2024/04/17 |
| SAR Software | Speag | DASY8 | V16.2.4.2524 | N/A | N/A |
| Power Amplifier | Mini-Circuit | ZHL-42 | D051404-20 | N/A | N/A |
| Power Amplifier | Mini-Circuit | ZVE-8G+ | 447202211 | N/A | N/A |
| Directional Coupler | Agilent | 87300C | MY44300353 | N/A | N/A[1] |
| Attenuator | Woken | WATT-218FS-10 | N/A | N/A | N/A[1] |
| Attenuator | Mini-Circuit | BW-S20W2+ | N/A | N/A | N/A[1] |
| Vector Network Analyzer | Agilent | E5071C | MY46108013 | 2023/03/09 | 2024/03/08 |
| Signal Generator | Anritsu | MG3694A | 041902 | 2023/09/07 | 2024/09/06 |
| Power Meter | Anritsu | ML2487A | 6K00001447 | 2023/11/06 | 2024/11/05 |
| Power Sensor | Anritsu | MA2411B | 1339194 | 2023/11/06 | 2024/11/05 |

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.

D2450V2-930

| | Frequency | Tissue | Return loss | Limit | Verified Date |
|---|---|---|---|---|---|
| Calibration | 2450 MHz | Head | -26.8 | Within 20% | 2022/11/21 |
| Measurement | 2450 MHz | Head | -26.79 | | 2023/11/16 |

D5GHzV2-1321

| | 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 |

D6.5GHzV2-1021

| | Frequency | Tissue | Return loss | Limit | Verified Date |
|---|---|---|---|---|---|
| Calibration | 6500 MHz | Head | -34.1 | Within 20% | 2021/2/9 |
| Measurement | 6500 MHz | Head | -31.54 | | 2022/2/9 |
| Measurement | 6500 MHz | Head | -33.89 | | 2023/2/3 |

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.

D2450V2-930

| | Frequency | Tissue | Impedance | Limit | Verified Date |
|---|---|---|---|---|---|
| Calibration | 2450 MHz | Head | 53.7 | Within 5Ω | 2022/11/21 |
| Measurement | 2450 MHz | Head | 53.82 | | 2023/11/16 |

D5GHzV2-1321

| | 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 |

D6.5GHzV2-1021

| | Frequency | Tissue | Impedance | Limit | Verified Date |
|---|---|---|---|---|---|
| Calibration | 6500 MHz | Head | 51.0 | Within 5Ω | 2021/2/9 |
| Measurement | 6500 MHz | Head | 51.08 | | 2022/2/9 |
| Measurement | 6500 MHz | Head | 50.97 | | 2023/2/3 |

# 7. Measurement Uncertainty

| Measurement uncertainty for 300 MHz to 3 GHz | | | | | | | |
|---|---|---|---|---|---|---|---|
| Error Description | Uncert. value | Prob. Dist. | Div. | ($c_i$) 1g | ($c_i$) 10g | Std. Unc. (1g) | Std. Unc. (10g) |
| **Measurement System Errors** | | | | | | | |
| 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% |
| **Phantom and Device Errors** | | | | | | | |
| 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% |
| **Correction to the SAR results** | | | | | | | |
| 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% |
| **Combined Uncertainty** | | | | | | ±11.0% | ±10.9% |
| **Expanded Uncertainty** | | | | | | ±21.9% | ±21.7% |

| Measurement uncertainty for 3 GHz to 6 GHz | | | | | | | |
|---|---|---|---|---|---|---|---|
| Error Description | Uncert. value | Prob. Dist. | Div. | ($c_i$) 1g | ($c_i$) 10g | Std. Unc. (1g) | Std. Unc. (10g) |
| **Measurement System Errors** | | | | | | | |
| 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% |
| **Phantom and Device Errors** | | | | | | | |
| 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% |
| **Correction to the SAR results** | | | | | | | |
| 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% |
| **Combined Uncertainty** | | | | | | ±11.9% | ±11.8% |
| **Expanded Uncertainty** | | | | | | ±23.8% | ±23.6% |

| Measurement uncertainty for 6 GHz to 10 GHz | | | | | | | |
|---|---|---|---|---|---|---|---|
| Error Description | Uncert. value | Prob. Dist. | Div. | ($c_i$) 1g | ($c_i$) 10g | Std. Unc. (1g) | Std. Unc. (10g) |
| **Measurement System Errors** | | | | | | | |
| Probe Calibration | ±18.6% | N | 2 | 1 | 1 | ±9.3% | ±9.3% |
| 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 | ±2.4% | N | 1 | 1 | 1 | ±2.4% | ±2.4% |
| RF Ambient | ±1.8% | N | 1 | 1 | 1 | ±1.8% | ±1.8% |
| Probe Positioning | ±0.005 mm | N | 1 | 0.5 | 0.5 | ±0.3% | ±0.3% |
| Data Processing | ±3.5% | N | 1 | 1 | 1 | ±3.5% | ±3.5% |
| **Phantom and Device Errors** | | | | | | | |
| Conductivity (meas.) | ±2.5% | N | 1 | 0.78 | 0.71 | ±2.0% | ±1.8% |
| Conductivity (temp.) | ±2.4% | R | 1.732 | 0.78 | 0.71 | ±1.1% | ±1.0% |
| Phantom Permittivity | ±14.0% | R | 1.732 | 0.5 | 0.5 | ±4.0% | ±4.0% |
| 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% |
| **Correction to the SAR results** | | | | | | | |
| 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% |
| **Combined Uncertainty** | | | | | | ±14.2% | ±14.1% |
| **Expanded Uncertainty** | | | | | | ±28.4% | ±28.3% |

| Measurement uncertainty for Power Density | | | | | | |
|---|---|---|---|---|---|---|
| Error Description | Uncert. Value (±dB) | Prob. Dist. | Div. | (ci) | Std. Unc. (±dB) | (vi) veff |
| **Uncertainty terms dependent on the measurement system** | | | | | | |
| Calibration | 0.49 | N | 1 | 1 | 0.49 | ∞ |
| Probe correction | 0 | R | 1.732 | 1 | 0 | ∞ |
| Frequency response (BW ≤ 1 GHz) | 0.2 | R | 1.732 | 1 | 0.12 | ∞ |
| Sensor cross coupling | 0 | R | 1.732 | 1 | 0 | ∞ |
| Isotropy | 0.5 | R | 1.732 | 1 | 0.29 | ∞ |
| Linearity | 0.2 | R | 1.732 | 1 | 0.12 | ∞ |
| Probe scattering | 0 | R | 1.732 | 1 | 0 | ∞ |
| Probe positioning offset | 0.3 | R | 1.732 | 1 | 0.17 | ∞ |
| Probe positioning repeatability | 0.04 | R | 1.732 | 1 | 0.02 | ∞ |
| Sensor mechanical offset | 0 | R | 1.732 | 1 | 0 | ∞ |
| Probe spatial resolution | 0 | R | 1.732 | 1 | 0 | ∞ |
| Field impedance dependance | 0 | R | 1.732 | 1 | 0 | ∞ |
| Amplitude and phase drift | 0 | R | 1.732 | 1 | 0 | ∞ |
| Amplitude and phase noise | 0.04 | R | 1.732 | 1 | 0.02 | ∞ |
| Measurement area truncation | 0 | R | 1.732 | 1 | 0 | ∞ |
| Data acquisition | 0.03 | N | 1 | 1 | 0.03 | ∞ |
| Sampling | 0 | R | 1.732 | 1 | 0 | ∞ |
| Field reconstruction | 0.6 | R | 1.732 | 1 | 0.35 | ∞ |
| FTE/MEO | 0 | R | 1.732 | 1 | 0 | ∞ |
| Power density scaling | 0 | R | 1.732 | 1 | 0 | ∞ |
| Spatial averaging | 0.1 | R | 1.732 | 1 | 0.06 | ∞ |
| System detection limit | 0.04 | R | 1.732 | 1 | 0.02 | ∞ |
| **Uncertainty terms dependent on the DUT and environmental factors** | | | | | | |
| Probe coupling with DUT | 0 | R | 1.732 | 1 | 0 | ∞ |
| Modulation response | 0.4 | R | 1.732 | 1 | 0.23 | ∞ |
| Integration time | 0 | R | 1.732 | 1 | 0 | ∞ |
| Response time | 0 | R | 1.732 | 1 | 0 | ∞ |
| Device holder influence | 0.1 | R | 1.732 | 1 | 0.06 | ∞ |
| DUT alignment | 0 | R | 1.732 | 1 | 0 | ∞ |
| RF ambient conditions | 0.04 | R | 1.732 | 1 | 0.02 | ∞ |
| Ambient reflections | 0.04 | R | 1.732 | 1 | 0.02 | ∞ |
| Immunity / secondary reception | 0 | R | 1.732 | 1 | 0 | ∞ |
| Drift of the DUT | 0.21 | R | 1.732 | 1 | 0.12 | ∞ |
| **Combined Standard Uncertainty** | | | | | 0.76 | ∞ |
| **Expanded Standard Uncertainty (95%)** | | | | | 1.52 | |

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

WLAN 2.4G 2TX SISO

| | Frequency | Mode | BW | SISO-Main(TX1) Chain B | | | SISO-Aux(TX2) Chain A | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | CH | AV Power | AV Target | CH | AV Power | AV Target |
| DSSS/OFDM mode specified maximum output power at an antenna port | WLAN 2.4GHz | b | 20 | 1 | 14.83 | 15 | 1 | 14.83 | 15 |
| | | | | 6 | 14.92 | 15 | 6 | 14.88 | 15 |
| | | | | 11 | 14.79 | 15 | 11 | 14.71 | 15 |
| | | | | 12 | 14.75 | 15 | 12 | 14.62 | 15 |
| | | | | 13 | 14.73 | 15 | 13 | 14.61 | 15 |
| | | g | 20 | 1 | 14.72 | 15 | 1 | 14.61 | 15 |
| | | | | 6 | 14.73 | 15 | 6 | 14.69 | 15 |
| | | | | 11 | 1.71 | 15 | 11 | 14.63 | 15 |
| | | | | 12 | 14.74 | 15 | 12 | 14.61 | 14.75 |
| | | | | 13 | 11.74 | 11.75 | 13 | 11.96 | 12 |
| | | n (HT) | 20 | 1 | 14.68 | 15 | 1 | 14.66 | 15 |
| | | | | 6 | 14.66 | 15 | 6 | 14.64 | 15 |
| | | | | 11 | 14.74 | 15 | 11 | 14.66 | 15 |
| | | | | 12 | 14.71 | 15 | 12 | 14.69 | 14.75 |
| | | | | 13 | 11.62 | 11.75 | 13 | 11.94 | 12 |
| | | | 40 | 3 | 14.72 | 15 | 3 | 14.63 | 15 |
| | | | | 6 | 14.73 | 15 | 6 | 14.66 | 15 |
| | | | | 9 | 14.71 | 15 | 9 | 14.69 | 15 |
| | | | | 10 | 12.21 | 12.25 | 10 | 12.47 | 12.5 |
| | | | | 11 | 9.71 | 9.75 | 11 | 10.74 | 10.75 |
| | | ax (HE) | 20 | 1 | 14.73 | 15 | 1 | 14.66 | 15 |
| | | | | 6 | 14.74 | 15 | 6 | 14.61 | 15 |
| | | | | 11 | 14.71 | 15 | 11 | 14.65 | 15 |
| | | | | 12 | 14.72 | 15 | 12 | 14.61 | 14.75 |
| | | | | 13 | 11.71 | 11.75 | 13 | 11.86 | 12 |
| | | | 40 | 3 | 14.71 | 15 | 3 | 14.64 | 15 |
| | | | | 6 | 14.64 | 15 | 6 | 14.62 | 15 |
| | | | | 9 | 14.64 | 15 | 9 | 14.61 | 15 |
| | | | | 10 | 12.21 | 12.25 | 10 | 12.48 | 12.5 |
| | | | | 11 | 9.62 | 9.75 | 11 | 10.65 | 10.75 |

WLAN 5G 2TX SISO

| | Frequency | Mode | BW | SISO-Main(TX1) Chain B | | | SISO-Aux(TX2) Chain A | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | CH | AV Power | AV Target | CH | AV Power | AV Target |
| OFDM mode specified maximum output power at an antenna port | U-NII-1 (5150~5250MHz) | a | 20 | 36 | 11.73 | 12 | 36 | 12.28 | 12.5 |
| | | | | 40 | 11.72 | 12 | 40 | 12.34 | 12.5 |
| | | | | 44 | 11.73 | 12 | 44 | 12.32 | 12.5 |
| | | | | 48 | 11.71 | 12 | 48 | 12.21 | 12.5 |
| | | n (HT) | 20 | 36 | 11.74 | 12 | 36 | 12.22 | 12.5 |
| | | | | 40 | 11.71 | 12 | 40 | 12.21 | 12.5 |
| | | | | 44 | 11.69 | 12 | 44 | 12.34 | 12.5 |
| | | | | 48 | 11.72 | 12 | 48 | 12.21 | 12.5 |
| | | | 40 | 38 | 11.65 | 12 | 38 | 12.34 | 12.5 |
| | | | | 46 | 11.62 | 12 | 46 | 12.33 | 12.5 |
| | | ac(VHT) | 80 | 42 | 11.78 | 12 | 42 | 12.43 | 12.5 |
| | | ax (HE) | 20 | 36 | 11.71 | 12 | 36 | 12.22 | 12.5 |
| | | | | 40 | 11.63 | 12 | 40 | 12.33 | 12.5 |
| | | | | 44 | 11.68 | 12 | 44 | 12.16 | 12.5 |
| | | | | 48 | 11.71 | 12 | 48 | 12.21 | 12.5 |
| | | | 40 | 38 | 11.74 | 12 | 38 | 12.21 | 12.5 |
| | | | | 46 | 11.68 | 12 | 46 | 12.33 | 12.5 |
| | | | 80 | 42 | 11.67 | 12 | 42 | 12.23 | 12.5 |
| | U-NII-2A (5250~5350MHz) | a | 20 | 52 | 11.67 | 12 | 52 | 12.22 | 12.5 |
| | | | | 56 | 11.65 | 12 | 56 | 12.12 | 12.5 |
| | | | | 60 | 11.62 | 12 | 60 | 12.14 | 12.5 |
| | | | | 64 | 11.65 | 12 | 64 | 12.16 | 12.5 |
| | | n (HT) | 20 | 52 | 11.71 | 12 | 52 | 12.14 | 12.5 |
| | | | | 56 | 11.61 | 12 | 56 | 12.12 | 12.5 |
| | | | | 60 | 11.63 | 12 | 60 | 12.28 | 12.5 |
| | | | | 64 | 11.71 | 12 | 64 | 12.29 | 12.5 |
| | | | 40 | 54 | 11.65 | 12 | 54 | 12.34 | 12.5 |
| | | | | 62 | 11.65 | 12 | 62 | 12.23 | 12.5 |
| | | ac (VHT) | 80 | 58 | 11.81 | 12 | 58 | 12.45 | 12.5 |
| | | | 160 | 50 | 11.73 | 12 | 50 | 12.29 | 12.5 |
| | | ax (HE) | 20 | 52 | 11.73 | 12 | 52 | 12.24 | 12.5 |
| | | | | 56 | 11.65 | 12 | 56 | 12.14 | 12.5 |
| | | | | 60 | 11.63 | 12 | 60 | 12.18 | 12.5 |
| | | | | 64 | 11.67 | 12 | 64 | 12.33 | 12.5 |
| | | | 40 | 54 | 11.68 | 12 | 54 | 12.32 | 12.5 |
| | | | | 62 | 11.66 | 12 | 62 | 12.31 | 12.5 |
| | | | 80 | 58 | 11.63 | 12 | 58 | 12.31 | 12.5 |
| | | | 160 | 50 | 11.71 | 12 | 50 | 12.17 | 12.5 |

| | Frequency | Mode | BW | SISO-Main(TX1) Chain B | | | SISO-Aux(TX2) Chain A | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | CH | AV Power | AV Target | CH | AV Power | AV Target |
| OFDM mode specified maximum output power at an antenna port | U-NII-2C (5470~5725MHz) | a | 20 | 100 | 11.33 | 11.5 | 100 | 12.13 | 12.5 |
| | | | | 116 | 11.31 | 11.5 | 116 | 12.26 | 12.5 |
| | | | | 124 | 11.33 | 11.5 | 124 | 12.21 | 12.5 |
| | | | | 132 | 11.25 | 11.5 | 132 | 12.15 | 12.5 |
| | | | | 140 | 11.34 | 11.5 | 140 | 12.16 | 12.5 |
| | | | | 144 | 11.32 | 11.5 | 144 | 12.18 | 12.5 |
| | | n (HT) | 20 | 100 | 11.34 | 11.5 | 100 | 12.28 | 12.5 |
| | | | | 116 | 11.32 | 11.5 | 116 | 12.17 | 12.5 |
| | | | | 124 | 11.31 | 11.5 | 124 | 12.12 | 12.5 |
| | | | | 132 | 11.32 | 11.5 | 132 | 12.22 | 12.5 |
| | | | | 140 | 11.33 | 11.5 | 140 | 12.33 | 12.5 |
| | | | | 144 | 11.26 | 11.5 | 144 | 12.34 | 12.5 |
| | | | 40 | 102 | 11.31 | 11.5 | 102 | 12.18 | 12.5 |
| | | | | 110 | 11.34 | 11.5 | 110 | 12.13 | 12.5 |
| | | | | 126 | 11.33 | 11.5 | 126 | 12.21 | 12.5 |
| | | | | 134 | 11.31 | 11.5 | 134 | 12.25 | 12.5 |
| | | | | 142 | 11.34 | 11.5 | 142 | 12.37 | 12.5 |
| | | ac (VHT) | 80 | 106 | 11.41 | 11.5 | 106 | 12.37 | 12.5 |
| | | | | 122 | 11.38 | 11.5 | 122 | 12.36 | 12.5 |
| | | | | 138 | 11.44 | 11.5 | 138 | 12.42 | 12.5 |
| | | | 160 | 114 | 11.34 | 11.5 | 114 | 12.28 | 12.5 |
| | | ax (HE) | 20 | 100 | 11.34 | 11.5 | 100 | 12.32 | 12.5 |
| | | | | 116 | 11.31 | 11.5 | 116 | 12.22 | 12.5 |
| | | | | 124 | 11.26 | 11.5 | 124 | 12.15 | 12.5 |
| | | | | 132 | 11.33 | 11.5 | 132 | 12.17 | 12.5 |
| | | | | 140 | 11.32 | 11.5 | 140 | 12.15 | 12.5 |
| | | | | 144 | 11.33 | 11.5 | 144 | 12.14 | 12.5 |
| | | | 40 | 102 | 11.31 | 11.5 | 102 | 12.27 | 12.5 |
| | | | | 110 | 11.31 | 11.5 | 110 | 12.34 | 12.5 |
| | | | | 126 | 11.28 | 11.5 | 126 | 12.34 | 12.5 |
| | | | | 134 | 11.31 | 11.5 | 134 | 12.31 | 12.5 |
| | | | | 142 | 11.32 | 11.5 | 142 | 12.34 | 12.5 |
| | | | 80 | 106 | 11.25 | 11.5 | 106 | 12.28 | 12.5 |
| | | | | 122 | 11.32 | 11.5 | 122 | 12.31 | 12.5 |
| | | | | 138 | 11.29 | 11.5 | 138 | 12.21 | 12.5 |
| | | | 160 | 114 | 11.33 | 11.5 | 114 | 12.26 | 12.5 |

| | Frequency | Mode | BW | SISO-Main(TX1) Chain B | | | SISO-Aux(TX2) Chain A | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | CH | AV Power | AV Target | CH | AV Power | AV Target |
| OFDM mode specified maximum output power at an antenna port | U-NII-3 (5725~5850MHz) | a | 20 | 149 | 11.34 | 11.5 | 149 | 13.29 | 13.5 |
| | | | | 157 | 11.31 | 11.5 | 157 | 13.29 | 13.5 |
| | | | | 165 | 11.32 | 11.5 | 165 | 13.25 | 13.5 |
| | | n (HT) | 20 | 149 | 11.34 | 11.5 | 149 | 13.29 | 13.5 |
| | | | | 157 | 11.31 | 11.5 | 157 | 13.27 | 13.5 |
| | | | | 165 | 11.32 | 11.5 | 165 | 13.24 | 13.5 |
| | | | 40 | 151 | 11.33 | 11.5 | 151 | 13.23 | 13.5 |
| | | | | 159 | 11.32 | 11.5 | 159 | 13.29 | 13.5 |
| | | ac(VHT) | 80 | 155 | 11.38 | 11.5 | 155 | 13.33 | 13.5 |
| | | ax (HE) | 20 | 149 | 11.32 | 11.5 | 149 | 13.26 | 13.5 |
| | | | | 157 | 11.31 | 11.5 | 157 | 13.27 | 13.5 |
| | | | | 165 | 11.33 | 11.5 | 165 | 13.22 | 13.5 |
| | | | 40 | 151 | 11.31 | 11.5 | 151 | 13.21 | 13.5 |
| | | | | 159 | 11.32 | 11.5 | 159 | 13.25 | 13.5 |
| | | | 80 | 155 | 11.32 | 11.5 | 155 | 13.21 | 13.5 |
| | U-NII-4 (5850~5925MHz) | a | 20 | 169 | 11.33 | 11.5 | 169 | 13.17 | 13.5 |
| | | | | 173 | 11.31 | 11.5 | 173 | 13.24 | 13.5 |
| | | | | 177 | 11.34 | 11.5 | 177 | 13.27 | 13.5 |
| | | n (HT) | 20 | 169 | 11.33 | 11.5 | 169 | 13.21 | 13.5 |
| | | | | 173 | 11.31 | 11.5 | 173 | 13.27 | 13.5 |
| | | | | 177 | 11.33 | 11.5 | 177 | 13.24 | 13.5 |
| | | | 40 | 167 | 11.29 | 11.5 | 167 | 13.22 | 13.5 |
| | | | | 175 | 11.31 | 11.5 | 175 | 13.28 | 13.5 |
| | | ac(VHT) | 80 | 171 | 11.42 | 11.5 | 171 | 13.31 | 13.5 |
| | | | 160 | 163 | 11.33 | 11.5 | 163 | 13.24 | 13.5 |
| | | ax (HE) | 20 | 169 | 11.33 | 11.5 | 169 | 13.25 | 13.5 |
| | | | | 173 | 11.31 | 11.5 | 173 | 13.29 | 13.5 |
| | | | | 177 | 11.34 | 11.5 | 177 | 13.31 | 13.5 |
| | | | 40 | 167 | 11.33 | 11.5 | 167 | 13.21 | 13.5 |
| | | | | 175 | 11.32 | 11.5 | 175 | 13.21 | 13.5 |
| | | | 80 | 171 | 11.31 | 11.5 | 171 | 13.22 | 13.5 |
| | | | 160 | 163 | 11.31 | 11.5 | 163 | 13.27 | 13.5 |

WLAN 6G 2TX SISO

| OFDM mode specified maximum output power at an antenna port | Frequency | Mode | BW | SISO-Main(TX1) Chain B | | | SISO-Aux(TX2) Chain A | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | CH | AV Power | AV Target | CH | AV Power | AV Target |
| | U-NII-5 (5925~6425MHz) | ax (HE) | 20 | 1 | 4.84 | 5.0 | 1 | 4.87 | 5 |
| | | | | 45 | 4.87 | 5.0 | 45 | 4.86 | 5 |
| | | | | 93 | 4.85 | 5.0 | 93 | 4.82 | 5 |
| | | | 40 | 3 | 8.17 | 8.3 | 3 | 8.11 | 8.25 |
| | | | | 43 | 8.21 | 8.3 | 43 | 8.17 | 8.25 |
| | | | | 91 | 8.23 | 8.3 | 91 | 8.16 | 8.25 |
| | | | 80 | 7 | 10.59 | 10.8 | 7 | 10.52 | 10.75 |
| | | | | 39 | 10.53 | 10.8 | 39 | 10.52 | 10.75 |
| | | | | 87 | 10.55 | 10.8 | 87 | 10.59 | 10.75 |
| | | | 160 | 15 | 11.92 | 12.0 | 15 | 12.95 | 13 |
| | | | | 47 | 11.79 | 12.0 | 47 | 12.78 | 13 |
| | | | | 79 | 11.76 | 12.0 | 79 | 12.74 | 13 |
| | U-NII-6 (6425~6525MHz) | ax (HE) | 20 | 97 | 4.81 | 5.0 | 97 | 4.85 | 5 |
| | | | | 105 | 4.92 | 5.0 | 105 | 4.81 | 5 |
| | | | | 113 | 4.92 | 5.0 | 113 | 4.85 | 5 |
| | | | 40 | 99 | 8.22 | 8.3 | 99 | 8.17 | 8.25 |
| | | | | 107 | 8.21 | 8.3 | 107 | 8.17 | 8.25 |
| | | | 80 | 103 | 10.53 | 10.8 | 103 | 10.51 | 10.75 |
| | | | 160 | 111 | 10.86 | 11.0 | 111 | 12.35 | 12.5 |

| | Frequency | Mode | BW | SISO-Main(TX1) Chain B | | | SISO-Aux(TX2) Chain A | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | CH | AV Power | AV Target | CH | AV Power | AV Target |
| OFDM mode specified maximum output power at an antenna port | U-NII-7 (6525~6875MHz) | ax (HE) | 20 | 117 | 4.21 | 4.3 | 117 | 4.11 | 4.25 |
| | | | | 149 | 4.23 | 4.3 | 149 | 4.13 | 4.25 |
| | | | | 181 | 4.21 | 4.3 | 181 | 4.12 | 4.25 |
| | | | 40 | 115 | 8.18 | 8.3 | 115 | 8.18 | 8.25 |
| | | | | 147 | 7.44 | 7.5 | 147 | 7.41 | 7.5 |
| | | | | 179 | 7.41 | 7.5 | 179 | 7.37 | 7.5 |
| | | | 80 | 119 | 10.54 | 10.8 | 119 | 10.51 | 10.75 |
| | | | | 135 | 9.84 | 10.0 | 135 | 9.87 | 10 |
| | | | | 151 | 9.81 | 10.0 | 151 | 9.82 | 10 |
| | | | | 167 | 9.87 | 10.0 | 167 | 9.87 | 10 |
| | | | | 183 | 9.87 | 10.0 | 183 | 9.87 | 10 |
| | | | 160 | 143 | 10.71 | 11.0 | 143 | 11.81 | 12 |
| | | | | 175 | 10.86 | 11.0 | 175 | 11.85 | 12 |
| | U-NII-8 (6875~7125MHz) | ax (HE) | 20 | 185 | 4.21 | 4.3 | 185 | 4.15 | 4.25 |
| | | | | 209 | 4.22 | 4.3 | 209 | 4.12 | 4.25 |
| | | | | 233 | -1.38 | -1.0 | 233 | -1.41 | -1 |
| | | | 40 | 187 | 7.42 | 7.5 | 187 | 7.42 | 7.5 |
| | | | | 227 | 7.32 | 7.5 | 227 | 7.41 | 7.5 |
| | | | 80 | 199 | 9.81 | 10.0 | 199 | 9.87 | 10 |
| | | | | 215 | 9.87 | 10.0 | 215 | 9.82 | 10 |
| | | | 160 | 207 | 10.89 | 11.0 | 207 | 11.46 | 11.5 |

| BT Only Support Aux | | | | | | |
|---|---|---|---|---|---|---|
| Bluetooth mode maximum output power | Frequency | Mode | Modulation | SISO-Aux(TX2) Chain A | | |
| | | | | CH | AV Power | AV Target |
| | BT 2.4GHz | BR | GFSK | 0 | 9.26 | 10.5 |
| | | | | 39 | 10.34 | 10.5 |
| | | | | 78 | 9.61 | 10.5 |
| | | EDR | 8DPSK | 0 | 7.75 | 9.5 |
| | | | | 39 | 7.88 | 9.5 |
| | | | | 78 | 8.23 | 9.5 |
| | | BLE | GFSK | 0 | 8.87 | 9.0 |
| | | | | 19 | 8.96 | 9.0 |
| | | | | 39 | 8.98 | 9.0 |

# 9. Test Results

## 9.1 Test Results Summary

| SAR MEASUREMENT | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Ambient Temperature (°C): 22.8 ±2 | | | | Relative Humidity (%): 51% | | | | |
| 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: WLAN2.4GHz_802.11b-1M_Ant Main | | | | | | | | |
| Bottom | 0 | 6 | 2437 | 14.92 | 15 | 0.636 | 0.654 | |
| Edge(Front) | 0 | 6 | 2437 | 14.92 | 15 | 0.200 | 0.206 | |
| Test Mode: WLAN2.4GHz_802.11b-1M_Ant Aux | | | | | | | | |
| Bottom | 0 | 1 | 2412 | 14.83 | 15 | 0.609 | 0.640 | |
| Bottom | 0 | 6 | 2437 | 14.88 | 15 | 0.672 | **0.698** | 2 |
| Edge(Front) | 0 | 6 | 2437 | 14.88 | 15 | 0.177 | 0.184 | |
| Bottom | 0 | 11 | 2462 | 14.71 | 15 | 0.604 | 0.652 | |
| Test Mode: Bluetooth_BT-1M_Ant Aux | | | | | | | | |
| Bottom | 0 | 39 | 2441 | 10.34 | 10.5 | 0.135 | 0.182 | 3 |

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.

| SAR MEASUREMENT | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Ambient Temperature (°C): 22.8 ±2 | | | | Relative Humidity (%): 51% | | | | |
| 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 | | | | | | | | |
| Bottom | 0 | 58 | 5290 | 11.81 | 12 | 0.785 | 0.828 | |
| Edge(Front) | 0 | 58 | 5290 | 11.81 | 12 | 0.333 | 0.351 | |
| Test Mode: WLAN5GHz_802.11ac80-VHT0_Ant Aux | | | | | | | | |
| Bottom | 0 | 58 | 5290 | 12.45 | 12.5 | 0.882 | 0.901 | 28 |
| Edge(Front) | 0 | 58 | 5290 | 12.45 | 12.5 | 0.496 | 0.507 | |
| Test Mode: WLAN5GHz_802.11ac80-VHT0_Ant Main | | | | | | | | |
| Bottom | 0 | 106 | 5530 | 11.41 | 11.5 | 0.752 | 0.775 | |
| Bottom | 0 | 122 | 5610 | 11.38 | 11.5 | 1.020 | 1.059 | |
| Bottom | 0 | 138 | 5690 | 11.44 | 11.5 | 1.070 | **1.096** | 24 |
| Edge(Front) | 0 | 138 | 5690 | 11.44 | 11.5 | 0.424 | 0.434 | |
| Test Mode: WLAN5GHz_802.11ac80-VHT0_Ant Aux | | | | | | | | |
| Bottom | 0 | 106 | 5530 | 12.37 | 12.5 | 1.020 | 1.062 | |
| Edge(Front) | 0 | 106 | 5530 | 12.37 | 12.5 | 0.489 | 0.509 | |
| Bottom | 0 | 122 | 5610 | 12.36 | 12.5 | 0.882 | 0.920 | |
| Bottom | 0 | 138 | 5690 | 12.42 | 12.5 | 0.768 | 0.790 | |
| Test Mode: WLAN5GHz_802.11ac80-VHT0_Ant Main | | | | | | | | |
| Bottom | 0 | 155 | 5775 | 11.38 | 11.5 | 1.010 | 1.049 | |
| Edge(Front) | 0 | 155 | 5775 | 11.38 | 11.5 | 0.362 | 0.376 | |
| Bottom | 0 | 171 | 5855 | 11.42 | 11.5 | 0.998 | 1.027 | |
| Test Mode: WLAN5GHz_802.11ac80-VHT0_Ant Aux | | | | | | | | |
| Bottom | 0 | 155 | 5775 | 13.33 | 13.5 | 1.010 | 1.061 | 12 |
| Edge(Front) | 0 | 155 | 5775 | 13.33 | 13.5 | 0.523 | 0.549 | |
| Bottom | 0 | 171 | 5855 | 13.31 | 13.5 | 0.990 | 1.045 | |

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.

| SAR MEASUREMENT | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ambient Temperature (°C): 22.8 ±2 | | | | | Relative Humidity (%): 51% | | | | |
| Liquid Temperature (°C): 22.1 ±2 | | | | | Depth of Liquid (cm): >15 | | | | |
| Test Position | Dist. (mm) | Frequency | | Conducted Power (dBm) | | SAR (W/kg) | | APD ($W/m^2$) | Plot No. |
| | | Ch. | MHz | Meas. | Tune-Up Limit | Meas-1g | Scaled-1g | Meas-4cm$^2$ | |
| Test Mode: WLAN6GHz_802.11ax160-HE0_Ant Main | | | | | | | | | |
| Bottom | 0 | 15 | 6025 | 11.92 | 12 | 1.120 | **1.164** | 6.870 | 19 |
| Edge(Front) | 0 | 15 | 6025 | 11.92 | 12 | 0.406 | 0.422 | 3.070 | |
| Bottom | 0 | 47 | 6185 | 11.79 | 12 | 0.976 | 1.045 | 5.980 | |
| Bottom | 0 | 111 | 6505 | 10.86 | 11 | 0.595 | 0.627 | 3.710 | |
| Bottom | 0 | 175 | 6825 | 10.86 | 11 | 1.020 | 1.074 | 5.820 | |
| Bottom | 0 | 207 | 6985 | 10.89 | 11 | 1.090 | 1.140 | 6.130 | |
| Test Mode: WLAN6GHz_802.11ax160-HE0_Ant Aux | | | | | | | | | |
| Bottom | 0 | 15 | 6025 | 12.95 | 13 | 0.951 | 0.981 | 6.640 | |
| Bottom | 0 | 47 | 6185 | 12.78 | 13 | 0.835 | 0.896 | 5.690 | |
| Bottom | 0 | 111 | 6505 | 12.35 | 12.5 | 0.981 | 1.036 | 6.190 | |
| Bottom | 0 | 175 | 6825 | 11.85 | 12 | 1.100 | 1.161 | 6.310 | |
| Edge(Front) | 0 | 175 | 6825 | 11.85 | 12 | 0.325 | 0.343 | 2.440 | |
| Bottom | 0 | 207 | 6985 | 11.46 | 11.5 | 0.676 | 0.696 | 4.430 | |

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.

| PD MEASUREMENT | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ambient Temperature (°C): 22.8 ±2 | | | | | | Relative Humidity (%): 51% | | | | | |
| Test Position | Dist. (mm) | Frequency | | Conducted Power (dBm) | | psPDn+ ($W/m^2$) | | psPDtot+ ($W/m^2$) | | Uncertainty | Plot No. |
| | | Ch. | MHz | Meas. | Tune-Up Limit | Meas-4cm² | Scaled-4cm² | Meas-4cm² | Scaled-4cm² | Uncertainty Scaling Factor | |
| Test Mode: WLAN6GHz_802.11ax160-HE0_Ant Main | | | | | | | | | | | |
| Bottom | 2 | 15 | 6025 | 11.92 | 12 | 3.960 | 6.377 | 4.370 | **7.037** | 1.550 | 1 |
| Test Mode: WLAN6GHz_802.11ax160-HE0_Ant Main | | | | | | | | | | | |
| Bottom | 2 | 47 | 6185 | 11.79 | 12 | 2.970 | 4.928 | 3.260 | 5.409 | 1.550 | |
| Test Mode: WLAN6GHz_802.11ax160-HE0_Ant Aux | | | | | | | | | | | |
| Bottom | 2 | 111 | 6505 | 12.35 | 12.5 | 2.870 | 4.697 | 3.170 | 5.188 | 1.550 | |
| Test Mode: WLAN6GHz_802.11ax160-HE0_Ant Aux | | | | | | | | | | | |
| Bottom | 2 | 175 | 6825 | 11.83 | 12 | 3.070 | 5.047 | 3.440 | 5.656 | 1.550 | |
| Test Mode: WLAN6GHz_802.11ax160-HE0_Ant Main | | | | | | | | | | | |
| Bottom | 2 | 207 | 6985 | 10.89 | 11 | 2.810 | 4.557 | 3.160 | 5.124 | 1.550 | |

Note:

1. Per WLAN 6 GHz interim test procedure in Oct. 2020 TCBs Workshop notes. At least 5 channels for BW 160MHz should be tested.

## 9.2 Simultaneous Transmission

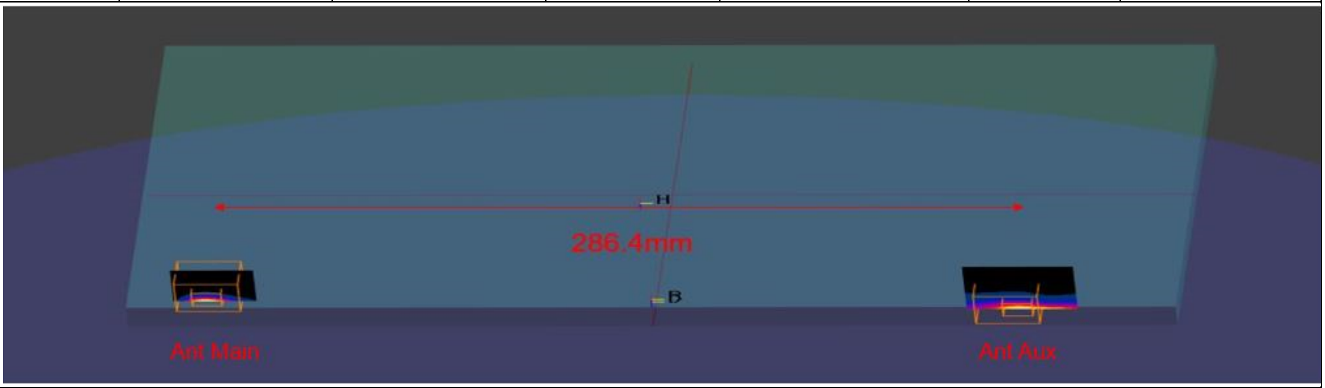
| Simultaneous Transmission Configurations | |
|---|---|
| 1 | WLAN 2.4 GHz ANT Main + WLAN 2.4 GHz ANT Aux |
| 2 | WLAN 2.4 GHz ANT Main + Bluetooth Aux |
| 3 | WLAN 5 GHz ANT Main + WLAN 5 GHz ANT Aux |
| 4 | WLAN 5 GHz ANT Main + Bluetooth Aux |
| 5 | WLAN 5 GHz ANT Main + WLAN 5 GHz ANT Aux + Bluetooth Aux |
| 6 | WLAN 6 GHz ANT Main + WLAN 6 GHz ANT Aux |
| 7 | WLAN 6 GHz ANT Main + Bluetooth Aux |
| 8 | WLAN 6 GHz ANT Main + WLAN 6 GHz ANT Aux + Bluetooth Aux |

### 9.2.1 Simultaneous transmission test exclusion considerations

| Test Position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 + 2 | 1 + 7 | 3 + 4 | 3 + 7 | 3 + 4 + 7 | 5 + 6 | 5 + 7 | 5 + 6 + 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | WLAN2.4GHz ANT Main (W/kg) | WLAN2.4GHz ANT Aux (W/kg) | WLAN5GHz ANT Main (W/kg) | WLAN5GHz ANT Aux (W/kg) | WLAN6GHz ANT Main (W/kg) | WLAN6GHz ANT Aux (W/kg) | Bluetooth ANT Aux (W/kg) | **Σ 1-g SAR** | **Σ 1-g SAR** | **Σ 1-g SAR** | **Σ 1-g SAR** | **Σ 1-g SAR** | **Σ 1-g SAR** | **Σ 1-g SAR** | **Σ 1-g SAR** |
| Bottom at 0 mm | 0.654 | 0.698 | 1.096 | 1.062 | 1.164 | 1.161 | 0.182 | 1.352 | 0.836 | 2.158 | 1.278 | **2.340** | 2.325 | 1.346 | **2.507** |

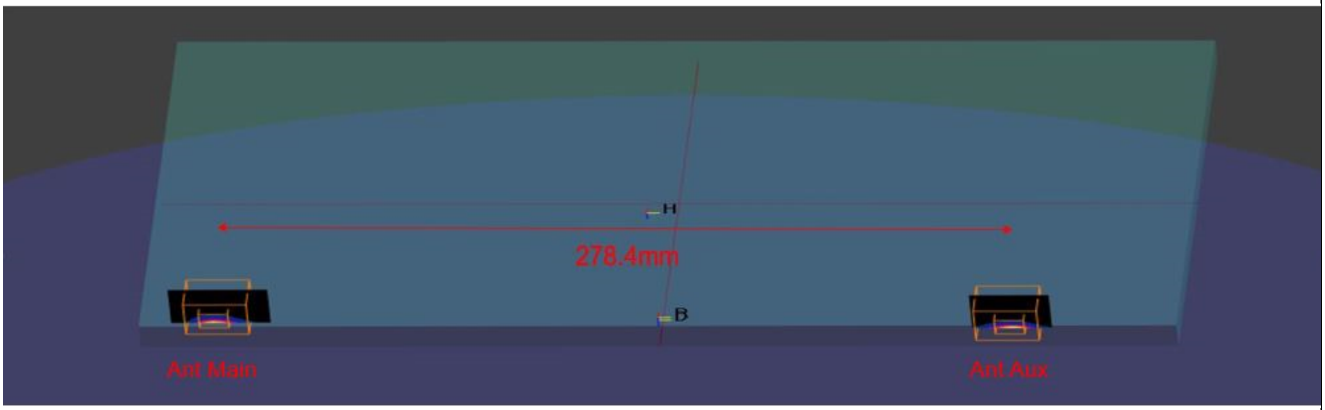
When the sum of SAR is larger than the limit, The ratio is determined by ***(SAR1 + SAR2)^1.5/Ri,*** rounded to two decimal digits, and must be ≤ 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion. The estimation result as below:

| Test Position | WLAN5GHz Ant Main SAR (W/kg) | WLAN5GHz Ant Aux SAR (W/kg) | Bluetooth SAR (W/kg) | Simultaneous Transmission (W/kg) | Antenna pair in mm | Peak location separation ratio |
|---|---|---|---|---|---|---|
| Bottom | 1.096 | 1.062 | 0.182 | 2.340 | 286.4 | 0.01 |




The ratio of value is less than 0.04, thus simultaneous SAR testing is not needed.

| Test Position | WLAN6GHz Ant Main SAR (W/kg) | WLAN6GHz Ant Aux SAR (W/kg) | Bluetooth SAR (W/kg) | Simultaneous Transmission (W/kg) | Antenna pair in mm | Peak location separation ratio |
|---|---|---|---|---|---|---|
| Bottom | 1.164 | 1.161 | 0.182 | 2.507 | 278.4 | 0.01 |




The ratio of value is less than 0.04, thus simultaneous SAR testing is not needed.

# 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 ≥ 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 ≥ 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 ≥ 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 | |
| | | | Value | Ratio |
| 138 | 5690 | 1.070 | 1.040 | 1.029 |
| 15 | 6025 | 1.120 | 1.110 | 1.009 |

**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: 23C0865R-Product Photos**