**FCC 47 CFR § 2.1093**
**IEEE Std 1528-2013**

# SAR EVALUATION REPORT

**FOR**

**DTS/UNII a/b/g/n/ac/ax Tablet + BT/BLE and WPT**

**MODEL NUMBER: SM-X900**

**FCC ID: A3LSMX900**

**REPORT NUMBER: 4790101669-S1V2**

**ISSUE DATE: 12/7/2021**

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IAS ACCREDITED

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**TL-637**

**Revision History**

| Rev. | Date | Revisions | Revised By |
|---|---|---|---|
| V1 | 11/29/2021 | Initial Issue | -- |
| V2 | 12/7/2021 | Revised Sec 6.3, Sec 9.1 and Sec 12<br>Revised Appendix G | Jeongyeon Won |
| | | | |

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# 1. Attestation of Test Results

| | | | |
|---|---|---|---|
| Applicant Name | SAMSUNG ELECTRONICS CO.,LTD. | | |
| FCC ID | A3LSMX900 | | |
| Model Number | SM-X900 | | |
| Applicable Standards | FCC 47 CFR § 2.1093<br>IEEE Std 1528-2013<br>Published RF exposure KDB procedures | | |
| Exposure Category | SAR Limits (W/Kg) | | |
| | Peak spatial-average<br>(1g of tissue) | | |
| General population / Uncontrolled exposure | 1.6 | | |
| RF Exposure Conditions | Equipment Class - The Highest Reported SAR (W/kg) | | |
| | DTS | NII | DSS |
| Standalone | 0.73 | 0.96 | 0.52 |
| Simultaneous TX | 1.40 | 1.46 | 1.46 |
| Date Tested | 11/16/2021 to 11/26/2021 | | |
| Test Results | Pass | | |

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

| Approved & Released By: | Prepared By: |
|---|---|
|  |  |
| Justin Park<br>Operations Leader<br>UL Korea, Ltd. Suwon Laboratory | Jeongyeon Won<br>Senior Laboratory technician<br>UL Korea, Ltd. Suwon Laboratory |

## 1.1. The Highest Reported SAR for RF exposure conditions for each bands

| Equipment Class | Band | Antenna | The Highest Reported SAR (W/kg) |
|---|---|---|---|
| | | | 1g of tissue |
| | | | Standalone exposure condition |
| DTS | 2.4GHz WLAN | All | **0.728** |
| UNII | 5GHz WLAN | All | **0.964** |
| DSS | Bluetooth | All | **0.521** |

# 2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE STD 1528-2013, ANSI C63.26-2015 the following FCC Published RF exposure KDB procedures:

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 616217 D04 SAR for laptop and tablets v01r02
- 690783 D01 SAR Listings on Grants v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04

In addition to the above, the following information was used:

- TCB workshop October, 2016; RF Exposure Procedures (Bluetooth Duty Factor)
- TCB workshop April, 2019; RF Exposure Procedures (Tissue Simulating Liquids (TSL))

# 3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at

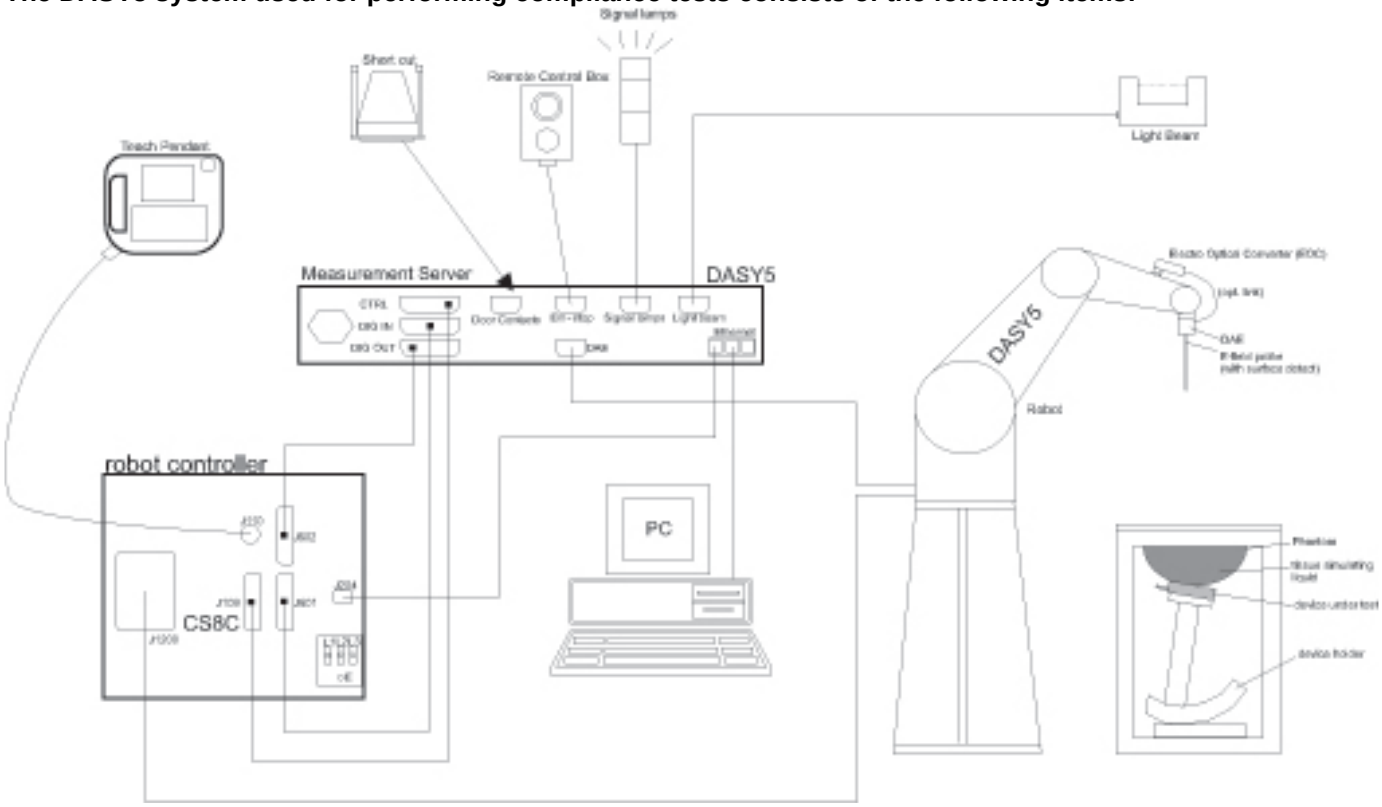
| Suwon |
|---|
| SAR 1 Room |
| SAR 2 Room |
| SAR 3 Room |
| SAR 4 Room |

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637.
The full scope of accreditation can be viewed at https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf.

# 4. SAR Measurement System & Test Equipment

## 4.1. SAR Measurement System

**The DASY5 system used 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).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- 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 function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 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.

## 4.2. SAR Scan Procedures

**Step 1: Power Reference Measurement**

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

**Step 2: Area Scan**

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

| | ≤ 3 GHz | > 3 GHz |
|---|---|---|
| Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface | 5 ± 1 mm | ½·δ·ln(2) ± 0.5 mm |
| Maximum probe angle from probe axis to phantom surface normal at the measurement location | 30° ± 1° | 20° ± 1° |
| Maximum area scan spatial resolution: $\Delta x_{Area}$, $\Delta y_{Area}$ | ≤ 2 GHz: ≤ 15 mm<br>2 – 3 GHz: ≤ 12 mm | 3 – 4 GHz: ≤ 12 mm<br>4 – 6 GHz: ≤ 10 mm |
| | When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device. | |

**Step 3: Zoom Scan**

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. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

| | | | ≤ 3 GHz | > 3 GHz |
|---|---|---|---|---|
| Maximum zoom scan spatial resolution: $\Delta x_{Zoom}$, $\Delta y_{Zoom}$ | | | ≤ 2 GHz: ≤ 8 mm<br>2 – 3 GHz: ≤ 5 mm* | 3 – 4 GHz: ≤ 5 mm*<br>4 – 6 GHz: ≤ 4 mm* |
| Maximum zoom scan spatial resolution, normal to phantom surface | uniform grid: $\Delta z_{Zoom}(n)$ | | ≤ 5 mm | 3 – 4 GHz: ≤ 4 mm<br>4 – 5 GHz: ≤ 3 mm<br>5 – 6 GHz: ≤ 2 mm |
| | graded grid | $\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface | ≤ 4 mm | 3 – 4 GHz: ≤ 3 mm<br>4 – 5 GHz: ≤ 2.5 mm<br>5 – 6 GHz: ≤ 2 mm |
| | | $\Delta z_{Zoom}(n>1)$: between subsequent points | ≤ 1.5·$\Delta z_{Zoom}(n-1)$ | |
| Minimum zoom scan volume | x, y, z | | ≥ 30 mm | 3 – 4 GHz: ≥ 28 mm<br>4 – 5 GHz: ≥ 25 mm<br>5 – 6 GHz: ≥ 22 mm |

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

**Step 4: Power drift measurement**

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

**Step 5: Z-Scan (FCC only)**

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be larger than the step size in Z-direction.

## 4.3. Test Equipment

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards.

**Dielectric Property Measurements**

| Name of Equipment | Manufacturer | Type/Model | Serial No. | Cal. Due Date |
|---|---|---|---|---|
| Network Analyzer | Agilent | E5071C | MY46522054 | 8-6-2022 |
| Dielectric Assessment Kit | SPEAG | DAK-3.5 | 1196 | 7-21-2022 |
| Shorting block | SPEAG | DAK-3.5 Short | SM DAK 200 BA | N/A |
| Thermometer | LKM | DTM3000 | 3851 | 8-4-2022 |

**System Check**

| Name of Equipment | Manufacturer | Type/Model | Serial No. | Cal. Due Date |
|---|---|---|---|---|
| MXG Analog Signal Generator | Agilent | N5181A | MY50145882 | 8-4-2022 |
| Power Sensor | Agilent | U2000A | MY54260007 | 8-4-2022 |
| Power Sensor | Agilent | U2000A | MY60180020 | 8-4-2022 |
| Power Amplifier | EXODUS | 1410025-AMP2027-10003 | 10003 | 8-4-2022 |
| Directional Coupler | Agilent | 772D | MY52180193 | 8-3-2022 |
| Directional Coupler | Agilent | 778D | MY52180432 | 8-3-2022 |
| Low Pass Filter | MINI-CIRCUITS | NLP-1200 | VUU19301915 | 8-4-2022 |
| Low Pass Filter | MICROLAB | LA-15N | 3943 | 8-3-2022 |
| Low Pass Filter | FILTRON | L14012FL | 1410003S | 8-3-2022 |
| Low Pass Filter | MICROLAB | LA-60N | 3942 | 8-4-2022 |
| Attenuator | MINI-CIRCUITS | BW-N3W5+ | N/A | 8-4-2022 |
| Attenuator | Agilent | 8491B/003 | MY39272275 | 8-17-2022 |
| Attenuator | Agilent | 8491B/010 | MY39272011 | 8-4-2022 |
| Attenuator | Agilent | 8491B/020 | MY39271973 | 8-4-2022 |
| E-Field Probe | SPEAG | EX3DV4 | 7314 | 5-31-2022 |
| E-Field Probe | SPEAG | EX3DV4 | 7645 | 4-15-2022 |
| E-Field Probe | SPEAG | EX3DV4 | 7330 | 9-29-2022 |
| E-Field Probe | SPEAG | EX3DV4 | 3697 | 3-22-2022 |
| E-Field Probe | SPEAG | EX3DV4 | 7376 | 7-30-2022 |
| Data Acquisition Electronics | SPEAG | DAE4 | 1591 | 3-26-2022 |
| Data Acquisition Electronics | SPEAG | DAE4 | 1343 | 8-23-2022 |
| Data Acquisition Electronics | SPEAG | DAE4 | 1468 | 9-27-2022 |
| Data Acquisition Electronics | SPEAG | DAE4 | 1447 | 2022-03-23 |
| System Validation Dipole | SPEAG | D2450V2 | 960 | 3-20-2022 |
| System Validation Dipole | SPEAG | D5GHzV2 | 1184 | 12-3-2022 |
| System Validation Dipole | SPEAG | D5GHzV2 | 1293 | 2023-07-22 |
| Thermometer | Lutron | MHB-382SD | AH.50213 | 8-4-2022 |
| Thermometer | Lutron | MHB-382SD | AJ.45903 | 8-3-2022 |
| Thermometer | Lutron | MHB-382SD | AK.12123 | 8-3-2022 |

**Others**

| Name of Equipment | Manufacturer | Type/Model | Serial No. | Cal. Due Date |
|---|---|---|---|---|
| Base Station Simulator | R & S | CMW500 | 169803 | 2022-01-28 |

**Note(s):**

1. For System Validation Dipole, Calibration interval applied every 2 years according to referencing KDB 865664 guidance.
2. Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations. (for blue box items)
3. All equipments were used until Cal.Due data.

# 5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

## 5.1. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedures 1, Clause 4.4.2 in IEC Guide 115:2007.

# 6. Device Under Test (DUT) Information

## 6.1. DUT Description

| | | | |
|---|---|---|---|
| Device Dimension | Refer to Appendix A. | | |
| Back Cover | ☒ The Back Cover is not removable. | | |
| Battery Options | ☒ The rechargeable battery is not user accessible | | |
| Wireless Router (Hotspot) | Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices.<br>☒ Mobile Hotspot (Wi-Fi 2.4 GHz)<br>☒ Mobile Hotspot (Wi-Fi 5.8 GHz) | | |
| Wi-Fi Direct | Wi-Fi Direct enabled devices transfer data directly between each other<br>☒ Wi-Fi Direct (Wi-Fi 2.4 GHz)<br>☒ Wi-Fi Direct (Wi-Fi 5.2 GHz_UNII-1, Wi-Fi 5.8 GHz_UNII-3) | | |
| Test Sample Information | **No.** | **S/N** | **Notes** |
| | 1 | R32R90041WE | Wi-Fi & BT Conducted |
| | 2 | R32RA006VAY | Wi-Fi & BT Conducted |
| | 3 | R32RA006V1M | SAR |
| | 4 | R32RA006V5X | SAR |
| | 5 | R32RB00B40E | SAR |
| | 6 | R32RB00B3YR | SAR |
| | 7 | R32RB00B58V | SAR |
| | 8 | R32RB00B3WH | SAR |
| | 9 | R32RB00B7AT | SAR |
| | 10 | R32RB00B3XZ | SAR |

## 6.2. Wireless Technologies

| Wireless technologies | Frequency bands | Operating mode | Duty Cycle used for SAR testing |
|---|---|---|---|
| Wi-Fi | 2.4 GHz | 802.11b<br>802.11g<br>802.11n (HT20)<br>802.11ax (HE20) | SISO mode<br>99.3% (802.11b)<br>96.3% (802.11g)<br>MIMO mode<br>99.3% (802.11b)<br>96.3% (802.11g) |
| | 5 GHz | 802.11a<br>802.11n (HT20) & (HT40)<br>802.11ac (VHT20) & (VHT40) & (VHT80) & (VHT160)<br>802.11ax (HE20) & (HE40) & (HE80) & (HE160) | MIMO mode<br>96.1% (802.11n HT40)<br>94.6% (802.11ac VHT80) |
| | Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No | | |
| | Does this device support Band gap channel(s)? ☒ Yes ☐ No | | |
| Bluetooth | 2.4 GHz | Version 5.0 LE | 76.7% (DH5) |

**Notes:**

1. The Bluetooth protocol is considered source-based averaging. Bluetooth GFSK (DH5) was verified to have the highest duty cycle of 76.7% and was considered and used for SAR Testing.
2. Duty cycle for Wi-Fi is referenced from the DTS and UNII report.

## 6.3 Nominal and Maximum Output Power

KDB 447498 sec.4.1. at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit

**Normal WLAN-Maximum power**

| Band | Mode | SISO/MIMO Ant.1 & Ant.2 (dBm) | | | | MIMO Ant.1 & Ant.2 (dBm) | | | | MIMO (Ant.1 + Ant.2) (dBm) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | b | g | n | ax | a | n | ac | ax | b | a | g | n | ac | ax |
| 2.4GHz | Ch1 - Ch11 | 16 | 18<br>16 (Ch1)<br>16.5 (Ch11) | 18<br>16 (Ch1)<br>16.5 (Ch11) | 18<br>15 (Ch1)<br>15.5 (Ch11) | | | | | 19 | | 21<br>19 (Ch1)<br>19.5 (Ch11) | 21<br>19 (Ch1)<br>19.5 (Ch11) | | 21<br>18 (Ch1)<br>18.5 (Ch11) |
| 2.4GHz | Ch12 | 9 | 9 | 9 | 9 | | | | | 9 | | 9 | 9 | | 9 |
| 2.4GHz | Ch13 | -2 | -2 | -2 | -2 | | | | | -2 | | -2 | -2 | | -2 |
| 5GHz (20MHz) | UNII-1 | | | | | 17 | 17 | 17 | 17 | | 20 | | 20 | 20 | 20 |
| | UNII-2A | | | | | 17 | 17 | 17 | 17 | | 20 | | 20 | 20 | 20 |
| | UNII-2C | | | | | 17 | 17 | 17 | 17 | | 20 | | 20 | 20 | 20 |
| | UNII-3 | | | | | 17 | 17 | 17 | 17 | | 20 | | 20 | 20 | 20 |
| | UNII-4 | | | | | 17 | 17 | 17 | 17 | | 20 | | 20 | 20 | 20 |
| 5GHz (40MHz) | UNII-1 | | | | | | 17 | 17 | 17<br>16 (Ch 38) | | | | 20 | 20 | 20<br>19 (Ch 38) |
| | UNII-2A | | | | | | 17 | 17 | 17 | | | | 20 | 20 | 20 |
| | UNII-2C | | | | | | 17 | 17 | 17 | | | | 20 | 20 | 20 |
| | UNII-3 | | | | | | 17 | 17 | 17 | | | | 20 | 20 | 20 |
| | UNII-4 | | | | | | 17 | 17 | 17 | | | | 20 | 20 | 20 |
| 5GHz (80MHz) | UNII-1 | | | | | | | 16 | 16<br>15 (Ch 42) | | | | | 19 | 19<br>18 (Ch 42) |
| | UNII-2A | | | | | | | 16 | 16 | | | | | 19 | 19 |
| | UNII-2C | | | | | | | 16 | 16 | | | | | 19 | 19 |
| | UNII-3 | | | | | | | 16 | 16 | | | | | 19 | 19 |
| | UNII-4 | | | | | | | 16 | 16 | | | | | 19 | 19 |
| 5GHz (160MHz) | UNII-1 & UNII-2A | | | | | | | 15 | 15 | | | | | 18 | 18 |
| | UNII-2C | | | | | | | 15 | 15 | | | | | 18 | 18 |
| | UNII-3 & UNII-4 | | | | | | | 15 | 15 | | | | | 18 | 18 |

**Normal WLAN-Reduced power**

| Band | Mode | SISO / MIMO Ant.1 & Ant.2 (dBm) | | | | MIMO Ant.1 & Ant.2 (dBm) | | | | MIMO (Ant.1 + Ant.2) (dBm) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | b | g | n | ax | a | n | ac | ax | b | a | g | n | ac | ax |
| 2.4GHz | Ch1 - Ch11 | 13 | 13 | 13 | 13 | | | | | 16 | | 16 | 16 | | 16 |
| 2.4GHz | Ch12 | | | | | | | | | | | | | | |
| 2.4GHz | Ch13 | | | | | | | | | | | | | | |
| 5GHz (20MHz) | UNII-1 | | | | | 9 | 9 | 9 | 9 | | 12 | | 12 | 12 | 12 |
| | UNII-2A | | | | | 9 | 9 | 9 | 9 | | 12 | | 12 | 12 | 12 |
| | UNII-2C | | | | | 9 | 9 | 9 | 9 | | 12 | | 12 | 12 | 12 |
| | UNII-3 | | | | | 7 | 7 | 7 | 7 | | 10 | | 10 | 10 | 10 |
| | UNII-4 | | | | | 7 | 7 | 7 | 7 | | 10 | | 10 | 10 | 10 |
| 5GHz (40MHz) | UNII-1 | | | | | | 9 | 9 | 9 | | | | 12 | 12 | 12 |
| | UNII-2A | | | | | | 9 | 9 | 9 | | | | 12 | 12 | 12 |
| | UNII-2C | | | | | | 9 | 9 | 9 | | | | 12 | 12 | 12 |
| | UNII-3 | | | | | | 7 | 7 | 7 | | | | 10 | 10 | 10 |
| | UNII-4 | | | | | | 7 | 7 | 7 | | | | 10 | 10 | 10 |
| 5GHz (80MHz) | UNII-1 | | | | | | | 9 | 9 | | | | | 12 | 12 |
| | UNII-2A | | | | | | | 9 | 9 | | | | | 12 | 12 |
| | UNII-2C | | | | | | | 9 | 9 | | | | | 12 | 12 |
| | UNII-3 | | | | | | | 7 | 7 | | | | | 10 | 10 |
| | UNII-4 | | | | | | | 7 | 7 | | | | | 10 | 10 |
| 5GHz (160MHz) | UNII-1 & UNII-2A | | | | | | | 8.5 | 8.5 | | | | | 11.5 | 11.5 |
| | UNII-2C | | | | | | | 8.5 | 8.5 | | | | | 11.5 | 11.5 |
| | UNII-3 & UNII-4 | | | | | | | 6.5 | 6.5 | | | | | 9.5 | 9.5 |

## RSDB WLAN Maximum power

| Band | Mode | SISO / MIMO Ant.1 & Ant.2 (dBm) | | | | MIMO Ant.1 & Ant.2 (dBm) | | | | MIMO (Ant.1 + Ant.2) (dBm) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | b | g | n | ax | a | n | ac | ax | b | a | g | n | ac | ax |
| 2.4GHz | Ch1 - Ch11 | 11 | 11 | 11 | 11 | | | | | 14 | | 14 | 14 | | 14 |
| 2.4GHz | Ch12 | | | | | | | | | | | | | | |
| 2.4GHz | Ch13 | | | | | | | | | | | | | | |
| 5GHz (20MHz) | UNII-1 | | | | | 7 | 7 | 7 | 7 | | 10 | | 10 | 10 | 10 |
| | UNII-2A | | | | | 7 | 7 | 7 | 7 | | 10 | | 10 | 10 | 10 |
| | UNII-2C | | | | | 7 | 7 | 7 | 7 | | 10 | | 10 | 10 | 10 |
| | UNII-3 | | | | | 7 | 7 | 7 | 7 | | 10 | | 10 | 10 | 10 |
| | UNII-4 | | | | | 7 | 7 | 7 | 7 | | 10 | | 10 | 10 | 10 |
| 5GHz (40MHz) | UNII-1 | | | | | | 7 | 7 | 7 | | | | 10 | 10 | 10 |
| | UNII-2A | | | | | | 7 | 7 | 7 | | | | 10 | 10 | 10 |
| | UNII-2C | | | | | | 7 | 7 | 7 | | | | 10 | 10 | 10 |
| | UNII-3 | | | | | | 7 | 7 | 7 | | | | 10 | 10 | 10 |
| | UNII-4 | | | | | | 7 | 7 | 7 | | | | 10 | 10 | 10 |
| 5GHz (80MHz) | UNII-1 | | | | | | | 7 | 7 | | | | | 10 | 10 |
| | UNII-2A | | | | | | | 7 | 7 | | | | | 10 | 10 |
| | UNII-2C | | | | | | | 7 | 7 | | | | | 10 | 10 |
| | UNII-3 | | | | | | | 7 | 7 | | | | | 10 | 10 |
| | UNII-4 | | | | | | | 7 | 7 | | | | | 10 | 10 |
| 5GHz (160MHz) | UNII-1 & UNII-2A | | | | | | | 6.5 | 6.5 | | | | | 9.5 | 9.5 |
| | UNII-2C | | | | | | | 6.5 | 6.5 | | | | | 9.5 | 9.5 |
| | UNII-3 & UNII-4 | | | | | | | 6.5 | 6.5 | | | | | 9.5 | 9.5 |

## Bluetooth Maximum & Reduced power

| Band | Mode | Maximum output power (dBm) | | Reduced output power (dBm) | |
|---|---|---|---|---|---|
| | | BT Ant.1 | BT Ant.2 | BT Ant.1 | BT Ant.2 |
| 2.4GHz | Bluetooth_BDR | 18 | 18 | 12 | 12 |
| 2.4GHz | Bluetooth_EDR | 16 | 16 | 12 | 12 |
| 2.4GHz | Bluetooth_LE (High power) | 16 | 16 | 12 | 12 |
| 2.4GHz | Bluetooth_LE (Low power) | 11 | 11 | 11 | 11 |

**Note(s):**.

1. 2.4GHz(DTS) mode are support both SISO and MIMO mode.
2. 5GHz(UNII) mode are support only MIMO mode.
3. Bluetooth mode are support only SISO mode.
4. WLAN has specific target power, when RSDB operation.
5. WLAN and Bluetooth are support power reduction mode during proximity sensor active.
6. WLAN (including RSDB) and Bluetooth simultaneous transmission scenarios are refer to section.12.

## 6.4. Power Back-off Operation

This device supports power back-off modes using triggering proximity sensor. For full details on how power back-off mode operates, refer to the Operational Description.

| Antenna | Technologies Supported | Proximity sensor | Power Back-off mode | Standalone Exposure Conditions | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Rear | Edge 1 | Edge 2 | Edge 3 | Edge 4 |
| WiFi/BT Ant.1 | Wi-Fi 2.4GHz | Proximity sensor.3 | Proximity sensor triggering | O | O | | | O |
| | Wi-Fi 5GHz | | | | | | | |
| | Bluetooth | | | | | | | |
| WiFi/BT Ant.2 | Wi-Fi 2.4GHz | Proximity sensor.1 | Proximity sensor triggering | O | | | O | O |
| | Wi-Fi 5GHz | | | | | | | |
| | Bluetooth | | | | | | | |

**Note(s):**

1. Please refer to Section.9 for all power measurements, and Proximity sensor verification is mention at Appendix G.

# 7. RF Exposure Conditions (Test Configurations)

Refer to Appendix A for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

**WLAN & Bluetooth Bands**

| Antenna | Tx Interface | Pwr Back-off | Rear | Edge 1 | Edge 2 | Edge 3 | Edge 4 | Corner A | Corner B |
|---|---|---|---|---|---|---|---|---|---|
| | | | | (Left Edge) | (Bottom Edge) | (Right Edge) | (Top Edge) | Note 3 | |
| WLAN/BT SISO Ant.1 | 2.4GHz DTS | OFF | Yes | Yes | No | No | Yes | Yes | |
| | | ON | Yes | Yes | No | No | Yes | No | |
| | Bluetooth | OFF | Yes | Yes | No | No | Yes | Yes | |
| | | ON | Yes | Yes | No | No | Yes | No | |
| WLAN SISO Ant.2 | 2.4GHz DTS | OFF | Yes | No | No | Yes | Yes | | Yes |
| | | ON | Yes | No | No | Yes | Yes | | No |
| | Bluetooth | OFF | Yes | No | No | Yes | Yes | | Yes |
| | | ON | Yes | No | No | Yes | Yes | | No |
| WLAN MIMO (Ant.1 + Ant.2) | 2.4GHz DTS | OFF | Yes | Yes | No | Yes | Yes | Yes | Yes |
| | | ON | Yes | Yes | No | Yes | Yes | No | No |
| | 5GHz UNII | OFF | Yes | Yes | No | Yes | Yes | Yes | Yes |
| | | ON | Yes | Yes | No | Yes | Yes | No | No |

**Note(s):**

1. Yes = Testing is required. No = Testing is not required.
2. Estimated SAR (0.4 W/kg) is applied for WLAN/BT SISO Ant.1's Edge 3 and WLAN/BT SISO Ant.2's Edge 1 due to Separation distance is over 50 mm. Detail of the Separation distance from antenna to Edge's are refer to Appendix A.
3. Corner SAR additionally evaluated using max power with triggering distance. (Corner A = between Edge.1 and Edge.4 / Corner B = between Edge 3 and Edge 4).

# 8. Dielectric Property Measurements & System Check

## 8.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.
The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.
Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

**Tissue Dielectric Parameters**

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

| Target Frequency (MHz) | Head | | Body | |
|---|---|---|---|---|
| | $\varepsilon_r$ | σ (S/m) | $\varepsilon_r$ | σ (S/m) |
| 150 | 52.3 | 0.76 | 61.9 | 0.80 |
| 300 | 45.3 | 0.87 | 58.2 | 0.92 |
| 450 | 43.5 | 0.87 | 56.7 | 0.94 |
| 835 | 41.5 | 0.90 | 55.2 | 0.97 |
| 900 | 41.5 | 0.97 | 55.0 | 1.05 |
| 915 | 41.5 | 0.98 | 55.0 | 1.06 |
| 1450 | 40.5 | 1.20 | 54.0 | 1.30 |
| 1610 | 40.3 | 1.29 | 53.8 | 1.40 |
| 1800 – 2000 | 40.0 | 1.40 | 53.3 | 1.52 |
| 2450 | 39.2 | 1.80 | 52.7 | 1.95 |
| 3000 | 38.5 | 2.40 | 52.0 | 2.73 |
| 5000 | 36.2 | 4.45 | 49.3 | 5.07 |
| 5100 | 36.1 | 4.55 | 49.1 | 5.18 |
| 5200 | 36.0 | 4.66 | 49.0 | 5.30 |
| 5300 | 35.9 | 4.76 | 48.9 | 5.42 |
| 5400 | 35.8 | 4.86 | 48.7 | 5.53 |
| 5500 | 35.6 | 4.96 | 48.6 | 5.65 |
| 5600 | 35.5 | 5.07 | 48.5 | 5.77 |
| 5700 | 35.4 | 5.17 | 48.3 | 5.88 |
| 5800 | 35.3 | 5.27 | 48.2 | 6.00 |

SAR test were performed in All RF exposure conditions using Head tissue according to TCB workshop note of April. 2019.

**IEEE Std 1528-2013**

Refer to Table 3 within the IEEE Std 1528-2013

**Dielectric Property Measurements Results:**

**SAR 1 Room**

| Date | Freq. (MHz) | Liquid Parameters | | | Measured | Target | Delta (%) | Limit ±(%) |
|---|---|---|---|---|---|---|---|---|
| 11/25/2021 | Head 2450 | e' | 38.8200 | Relative Permittivity ($\varepsilon_r$): | 38.82 | 39.20 | -0.97 | 5 |
| | | e" | 13.3800 | Conductivity (σ): | 1.82 | 1.80 | 1.26 | 5 |
| | Head 2400 | e' | 38.9500 | Relative Permittivity ($\varepsilon_r$): | 38.95 | 39.30 | -0.88 | 5 |
| | | e" | 13.3900 | Conductivity (σ): | 1.79 | 1.75 | 2.01 | 5 |
| | Head 2480 | e' | 38.7600 | Relative Permittivity ($\varepsilon_r$): | 38.76 | 39.16 | -1.03 | 5 |
| | | e" | 13.4000 | Conductivity (σ): | 1.85 | 1.83 | 0.84 | 5 |

**SAR 2 Room**

| Date | Freq. (MHz) | Liquid Parameters | | | Measured | Target | Delta (%) | Limit ±(%) |
|---|---|---|---|---|---|---|---|---|
| 11/16/2021 | Head 5250 | e' | 35.9400 | Relative Permittivity ($\varepsilon_r$): | 35.94 | 35.93 | 0.02 | 5 |
| | | e" | 16.2000 | Conductivity (σ): | 4.73 | 4.70 | 0.57 | 5 |
| | Head 5260 | e' | 35.9200 | Relative Permittivity ($\varepsilon_r$): | 35.92 | 35.92 | 0.00 | 5 |
| | | e" | 16.2100 | Conductivity (σ): | 4.74 | 4.71 | 0.61 | 5 |
| | Head 5600 | e' | 35.5700 | Relative Permittivity ($\varepsilon_r$): | 35.57 | 35.53 | 0.10 | 5 |
| | | e" | 16.2200 | Conductivity (σ): | 5.05 | 5.06 | -0.19 | 5 |
| | Head 5750 | e' | 35.3000 | Relative Permittivity ($\varepsilon_r$): | 35.30 | 35.36 | -0.18 | 5 |
| | | e" | 16.2600 | Conductivity (σ): | 5.20 | 5.21 | -0.29 | 5 |
| | Head 5825 | e' | 35.1400 | Relative Permittivity ($\varepsilon_r$): | 35.14 | 35.30 | -0.45 | 5 |
| | | e" | 16.2800 | Conductivity (σ): | 5.27 | 5.27 | 0.06 | 5 |
| 11/18/2021 | Head 5250 | e' | 36.5100 | Relative Permittivity ($\varepsilon_r$): | 36.51 | 35.93 | 1.61 | 5 |
| | | e" | 15.8800 | Conductivity (σ): | 4.64 | 4.70 | -1.41 | 5 |
| | Head 5260 | e' | 36.5100 | Relative Permittivity ($\varepsilon_r$): | 36.51 | 35.92 | 1.64 | 5 |
| | | e" | 15.8800 | Conductivity (σ): | 4.64 | 4.71 | -1.44 | 5 |
| | Head 5600 | e' | 35.9800 | Relative Permittivity ($\varepsilon_r$): | 35.98 | 35.53 | 1.26 | 5 |
| | | e" | 16.0200 | Conductivity (σ): | 4.99 | 5.06 | -1.42 | 5 |
| | Head 5750 | e' | 35.7700 | Relative Permittivity ($\varepsilon_r$): | 35.77 | 35.36 | 1.15 | 5 |
| | | e" | 16.1400 | Conductivity (σ): | 5.16 | 5.21 | -1.03 | 5 |
| | Head 5800 | e' | 35.7200 | Relative Permittivity ($\varepsilon_r$): | 35.72 | 35.30 | 1.19 | 5 |
| | | e" | 16.1800 | Conductivity (σ): | 5.22 | 5.27 | -0.99 | 5 |
| | Head 5925 | e' | 35.5500 | Relative Permittivity ($\varepsilon_r$): | 35.55 | 35.20 | 0.99 | 5 |
| | | e" | 16.2500 | Conductivity (σ): | 5.35 | 5.40 | -0.86 | 5 |
| 11/21/2021 | Head 5250 | e' | 35.5300 | Relative Permittivity ($\varepsilon_r$): | 35.53 | 35.93 | -1.12 | 5 |
| | | e" | 16.3600 | Conductivity (σ): | 4.78 | 4.70 | 1.57 | 5 |
| | Head 5260 | e' | 35.5100 | Relative Permittivity ($\varepsilon_r$): | 35.51 | 35.92 | -1.15 | 5 |
| | | e" | 16.3700 | Conductivity (σ): | 4.79 | 4.71 | 1.60 | 5 |
| | Head 5600 | e' | 34.9500 | Relative Permittivity ($\varepsilon_r$): | 34.95 | 35.53 | -1.64 | 5 |
| | | e" | 16.5600 | Conductivity (σ): | 5.16 | 5.06 | 1.90 | 5 |
| | Head 5750 | e' | 34.7000 | Relative Permittivity ($\varepsilon_r$): | 34.70 | 35.36 | -1.87 | 5 |
| | | e" | 16.6500 | Conductivity (σ): | 5.32 | 5.21 | 2.10 | 5 |
| | Head 5800 | e' | 34.6200 | Relative Permittivity ($\varepsilon_r$): | 34.62 | 35.30 | -1.93 | 5 |
| | | e" | 16.6800 | Conductivity (σ): | 5.38 | 5.27 | 2.07 | 5 |
| | Head 5925 | e' | 34.4200 | Relative Permittivity ($\varepsilon_r$): | 34.42 | 35.20 | -2.22 | 5 |
| | | e" | 16.7400 | Conductivity (σ): | 5.51 | 5.40 | 2.13 | 5 |

**SAR 3 Room**

| Date | Freq. (MHz) | Liquid Parameters | | | Measured | Target | Delta (%) | Limit ±(%) |
|---|---|---|---|---|---|---|---|---|
| 11/25/2021 | Head 2450 | e' | 39.3000 | Relative Permittivity ($\epsilon_r$): | 39.30 | 39.20 | 0.26 | 5 |
| | | e'' | 13.7200 | Conductivity (σ): | 1.87 | 1.80 | 3.84 | 5 |
| | Head 2400 | e' | 39.4100 | Relative Permittivity ($\epsilon_r$): | 39.41 | 39.30 | 0.29 | 5 |
| | | e'' | 13.6900 | Conductivity (σ): | 1.83 | 1.75 | 4.30 | 5 |
| | Head 2480 | e' | 39.2200 | Relative Permittivity ($\epsilon_r$): | 39.22 | 39.16 | 0.15 | 5 |
| | | e'' | 13.7000 | Conductivity (σ): | 1.89 | 1.83 | 3.10 | 5 |

**SAR 4 Room**

| Date | Freq. (MHz) | Liquid Parameters | | | Measured | Target | Delta (%) | Limit ±(%) |
|---|---|---|---|---|---|---|---|---|
| 11/22/2021 | Head 2450 | e' | 38.3500 | Relative Permittivity ($\epsilon_r$): | 38.35 | 39.20 | -2.17 | 5 |
| | | e'' | 13.6700 | Conductivity (σ): | 1.86 | 1.80 | 3.46 | 5 |
| | Head 2400 | e' | 38.4900 | Relative Permittivity ($\epsilon_r$): | 38.49 | 39.30 | -2.05 | 5 |
| | | e'' | 13.6900 | Conductivity (σ): | 1.83 | 1.75 | 4.30 | 5 |
| | Head 2480 | e' | 38.3100 | Relative Permittivity ($\epsilon_r$): | 38.31 | 39.16 | -2.18 | 5 |
| | | e'' | 13.7000 | Conductivity (σ): | 1.89 | 1.83 | 3.10 | 5 |
| 11/25/2021 | Head 2450 | e' | 38.1000 | Relative Permittivity ($\epsilon_r$): | 38.10 | 39.20 | -2.81 | 5 |
| | | e'' | 13.5100 | Conductivity (σ): | 1.84 | 1.80 | 2.25 | 5 |
| | Head 2400 | e' | 38.2400 | Relative Permittivity ($\epsilon_r$): | 38.24 | 39.30 | -2.69 | 5 |
| | | e'' | 13.5100 | Conductivity (σ): | 1.80 | 1.75 | 2.92 | 5 |
| | Head 2480 | e' | 38.0300 | Relative Permittivity ($\epsilon_r$): | 38.03 | 39.16 | -2.89 | 5 |
| | | e'' | 13.4900 | Conductivity (σ): | 1.86 | 1.83 | 1.52 | 5 |

## 8.2. System Check

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

**System Performance Check Measurement Conditions:**

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 2.5 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 1.4 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

**Reference Target SAR Values**

The reference SAR values can be obtained from the calibration certificate of system validation dipoles.

| System Dipole | Serial No. | Cal. Date | Freq. (MHz) | Target SAR Values (W/kg) | |
|---|---|---|---|---|---|
| | | | | 1g/10g | Head |
| D2450V2 | 960 | 3/20/2020 | 2450 | 1g | 53.20 |
| | | | | 10g | 24.80 |
| D5GHzV2 | 1184 | 12/3/2020 | 5250 | 1g | 79.10 |
| | | | | 10g | 22.70 |
| | | | 5600 | 1g | 82.40 |
| | | | | 10g | 23.30 |
| | | | 5750 | 1g | 79.90 |
| | | | | 10g | 22.60 |
| D5GHzV2 | 1293 | 7/22/2021 | 5800 | 1g | 80.60 |
| | | | | 10g | 22.90 |

**Note(s):**

Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations.

**System Check Results**

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

**SAR 1 Room**

| Date Tested | System Dipole | | T.S. Liquid | | Measured Results | | Target (Ref. Value) | Delta ±10 % | Plot No. |
|---|---|---|---|---|---|---|---|---|---|
| | Type | Serial # | | | Zoom Scan to 100 mW | Normalize to 1 W | | | |
| 11/25/2021 | D2450V2 | 960 | Head | 1g | 5.61 | 56.1 | 53.20 | 5.45 | 1, 2 |
| | | | | 10g | 2.63 | 26.3 | 24.80 | 6.05 | |

**SAR 2 Room**

| Date Tested | System Dipole | | T.S. Liquid | | Measured Results | | Target (Ref. Value) | Delta ±10 % | Plot No. |
|---|---|---|---|---|---|---|---|---|---|
| | Type | Serial # | | | Zoom Scan to 100 mW | Normalize to 1 W | | | |
| 11/16/2021 | D5GHzV2 | 1184 | Head | 1g | 8.46 | 84.6 | 79.10 | 6.95 | |
| | | | | 10g | 2.46 | 24.6 | 22.70 | 8.37 | |
| 11/16/2021 | D5GHzV2 | 1184 | Head | 1g | 8.18 | 81.8 | 82.40 | -0.73 | |
| | | | | 10g | 2.34 | 23.4 | 23.30 | 0.43 | |
| 11/16/2021 | D5GHzV2 | 1184 | Head | 1g | 8.41 | 84.1 | 79.90 | 5.26 | |
| | | | | 10g | 2.41 | 24.1 | 22.60 | 6.64 | |
| 11/18/2021 | D5GHzV2 | 1293 | Head | 1g | 7.57 | 75.7 | 80.60 | -6.08 | 3, 4 |
| | | | | 10g | 2.13 | 21.3 | 22.90 | -6.99 | |
| 11/21/2021 | D5GHzV2 | 1184 | Head | 1g | 8.48 | 84.8 | 79.10 | 7.21 | 5, 6 |
| | | | | 10g | 2.42 | 24.2 | 22.70 | 6.61 | |
| 11/21/2021 | D5GHzV2 | 1184 | Head | 1g | 8.81 | 88.1 | 82.40 | 6.92 | |
| | | | | 10g | 2.50 | 25.0 | 23.30 | 7.30 | |
| 11/21/2021 | D5GHzV2 | 1184 | Head | 1g | 8.49 | 84.9 | 79.90 | 6.26 | |
| | | | | 10g | 2.42 | 24.2 | 22.60 | 7.08 | |

**SAR 3 Room**

| Date Tested | System Dipole | | T.S. Liquid | | Measured Results | | Target (Ref. Value) | Delta ±10 % | Plot No. |
|---|---|---|---|---|---|---|---|---|---|
| | Type | Serial # | | | Zoom Scan to 100 mW | Normalize to 1 W | | | |
| 11/25/2021 | D2450V2 | 960 | Head | 1g | 5.73 | 57.3 | 53.20 | 7.71 | 7, 8 |
| | | | | 10g | 2.66 | 26.6 | 24.80 | 7.26 | |

**SAR 4 Room**

| Date Tested | System Dipole | | T.S. Liquid | | Measured Results | | Target (Ref. Value) | Delta ±10 % | Plot No. |
|---|---|---|---|---|---|---|---|---|---|
| | Type | Serial # | | | Zoom Scan to 100 mW | Normalize to 1 W | | | |
| 11/22/2021 | D2450V2 | 960 | Head | 1g | 5.19 | 51.9 | 53.20 | -2.44 | |
| | | | | 10g | 2.40 | 24.0 | 24.80 | -3.23 | |
| 11/25/2021 | D2450V2 | 960 | Head | 1g | 5.17 | 51.7 | 53.20 | -2.82 | 9, 10 |
| | | | | 10g | 2.39 | 23.9 | 24.80 | -3.63 | |

# 9. Conducted Output Power Measurements

## 9.1. Wi-Fi 2.4 GHz (DTS Band)

**Normal WLAN SISO output power results**

| Antenna | Mode | Data Rate | Ch # | Freq. (MHz) | WLAN mode power | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Max.Average Power | | | Reduced Average Power | | |
| | | | | | Meas. Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) | Meas. Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) |
| WiFi 2.4G Ant.1 | 802.11b | 1 Mbps | 1 | 2412.0 | Not Required | 16.0 | No | 12.5 | 13.0 | Yes |
| | | | 6 | 2437.0 | | | | 12.6 | | |
| | | | 11 | 2462.0 | | | | 12.5 | | |
| | | | 12 | 2467.0 | | 9.0 | | | | |
| | | | 13 | 2472.0 | | -2.0 | | | | |
| | 802.11g | 6 Mbps | 1 | 2412.0 | Not Required | 16.0 | Yes | Not Required | 13.0 | No |
| | | | 2 | 2417.0 | 17.5 | 18.0 | | | | |
| | | | 6 | 2437.0 | 17.9 | | | | | |
| | | | 10 | 2457.0 | 17.3 | | | | | |
| | | | 11 | 2462.0 | Not Required | 16.5 | | | | |
| | | | 12 | 2467.0 | Not Required | 9.0 | No | | | |
| | | | 13 | 2472.0 | Not Required | -2.0 | | | | |
| WiFi 2.4G Ant.2 | 802.11b | 1 Mbps | 1 | 2412.0 | Not Required | 16.0 | No | 12.3 | 13.0 | Yes |
| | | | 6 | 2437.0 | | | | 12.6 | | |
| | | | 11 | 2462.0 | | | | 12.8 | | |
| | | | 12 | 2467.0 | | 9.0 | | Not Required | 9.0 | No |
| | | | 13 | 2472.0 | | -2.0 | | Not Required | -2.0 | |
| | 802.11g | 6 Mbps | 1 | 2412.0 | Not Required | 16.0 | Yes | Not Required | 13.0 | No |
| | | | 2 | 2417.0 | 17.4 | 18.0 | | | | |
| | | | 6 | 2437.0 | 17.3 | | | | | |
| | | | 10 | 2457.0 | 17.7 | | | | | |
| | | | 11 | 2462.0 | Not Required | 16.5 | | | | |
| | | | 12 | 2467.0 | Not Required | 9.0 | No | | | |
| | | | 13 | 2472.0 | Not Required | -2.0 | | | | |

## Normal WLAN MIMO output power results

| Antenna | Mode | Data Rate | Ch # | Freq. (MHz) | WLAN mode power | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Max.Average Power | | | Reduced Average Power | | |
| | | | | | Meas. Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) | Meas. Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) |
| WiFi 2.4G Ant.1 | 802.11b | 1 Mbps | 1 | 2412.0 | Not Required | 16.0 | No | 12.3 | 13.0 | Yes |
| | | | 6 | 2437.0 | | | | 13.0 | | |
| | | | 11 | 2462.0 | | | | 12.8 | | |
| | | | 12 | 2467.0 | | 6.0 | | | | |
| | | | 13 | 2472.0 | | -5.0 | | | | |
| | 802.11g | 6 Mbps | 1 | 2412.0 | Not Required | 16.0 | No | Not Required | 13.0 | No |
| | | | 2 | 2417.0 | 17.4 | 18.0 | Yes | | | |
| | | | 6 | 2437.0 | 17.9 | | | | | |
| | | | 10 | 2457.0 | 17.3 | | | | | |
| | | | 11 | 2462.0 | Not Required | 16.5 | No | | | |
| | | | 12 | 2467.0 | | 6.0 | | | | |
| | | | 13 | 2472.0 | | -5.0 | | | | |
| | 802.11n | 6.5 Mbps | 1 | 2412.0 | Not Required | 16.0 | No | Not Required | 13.0 | No |
| | | | 2 | 2417.0 | | 18.0 | | | | |
| | | | 6 | 2437.0 | | | | | | |
| | | | 10 | 2457.0 | | | | | | |
| | | | 11 | 2462.0 | | 16.5 | | | | |
| | | | 12 | 2467.0 | | 6.0 | | | | |
| | | | 13 | 2472.0 | | -5.0 | | | | |
| | 802.11ax | 7.3 Mbps | 1 | 2412.0 | Not Required | 15.0 | No | Not Required | 13.0 | No |
| | | | 2 | 2417.0 | | 18.0 | | | | |
| | | | 6 | 2437.0 | | | | | | |
| | | | 10 | 2457.0 | | | | | | |
| | | | 11 | 2462.0 | | 15.5 | | | | |
| | | | 12 | 2467.0 | | 6.0 | | | | |
| | | | 13 | 2472.0 | | -5.0 | | | | |
| WiFi 2.4G Ant.2 | 802.11b | 1 Mbps | 1 | 2412.0 | Not Required | 16.0 | No | 11.8 | 13.0 | Yes |
| | | | 6 | 2437.0 | | | | 11.9 | | |
| | | | 11 | 2462.0 | | | | 11.2 | | |
| | | | 12 | 2467.0 | | 6.0 | | | | |
| | | | 13 | 2472.0 | | -5.0 | | | | |
| | 802.11g | 6 Mbps | 1 | 2412.0 | Not Required | 16.0 | No | Not Required | 13.0 | No |
| | | | 2 | 2417.0 | 18.0 | 18.0 | Yes | | | |
| | | | 6 | 2437.0 | 17.9 | | | | | |
| | | | 10 | 2457.0 | 17.9 | | | | | |
| | | | 11 | 2462.0 | Not Required | 16.5 | No | | | |
| | | | 12 | 2467.0 | | 6.0 | | | | |
| | | | 13 | 2472.0 | | -5.0 | | | | |
| | 802.11n | 6.5 Mbps | 1 | 2412.0 | Not Required | 16.0 | No | Not Required | 13.0 | No |
| | | | 2 | 2417.0 | | 18.0 | | | | |
| | | | 6 | 2437.0 | | | | | | |
| | | | 10 | 2457.0 | | | | | | |
| | | | 11 | 2462.0 | | 16.5 | | | | |
| | | | 12 | 2467.0 | | 6.0 | | | | |
| | | | 13 | 2472.0 | | -5.0 | | | | |
| | 802.11ax | 7.3 Mbps | 1 | 2412.0 | Not Required | 15.0 | No | Not Required | 13.0 | No |
| | | | 2 | 2417.0 | | 18.0 | | | | |
| | | | 6 | 2437.0 | | | | | | |
| | | | 10 | 2457.0 | | | | | | |
| | | | 11 | 2462.0 | | 15.5 | | | | |
| | | | 12 | 2467.0 | | 6.0 | | | | |
| | | | 13 | 2472.0 | | -5.0 | | | | |

**Note(s):**

1. SAR is not required for 802.11g/n modes when the adjusted SAR for 802.11b is < 1.2 W/kg.
2. For “Not required”, SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11n/g/ax mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.
3. Additionally, SAR is not required for Channels 12 and 13 because the tune-up limit and the measured output power for these two channels are no greater than those for the default test channels. Refer to §6.3.
4. Normal WLAN MIMO SAR additionally were evaluated for satisfy to simultaneous transmission analysis.

## RSDB WLAN SISO output power results

| Antenna | Mode | Data Rate | Ch # | Freq. (MHz) | WLAN mode power | | |
|---|---|---|---|---|---|---|---|
| | | | | | Max.Average Power | | |
| | | | | | Meas. Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) |
| WiFi 2.4G Ant.1 | 802.11b | 1 Mbps | 1 | 2412.0 | 10.0 | 11.0 | Yes |
| | | | 6 | 2437.0 | 10.3 | | |
| | | | 11 | 2462.0 | 9.8 | | |
| WiFi 2.4G Ant.2 | 802.11b | 1 Mbps | 1 | 2412.0 | 9.9 | 11.0 | Yes |
| | | | 6 | 2437.0 | 11.0 | | |
| | | | 11 | 2462.0 | 10.4 | | |

## RSDB WLAN MIMO output power results

| Antenna | Mode | Data Rate | Ch # | Freq. (MHz) | WLAN mode power | | |
|---|---|---|---|---|---|---|---|
| | | | | | Max.Average Power | | |
| | | | | | Meas. Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) |
| WiFi 2.4G Ant.1 | 802.11b | 1 Mbps | 1 | 2412.0 | 11.0 | 11.0 | Yes |
| | | | 6 | 2437.0 | 11.0 | | |
| | | | 11 | 2462.0 | 11.0 | | |
| | 802.11g | 6 Mbps | 1 | 2412.0 | Not Required | 11.0 | Yes |
| | | | 6 | 2437.0 | | | |
| | | | 11 | 2462.0 | | | |
| | 802.11n | 6.5 Mbps | 1 | 2412.0 | Not Required | 11.0 | Yes |
| | | | 6 | 2437.0 | | | |
| | | | 11 | 2462.0 | | | |
| | 802.11ax | 7.3 Mbps | 1 | 2412.0 | Not Required | 11.0 | Yes |
| | | | 6 | 2437.0 | | | |
| | | | 11 | 2462.0 | | | |
| WiFi 2.4G Ant.2 | 802.11b | 1 Mbps | 1 | 2412.0 | 10.5 | 11.0 | Yes |
| | | | 6 | 2437.0 | 9.4 | | |
| | | | 11 | 2462.0 | 9.1 | | |
| | 802.11g | 6 Mbps | 1 | 2412.0 | Not Required | 11.0 | Yes |
| | | | 6 | 2437.0 | | | |
| | | | 11 | 2462.0 | | | |
| | 802.11n | 6.5 Mbps | 1 | 2412.0 | Not Required | 11.0 | Yes |
| | | | 6 | 2437.0 | | | |
| | | | 11 | 2462.0 | | | |
| | 802.11ax | 7.3 Mbps | 1 | 2412.0 | Not Required | 11.0 | Yes |
| | | | 6 | 2437.0 | | | |
| | | | 11 | 2462.0 | | | |

**Note(s):**

1. SAR is not required for 802.11g/n modes when the adjusted SAR for 802.11b is < 1.2 W/kg.
2. For “Not required”, SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11n/g/ax mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.
3. RSDB WLAN SISO & MIMO SAR additionally were evaluated for satisfy to simultaneous transmission analysis.

## 9.2. Wi-Fi 5GHz (U-NII Bands)

**Normal WLAN MIMO Ant.1 output power Results**

| Antenna | Band (GHz) | Mode | Data Rate | Ch # | Freq. (MHz) | WLAN mode power | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Max. Average Power | | | Reduced Average Power | | |
| | | | | | | Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) | Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) |
| 5GHz MIMO Ant.1 | 5.3 (UNII 2A) | 802.11a | 6 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | 54 | 5270.0 | 15.6 | 17.0 | Yes | Not Required | 9.0 | No |
| | | | | 62 | 5310.0 | 15.9 | | | | | |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 58 | 5290.0 | Not Required | 16.0 | No | 8.8 | 9.0 | Yes |
| | | 802.11ac (VHT160) | 58.5 Mbps | Not Required | | | 15.0 | No | Not Required | 8.5 | No |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ax (HE80) | 36.0 Mbps | Not Required | | | 16.0 | No | Not Required | 9.0 | No |
| | | 802.11ax (HE160) | 72.0 Mbps | Not Required | | | 15.0 | No | Not Required | 8.5 | No |
| | 5.5 (U-NII 2C) | 802.11a | 6 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | 102 | 5510.0 | 16.0 | 17.0 | Yes | Not Required | 9.0 | No |
| | | | | 118 | 5590.0 | 15.8 | | | | | |
| | | | | 126 | 5630.0 | 15.0 | | | | | |
| | | | | 142 | 5710.0 | 15.3 | | | | | |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | | 17.0 | Yes | Not Required | 9.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 106 | 5530.0 | Not Required | 16.0 | No | 8.7 | 9.0 | Yes |
| | | | | 122 | 5610.0 | | | | 8.4 | | |
| | | | | 138 | 5690.0 | | | | 8.6 | | |
| | | 802.11ac (VHT160) | 58.5 Mbps | Not Required | | | 15.0 | No | Not Required | 8.5 | No |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ax (HE80) | 36.0 Mbps | Not Required | | | 16.0 | No | Not Required | 9.0 | No |
| | | 802.11ax (HE160) | 72.0 Mbps | Not Required | | | 15.0 | No | Not Required | 8.5 | No |

**Note(s):**

1. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
2. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac/ax modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n ac then ax) is selected.
3. When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest *reported* SAR for UNII band 2A is
   - ≤ 1.2 W/kg, SAR is not required for UNII band I
   - > 1.2 W/kg, both bands should be tested independently for SAR.

## Normal WLAN MIMO Ant.1 output power Results (continued)

| Antenna | Band (GHz) | Mode | Data Rate | Ch # | Freq. (MHz) | WLAN mode power | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Max. Average Power | | | Reduced Average Power | | |
| | | | | | | Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) | Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) |
| 5GHz MIMO Ant.1 | 5.8 (UNII 3) | 802.11a | 6 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | 151 | 5755.0 | 15.7 | 17.0 | Yes | Not Required | 7.0 | No |
| | | | | 159 | 5795.0 | 15.4 | | | | | |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 155 | 5775.0 | Not Required | 16.0 | No | 6.2 | 7.0 | Yes |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ax (HE80) | 36.0 Mbps | Not Required | | | 16.0 | No | Not Required | 7.0 | No |
| | 5.9 (U-NII 4) | 802.11a | 6 Mbps | Not Required | | | 17.0 | Yes | Not Required | 7.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | 167 | 5835.0 | 15.3 | 17.0 | Yes | Not Required | 7.0 | No |
| | | | | 175 | 5875.0 | 15.2 | | | | | |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 171 | 5855.0 | Not Required | 16.0 | No | 6.4 | 7.0 | Yes |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ax (HE80) | 30.6 Mbps | Not Required | | | 16.0 | No | Not Required | 7.0 | No |
| | UNII 3 & UNII 4 | 802.11ac (VHT160) | 58.5 Mbps | Not Required | | | 15.0 | No | Not Required | 6.5 | No |
| | | 802.11ax (HE160) | 72.0 Mbps | Not Required | | | 15.0 | No | Not Required | 6.5 | No |

**Note(s):**

1. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
2. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac/ax modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n ac then ax) is selected.
3. When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest *reported* SAR for UNII band 2A is
   - ≤ 1.2 W/kg, SAR is not required for UNII band I
   - > 1.2 W/kg, both bands should be tested independently for SAR.

## Normal WLAN MIMO Ant.2 output power Results

| Antenna | Band (GHz) | Mode | Data Rate | Ch # | Freq. (MHz) | WLAN mode power | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Max. Average Power | | | Reduced Average Power | | |
| | | | | | | Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) | Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) |
| 5GHz MIMO Ant.2 | 5.3 (UNII 2A) | 802.11a | 6 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | 54 | 5270.0 | 16.1 | 17.0 | Yes | Not Required | 9.0 | No |
| | | | | 62 | 5310.0 | 16.6 | | | | | |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 58 | 5290.0 | Not Required | 16.0 | No | 8.3 | 9.0 | Yes |
| | | 802.11ac (VHT160) | 58.5 Mbps | Not Required | | | 15.0 | No | Not Required | 8.5 | No |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ax (HE80) | 36.0 Mbps | Not Required | | | 16.0 | No | Not Required | 9.0 | No |
| | | 802.11ax (HE160) | 72.0 Mbps | Not Required | | | 15.0 | No | Not Required | 8.5 | No |
| | 5.5 (U-NII 2C) | 802.11a | 6 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | 102 | 5510.0 | 16.3 | 17.0 | Yes | Not Required | 9.0 | No |
| | | | | 118 | 5590.0 | 15.9 | | | | | |
| | | | | 126 | 5630.0 | 16.0 | | | | | |
| | | | | 142 | 5710.0 | 16.2 | | | | | |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | | 17.0 | Yes | Not Required | 9.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 106 | 5530.0 | Not Required | 16.0 | No | 8.6 | 9.0 | Yes |
| | | | | 122 | 5610.0 | | | | 8.1 | | |
| | | | | 138 | 5690.0 | | | | 7.8 | | |
| | | 802.11ac (VHT160) | 58.5 Mbps | Not Required | | | 15.0 | No | Not Required | 8.5 | No |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | | 17.0 | No | Not Required | 9.0 | No |
| | | 802.11ax (HE80) | 36.0 Mbps | Not Required | | | 16.0 | No | Not Required | 9.0 | No |
| | | 802.11ax (HE160) | 72.0 Mbps | Not Required | | | 15.0 | No | Not Required | 8.5 | No |

**Note(s):**

1. For “Not required”, SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
2. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac/ax modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n ac then ax) is selected.
3. When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest *reported* SAR for UNII band 2A is
   - ≤ 1.2 W/kg, SAR is not required for UNII band I
   - > 1.2 W/kg, both bands should be tested independently for SAR.

## Normal WLAN MIMO Ant.2 output power Results (continued)

| Antenna | Band (GHz) | Mode | Data Rate | Ch # | Freq. (MHz) | WLAN mode power | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Max. Average Power | | | Reduced Average Power | | |
| | | | | | | Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) | Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) |
| 5GHz MIMO Ant.2 | 5.8 (UNII 3) | 802.11a | 6 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | 151 | 5755.0 | 16.5 | 17.0 | Yes | Not Required | 7.0 | No |
| | | | | 159 | 5795.0 | 16.5 | | | | | |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 155 | 5775.0 | Not Required | 16.0 | No | 6.8 | 7.0 | Yes |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ax (HE80) | 36.0 Mbps | Not Required | | | 16.0 | No | Not Required | 7.0 | No |
| | 5.9 (U-NII 4) | 802.11a | 6 Mbps | Not Required | | | 17.0 | Yes | Not Required | 7.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | 167 | 5835.0 | 16.0 | 17.0 | Yes | Not Required | 7.0 | No |
| | | | | 175 | 5875.0 | 16.0 | | | | | |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 171 | 5855.0 | Not Required | 16.0 | No | 6.9 | 7.0 | Yes |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | | 17.0 | No | Not Required | 7.0 | No |
| | | 802.11ax (HE80) | 30.6 Mbps | Not Required | | | 16.0 | No | Not Required | 7.0 | No |
| | UNII 3 & UNII 4 | 802.11ac (VHT160) | 58.5 Mbps | Not Required | | | 15.0 | No | Not Required | 6.5 | No |
| | | 802.11ax (HE160) | 72.0 Mbps | Not Required | | | 15.0 | No | Not Required | 6.5 | No |

**Note(s):**

1. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
2. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac/ax modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n ac then ax) is selected.
3. When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest *reported* SAR for UNII band 2A is
   - ≤ 1.2 W/kg, SAR is not required for UNII band I
   - > 1.2 W/kg, both bands should be tested independently for SAR.

## RSDB WLAN MIMO Ant 1 & 2 output power Results

| Antenna | Band (GHz) | Mode | Data Rate | Ch # | Freq. (MHz) | RSDB WLAN mode power | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Max Average Power | | |
| | | | | | | Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) |
| 5GHz MIMO Ant.1 | 5.3 (UNII 2A) | 802.11a | 6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 58 | 5290.0 | 6.7 | 7.0 | Yes |
| | | 802.11ac (VHT160) | 58.5 Mbps | Not Required | | Not Required | 6.5 | No |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE80) | 36.0 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE160) | 72.0 Mbps | Not Required | | Not Required | 6.5 | No |
| | 5.5 (U-NII 2C) | 802.11a | 6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 106 | 5530.0 | 6.7 | 7.0 | Yes |
| | | | | 122 | 5610.0 | 6.4 | | |
| | | | | 138 | 5690.0 | 6.6 | | |
| | | 802.11ac (VHT160) | 58.5 Mbps | Not Required | | Not Required | 6.5 | No |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE80) | 36.0 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE160) | 72.0 Mbps | Not Required | | Not Required | 6.5 | No |

| Antenna | Band (GHz) | Mode | Data Rate | Ch # | Freq. (MHz) | RSDB WLAN mode power | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Max Average Power | | |
| | | | | | | Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) |
| 5GHz MIMO Ant.2 | 5.3 (UNII 2A) | 802.11a | 6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | Not Required | | 6.2 | 7.0 | Yes |
| | | 802.11ac (VHT160) | 58.5 Mbps | Not Required | | Not Required | 6.5 | No |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE80) | 36.0 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE160) | 72.0 Mbps | Not Required | | Not Required | 6.5 | No |
| | 5.5 (U-NII 2C) | 802.11a | 6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 106 | 5530.0 | 6.5 | 7.0 | Yes |
| | | | | 122 | 5610.0 | 6.3 | | |
| | | | | 138 | 5690.0 | 6.3 | | |
| | | 802.11ac (VHT160) | 58.5 Mbps | Not Required | | Not Required | 6.5 | No |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE80) | 36.0 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE160) | 72.0 Mbps | Not Required | | Not Required | 6.5 | No |

**Note(s):**

1. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
2. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac/ax modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n ac then ax) is selected.
3. When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest *reported* SAR for UNII band 2A is
   - ≤ 1.2 W/kg, SAR is not required for UNII band I
   - > 1.2 W/kg, both bands should be tested independently for SAR.
4. RSDB WLAN MIMO SAR additionally were evaluated for satisfy to simultaneous transmission analysis.

## RSDB WLAN MIMO Ant 1 & 2 output power Results (Continued)

| Antenna | Band (GHz) | Mode | Data Rate | Ch # | Freq. (MHz) | RSDB WLAN mode power | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Max Average Power | | |
| | | | | | | Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) |
| 5GHz MIMO Ant.1 | 5.8 (UNII 3) | 802.11a | 6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 155 | 5775.0 | 6.2 | 7.0 | Yes |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | Not Required | 7.0 | NO |
| | | 802.11ax (HE80) | 30.6 Mbps | Not Required | | Not Required | 7.0 | No |
| | 5.9 (U-NII 4) | 802.11a | 6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 171 | 5855.0 | 6.4 | 7.0 | Yes |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE80) | 30.6 Mbps | Not Required | | Not Required | 7.0 | No |
| | UNII 3 & UNII 4 | 802.11ac (VHT160) | 14.6 Mbps | Not Required | | Not Required | 6.5 | No |
| | | 802.11ax (HE160) | 30.6 Mbps | Not Required | | Not Required | 6.5 | No |

| Antenna | Band (GHz) | Mode | Data Rate | Ch # | Freq. (MHz) | RSDB WLAN mode power | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Max Average Power | | |
| | | | | | | Avg Pwr (dBm) | Max. Tune-up Limit (dBm) | SAR Test (Yes/No) |
| 5GHz MIMO Ant.2 | 5.8 (UNII 3) | 802.11a | 6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 155.0 | 5775.0 | 6.8 | 7.0 | Yes |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE80) | 30.6 Mbps | Not Required | | Not Required | 7.0 | No |
| | 5.9 (U-NII 4) | 802.11a | 6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11n (HT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT20) | 6.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT40) | 13.5 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ac (VHT80) | 29.3 Mbps | 171 | 5855.0 | 6.9 | 7.0 | Yes |
| | | 802.11ax (HE20) | 7.3 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE40) | 14.6 Mbps | Not Required | | Not Required | 7.0 | No |
| | | 802.11ax (HE80) | 30.6 Mbps | Not Required | | Not Required | 7.0 | No |
| | UNII 3 & UNII 4 | 802.11ac (VHT160) | 14.6 Mbps | Not Required | | Not Required | 6.5 | No |
| | | 802.11ax (HE160) | 30.6 Mbps | Not Required | | Not Required | 6.5 | No |

**Note(s):**

1. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
2. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac/ax modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n ac then ax) is selected.
3. When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest *reported* SAR for UNII band 2A is
   - ≤ 1.2 W/kg, SAR is not required for UNII band I
   - > 1.2 W/kg, both bands should be tested independently for SAR.
4. RSDB WLAN MIMO SAR additionally were evaluated for satisfy to simultaneous transmission analysis.

## 9.3. Bluetooth

### Bluetooth SISO Measured Results

| Band (GHz) | Antenna | Mode | Ch # | Freq. (MHz) | Maximum Average Power (dBm) | | Reduced Average Power (dBm) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Meas Pwr | Tune-up Limit | Meas Pwr | Tune-up Limit |
| 2.4 | BT SISO Ant.1 | GFSK | 0 | 2402 | 16.4 | 18.0 | 10.6 | 12.0 |
| | | | 39 | 2441 | 16.7 | | 11.9 | |
| | | | 78 | 2480 | 15.0 | | 9.3 | |
| | | EDR | 0 | 2402 | Not required | 16.0 | Not required | 12.0 |
| | | | 39 | 2441 | | | | |
| | | | 78 | 2480 | | | | |
| | | LE | 0 | 2402 | | 16.0 | | 12.0 |
| | | | 19 | 2440 | | | | |
| | | | 39 | 2480 | | | | |
| 2.4 | BT SISO Ant.2 | GFSK | 0 | 2402 | 16.5 | 18.0 | 10.0 | 12.0 |
| | | | 39 | 2441 | 17.3 | | 11.5 | |
| | | | 78 | 2480 | 16.1 | | 9.4 | |
| | | EDR | 0 | 2402 | Not required | 16.0 | Not required | 12.0 |
| | | | 39 | 2441 | | | | |
| | | | 78 | 2480 | | | | |
| | | LE | 0 | 2402 | | 16.0 | | 12.0 |
| | | | 19 | 2440 | | | | |
| | | | 39 | 2480 | | | | |

**Note(s):**

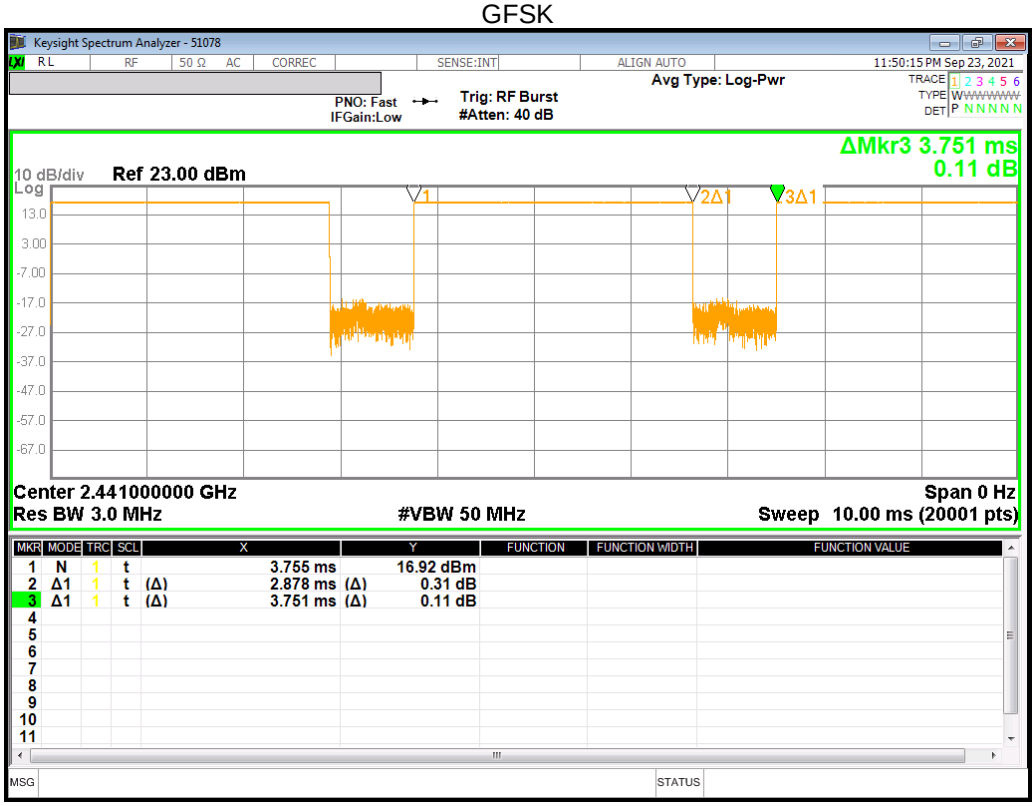
For All exposure conditions, SAR test is evaluated at GFSK mode in Bluetooth using maximum power condition.

### Duty Factor Measured Results

| Mode | Type | T on (ms) | Period (ms) | Duty Cycle | Crest Factor (1/duty cycle) |
|---|---|---|---|---|---|
| GFSK | DH5 | 2.878 | 3.751 | 76.7% | 1.30 |

## Duty Cycle plots

GFSK



# 10. Measured and Reported (Scaled) SAR Results

**SAR Test Reduction criteria are as follows:**

- Reported SAR(W/kg) for WWAN= Measured SAR *Tune-up Scaling Factor
- Reported SAR(W/kg) for Wi-Fi and Bluetooth= Measured SAR * Tune-up scaling factor * Duty Cycle scaling factor
- Duty Cycle scaling factor = 1 / Duty cycle (%)

**KDB 447498 D01 General RF Exposure Guidance:**

Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

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

**KDB 248227 D01 SAR meas for 802.11:**

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the *initial test position(s)* by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The *initial test position(s)* is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the *reported* SAR for the *initial test position* is:

- ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- > 0.4 W/kg, SAR is repeated using the same wireless mode test configuration tested in the *initial test position* to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the *reported* SAR is ≤ 0.8 W/kg or all required test positions are tested.
  - For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
  - When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the *initial test position* and subsequent test positions, when the *reported* SAR is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the *reported* SAR is ≤ 1.2 W/kg or all required test channels are considered.
  - The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.
- When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is ≤ 1.2 W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.
- When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is ≤ 1.2 W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

To determine the *initial test position*, Area Scans were performed to determine the position with the *Maximum Value of SAR (measured)*. The position that produced the highest *Maximum Value of SAR* is considered the worst case position; thus used as the *initial test position*.

# 10.1. Wi-Fi (DTS Band)

## Normal WLAN SISO SAR results

| Frequency Band | Antenna | Mode | RF Exposure Conditions | PWR Back-off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Duty Cycle | Power (dBm) | | 1-g SAR (W/kg) | | Note | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Tune-up limit | Meas. | Meas. | Scaled | | |
| 2.4GHz | WLAN SISO Ant.1 | 802.11g 6Mbps | Standanloe | Off | 16 | Rear | 6 | 2437.0 | 96.3% | 18.0 | 17.9 | 0.040 | 0.043 | | |
| | | | | | 7 | Edge 1 | 6 | 2437.0 | 96.3% | 18.0 | 17.9 | 0.247 | 0.261 | | |
| | | | | | 20 | Edge 4 | 6 | 2437.0 | 96.3% | 18.0 | 17.9 | 0.068 | 0.072 | | |
| | | | | | 9 | Corner A | 6 | 2437.0 | 96.3% | 18.0 | 17.9 | 0.071 | 0.075 | | |
| | | 802.11b 1 Mbps | | On | 0 | Rear | 6 | 2437.0 | 99.3% | 13.0 | 12.6 | 0.290 | 0.324 | | |
| | | | | | 0 | Edge 1 | 6 | 2437.0 | 99.3% | 13.0 | 12.6 | 0.398 | 0.444 | | 1 |
| | | | | | 0 | Edge 4 | 6 | 2437.0 | 99.3% | 13.0 | 12.6 | 0.159 | 0.178 | | |
| | WLAN SISO Ant.2 | 802.11g 6Mbps | Standanloe | Off | 14 | Rear | 10 | 2457.0 | 96.3% | 18.0 | 17.7 | 0.072 | 0.081 | | |
| | | | | | 9 | Edge 3 | 10 | 2457.0 | 96.3% | 18.0 | 17.7 | 0.180 | 0.203 | | |
| | | | | | 17 | Edge 4 | 10 | 2457.0 | 96.3% | 18.0 | 17.7 | 0.077 | 0.087 | | |
| | | | | | 11 | Corner B | 10 | 2457.0 | 96.3% | 18.0 | 17.7 | 0.047 | 0.052 | | |
| | | 802.11b 1 Mbps | | On | 0 | Rear | 11 | 2462.0 | 99.3% | 13.0 | 12.8 | 0.668 | 0.712 | | 2 |
| | | | | | 0 | Edge 3 | 11 | 2462.0 | 99.3% | 13.0 | 12.8 | 0.473 | 0.504 | | |
| | | | | | 0 | Edge 4 | 11 | 2462.0 | 99.3% | 13.0 | 12.8 | 0.211 | 0.225 | | |

## Normal WLAN MIMO SAR results

| Frequency Band | Antenna | Mode | RF Exposure Conditions | PWR Back-off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Duty Cycle | Power (dBm) | | 1-g SAR (W/kg) | | Note | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Tune-up limit | Meas. | Meas. | Scaled | | |
| 2.4GHz | WLAN MIMO Ant.1 | 802.11g 6Mbps | Standanloe | Off | 14 | Rear | 2 | 2417.0 | 96.3% | 18.0 | 17.4 | | | | |
| | | | | | 7 | Edge 1 | 2 | 2417.0 | 96.3% | 18.0 | 17.4 | 0.388 | 0.458 | | |
| | | | | | 9 | Edge 3 | 2 | 2417.0 | 96.3% | 18.0 | 17.4 | 0.285 | 0.337 | | |
| | | | | | 17 | Edge 4 | 2 | 2417.0 | 96.3% | 18.0 | 17.4 | 0.095 | 0.112 | | |
| | | | | | 9 | Corner A | 2 | 2417.0 | 96.3% | 18.0 | 17.4 | 0.082 | 0.097 | | |
| | | | | | 11 | Corner B | 2 | 2417.0 | 96.3% | 18.0 | 17.4 | | | | |
| | | 802.11b 1Mbps | | On | 0 | Rear | 6 | 2437.0 | 99.3% | 13.0 | 13.0 | 0.502 | 0.508 | | |
| | | | | | | | 11 | 2462.0 | 99.3% | 13.0 | 12.8 | 0.418 | 0.438 | | |
| | | | | | 0 | Edge 1 | 6 | 2437.0 | 99.3% | 13.0 | 13.0 | 0.567 | 0.573 | | |
| | | | | | 0 | Edge 3 | 6 | 2437.0 | 99.3% | 13.0 | 13.0 | | | | |
| | | | | | 0 | Edge 4 | 6 | 2437.0 | 99.3% | 13.0 | 13.0 | 0.340 | 0.344 | | |
| | WLAN MIMO Ant.2 | 802.11g 6Mbps | Standanloe | Off | 14 | Rear | 2 | 2417.0 | 96.3% | 18.0 | 18.0 | 0.146 | 0.153 | | |
| | | | | | 7 | Edge 1 | 2 | 2417.0 | 96.3% | 18.0 | 18.0 | | | | |
| | | | | | 9 | Edge 3 | 2 | 2417.0 | 96.3% | 18.0 | 18.0 | | | | |
| | | | | | 17 | Edge 4 | 2 | 2417.0 | 96.3% | 18.0 | 18.0 | | | | |
| | | | | | 9 | Corner A | 2 | 2417.0 | 96.3% | 18.0 | 18.0 | | | | |
| | | | | | 11 | Corner B | 2 | 2417.0 | 96.3% | 18.0 | 18.0 | 0.063 | 0.066 | | |
| | | 802.11b 1Mbps | | On | 0 | Rear | 6 | 2437.0 | 99.3% | 13.0 | 11.9 | | | | |
| | | | | | | | 11 | 2462.0 | 99.3% | 13.0 | 11.2 | | | | |
| | | | | | 0 | Edge 1 | 6 | 2437.0 | 99.3% | 13.0 | 11.9 | | | | |
| | | | | | 0 | Edge 3 | 6 | 2437.0 | 99.3% | 13.0 | 11.9 | 0.560 | 0.728 | | 3 |
| | | | | | 0 | Edge 4 | 6 | 2437.0 | 99.3% | 13.0 | 11.9 | | | | |

**Note(s):**

1. When the Highest reported SAR is ≤ 0.4 or 1.0 W/kg (1-g or 10-g respectively). Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 or 1.0 W/kg (1-g or 10-g respectively). Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 or 2.0 W/kg (1-g or 10-g respectively) was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 or 2.0 W/kg (1-g or 10-g respectively).
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. SAR testing is not required for OFDM mode(s) 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.
6. Normal WLAN MIMO SAR additionally evaluated due to satisfy simultaneous transmission criteria.

# Wi-Fi (DTS Band) (Continued)

## RSDB WLAN SISO SAR results

| Frequency Band | Antenna | Mode | RF Exposure Conditions | PWR Back-off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Duty Cycle | Power (dBm) | | 1-g SAR (W/kg) | | Note | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Tune-up limit | Meas. | Meas. | Scaled | | |
| 2.4GHz | WLAN SISO Ant.1 | 802.11b 1 Mbps | Standanloe | N/A | 0 | Rear | 6 | 2437.0 | 99.3% | 11.0 | 10.3 | 0.237 | 0.282 | | |
| | | | | | 0 | Edge 1 | 6 | 2437.0 | 99.3% | 11.0 | 10.3 | 0.256 | 0.304 | | |
| | | | | | 0 | Edge 4 | 6 | 2437.0 | 99.3% | 11.0 | 10.3 | 0.107 | 0.127 | | |
| | WLAN SISO Ant.2 | 802.11b 1 Mbps | Standanloe | N/A | 0 | Rear | 6 | 2437.0 | 99.3% | 11.0 | 11.0 | 0.533 | 0.541 | | |
| | | | | | 0 | Edge 3 | 6 | 2437.0 | 99.3% | 11.0 | 11.0 | 0.375 | 0.381 | | |
| | | | | | 0 | Edge 4 | 6 | 2437.0 | 99.3% | 11.0 | 11.0 | 0.177 | 0.180 | | |

## RSDB WLAN MIMO SAR results

| Frequency Band | Antenna | Mode | RF Exposure Conditions | PWR Back-off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Duty Cycle | Power (dBm) | | 1-g SAR (W/kg) | | Note | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Tune-up limit | Meas. | Meas. | Scaled | | |
| 2.4GHz | WLAN MIMO Ant.1 | 802.11b 1 Mbps | Standanloe | N/A | 0 | Rear | 1 | 2412.0 | 99.3% | 11.0 | 11.0 | | | | |
| | | | | | 0 | Edge 1 | 1 | 2412.0 | 99.3% | 11.0 | 11.0 | 0.365 | 0.369 | | |
| | | | | | 0 | Edge 3 | 1 | 2412.0 | 99.3% | 11.0 | 11.0 | | | | |
| | | | | | 0 | Edge 4 | 1 | 2412.0 | 99.3% | 11.0 | 11.0 | | | | |
| | WLAN MIMO Ant.2 | 802.11b 1 Mbps | Standanloe | N/A | 0 | Rear | 1 | 2412.0 | 99.3% | 11.0 | 9.4 | 0.377 | 0.550 | | |
| | | | | | 0 | Edge 1 | 1 | 2412.0 | 99.3% | 11.0 | 9.4 | | | | |
| | | | | | 0 | Edge 3 | 1 | 2412.0 | 99.3% | 11.0 | 9.4 | 0.267 | 0.389 | | |
| | | | | | 0 | Edge 4 | 1 | 2412.0 | 99.3% | 11.0 | 9.4 | 0.173 | 0.252 | | |

**Note(s):**

1. When the Highest reported SAR is ≤ 0.4 or 1.0 W/kg (1-g or 10-g respectively). Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 or 1.0 W/kg (1-g or 10-g respectively). Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 or 2.0 W/kg (1-g or 10-g respectively) was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 or 2.0 W/kg (1-g or 10-g respectively).
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. SAR testing is not required for OFDM mode(s) 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.
6. RSDB WLAN SISO & MIMO SAR additionally evaluated due to satisfy simultaneous transmission criteria.

# 10.2. Wi-Fi (U-NII Bands)

## Normal U-NII 2A Results

| Frequency Band | Antenna | Mode | RF Exposure Conditions | PWR Back-off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Duty Cycle (%) | Power (dBm) | | 1-g SAR (W/kg) | | Note | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Tune-up limit | Meas. | Meas. | Scaled | | |
| 5.3 GHz U-NII 2A | WLAN MIMO Ant.1 | 802.11n HT40 13.5 Mbps | Standalone | Off | 14 | Rear | 62 | 5310.0 | 96.1% | 17.0 | 15.9 | 0.043 | 0.058 | | |
| | | | | | 7 | Edge 1 | 62 | 5310.0 | 96.1% | 17.0 | 15.9 | 0.160 | 0.214 | | 4 |
| | | | | | 9 | Edge 3 | 62 | 5310.0 | 96.1% | 17.0 | 15.9 | | | | |
| | | | | | 17 | Edge 4 | 62 | 5310.0 | 96.1% | 17.0 | 15.9 | 0.034 | 0.045 | | |
| | | | | | 9 | Corner A | 62 | 5310.0 | 96.1% | 17.0 | 15.9 | 0.040 | 0.053 | | |
| | | | | | 11 | Corner B | 62 | 5310.0 | 96.1% | 17.0 | 15.9 | | | | |
| | | 802.11ac VHT80 29.3 Mbps | Standalone | On | 0 | Rear | 58 | 5290.0 | 94.6% | 9.0 | 8.8 | | | | |
| | | | | | 0 | Edge 1 | 58 | 5290.0 | 94.6% | 9.0 | 8.8 | 0.156 | 0.172 | | |
| | | | | | 0 | Edge 3 | 58 | 5290.0 | 94.6% | 9.0 | 8.8 | | | | |
| | | | | | 0 | Edge 4 | 58 | 5290.0 | 94.6% | 9.0 | 8.8 | 0.074 | 0.082 | | |
| | WLAN MIMO Ant.2 | 802.11n HT40 13.5 Mbps | Standalone | Off | 14 | Rear | 62 | 5310.0 | 96.1% | 17.0 | 16.6 | | | | |
| | | | | | 7 | Edge 1 | 62 | 5310.0 | 96.1% | 17.0 | 16.6 | | | | |
| | | | | | 9 | Edge 3 | 62 | 5310.0 | 96.1% | 17.0 | 16.6 | 0.281 | 0.324 | | |
| | | | | | 17 | Edge 4 | 62 | 5310.0 | 96.1% | 17.0 | 16.6 | | | | |
| | | | | | 9 | Corner A | 62 | 5310.0 | 96.1% | 17.0 | 16.6 | | | | |
| | | | | | 11 | Corner B | 62 | 5310.0 | 96.1% | 17.0 | 16.6 | 0.115 | 0.132 | | |
| | | 802.11ac VHT80 29.3 Mbps | Standalone | On | 0 | Rear | 58 | 5290.0 | 94.6% | 9.0 | 8.3 | 0.397 | 0.494 | | |
| | | | | | 0 | Edge 1 | 58 | 5290.0 | 94.6% | 9.0 | 8.3 | | | | |
| | | | | | 0 | Edge 3 | 58 | 5290.0 | 94.6% | 9.0 | 8.3 | 0.774 | 0.964 | | 5 |
| | | | | | 0 | Edge 4 | 58 | 5290.0 | 94.6% | 9.0 | 8.3 | | | | |

## RSDB U-NII 2A Results

| Frequency Band | Antenna | Mode | RF Exposure Conditions | PWR Back-off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Duty Cycle (%) | Power (dBm) | | 1-g SAR (W/kg) | | Note | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Tune-up limit | Meas. | Meas. | Scaled | | |
| 5.3 GHz U-NII 2A | WLAN MIMO Ant.1 | 802.11ac VHT80 29.3 Mbps | Standalone | N/A | 0 | Rear | 58 | 5290.0 | 94.6% | 7.0 | 6.7 | | | | |
| | | | | | 0 | Edge 1 | 58 | 5290.0 | 94.6% | 7.0 | 6.7 | 0.058 | 0.066 | | |
| | | | | | 0 | Edge 3 | 58 | 5290.0 | 94.6% | 7.0 | 6.7 | | | | |
| | | | | | 0 | Edge 4 | 58 | 5290.0 | 94.6% | 7.0 | 6.7 | 0.034 | 0.039 | | |
| | WLAN MIMO Ant.2 | 802.11ac VHT80 29.3 Mbps | Standalone | N/A | 0 | Rear | 58 | 5290.0 | 94.6% | 7.0 | 6.2 | 0.203 | 0.259 | | |
| | | | | | 0 | Edge 1 | 58 | 5290.0 | 94.6% | 7.0 | 6.2 | | | | |
| | | | | | 0 | Edge 3 | 58 | 5290.0 | 94.6% | 7.0 | 6.2 | 0.513 | 0.655 | | |
| | | | | | 0 | Edge 4 | 58 | 5290.0 | 94.6% | 7.0 | 6.2 | | | | |

**Note(s):**

1. When the Highest reported SAR is ≤ 0.4 or 1.0 W/kg (1-g or 10-g respectively). Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 or 1.0 W/kg (1-g or 10-g respectively). Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 or 2.0 W/kg (1-g or 10-g respectively) was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 or 2.0 W/kg (1-g or 10-g respectively).
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. RSDB WLAN SAR additionally evaluated due to satisfy simultaneous transmission criteria.

## Normal U-NII 2C Results

| Frequency Band | Antenna | Mode | RF Exposure Conditions | PWR Back-off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Duty Cycle (%) | Power (dBm) | | 1-g SAR (W/kg) | | Note | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Tune-up limit | Meas. | Meas. | Scaled | | |
| 5.5 GHz U-NII 2C | WLAN MIMO Ant.1 | 802.11n HT40 13.5 Mbps | Standalone | Off | 14 | Rear | 102 | 5510.0 | 96.1% | 17.0 | 16.0 | | | | |
| | | | | | 7 | Edge 1 | 102 | 5510.0 | 96.1% | 17.0 | 16.0 | 0.126 | 0.166 | | |
| | | | | | 9 | Edge 3 | 102 | 5510.0 | 96.1% | 17.0 | 16.0 | | | | |
| | | | | | 17 | Edge 4 | 102 | 5510.0 | 96.1% | 17.0 | 16.0 | | | | |
| | | | | | 9 | Corner A | 102 | 5510.0 | 96.1% | 17.0 | 16.0 | 0.073 | 0.096 | | |
| | | | | | 11 | Corner B | 102 | 5510.0 | 96.1% | 17.0 | 16.0 | | | | |
| | | 802.11ac VHT80 29.3 Mbps | Standalone | On | 0 | Rear | 106 | 5530.0 | 94.6% | 9.0 | 8.7 | | | | |
| | | | | | 0 | Edge 1 | 106 | 5530.0 | 94.6% | 9.0 | 8.7 | 0.170 | 0.195 | | 6 |
| | | | | | 0 | Edge 3 | 106 | 5530.0 | 94.6% | 9.0 | 8.7 | | | | |
| | | | | | 0 | Edge 4 | 106 | 5530.0 | 94.6% | 9.0 | 8.7 | | | | |
| | WLAN MIMO Ant.2 | 802.11n HT40 13.5 Mbps | Standalone | Off | 14 | Rear | 102 | 5510.0 | 96.1% | 17.0 | 16.3 | 0.044 | 0.054 | | |
| | | | | | 7 | Edge 1 | 102 | 5510.0 | 96.1% | 17.0 | 16.3 | | | | |
| | | | | | 9 | Edge 3 | 102 | 5510.0 | 96.1% | 17.0 | 16.3 | 0.242 | 0.297 | | |
| | | | | | 17 | Edge 4 | 102 | 5510.0 | 96.1% | 17.0 | 16.3 | 0.014 | 0.018 | | |
| | | | | | 9 | Corner A | 102 | 5510.0 | 96.1% | 17.0 | 16.3 | | | | |
| | | | | | 11 | Corner B | 102 | 5510.0 | 96.1% | 17.0 | 16.3 | 0.097 | 0.119 | | |
| | | 802.11ac VHT80 29.3 Mbps | Standalone | On | 0 | Rear | 106 | 5530.0 | 94.6% | 9.0 | 8.6 | 0.375 | 0.434 | | |
| | | | | | 0 | Edge 1 | 106 | 5530.0 | 94.6% | 9.0 | 8.6 | | | | |
| | | | | | 0 | Edge 3 | 106 | 5530.0 | 94.6% | 9.0 | 8.6 | 0.631 | 0.730 | | 7 |
| | | | | | 0 | Edge 4 | 106 | 5530.0 | 94.6% | 9.0 | 8.6 | 0.058 | 0.067 | | |

## RSDB U-NII 2C Results

| Frequency Band | Antenna | Mode | RF Exposure Conditions | PWR Back-off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Duty Cycle (%) | Power (dBm) | | 1-g SAR (W/kg) | | Note | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Tune-up limit | Meas. | Meas. | Scaled | | |
| 5.5 GHz U-NII 2C | WLAN MIMO Ant.1 | 802.11ac VHT80 29.3 Mbps | Standalone | N/A | 0 | Rear | 106 | 5530.0 | 94.6% | 7.0 | 6.7 | | | | |
| | | | | | 0 | Edge 1 | 106 | 5530.0 | 94.6% | 7.0 | 6.7 | 0.189 | 0.216 | | |
| | | | | | 0 | Edge 3 | 106 | 5530.0 | 94.6% | 7.0 | 6.7 | | | | |
| | | | | | 0 | Edge 4 | 106 | 5530.0 | 94.6% | 7.0 | 6.7 | 0.040 | 0.045 | | |
| | WLAN MIMO Ant.2 | 802.11ac VHT80 29.3 Mbps | Standalone | N/A | 0 | Rear | 106 | 5530.0 | 94.6% | 7.0 | 6.5 | 0.278 | 0.331 | | |
| | | | | | 0 | Edge 1 | 106 | 5530.0 | 94.6% | 7.0 | 6.5 | | | | |
| | | | | | 0 | Edge 3 | 106 | 5530.0 | 94.6% | 7.0 | 6.5 | 0.410 | 0.489 | | |
| | | | | | 0 | Edge 4 | 106 | 5530.0 | 94.6% | 7.0 | 6.5 | | | | |

**Note(s):**

1. When the Highest reported SAR is ≤ 0.4 or 1.0 W/kg (1-g or 10-g respectively). Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 or 1.0 W/kg (1-g or 10-g respectively). Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 or 2.0 W/kg (1-g or 10-g respectively) was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 or 2.0 W/kg (1-g or 10-g respectively).
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. RSDB WLAN SAR additionally evaluated due to satisfy simultaneous transmission criteria.

## Normal & RSDB U-NII 3 Results

| Frequency Band | Antenna | Mode | RF Exposure Conditions | PWR Back-off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Duty Cycle (%) | Power (dBm) | | 1-g SAR (W/kg) | | Note | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Tune-up limit | Meas. | Meas. | Scaled | | |
| 5.8 GHz U-NII 3 | WLAN MIMO Ant.1 | 802.11n HT40 13.5 Mbps | Standalone | Off | 14 | Rear | 159 | 5795.0 | 96.1% | 17.0 | 15.4 | | | | |
| | | | | | 7 | Edge 1 | 159 | 5795.0 | 96.1% | 17.0 | 15.4 | 0.303 | 0.459 | | 8 |
| | | | | | 9 | Edge 3 | 159 | 5795.0 | 96.1% | 17.0 | 15.4 | | | | |
| | | | | | 17 | Edge 4 | 159 | 5795.0 | 96.1% | 17.0 | 15.4 | 0.051 | 0.077 | | |
| | | | | | 9 | Corner A | 159 | 5795.0 | 96.1% | 17.0 | 15.4 | 0.168 | 0.254 | | |
| | | | | | 11 | Corner B | 159 | 5795.0 | 96.1% | 17.0 | 15.4 | | | | |
| | | 802.11ac VHT80 29.3 Mbps | Standalone | On | 0 | Rear | 155 | 5775.0 | 94.6% | 7.0 | 6.2 | | | | |
| | | | | | 0 | Edge 1 | 155 | 5775.0 | 94.6% | 7.0 | 6.2 | 0.295 | 0.378 | | |
| | | | | | 0 | Edge 3 | 155 | 5775.0 | 94.6% | 7.0 | 6.2 | | | | |
| | | | | | 0 | Edge 4 | 155 | 5775.0 | 94.6% | 7.0 | 6.2 | 0.099 | 0.126 | | |
| | WLAN MIMO Ant.2 | 802.11n HT40 13.5 Mbps | Standalone | Off | 14 | Rear | 159 | 5795.0 | 96.1% | 17.0 | 16.5 | 0.086 | 0.100 | | |
| | | | | | 7 | Edge 1 | 159 | 5795.0 | 96.1% | 17.0 | 16.5 | | | | |
| | | | | | 9 | Edge 3 | 159 | 5795.0 | 96.1% | 17.0 | 16.5 | 0.535 | 0.626 | | 9 |
| | | | | | 17 | Edge 4 | 159 | 5795.0 | 96.1% | 17.0 | 16.5 | | | | |
| | | | | | 9 | Corner A | 159 | 5795.0 | 96.1% | 17.0 | 16.5 | | | | |
| | | | | | 11 | Corner B | 159 | 5795.0 | 96.1% | 17.0 | 16.5 | 0.218 | 0.255 | | |
| | | 802.11ac VHT80 29.3 Mbps | Standalone | On | 0 | Rear | 155 | 5775.0 | 94.6% | 7.0 | 6.7 | 0.407 | 0.465 | | |
| | | | | | 0 | Edge 1 | 155 | 5775.0 | 94.6% | 7.0 | 6.7 | | | | |
| | | | | | 0 | Edge 3 | 155 | 5775.0 | 94.6% | 7.0 | 6.7 | 0.511 | 0.584 | | |
| | | | | | 0 | Edge 4 | 155 | 5775.0 | 94.6% | 7.0 | 6.7 | | | | |

**Note(s):**

1. When the Highest reported SAR is ≤ 0.4 or 1.0 W/kg (1-g or 10-g respectively). Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 or 1.0 W/kg (1-g or 10-g respectively). Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 or 2.0 W/kg (1-g or 10-g respectively) was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 or 2.0 W/kg (1-g or 10-g respectively).
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. RSDB WLAN SAR additionally evaluated due to satisfy simultaneous transmission criteria.

## Normal & RSDB U-NII 4 Results

| Frequency Band | Antenna | Mode | RF Exposure Conditions | PWR Back-off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Duty Cycle (%) | Power (dBm) | | 1-g SAR (W/kg) | | Note | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Tune-up limit | Meas. | Meas. | Scaled | | |
| 5.9 GHz U-NII 4 | WLAN MIMO Ant.1 | 802.11n HT40 13.5 Mbps | Standalone | Off | 14 | Rear | 175 | 5875.0 | 96.1% | 17.0 | 15.2 | | | | |
| | | | | | 7 | Edge 1 | 175 | 5875.0 | 96.1% | 17.0 | 15.2 | 0.327 | 0.516 | | 10 |
| | | | | | 9 | Edge 3 | 175 | 5875.0 | 96.1% | 17.0 | 15.2 | | | | |
| | | | | | 17 | Edge 4 | 175 | 5875.0 | 96.1% | 17.0 | 15.2 | | | | |
| | | | | | 9 | Corner A | 175 | 5875.0 | 96.1% | 17.0 | 15.2 | 0.108 | 0.171 | | |
| | | | | | 11 | Corner B | 175 | 5875.0 | 96.1% | 17.0 | 15.2 | | | | |
| | | 802.11ac VHT80 29.3 Mbps | Standalone | On | 0 | Rear | 171 | 5855.0 | 94.6% | 7.0 | 6.4 | | | | |
| | | | | | 0 | Edge 1 | 171 | 5855.0 | 94.6% | 7.0 | 6.4 | 0.253 | 0.310 | | |
| | | | | | 0 | Edge 3 | 171 | 5855.0 | 94.6% | 7.0 | 6.4 | | | | |
| | | | | | 0 | Edge 4 | 171 | 5855.0 | 94.6% | 7.0 | 6.4 | | | | |
| | WLAN MIMO Ant.2 | 802.11n HT40 13.5 Mbps | Standalone | Off | 14 | Rear | 175 | 5875.0 | 96.1% | 17.0 | 16.0 | 0.071 | 0.093 | | |
| | | | | | 7 | Edge 1 | 175 | 5875.0 | 96.1% | 17.0 | 16.0 | | | | |
| | | | | | 9 | Edge 3 | 175 | 5875.0 | 96.1% | 17.0 | 16.0 | 0.366 | 0.477 | | |
| | | | | | 17 | Edge 4 | 175 | 5875.0 | 96.1% | 17.0 | 16.0 | 0.054 | 0.070 | | |
| | | | | | 9 | Corner A | 175 | 5875.0 | 96.1% | 17.0 | 16.0 | | | | |
| | | | | | 11 | Corner B | 175 | 5875.0 | 96.1% | 17.0 | 16.0 | 0.154 | 0.201 | | |
| | | 802.11ac VHT80 29.3 Mbps | Standalone | On | 0 | Rear | 171 | 5855.0 | 94.6% | 7.0 | 6.9 | 0.444 | 0.486 | | 11 |
| | | | | | 0 | Edge 1 | 171 | 5855.0 | 94.6% | 7.0 | 6.9 | | | | |
| | | | | | 0 | Edge 3 | 171 | 5855.0 | 94.6% | 7.0 | 6.9 | 0.306 | 0.335 | | |
| | | | | | 0 | Edge 4 | 171 | 5855.0 | 94.6% | 7.0 | 6.9 | 0.084 | 0.091 | | |

**Note(s):**

1. When the Highest reported SAR is ≤ 0.4 or 1.0 W/kg (1-g or 10-g respectively). Therefore, further SAR measurements within this exposure condition are not required.
2. Highest reported SAR is > 0.4 or 1.0 W/kg (1-g or 10-g respectively). Due to the highest reported SAR for this test position, other test positions in this exposure condition were evaluated until a SAR ≤ 0.8 or 2.0 W/kg (1-g or 10-g respectively) was reported.
3. Testing for a second channel was required because the reported SAR for this test position was > 0.8 or 2.0 W/kg (1-g or 10-g respectively).
4. Additional testing required in order satisfying FCC simultaneous transmission limit criteria.
5. RSDB WLAN SAR additionally evaluated due to satisfy simultaneous transmission criteria.

## 10.3. Bluetooth

| Frequency Band | Antenna | Mode | RF Exposure Conditions | PWR Back-off | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Duty Cycle (%) | Power (dBm) | | 1-g SAR (W/kg) | | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Tune-up limit | Meas. | Meas. | Scaled | |
| 2.4 GHz | BT SISO Ant.1 | GFSK | Standalone | Off | 16 | Rear | 39 | 2441.0 | 76.7% | 18.0 | 16.7 | 0.057 | 0.099 | |
| | | | | | 7 | Edge 1 | 39 | 2441.0 | 76.7% | 18.0 | 16.7 | 0.208 | 0.363 | 12 |
| | | | | | 20 | Edge 4 | 39 | 2441.0 | 76.7% | 18.0 | 16.7 | 0.049 | 0.085 | |
| | | | | | 9 | Corner A | 39 | 2441.0 | 76.7% | 18.0 | 16.7 | 0.072 | 0.126 | |
| | | | | On | 0 | Rear | 39 | 2441.0 | 76.7% | 12.0 | 11.9 | 0.224 | 0.298 | |
| | | | | | 0 | Edge 1 | 39 | 2441.0 | 76.7% | 12.0 | 11.9 | 0.230 | 0.306 | |
| | | | | | 0 | Edge 4 | 39 | 2441.0 | 76.7% | 12.0 | 11.9 | 0.090 | 0.120 | |
| 2.4 GHz | BT SISO Ant.2 | GFSK | Standalone | Off | 16 | Rear | 39 | 2441.0 | 76.7% | 18.0 | 17.3 | 0.065 | 0.101 | |
| | | | | | 9 | Edge 3 | 39 | 2441.0 | 76.7% | 18.0 | 17.3 | 0.143 | 0.221 | |
| | | | | | 17 | Edge 4 | 39 | 2441.0 | 76.7% | 18.0 | 17.3 | 0.060 | 0.093 | |
| | | | | | 11 | Corner B | 39 | 2441.0 | 76.7% | 18.0 | 17.3 | 0.049 | 0.076 | |
| | | | | On | 0 | Rear | 39 | 2441.0 | 76.7% | 12.0 | 11.5 | 0.360 | 0.521 | 13 |
| | | | | | 0 | Edge 3 | 39 | 2441.0 | 76.7% | 12.0 | 11.5 | 0.342 | 0.495 | |
| | | | | | 0 | Edge 4 | 39 | 2441.0 | 76.7% | 12.0 | 11.5 | 0.112 | 0.162 | |

# 11. SAR Masurement Variability

In accordance with published RF Exposure KDB 865664 D01 SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is <0.8 or 2 W/kg (1-g or 10-g respectively); steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.8 or 2 W/kg (1-g or 10-g respectively), 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 or 3.6 W/kg (~ 10% from the 1-g or 10-g respective SAR limit).
4) Perform a third repeated measurement only if the original, first, or second repeated measurement is ≥ 1.5 or 3.75 W/kg (1-g or 10-g respectively) and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

**Peak spatial-average (1g of tissue)**

| Frequency Band (MHz) | Air Interface | RF Exposure Conditions | Test Position | Repeated SAR (Yes/No) | Highest Measured SAR (W/kg) | Repeated Measured SAR (W/kg) | Largest to Smallest SAR Ratio |
|---|---|---|---|---|---|---|---|
| 2450 | Wi-Fi 802.11b/g/n | Standalone | Edge 1 | No | 0.567 | N/A | N/A |
| | Bluetooth | Standalone | Rear | No | 0.360 | N/A | N/A |
| 5300 | Wi-Fi 802.11a/n | Standalone | Edge 3 | No | 0.774 | N/A | N/A |
| 5500 | Wi-Fi 802.11a/n | Standalone | Edge 3 | No | 0.631 | N/A | N/A |
| 5800 | Wi-Fi 802.11a/n | Standalone | Edge 3 | No | 0.535 | N/A | N/A |
| 5900 | Wi-Fi 802.11a/n | Standalone | Rear | No | 0.444 | N/A | N/A |

**Note(s):**

Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.

# 12. Simultaneous Transmission SAR Analysis

**Simultaneous Transmission Condition**

| RF Exposure Condition | Item | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Standalone | 1 | DTS MIMO | | | | | | Non-RSDB Scenarios |
| | 2 | DTS Ant.2 | + | BT Ant.1 | | | | |
| | 3 | UNII MIMO | | | | | | |
| | 4, 5 | UNII MIMO | + | BT Ant.1 | or | BT Ant.2 | | |
| | 6 | DTS Ant.1 | + | UNII MIMO | | | | RSDB Scenarios |
| | 7 | DTS MIMO | + | UNII MIMO | | | | |
| | 8 | DTS Ant.2 | + | UNII MIMO | + | BT Ant.1 | | |

Notes:

1. DTS supports Wi-Fi Direct, Hotspot and VoIP.
2. U-NII supports Wi-Fi Direct, Hotspot and VoIP.
3. DTS supports SISO (Only Ant.2) and MIMO mode, U-NII only supports MIMO mode.
4. U-NII Radio can transmit simultaneously with Bluetooth Radio.
5. DTS Radio can transmit simultaneously with Bluetooth Radio in only RSDB Scenarios
6. DTS Radio can transmit simultaneously with U-NII Radio in only RSDB Scenarios
7. BT supports only SISO mode.

# Simultaneous transmission SAR test exclusion considerations

KDB 447498 D01 General RF Exposure Guidance provides two procedures for determining simultaneous transmission SAR test exclusion: Sum of SAR and SAR to Peak Location Ratio (SPLSR)

## Sum of SAR

To qualify for simultaneous transmission SAR test exclusion based upon Sum of SAR the sum of the reported standalone SARs for all simultaneously transmitting antennas shall be below the applicable standalone SAR limit. If the sum of the SARs is above the applicable limit then simultaneous transmission SAR test exclusion may still apply if the requirements of the SAR to Peak Location Ratio (SPLSR) evaluation are met.

## 12.1. Sum of the SAR for Wi-Fi & BT

### Non-RSDB scenarios

| RF Exposure | Test Position | Standalone SAR (W/kg) | | | | | | Sum of SAR (W/kg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Non-RSDB scenarios | | | | | | | | | | |
| | | DTS Ant.2 | DTS MIMO | BT Ant.1 | BT Ant.2 | UNII MIMO (5GHz) | UNII MIMO (6GHz) | DTS Ant.2 + BT Ant.1 | UNII MIMO + BT Ant.1 | UNII MIMO + BT Ant.2 | UNII MIMO + BT Ant.1 | UNII MIMO + BT Ant.2 |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 1+3 | 3+5 | 4+5 | 3+6 | 4+6 |
| Standalone | Rear | 0.712 | 0.508 | 0.298 | 0.521 | 0.494 | 0.501 | 1.220 | 0.792 | 1.015 | 0.799 | 1.022 |
| | Edge 1 | 0.712 | 0.573 | 0.363 | 0.521 | 0.516 | 0.019 | 1.285 | 0.879 | 1.037 | 0.382 | 0.540 |
| | Edge 3 | 0.504 | 0.728 | 0.363 | 0.495 | 0.964 | 0.104 | 1.232 | 1.327 | 1.459 | 0.467 | 0.599 |
| | Edge 4 | 0.225 | 0.344 | 0.120 | 0.162 | 0.126 | 0.006 | 0.569 | 0.246 | 0.288 | 0.126 | 0.168 |

### RSDB scenarios

| RF Exposure | Test Position | Standalone SAR (W/kg) | | | | | | Sum of SAR (W/kg) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | RSDB scenarios | | | | | | | | | | | | | |
| | | DTS Ant.1 | DTS Ant.2 | DTS MIMO | BT Ant.1 | UNII MIMO (5GHz) | UNII MIMO (6GHz) | DTS Ant.1 + UNII MIMO | DTS MIMO + UNII MIMO | BT Ant.1 DTS Ant.2 + UNII MIMO | DTS Ant.1 + UNII MIMO | DTS MIMO + UNII MIMO | BT Ant.1 DTS Ant.2 + UNII MIMO | RSDB SUM (DTS MIMO + UNII MIMO) | RSDB SUM (DTS MIMO + UNII MIMO) |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 1+5 | 3+5 | 2+4+5 | 1+6 | 3+6 | 2+4+6 | 3+5 | 3+6 |
| Standalone | Rear | 0.282 | 0.541 | 0.550 | 0.298 | 0.486 | 0.501 | 0.768 | 1.036 | 1.325 | 0.783 | 1.051 | 1.340 | 1.036 | 1.051 |
| | Edge 1 | 0.304 | 0.541 | 0.369 | 0.363 | 0.378 | 0.019 | 0.682 | 0.747 | 1.282 | 0.323 | 0.388 | 0.923 | 0.747 | 0.388 |
| | Edge 3 | 0.304 | 0.381 | 0.389 | 0.363 | 0.655 | 0.104 | 0.959 | 1.044 | 1.399 | 0.408 | 0.493 | 0.848 | 1.044 | 0.493 |
| | Edge 4 | 0.127 | 0.180 | 0.252 | 0.120 | 0.126 | 0.006 | 0.253 | 0.378 | 0.426 | 0.133 | 0.258 | 0.306 | 0.378 | 0.258 |

**Note(s):**

1. Green value is estimated SAR value according to Sec.4.3.2.b).2) in KDB 447498 D01.

**Conclusion:**

Simultaneous Transmission SAR analysis results is satisfied the FCC Limit requirement according to follow procedures with “Sum of SAR”

# Appendixes

**Refer to separated files for the following appendixes.**

**4790101669-S1 FCC Report SAR_App A_Photos & Ant. Locations**

**4790101669-S1 FCC Report SAR_App B_Highest SAR Test Plots**

**4790101669-S1 FCC Report SAR_App C_System Check Plots**

**4790101669-S1 FCC Report SAR_App D_SAR Tissue Ingredients**

**4790101669-S1 FCC Report SAR_App E_Probe Cal. Certificates**

**4790101669-S1 FCC Report SAR_App F_Dipole Cal. Certificates**

**4790101669-S1 FCC Report SAR_App G_Proximity Sensor feature**

**END OF REPORT**