



## **SAR EVALUATION REPORT**

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

For

**FCC ID: APIHKALLUREPORT  
Model Name: ALLURE PORTABLE**

**Report Number: 4788325650-2**

**Issue Date: January 23, 2018**

Prepared for  
**Harman International Industries, Incorporated  
8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES**

Prepared by  
**UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch  
Room 101, Building 10, Innovation Technology Park,  
Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China  
Tel: +86 769 22038881  
Fax: +86 769 33244054  
Website: [www.ul.com](http://www.ul.com)**

### Revision History

| Rev. | Date             | Revisions     | Revised By |
|------|------------------|---------------|------------|
| V1.0 | January 23, 2018 | Initial Issue | \          |
|      |                  |               |            |
|      |                  |               |            |
|      |                  |               |            |

## Table of Contents

|            |                                                                      |           |
|------------|----------------------------------------------------------------------|-----------|
| <b>1.</b>  | <b>Attestation of Test Results .....</b>                             | <b>5</b>  |
| <b>2.</b>  | <b>Test Specification, Methods and Procedures.....</b>               | <b>6</b>  |
| <b>3.</b>  | <b>Facilities and Accreditation .....</b>                            | <b>7</b>  |
| <b>4.</b>  | <b>SAR Measurement System &amp; Test Equipment .....</b>             | <b>8</b>  |
| 4.1.       | SAR Measurement System.....                                          | 8         |
| 4.2.       | SAR Scan Procedures.....                                             | 9         |
| 4.3.       | Test Equipment.....                                                  | 11        |
| <b>5.</b>  | <b>Measurement Uncertainty.....</b>                                  | <b>12</b> |
| <b>6.</b>  | <b>Device Under Test (DUT) Information .....</b>                     | <b>13</b> |
| 6.1.       | DUT Description .....                                                | 13        |
| 6.2.       | Wireless Technology.....                                             | 13        |
| <b>7.</b>  | <b>SAR Test Configuration .....</b>                                  | <b>14</b> |
| <b>8.</b>  | <b>Conducted Output Power Measurement and tune-up tolerance.....</b> | <b>15</b> |
| 8.1.       | 2.4GHz Wi-Fi .....                                                   | 15        |
| 8.2.       | 5GHz Wi-Fi (U-NII-1) .....                                           | 16        |
| 8.3.       | 5GHz Wi-Fi (U-NII-2A).....                                           | 17        |
| 8.4.       | 5GHz Wi-Fi (U-NII-2C).....                                           | 18        |
| 8.5.       | 5GHz Wi-Fi (U-NII-3) .....                                           | 21        |
| 8.6.       | BT.....                                                              | 22        |
| <b>9.</b>  | <b>RF Exposure Conditions.....</b>                                   | <b>23</b> |
| <b>10.</b> | <b>Dielectric Property Measurements &amp; System Check .....</b>     | <b>29</b> |
| 10.1.      | Dielectric Property Measurements.....                                | 29        |
| 10.2.      | System Check.....                                                    | 31        |
| <b>11.</b> | <b>Measured and Reported (Scaled) SAR Results.....</b>               | <b>33</b> |
| 11.1.      | SAR Test Results of 2.4G Wi-Fi .....                                 | 35        |
| 11.2.      | SAR Test Results of 5G Wi-Fi .....                                   | 37        |
| <b>12.</b> | <b>Simultaneous Transmission SAR Analysis .....</b>                  | <b>42</b> |
| 12.1.      | Estimated SAR.....                                                   | 42        |
| 12.2.      | Simultaneous Transmission calculation for 1-g SAR .....              | 43        |
| 12.3.      | Simultaneous Transmission calculation for 10-g SAR .....             | 45        |

|                                                    |           |
|----------------------------------------------------|-----------|
| <b>Appendixes .....</b>                            | <b>47</b> |
| <i>4788325650-2_App A Photo .....</i>              | <i>47</i> |
| <i>4788325650-2_App B System Check Plots.....</i>  | <i>47</i> |
| <i>4788325650-2_App C Highest Test Plots .....</i> | <i>47</i> |
| <i>4788325650-2_App D Cal. Certificates .....</i>  | <i>47</i> |

## 1. Attestation of Test Results

|                                                                                                                                              |                                                                                                                                       |                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Applicant Name                                                                                                                               | Harman International Industries, Incorporated                                                                                         |                                                                                                                                            |
| Address                                                                                                                                      | 8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES                                                                            |                                                                                                                                            |
| Manufacturer                                                                                                                                 | Harman International Industries, Incorporated                                                                                         |                                                                                                                                            |
| Address                                                                                                                                      | 8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES                                                                            |                                                                                                                                            |
| EUT Name                                                                                                                                     | Wireless Speaker                                                                                                                      |                                                                                                                                            |
| Model Name                                                                                                                                   | ALLURE PORTABLE                                                                                                                       |                                                                                                                                            |
| Sample Status                                                                                                                                | Normal                                                                                                                                |                                                                                                                                            |
| Sample ID                                                                                                                                    | 1365696                                                                                                                               |                                                                                                                                            |
| Brand                                                                                                                                        | Harman Kardon                                                                                                                         |                                                                                                                                            |
| Sample Received Date                                                                                                                         | January 15, 2018                                                                                                                      |                                                                                                                                            |
| Date of Tested                                                                                                                               | January 20, 2018 to January 25, 2018                                                                                                  |                                                                                                                                            |
| Applicable Standards                                                                                                                         | FCC 47 CFR § 2.1093<br>IEEE Std. 1528-2013<br>KDB publication                                                                         |                                                                                                                                            |
| <b>SAR Limits (W/Kg)</b>                                                                                                                     |                                                                                                                                       |                                                                                                                                            |
| Exposure Category                                                                                                                            | Peak spatial-average(1g of tissue)                                                                                                    | Extremities (hands, wrists, ankles, etc.)<br>(10g of tissue)                                                                               |
| General population /<br>Uncontrolled exposure                                                                                                | 1.6                                                                                                                                   | 4                                                                                                                                          |
| <b>The Highest Reported SAR (W/kg)</b>                                                                                                       |                                                                                                                                       |                                                                                                                                            |
| <b>RF Exposure Conditions</b>                                                                                                                | <b>Equipment Class</b>                                                                                                                |                                                                                                                                            |
|                                                                                                                                              | <b>DTS</b>                                                                                                                            | <b>U-NII</b>                                                                                                                               |
| Body (1-g)                                                                                                                                   | 0.705                                                                                                                                 | 1.127                                                                                                                                      |
| Extremities (10-g)                                                                                                                           | 0.287                                                                                                                                 | \                                                                                                                                          |
| Simultaneous Transmission                                                                                                                    | Body                                                                                                                                  | Extremities                                                                                                                                |
|                                                                                                                                              | 1.527                                                                                                                                 | 2.0                                                                                                                                        |
| Test Results                                                                                                                                 | Pass                                                                                                                                  |                                                                                                                                            |
| Tested By:<br><br>James Qin<br>Engineer Project Associate | Reviewed By:<br><br>Shawn Wen<br>Laboratory Leader | Approved By:<br><br>Stephen Guo<br>Laboratory Manager |

## 2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with IEEE Std. 1528-2013, the following FCC Published RF exposure KDB procedures:

- 248227 D01 802.11 Wi-Fi SAR
- 447498 D01 General RF Exposure Guidance
- 690783 D01 SAR Listings on Grants
- 865664 D01 SAR measurement 100 MHz to 6 GHz
- 865664 D02 RF Exposure Reporting
- 941225 D07 UMPC Mini Tablet

### 3. Facilities and Accreditation

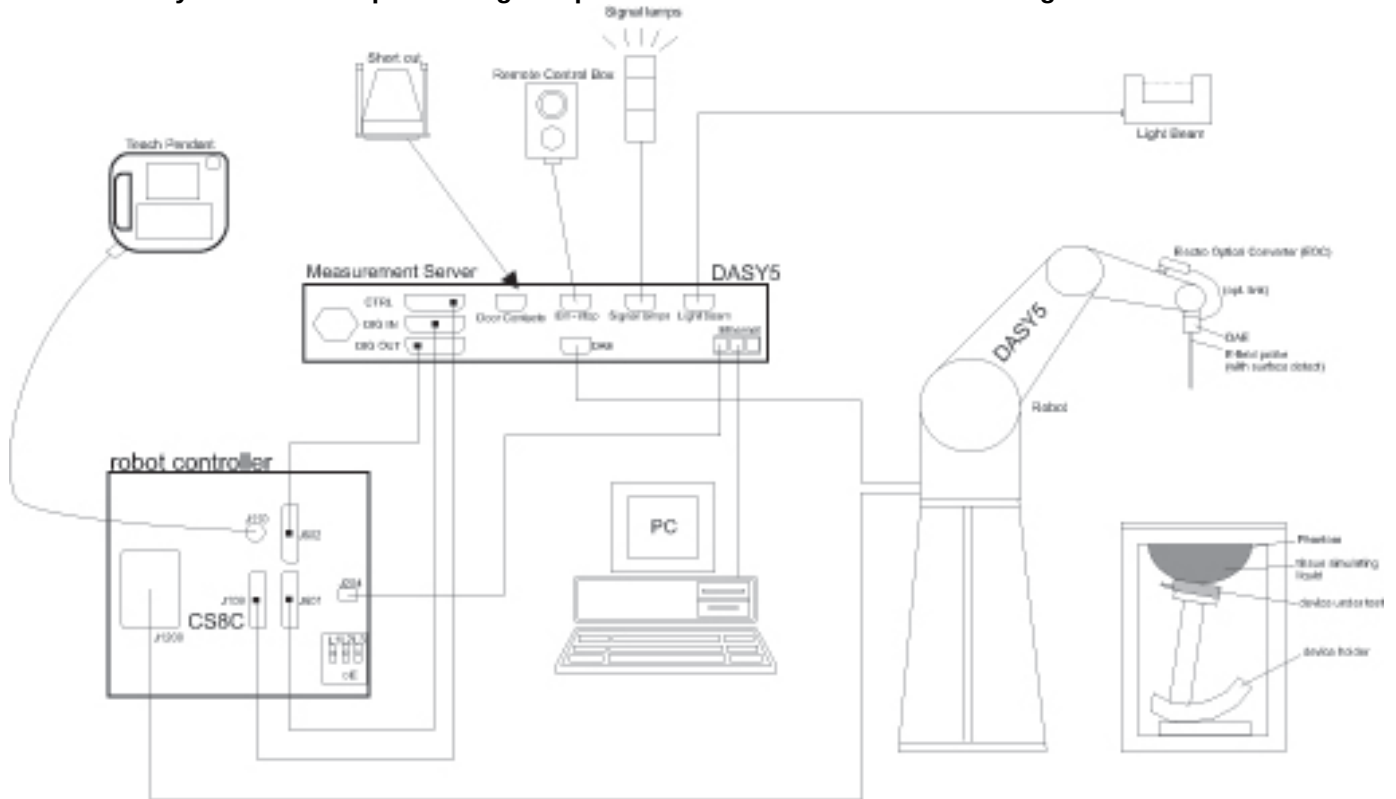
The test site and measurement facilities used to collect data are located at

|                           |                                                                                                                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Location             | UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.                                                                                                                   |
| Address                   | Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China                                                                               |
| Accreditation Certificate | The Laboratory has been assessed and proved to be in compliance with IAS & A2LA. Laboratory code is TL-702 & 4102.01 respectively.                                                      |
| Description               | All measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China |

## 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 Win7 and the DASY52 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 v01r04 SAR Measurement 100 MHz to 6 GHz

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

### 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 v01r04 SAR Measurement 100 MHz to 6 GHz

|                                                                                                                                                                                                                                                                                                      |                                           |                                                                                             | $\leq 3$ GHz                                         | $> 3$ GHz                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------------------|
| Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$                                                                                                                                                                                                               |                                           |                                                                                             | $\leq 2$ GHz: $\leq 8$ mm<br>2 – 3 GHz: $\leq 5$ mm* | 3 – 4 GHz: $\leq 5$ mm*<br>4 – 6 GHz: $\leq 4$ mm*                            |
| Maximum zoom scan spatial resolution, normal to phantom surface                                                                                                                                                                                                                                      | uniform grid: $\Delta z_{\text{Zoom}}(n)$ |                                                                                             | $\leq 5$ mm                                          | 3 – 4 GHz: $\leq 4$ mm<br>4 – 5 GHz: $\leq 3$ mm<br>5 – 6 GHz: $\leq 2$ mm    |
|                                                                                                                                                                                                                                                                                                      | graded grid                               | $\Delta z_{\text{Zoom}}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface | $\leq 4$ mm                                          | 3 – 4 GHz: $\leq 3$ mm<br>4 – 5 GHz: $\leq 2.5$ mm<br>5 – 6 GHz: $\leq 2$ mm  |
|                                                                                                                                                                                                                                                                                                      |                                           | $\Delta z_{\text{Zoom}}(n>1)$ : between subsequent points                                   | $\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$         |                                                                               |
| Minimum zoom scan volume                                                                                                                                                                                                                                                                             | x, y, z                                   |                                                                                             | $\geq 30$ mm                                         | 3 – 4 GHz: $\geq 28$ mm<br>4 – 5 GHz: $\geq 25$ mm<br>5 – 6 GHz: $\geq 22$ mm |
| Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.                                                                                                                                                    |                                           |                                                                                             |                                                      |                                                                               |
| * When zoom scan is required and the <i>reported</i> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz. |                                           |                                                                                             |                                                      |                                                                               |

### 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 greater 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.

| Name of equipment             | Manufacturer         | Type/Model             | Serial No. | Cal. Due Date     |
|-------------------------------|----------------------|------------------------|------------|-------------------|
| ENA Network Analyzer          | Keysight             | E5080A                 | MY55100583 | December 11, 2018 |
| Dielectric Probe kit          | SPEAG                | SM DAK 040 SA          | 1155       | NCR               |
| DC power supply               | Keysight             | E36103A                | MY55350020 | December 11, 2018 |
| Signal Generator              | Rohde & Schwarz      | SME06                  | 837633\001 | May 16, 2018      |
| BI-Directional Coupler        | WERLATONE            | C8060-102              | 3423       | December 11, 2018 |
| Peak and Average Power Sensor | Keysight             | E9323A                 | MY55440013 | December 11, 2018 |
| Peak and Average Power Sensor | Keysight             | E9323A                 | MY55420006 | December 11, 2018 |
| Dual Channel PK Power Meter   | Keysight             | N1912A                 | MY55416024 | December 11, 2018 |
| Amplifier                     | CORAD TECHNOLOGY LTD | AMF-4D-00400600-50-30P | 1983561    | NCR               |
| Dosimetric E-Field Probe      | SPEAG                | EX3DV4                 | 7383       | December 13, 2018 |
| Data Acquisition Electronic   | SPEAG                | DAE3                   | 427        | December 3, 2018  |
| Dipole Kit 2450 MHz           | SPEAG                | D2450V2                | 977        | January 13, 2019  |
| Dipole Kit 5 GHz              | SPEAG                | D5GHzV2                | 1231       | January 12, 2019  |
| Software                      | SPEAG                | DASY52                 | N/A        | NCR               |
| Twin Phantom                  | SPEAG                | SAM V5.0               | 1805       | NCR               |
| ELI Phantom                   | SPEAG                | ELI V5.0               | 1235       | NCR               |
| Thermometer                   | Control Company      | 4242                   | 150709653  | December 11, 2018 |
| Thermometer                   | VICTOR               | VC230                  | /          | December 11, 2018 |

**Note:**

1) Per KDB865664D01 v01r04 requirements for dipole calibration, the test laboratory has adopted three-year extended calibration interval. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.

- There is no physical damage on the dipole;
- System check with specific dipole is within 10% of calibrated value;
- The most recent return-loss result, measured at least annually, deviates by no more than 20% from the previous measurement.
- The most recent measurement of the real or imaginary parts of the impedance, measured at least annually is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

## 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, the extensive SAR measurement uncertainty analysis described in IEEE Std. 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

## 6. Device Under Test (DUT) Information

### 6.1. DUT Description

|                                                                         |                                                                                  |
|-------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| The EUT is a wireless speaker with IEEE 802.11a/b/g/n/ac, and BT radio. |                                                                                  |
| Device Dimension                                                        | Overall (Length x Width x Height): 114 mm x 114 mm x 160 mm                      |
| Battery Options                                                         | Type: Lithium-ion Polymer<br>Capacity: DC 3.7V, 6000mAh<br>Power supply: 5V/2.3A |
| Accessory                                                               | Charging stand, USB Cable, Adapter                                               |

### 6.2. Wireless Technology

| Wireless technology | Frequency band |
|---------------------|----------------|
| Wi-Fi               | 2.4 GHz        |
| Wi-Fi               | 5 GHz          |
| BT                  | 2.4 GHz        |

## 7. SAR Test Configuration

The EUT supports handheld using scenario, and it may very close to the human body when used, so the 10-g Extremity SAR and 1-g Body SAR (10mm) evaluation are both considered.

## 8. Conducted Output Power Measurement and tune-up tolerance

### 8.1. 2.4GHz Wi-Fi

| Band | Antenna | Mode | Ch.# | Rate(Mbps) | Freq.(MHz) | Meas. Avg. Pwr.(dBm) | Tune-up(dBm) |
|------|---------|------|------|------------|------------|----------------------|--------------|
| 2.4G | 1       | b    | 1    | 1          | 2412       | 20.24                | 22.0         |
|      |         |      | 6    |            | 2437       | 20.56                | 22.0         |
|      |         |      | 11   |            | 2462       | 20.31                | 22.0         |
|      |         | g    | 1    | 6          | 2412       | 20.67                | 22.0         |
|      |         |      | 6    |            | 2437       | 20.99                | 22.0         |
|      |         |      | 11   |            | 2462       | 20.67                | 22.0         |
|      |         | n20  | 1    | 6.5        | 2412       | 20.87                | 22.0         |
|      |         |      | 6    |            | 2437       | 21.31                | 22.0         |
|      |         |      | 11   |            | 2462       | 21.05                | 22.0         |
|      | 2       | b    | 1    | 1          | 2412       | 20.22                | 22.0         |
|      |         |      | 6    |            | 2437       | 20.67                | 22.0         |
|      |         |      | 11   |            | 2462       | 20.29                | 22.0         |
|      |         | g    | 1    | 6          | 2412       | 20.54                | 22.0         |
|      |         |      | 6    |            | 2437       | 21.04                | 22.0         |
|      |         |      | 11   |            | 2462       | 20.77                | 22.0         |
|      |         | n20  | 1    | 6.5        | 2412       | 20.84                | 22.0         |
|      |         |      | 6    |            | 2437       | 21.26                | 22.0         |
|      |         |      | 11   |            | 2462       | 20.91                | 22.0         |

## 8.2. 5GHz Wi-Fi (U-NII-1)

| Band | Antenna | Mode | Ch.# | Rate(Mbps) | Freq.(MHz) | Meas. Avg. Pwr.(dBm) | Tune-up(dBm) |
|------|---------|------|------|------------|------------|----------------------|--------------|
| 5G   | 1       | a    | 36   | 6          | 5180       | 15.49                | 16.0         |
|      |         |      | 40   |            | 5200       | 14.76                | 16.0         |
|      |         |      | 44   |            | 5220       | 15.54                | 16.0         |
|      |         |      | 48   |            | 5240       | 15.25                | 16.0         |
|      |         | n20  | 36   | MCS0       | 5180       | 15.65                | 16.0         |
|      |         |      | 40   |            | 5200       | 14.79                | 16.0         |
|      |         |      | 44   |            | 5220       | 14.33                | 16.0         |
|      |         |      | 48   |            | 5240       | 15.27                | 16.0         |
|      |         | n40  | 38   | MCS0       | 5190       | 15.52                | 16.0         |
|      |         |      | 46   |            | 5230       | 15.11                | 16.0         |
|      |         | ac   | 36   | 6          | 5180       | 14.79                | 15.0         |
|      |         |      | 40   |            | 5200       | 14.37                | 15.0         |
|      |         |      | 44   |            | 5220       | 14.34                | 15.0         |
|      |         |      | 48   |            | 5240       | 14.71                | 15.0         |
|      |         | ac40 | 38   | MCS0       | 5190       | 13.39                | 14.0         |
|      |         |      | 46   |            | 5230       | 12.55                | 14.0         |
|      |         | ac80 | 42   | MCS0       | 5210       | 13.32                | 14.0         |
|      | 2       | a    | 36   | 6          | 5180       | 15.04                | 16.0         |
|      |         |      | 40   |            | 5200       | 15.57                | 16.0         |
|      |         |      | 44   |            | 5220       | 15.31                | 16.0         |
|      |         |      | 48   |            | 5240       | 14.71                | 16.0         |
|      |         | n20  | 36   | MCS0       | 5180       | 14.58                | 16.0         |
|      |         |      | 40   |            | 5200       | 14.96                | 16.0         |
|      |         |      | 44   |            | 5220       | 14.25                | 16.0         |
|      |         |      | 48   |            | 5240       | 14.13                | 16.0         |
|      |         | n40  | 38   | MCS0       | 5190       | 15.44                | 16.0         |
|      |         |      | 46   |            | 5230       | 15.35                | 16.0         |
|      |         | ac   | 36   | 6          | 5180       | 14.06                | 15.0         |
|      |         |      | 40   |            | 5200       | 14.59                | 15.0         |
|      |         |      | 44   |            | 5220       | 14.19                | 15.0         |
|      |         |      | 48   |            | 5240       | 14.13                | 15.0         |
|      |         | ac40 | 38   | MCS0       | 5190       | 13.02                | 14.0         |
|      |         |      | 46   |            | 5230       | 13.09                | 14.0         |
|      |         | ac80 | 42   | MCS0       | 5210       | 13.26                | 14.0         |

### 8.3. 5GHz Wi-Fi (U-NII-2A)

| Band | Antenna | Mode | Ch.# | Rate(Mbps) | Freq.(MHz) | Meas. Avg. Pwr.(dBm) | Tune-up(dBm) |
|------|---------|------|------|------------|------------|----------------------|--------------|
| 5G   | 1       | a    | 52   | 6          | 5260       | 14.93                | 16.0         |
|      |         |      | 56   |            | 5280       | 15.00                | 16.0         |
|      |         |      | 60   |            | 5300       | 15.83                | 16.0         |
|      |         |      | 64   |            | 5320       | 15.75                | 16.0         |
|      |         | n20  | 52   | MCS0       | 5260       | 10.59                | 12.0         |
|      |         |      | 56   |            | 5280       | 10.50                | 12.0         |
|      |         |      | 60   |            | 5300       | 11.37                | 12.0         |
|      |         |      | 64   |            | 5320       | 11.69                | 12.0         |
|      |         | n40  | 54   | MCS0       | 5270       | 13.60                | 15.0         |
|      |         |      | 62   |            | 5310       | 14.50                | 15.0         |
|      |         | ac   | 52   | 6          | 5260       | 10.47                | 12.0         |
|      |         |      | 56   |            | 5280       | 10.65                | 12.0         |
|      |         |      | 60   |            | 5300       | 11.35                | 12.0         |
|      |         |      | 64   |            | 5320       | 11.73                | 12.0         |
|      |         | ac40 | 54   | MCS0       | 5270       | 11.80                | 13.0         |
|      |         |      | 62   |            | 5310       | 12.66                | 13.0         |
|      |         | ac80 | 58   | MCS0       | 5290       | 12.93                | 14.0         |
|      | 2       | a    | 52   | 6          | 5260       | 15.35                | 16.0         |
|      |         |      | 56   |            | 5280       | 15.64                | 16.0         |
|      |         |      | 60   |            | 5300       | 15.99                | 16.0         |
|      |         |      | 64   |            | 5320       | 15.98                | 16.0         |
|      |         | n20  | 52   | MCS0       | 5260       | 10.92                | 12.0         |
|      |         |      | 56   |            | 5280       | 11.39                | 12.0         |
|      |         |      | 60   |            | 5300       | 11.24                | 12.0         |
|      |         |      | 64   |            | 5320       | 11.99                | 12.0         |
|      |         | n40  | 54   | MCS0       | 5270       | 13.91                | 15.0         |
|      |         |      | 62   |            | 5310       | 14.62                | 15.0         |
|      |         | ac   | 52   | 6          | 5260       | 10.6                 | 12.0         |
|      |         |      | 56   |            | 5280       | 11.05                | 12.0         |
|      |         |      | 60   |            | 5300       | 11.31                | 12.0         |
|      |         |      | 64   |            | 5320       | 11.97                | 12.0         |
|      |         | ac40 | 54   | MCS0       | 5270       | 11.99                | 13.0         |
|      |         |      | 62   |            | 5310       | 12.87                | 13.0         |
|      |         | ac80 | 58   | MCS0       | 5290       | 13.12                | 14.0         |

#### 8.4. 5GHz Wi-Fi (U-NII-2C)

| Band | Antenna | Mode | Ch.# | Rate(Mbps) | Freq.(MHz) | Meas. Avg. Pwr.(dBm) | Tune-up(dBm) |
|------|---------|------|------|------------|------------|----------------------|--------------|
| 5G   | 1       | a    | 100  | 6          | 5500       | 15.76                | 16.0         |
|      |         |      | 104  |            | 5520       | 15.64                | 16.0         |
|      |         |      | 108  |            | 5540       | 14.12                | 16.0         |
|      |         |      | 112  |            | 5560       | 14.66                | 16.0         |
|      |         |      | 116  |            | 5580       | 14.59                | 16.0         |
|      |         |      | 120  |            | 5600       | 14.60                | 16.0         |
|      |         |      | 124  |            | 5620       | 14.67                | 16.0         |
|      |         |      | 128  |            | 5640       | 14.42                | 16.0         |
|      |         |      | 132  |            | 5660       | 14.74                | 16.0         |
|      |         |      | 136  |            | 5680       | 14.70                | 16.0         |
|      |         |      | 140  |            | 5700       | 15.70                | 16.0         |
|      |         | n20  | 100  | MCS0       | 5500       | 14.60                | 15.0         |
|      |         |      | 104  |            | 5520       | 14.58                | 15.0         |
|      |         |      | 108  |            | 5540       | 13.09                | 15.0         |
|      |         |      | 112  |            | 5560       | 13.61                | 15.0         |
|      |         |      | 116  |            | 5580       | 13.67                | 15.0         |
|      |         |      | 120  |            | 5600       | 13.59                | 15.0         |
|      |         |      | 124  |            | 5620       | 13.87                | 15.0         |
|      |         |      | 128  |            | 5640       | 13.24                | 15.0         |
|      |         |      | 132  |            | 5660       | 13.50                | 15.0         |
|      |         |      | 136  |            | 5680       | 13.50                | 15.0         |
|      |         |      | 140  |            | 5700       | 13.53                | 15.0         |
|      |         | n40  | 102  | MCS0       | 5510       | 15.23                | 16.0         |
|      |         |      | 110  |            | 5550       | 14.06                | 16.0         |
|      |         |      | 118  |            | 5590       | 14.12                | 16.0         |
|      |         |      | 126  |            | 5630       | 14.74                | 16.0         |
|      |         |      | 134  |            | 5670       | 14.03                | 16.0         |
|      |         |      | 140  |            | 5700       | 14.88                | 16.0         |
|      |         | ac   | 100  | 6          | 5500       | 14.77                | 15.0         |
|      |         |      | 104  |            | 5520       | 14.58                | 15.0         |
|      |         |      | 108  |            | 5540       | 13.36                | 15.0         |
|      |         |      | 112  |            | 5560       | 13.81                | 15.0         |
|      |         |      | 116  |            | 5580       | 13.53                | 15.0         |
|      |         |      | 120  |            | 5600       | 13.79                | 15.0         |
|      |         |      | 124  |            | 5620       | 13.78                | 15.0         |
|      |         |      | 128  |            | 5640       | 13.45                | 15.0         |
|      |         |      | 132  |            | 5660       | 13.64                | 15.0         |
|      |         |      | 136  |            | 5680       | 13.53                | 15.0         |
|      |         |      | 140  |            | 5700       | 14.07                | 15.0         |
|      |         | ac40 | 102  | MCS0       | 5510       | 12.99                | 13.0         |
|      |         |      | 110  |            | 5550       | 11.65                | 13.0         |
|      |         |      | 118  |            | 5590       | 12.10                | 13.0         |
|      |         |      | 126  |            | 5630       | 11.92                | 13.0         |
|      |         |      | 134  |            | 5670       | 11.82                | 13.0         |
|      |         |      | 140  |            | 5700       | 12.47                | 13.0         |
|      |         | ac80 | 106  | MCS0       | 5530       | 12.95                | 14.0         |

|    |   |      |     |      |      |       |      |
|----|---|------|-----|------|------|-------|------|
| 5G | 2 |      | 122 |      | 5610 | 12.50 | 14.0 |
|    |   |      | 138 |      | 5690 | 12.65 | 14.0 |
|    |   | a    | 100 | 6    | 5500 | 15.39 | 16.0 |
|    |   |      | 104 |      | 5520 | 15.42 | 16.0 |
|    |   |      | 108 |      | 5540 | 14.26 | 16.0 |
|    |   |      | 112 |      | 5560 | 14.37 | 16.0 |
|    |   |      | 116 |      | 5580 | 14.36 | 16.0 |
|    |   |      | 120 |      | 5600 | 14.53 | 16.0 |
|    |   |      | 124 |      | 5620 | 14.61 | 16.0 |
|    |   |      | 128 |      | 5640 | 14.47 | 16.0 |
|    |   |      | 132 |      | 5660 | 14.54 | 16.0 |
|    |   |      | 136 |      | 5680 | 14.39 | 16.0 |
|    |   |      | 140 |      | 5700 | 15.26 | 16.0 |
|    |   | n20  | 100 | MCS0 | 5500 | 14.14 | 15.0 |
|    |   |      | 104 |      | 5520 | 14.24 | 15.0 |
|    |   |      | 108 |      | 5540 | 13.41 | 15.0 |
|    |   |      | 112 |      | 5560 | 13.24 | 15.0 |
|    |   |      | 116 |      | 5580 | 13.10 | 15.0 |
|    |   |      | 120 |      | 5600 | 13.23 | 15.0 |
|    |   |      | 124 |      | 5620 | 13.14 | 15.0 |
|    |   |      | 128 |      | 5640 | 13.51 | 15.0 |
|    |   |      | 132 |      | 5660 | 13.28 | 15.0 |
|    |   |      | 136 |      | 5680 | 13.34 | 15.0 |
|    |   |      | 140 |      | 5700 | 13.77 | 15.0 |
|    |   | n40  | 102 | MCS0 | 5510 | 14.78 | 16.0 |
|    |   |      | 110 |      | 5550 | 14.07 | 16.0 |
|    |   |      | 118 |      | 5590 | 14.35 | 16.0 |
|    |   |      | 126 |      | 5630 | 14.63 | 16.0 |
|    |   |      | 134 |      | 5670 | 14.24 | 16.0 |
|    |   |      | 140 |      | 5700 | 14.75 | 16.0 |
|    |   | ac   | 100 | 6    | 5500 | 13.67 | 15.0 |
|    |   |      | 104 |      | 5520 | 13.54 | 15.0 |
|    |   |      | 108 |      | 5540 | 13.52 | 15.0 |
|    |   |      | 112 |      | 5560 | 13.49 | 15.0 |
|    |   |      | 116 |      | 5580 | 13.18 | 15.0 |
|    |   |      | 120 |      | 5600 | 13.61 | 15.0 |
|    |   |      | 124 |      | 5620 | 13.57 | 15.0 |
|    |   |      | 128 |      | 5640 | 13.60 | 15.0 |
|    |   |      | 132 |      | 5660 | 13.47 | 15.0 |
|    |   |      | 136 |      | 5680 | 13.46 | 15.0 |
|    |   |      | 140 |      | 5700 | 13.34 | 15.0 |
|    |   | ac40 | 102 | MCS0 | 5510 | 12.40 | 13.0 |
|    |   |      | 110 |      | 5550 | 11.75 | 13.0 |
|    |   |      | 118 |      | 5590 | 12.16 | 13.0 |
|    |   |      | 126 |      | 5630 | 11.92 | 13.0 |
|    |   |      | 134 |      | 5670 | 12.14 | 13.0 |
|    |   |      | 140 |      | 5700 | 11.89 | 13.0 |
|    |   | ac80 | 106 | MCS0 | 5530 | 12.75 | 14.0 |
|    |   |      | 122 |      | 5610 | 12.53 | 14.0 |

|  |  |  |     |  |      |       |      |
|--|--|--|-----|--|------|-------|------|
|  |  |  | 138 |  | 5690 | 12.51 | 14.0 |
|--|--|--|-----|--|------|-------|------|

### 8.5. 5GHz Wi-Fi (U-NII-3)

| Band | Antenna | Mode | Ch.# | Rate(Mbps) | Freq.(MHz) | Meas. Avg. Pwr.(dBm) | Tune-up(dBm) |
|------|---------|------|------|------------|------------|----------------------|--------------|
| 5G   | 1       | a    | 149  | 6          | 5745       | 14.71                | 16.5         |
|      |         |      | 153  |            | 5765       | 15.54                | 16.5         |
|      |         |      | 157  |            | 5785       | 15.94                | 16.5         |
|      |         |      | 161  |            | 5805       | 16.31                | 16.5         |
|      |         |      | 165  |            | 5825       | 15.83                | 16.5         |
|      |         | n20  | 149  | MCS0       | 5745       | 13.78                | 15.5         |
|      |         |      | 153  |            | 5765       | 14.43                | 15.5         |
|      |         |      | 157  |            | 5785       | 14.83                | 15.5         |
|      |         |      | 161  |            | 5805       | 15.22                | 15.5         |
|      |         |      | 165  |            | 5825       | 14.29                | 15.5         |
|      |         | n40  | 151  | MCS0       | 5755       | 14.93                | 16.0         |
|      |         |      | 159  |            | 5795       | 15.67                | 16.0         |
|      |         | ac20 | 149  | 6          | 5745       | 13.55                | 15.5         |
|      |         |      | 153  |            | 5765       | 14.46                | 15.5         |
|      |         |      | 157  |            | 5785       | 14.69                | 15.5         |
|      |         |      | 161  |            | 5805       | 15.24                | 15.5         |
|      |         |      | 165  |            | 5825       | 14.28                | 15.5         |
|      |         | ac40 | 151  | MCS0       | 5755       | 13.07                | 14.0         |
|      |         |      | 159  |            | 5795       | 13.51                | 14.0         |
|      |         | ac80 | 155  | MCS0       | 5775       | 13.73                | 14.0         |
|      | 2       | a    | 149  | 6          | 5745       | 15.27                | 16.5         |
|      |         |      | 153  |            | 5765       | 15.52                | 16.5         |
|      |         |      | 157  |            | 5785       | 16.01                | 16.5         |
|      |         |      | 161  |            | 5805       | 16.34                | 16.5         |
|      |         |      | 165  |            | 5825       | 15.65                | 16.5         |
|      |         | n20  | 149  | MCS0       | 5745       | 14.09                | 15.5         |
|      |         |      | 153  |            | 5765       | 14.47                | 15.5         |
|      |         |      | 157  |            | 5785       | 14.73                | 15.5         |
|      |         |      | 161  |            | 5805       | 15.17                | 15.5         |
|      |         |      | 165  |            | 5825       | 14.24                | 15.5         |
|      |         | n40  | 151  | MCS0       | 5755       | 15.16                | 16.0         |
|      |         |      | 159  |            | 5795       | 15.65                | 16.0         |
|      |         | ac20 | 149  | 6          | 5745       | 14.12                | 15.5         |
|      |         |      | 153  |            | 5765       | 14.36                | 15.5         |
|      |         |      | 157  |            | 5785       | 14.83                | 15.5         |
|      |         |      | 161  |            | 5805       | 15.43                | 15.5         |
|      |         |      | 165  |            | 5825       | 14.37                | 15.5         |
|      |         | ac40 | 151  | MCS0       | 5755       | 13.24                | 14.0         |
|      |         |      | 159  |            | 5795       | 13.42                | 14.0         |
|      |         | ac80 | 155  | MCS0       | 5775       | 13.83                | 14.0         |

## 8.6. BT

ANT.2

| BT 2450 | Average Conducted Power (dBm) |      |       | Tune-up |
|---------|-------------------------------|------|-------|---------|
|         | 0CH                           | 39CH | 78CH  |         |
| DH5     | 5.4                           | 5.3  | 4.49  | 6.0     |
| 2DH5    | -0.27                         | 0    | -0.98 | 0.5     |
| 3DH5    | -0.19                         | 0.1  | -0.95 | 0.5     |

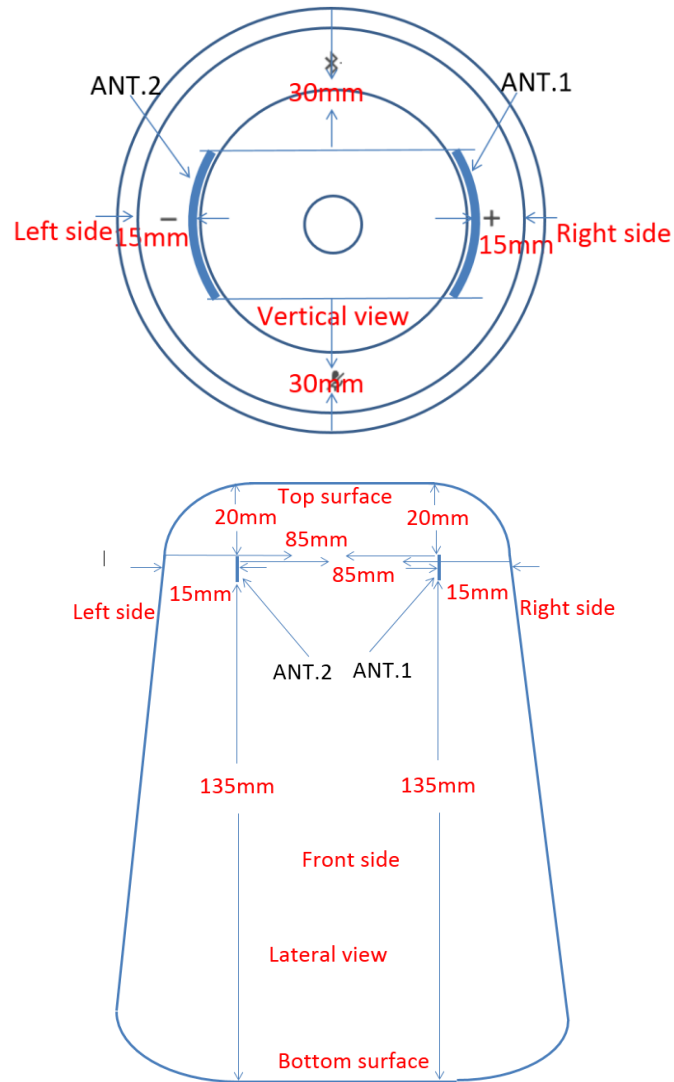
| BT 2450 | Average Conducted Power (dBm) |      |      | Tune-up |
|---------|-------------------------------|------|------|---------|
|         | 0CH                           | 39CH | 78CH |         |
| BLE     | 4.8                           | 4.98 | 3.79 | 5.5     |

Note:

As per KDB 447498 sec.4.1.d) 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.

## 9. RF Exposure Conditions

Refer to the diagram inside the device which attached below for the specific details of the antennas to outer surface distances.



Per FCC KDB 447498D01:

1. The 1-g SAR and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  for product specific 10-g SAR, where:

- $f(\text{GHz})$  is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm is applied to determine SAR test exclusion.

2. The SAR exclusion threshold for distances  $> 50$  mm is defined by the following equation, as illustrated in KDB 447498 D01 Appendix B:

a) at 100 MHz to 1500 MHz

[Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm) · (f(MHz)/150)] mW

b) at  $> 1500$  MHz and  $\leq 6$  GHz

[Power allowed at numeric Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · 10] mW

For BT 1-g SAR

| Mode | Frequency | Power (dBm) | Power (mW) | Separation Distance (mm) | Calculated Result | Threshold | SAR Test |
|------|-----------|-------------|------------|--------------------------|-------------------|-----------|----------|
| 2.4G | 2480      | 6           | 3.98       | 15.00                    | 0.4               | 3.0       | Excluded |

Note:

Because the calculated result is less than the threshold, so SAR evaluation for BT 1-g SAR is not required.

For BT 10-g SAR

| Mode | Frequency | Power (dBm) | Power (mW) | Separation Distance (mm) | Calculated Result | Threshold | SAR Test |
|------|-----------|-------------|------------|--------------------------|-------------------|-----------|----------|
| 2.4G | 2480      | 6           | 3.98       | 15.00                    | 0.4               | 7.5       | Excluded |

Note:

Because the calculated result is less than the threshold, so SAR evaluation for BT 10-g SAR is not required.

For 2.4G Wi-Fi 1-g SAR (antenna to outer surface separation distance less than 50mm)

| Position                 | Frequency (MHz) | Power (dBm) | Power (mW) | Separation Distance (mm) | Calculated Result | Threshold | SAR Test |
|--------------------------|-----------------|-------------|------------|--------------------------|-------------------|-----------|----------|
| Top surface              | 2462            | 22.00       | 158.49     | 20.00                    | 12.4              | 3.0       | Required |
| Bottom surface           | 2462            | 22.00       | 158.49     | \                        | \                 | \         | \        |
| Left side for antenna 1  | 2462            | 22.00       | 158.49     | \                        | \                 | \         | \        |
| Left side for antenna 2  | 2462            | 22.00       | 158.49     | 15.00                    | 16.6              | 3.0       | Required |
| Right side for antenna 1 | 2462            | 22.00       | 158.49     | 15.00                    | 16.6              | 3.0       | Required |
| Right side for antenna 2 | 2462            | 22.00       | 158.49     | \                        | \                 | \         | \        |
| Front side               | 2462            | 22.00       | 158.49     | 30.00                    | 8.3               | 3.0       | Required |
| Back side                | 2462            | 22.00       | 158.49     | 30.00                    | 8.3               | 3.0       | Required |

Note:

If the calculated result is greater than the threshold, SAR evaluation for the corresponding position is required. If not, SAR evaluation for the corresponding position is not required.

For 2.4G Wi-Fi 1-g SAR (antenna to outer surface separation distance greater than 50mm)

| Position                 | Frequency (MHz) | Power (dBm) | Power (mW) | Power allowed at 50mm | Separation Distance (mm) | Calculated Result (mW) | SAR Test |
|--------------------------|-----------------|-------------|------------|-----------------------|--------------------------|------------------------|----------|
| Top surface              | 2462            | 22.00       | 223.87     | \                     | \                        | \                      | \        |
| Bottom surface           | 2462            | 22.00       | 223.87     | 95.60                 | 135                      | 945.60                 | Excluded |
| Left side for antenna 1  | 2462            | 22.00       | 223.87     | 95.60                 | 85                       | 445.60                 | Excluded |
| Left side for antenna 2  | 2462            | 22.00       | 223.87     | \                     | \                        | \                      | \        |
| Right side for antenna 1 | 2462            | 22.00       | 223.87     | \                     | \                        | \                      | \        |
| Right side for antenna 2 | 2462            | 22.00       | 223.87     | 95.60                 | 85                       | 445.60                 | Excluded |
| Front side               | 2462            | 22.00       | 223.87     | \                     | \                        | \                      | \        |
| Back side                | 2462            | 22.00       | 223.87     | \                     | \                        | \                      | \        |

Note:

If the power in mW is greater than the calculated result, SAR evaluation for the corresponding position is required. If not, SAR evaluation for the corresponding position is not required.

For 2.4G Wi-Fi 10-g SAR (antenna to outer surface separation distance less than 50mm)

| Position                 | Frequency (MHz) | Power (dBm) | Power (mW) | Separation Distance (mm) | Calculated Result | Threshold | SAR Test |
|--------------------------|-----------------|-------------|------------|--------------------------|-------------------|-----------|----------|
| Top surface              | 2462            | 22.00       | 158.49     | 20.00                    | 12.4              | 7.5       | Required |
| Bottom surface           | 2462            | 22.00       | 158.49     | \                        | \                 | \         | \        |
| Left side for antenna 1  | 2462            | 22.00       | 158.49     | \                        | \                 | \         | \        |
| Left side for antenna 2  | 2462            | 22.00       | 158.49     | 15.00                    | 16.6              | 7.5       | Required |
| Right side for antenna 1 | 2462            | 22.00       | 158.49     | 15.00                    | 16.6              | 7.5       | Required |
| Right side for antenna 2 | 2462            | 22.00       | 158.49     | \                        | \                 | \         | \        |
| Front side               | 2462            | 22.00       | 158.49     | 30.00                    | 8.3               | 7.5       | Required |
| Back side                | 2462            | 22.00       | 158.49     | 30.00                    | 8.3               | 7.5       | Required |

Note:

If the calculated result is greater than the threshold, SAR evaluation for the corresponding position is required. If not, SAR evaluation for the corresponding position is not required.

For 2.4G Wi-Fi 10-g SAR (antenna to outer surface separation distance greater than 50mm)

| Position                 | Frequency (MHz) | Power (dBm) | Power (mW) | Power allowed at 50mm | Separation Distance (mm) | Calculated Result (mW) | SAR Test |
|--------------------------|-----------------|-------------|------------|-----------------------|--------------------------|------------------------|----------|
| Top surface              | 2462            | 22.00       | 223.87     | \                     | \                        | \                      | \        |
| Bottom surface           | 2462            | 22.00       | 223.87     | 238.99                | 135                      | 1088.99                | Excluded |
| Left side for antenna 1  | 2462            | 22.00       | 223.87     | 238.99                | 85                       | 588.99                 | Excluded |
| Left side for antenna 2  | 2462            | 22.00       | 223.87     | \                     | \                        | \                      | \        |
| Right side for antenna 1 | 2462            | 22.00       | 223.87     | \                     | \                        | \                      | \        |
| Right side for antenna 2 | 2462            | 22.00       | 223.87     | 238.99                | 85                       | 588.99                 | Excluded |
| Front side               | 2462            | 22.00       | 223.87     | \                     | \                        | \                      | \        |
| Back side                | 2462            | 22.00       | 223.87     | \                     | \                        | \                      | \        |

Note:

If the power in mW is greater than the calculated result, SAR evaluation for the corresponding position is required. If not, SAR evaluation for the corresponding position is not required.

For 5G Wi-Fi 1-g SAR (antenna to outer surface separation distance less than 50mm)

| Position                 | Frequency (MHz) | Power (dBm) | Power (mW) | Separation Distance (mm) | Calculated Result | Threshold | SAR Test |
|--------------------------|-----------------|-------------|------------|--------------------------|-------------------|-----------|----------|
| Top surface              | 5825            | 16.50       | 44.67      | 20.00                    | 5.4               | 3.0       | Required |
| Bottom surface           | 5825            | 16.50       | 44.67      | \                        | \                 | \         | \        |
| Left side for antenna 1  | 5825            | 16.50       | 44.67      | \                        | \                 | \         | \        |
| Left side for antenna 2  | 5825            | 16.50       | 44.67      | 15.00                    | 7.2               | 3.0       | Required |
| Right side for antenna 1 | 5825            | 16.50       | 44.67      | 15.00                    | 7.2               | 3.0       | Required |
| Right side for antenna 2 | 5825            | 16.50       | 44.67      | \                        | \                 | \         | \        |
| Front side               | 5825            | 16.50       | 44.67      | 30.00                    | 3.6               | 3.0       | Required |
| Back side                | 5825            | 16.50       | 44.67      | 30.00                    | 3.6               | 3.0       | Required |

Note:

If the calculated result is greater than the threshold, SAR evaluation for the corresponding position is required. If not, SAR evaluation for the corresponding position is not required.

For 5G Wi-Fi 1-g SAR (antenna to outer surface separation distance greater than 50mm)

| Position                 | Frequency (MHz) | Power (dBm) | Power (mW) | Power allowed at 50mm | Separation Distance (mm) | Calculated Result (mW) | SAR Test |
|--------------------------|-----------------|-------------|------------|-----------------------|--------------------------|------------------------|----------|
| Top surface              | 5825            | 16.50       | 44.67      | \                     | \                        | \                      | \        |
| Bottom surface           | 5825            | 16.50       | 44.67      | 62.15                 | 135                      | 912.15                 | Excluded |
| Left side for antenna 1  | 5825            | 16.50       | 44.67      | 62.15                 | 85                       | 412.15                 | Excluded |
| Left side for antenna 2  | 5825            | 16.50       | 44.67      | \                     | \                        | \                      | \        |
| Right side for antenna 1 | 5825            | 16.50       | 44.67      | \                     | \                        | \                      | \        |
| Right side for antenna 2 | 5825            | 16.50       | 44.67      | 62.15                 | 85                       | 412.15                 | Excluded |
| Front side               | 5825            | 16.50       | 44.67      | \                     | \                        | \                      | \        |
| Back side                | 5825            | 16.50       | 44.67      | \                     | \                        | \                      | \        |

Note:

If the power in mW is greater than the calculated result, SAR evaluation for the corresponding position is required. If not, SAR evaluation for the corresponding position is not required.

For 5G Wi-Fi 10-g SAR (antenna to outer surface separation distance less than 50mm)

| Position                 | Frequency (MHz) | Power (dBm) | Power (mW) | Separation Distance (mm) | Calculated Result | Threshold | SAR Test |
|--------------------------|-----------------|-------------|------------|--------------------------|-------------------|-----------|----------|
| Top surface              | 5825            | 16.50       | 44.67      | 20.00                    | 5.4               | 7.5       | Excluded |
| Bottom surface           | 5825            | 16.50       | 44.67      | \                        | \                 | \         | \        |
| Left side for antenna 1  | 5825            | 16.50       | 44.67      | \                        | \                 | \         | \        |
| Left side for antenna 2  | 5825            | 16.50       | 44.67      | 15.00                    | 7.2               | 7.5       | Excluded |
| Right side for antenna 1 | 5825            | 16.50       | 44.67      | 15.00                    | 7.2               | 7.5       | Excluded |
| Right side for antenna 2 | 5825            | 16.50       | 44.67      | \                        | \                 | \         | \        |
| Front side               | 5825            | 16.50       | 44.67      | 30.00                    | 3.6               | 7.5       | Excluded |
| Back side                | 5825            | 16.50       | 44.67      | 30.00                    | 3.6               | 7.5       | Excluded |

Note:

If the calculated result is greater than the threshold, SAR evaluation for the corresponding position is required. If not, SAR evaluation for the corresponding position is not required.

For 5G Wi-Fi 10-g SAR (antenna to outer surface separation distance greater than 50mm)

| Position                 | Frequency (MHz) | Power (dBm) | Power (mW) | Power allowed at 50mm | Separation Distance (mm) | Calculated Result (mW) | SAR Test |
|--------------------------|-----------------|-------------|------------|-----------------------|--------------------------|------------------------|----------|
| Top surface              | 5825            | 16.50       | 44.67      | \                     | \                        | \                      | \        |
| Bottom surface           | 5825            | 16.50       | 44.67      | 155.38                | 135                      | 1005.38                | Excluded |
| Left side for antenna 1  | 5825            | 16.50       | 44.67      | 155.38                | 85                       | 505.38                 | Excluded |
| Left side for antenna 2  | 5825            | 16.50       | 44.67      | \                     | \                        | \                      | \        |
| Right side for antenna 1 | 5825            | 16.50       | 44.67      | \                     | \                        | \                      | \        |
| Right side for antenna 2 | 5825            | 16.50       | 44.67      | 155.38                | 85                       | 505.38                 | Excluded |
| Front side               | 5825            | 16.50       | 44.67      | \                     | \                        | \                      | \        |
| Back side                | 5825            | 16.50       | 44.67      | \                     | \                        | \                      | \        |

Note:

If the power in mW is greater than the calculated result, SAR evaluation for the corresponding position is required. If not, SAR evaluation for the corresponding position is not required.

## 10. Dielectric Property Measurements & System Check

### 10.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within  $\pm 2^\circ\text{C}$  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 v01r04 SAR Measurement 100 MHz to 6 GHz

| Target Frequency (MHz) | Head         |                | Body         |                |
|------------------------|--------------|----------------|--------------|----------------|
|                        | $\epsilon_r$ | $\sigma$ (S/m) | $\epsilon_r$ | $\sigma$ (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           |

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

**Dielectric Property Measurements Results:**

| Liquid    | Freq. | Liquid Parameters |       |                |      | Delta(%)       |       | Limit (%) | Temp. (°C) | Test Date        |
|-----------|-------|-------------------|-------|----------------|------|----------------|-------|-----------|------------|------------------|
|           |       | Measured          |       | Target         |      |                |       |           |            |                  |
|           |       | ϵ <sub>r</sub>    | σ     | ϵ <sub>r</sub> | σ    | ϵ <sub>r</sub> | σ     |           |            |                  |
| Body 2450 | 2360  | 52.81             | 1.92  | 52.82          | 1.86 | -0.02          | 2.96  | ±5        | 22.4       | January 23, 2018 |
|           | 2450  | 52.53             | 2.01  | 52.70          | 1.95 | -0.32          | 3.18  | ±5        |            |                  |
|           | 2540  | 52.28             | 2.11  | 52.59          | 2.08 | -0.59          | 1.54  | ±5        |            |                  |
| Body 5250 | 5160  | 49.90             | 5.40  | 49.07          | 5.25 | 1.69           | 2.88  | ±5        | 21.9       | January 20, 2018 |
|           | 5250  | 49.61             | 5.45  | 48.95          | 5.36 | 1.35           | 1.66  | ±5        |            |                  |
|           | 5340  | 49.55             | 5.62  | 48.96          | 5.46 | 1.21           | 2.99  | ±5        |            |                  |
| Body 5600 | 5510  | 48.76             | 5.62  | 48.59          | 5.66 | 0.35           | -0.64 | ±5        | 21.9       | January 20, 2018 |
|           | 5600  | 48.77             | 5.78  | 48.47          | 5.77 | 0.62           | 0.16  | ±5        |            |                  |
|           | 5690  | 48.56             | 5.92  | 48.35          | 5.87 | 0.43           | 0.92  | ±5        |            |                  |
| Body 5750 | 5660  | 48.47             | 5.82  | 48.39          | 5.84 | 0.17           | -0.29 | ±5        | 21.9       | January 20, 2018 |
|           | 5750  | 48.38             | 5.95  | 48.27          | 5.94 | 0.23           | 0.12  | ±5        |            |                  |
|           | 5840  | 48.14             | 6.06  | 48.16          | 6.03 | -0.04          | 0.55  | ±5        |            |                  |
| Body 5750 | 5660  | 48.99             | 5.77  | 48.39          | 5.84 | 1.24           | -1.20 | ±5        | 21.6       | January 25, 2018 |
|           | 5750  | 48.91             | 5.89  | 48.27          | 5.94 | 1.33           | -0.79 | ±5        |            |                  |
|           | 5840  | 48.66             | 6.01  | 48.16          | 6.03 | 1.04           | -0.35 | ±5        |            |                  |
| Body 5750 | 48.67 | 5.81              | 48.39 | 5.84           | 0.58 | -0.53          | 48.67 | 5.81      | 21.2       | February 9, 2018 |
|           | 48.59 | 5.93              | 48.27 | 5.94           | 0.66 | -0.13          | 48.59 | 5.93      |            |                  |
|           | 48.34 | 6.05              | 48.16 | 6.03           | 0.37 | 0.32           | 48.34 | 6.05      |            |                  |

## 10.2. 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:  $2.0 \pm 0.2$  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  $\geq 15.0$  cm for SAR measurements  $\leq 3$  GHz and  $\geq 10.0$  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 10mm (above 1GHz) and 15mm (below 1GHz) from dipole center to the simulating liquid surface.
- For area scan, standard grid spacing for head measurements is 15 mm in x- and y- dimension ( $\leq 2$ GHz), 12 mm in x- and y-dimension (2-4 GHz) and 10mm in x- and y- dimension (4-6GHz).
- For zoom scan,  $\Delta x_{\text{zoom}} \leq 2\text{GHz} - \leq 8\text{mm}$ , 2-4GHz -  $\leq 5$  mm and 4-6 GHz- $\leq 4\text{mm}$ ;  $\Delta z_{\text{zoom}} \leq 3\text{GHz} - \leq 5$  mm, 3-4 GHz-  $\leq 4\text{mm}$  and 4-6GHz- $\leq 2\text{mm}$ .
- Distance between probe sensors and phantom surface was set to 3 mm except for 5 GHz band. For 5GHz band, Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was set to 100 mW or 250 mW depend on the certificate of the dipoles.
- The results are normalized to 1 W input power.

## 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.

| System Dipole | T.S. Liquid |     | Measured Results |                        | Target (Ref. value) | Delta (%) | Limit (%) | Temp. (°C) | Test Date        |
|---------------|-------------|-----|------------------|------------------------|---------------------|-----------|-----------|------------|------------------|
| Serial #      |             |     | Zoom Scan (W/Kg) | Normalize to 1W (W/Kg) |                     |           |           |            |                  |
| 977           | Body 2450   | 1g  | 13.200           | 52.80                  | 51.70               | 2.13      | ±10       | 22.4       | January 23, 2018 |
|               |             | 10g | 6.230            | 24.92                  | 24.30               | 2.55      |           |            |                  |
| 1231          | Body 5250   | 1g  | 7.760            | 77.60                  | 76.10               | 1.97      | ±10       | 21.9       | January 20, 2018 |
|               |             | 10g | 2.200            | 22.00                  | 21.40               | 2.80      |           |            |                  |
|               | Body 5600   | 1g  | 8.080            | 80.80                  | 80.40               | 0.50      | ±10       | 21.9       | January 20, 2018 |
|               |             | 10g | 2.240            | 22.40                  | 22.50               | -0.44     |           |            |                  |
|               | Body 5750   | 1g  | 7.710            | 77.10                  | 77.00               | 0.13      | ±10       | 21.9       | January 20, 2018 |
|               |             | 10g | 2.150            | 21.50                  | 21.50               | 0.00      |           |            |                  |
|               | Body 5750   | 1g  | 7.640            | 76.40                  | 77.00               | -0.78     | ±10       | 21.6       | January 25, 2018 |
|               |             | 10g | 2.130            | 21.30                  | 21.50               | -0.93     |           |            |                  |
|               | Body 5750   | 1g  | 7.700            | 77.00                  | 77.00               | 0.00      | ±10       | 21.2       | February 9, 2018 |
|               |             | 10g | 2.140            | 21.40                  | 21.50               | -0.47     |           |            |                  |

## 11. Measured and Reported (Scaled) SAR Results

As per KDB 447498 sec.4.1.e), When SAR or MPE is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as reported.

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

### KDB 447498 D01 General RF Exposure Guidance:

- A) Per KDB447498 D01 v06, all SAR measurement results are scaled to the maximum tune-up tolerance limit to demonstrate SAR compliance.
- B) 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:
- $\leq 0.8$  W/kg or  $2.0$  W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz.
  - $\leq 0.6$  W/kg or  $1.5$  W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.
  - $\leq 0.4$  W/kg or  $1.0$  W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz.

### Per KDB865664 D01 v01r04:

For each frequency band, repeated SAR measurement is required only when the measured SAR is  $\geq 0.8$  W/Kg; if the deviation among the repeated measurement is  $\leq 20\%$ , and the measured SAR  $< 1.45$  W/Kg, only one repeated measurement is required.

### Per KDB 248227 D01 v02r02:

For Wi-Fi SAR testing, a communication link is set up with the testing software for Wi-Fi mode test. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. The RF signal utilized in SAR measurement has 100% duty cycle and its crest factor is 1. The test procedures in KDB 248227 D01 v02r02 are applied. (Refer to KDB 248227D01 v02r02 for more details)

### Initial Test Position Procedure

For exposure condition with multiple test position, such as handsets operating next to the ear, devices with hotspot mode or UMPC mini-tablet, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all position in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is  $\leq 0.4$  W/kg, no additional testing for the remaining test position is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR position until the reported SAR result is  $\leq 0.8$  W/kg or all test position are measured. For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is  $> 0.8$  W/kg, SAR is measured for these test positions /configurations on the subsequent next highest measured output power channel(s) until the reported SAR is  $\leq 1.2$  W/kg or all required channels are tested.

### Initial Test Configuration Procedure

An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. SAR is measured using the highest measured maximum output power channel. For configurations with the same specified or measured maximum output power, additional transmission mode and test channel selection procedures are required (see section 5.3.2 of KDB 248227D01 v02r02). SAR test reduction of subsequent highest output test channels is based on the reported SAR of the initial test configuration.

For next to the ear, hotspot mode and UMC mini-tablet exposure configurations where multiple test positions are required, the initial test position procedure is applied to minimize the number of test positions required for SAR

measurement using the initial test configuration transmission mode. For fixed exposure conditions that do not have multiple SAR test positions, SAR is measured in the transmission mode determined by the initial test configuration. When the reported SAR of the initial test configuration is  $> 0.8 \text{ W/kg}$ , SAR measurement is required for the subsequent next highest measured output power channel(s) in the initial test configuration until the reported SAR is  $\leq 1.2 \text{ W/kg}$  or all required channels are tested.

#### **Sub Test Configuration Procedure**

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. When the highest reported SAR for the initial test configuration, according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is  $\leq 1.2 \text{ W/kg}$ , SAR is not required for that subsequent test configuration.

## 11.1. SAR Test Results of 2.4G Wi-Fi

| Test Position<br>(Body 0mm) | Test Mode | Channel/<br>Frequency | Power (dBm) |       | SAR Value  |             | Power Drift | Duty Factor (%) | Scaled 1-g (W/Kg) | Scaled 10-g (W/Kg) |
|-----------------------------|-----------|-----------------------|-------------|-------|------------|-------------|-------------|-----------------|-------------------|--------------------|
|                             |           |                       | Tune-up     | Meas. | 1-g (W/Kg) | 10-g (W/Kg) |             |                 |                   |                    |
| ANT.1                       |           |                       |             |       |            |             |             |                 |                   |                    |
| Top Surface                 | 802.11 b  | 6/2437                | 22.00       | 20.56 | 0.143      | 0.067       | 0.16        | 99.0            | 0.201             | 0.095              |
| Right Side                  | 802.11 b  | 6/2437                | 22.00       | 20.56 | 0.501      | 0.204       | 0.00        | 99.0            | <b>0.705</b>      | <b>0.287</b>       |
| Front Side                  | 802.11 b  | 6/2437                | 22.00       | 20.56 | 0.123      | 0.061       | -0.11       | 99.0            | 0.173             | 0.086              |
| Back Side                   | 802.11 b  | 6/2437                | 22.00       | 20.56 | 0.079      | 0.036       | -0.04       | 99.0            | 0.111             | 0.051              |
| ANT.2                       |           |                       |             |       |            |             |             |                 |                   |                    |
| Top Surface                 | 802.11 b  | 6/2437                | 22.00       | 20.67 | 0.145      | 0.067       | -0.03       | 99.0            | 0.199             | 0.092              |
| Left Side                   | 802.11 b  | 6/2437                | 22.00       | 20.67 | 0.443      | 0.186       | 0.09        | 99.0            | <b>0.608</b>      | <b>0.255</b>       |
| Front Side                  | 802.11 b  | 6/2437                | 22.00       | 20.67 | 0.123      | 0.062       | -0.05       | 99.0            | 0.169             | 0.084              |
| Back Side                   | 802.11 b  | 6/2437                | 22.00       | 20.67 | 0.102      | 0.049       | 0.11        | 99.0            | 0.140             | 0.067              |

Note:

Because the SAR value evaluated at 0mm meet the limit of 1-g SAR and 10-g SAR at the same time, so SAR evaluation for 1-g Body SAR is abandoned.

OFDM mode SAR evaluation exclusion analysis for 1-g SAR for ANT.1

| Mode          | Tune-up (dBm) | Tune-up (mW) | Highest Reported SAR 1-g (W/Kg) | Adjusted SAR 1-g (W/Kg) | SAR test |
|---------------|---------------|--------------|---------------------------------|-------------------------|----------|
| 802.11b       | 22            | 158.49       | 0.705                           | \                       | \        |
| 802.11g       | 22            | 158.49       | \                               | 0.705                   | Excluded |
| 802.11n (20M) | 22            | 158.49       | \                               | 0.705                   | Excluded |

Note:

1) The highest reported SAR for DSSS adjusted by the ratio of OFDM 802.11g/n to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg, so SAR evaluation for 802.11g/n is not required.

OFDM mode SAR evaluation exclusion analysis for 10-g SAR for ANT.1

| Mode          | Tune-up (dBm) | Tune-up (mW) | Highest Reported SAR 10-g (W/Kg) | Adjusted SAR 10-g (W/Kg) | SAR test |
|---------------|---------------|--------------|----------------------------------|--------------------------|----------|
| 802.11b       | 22            | 158.49       | 0.287                            | \                        | \        |
| 802.11g       | 22            | 158.49       | \                                | 0.287                    | Excluded |
| 802.11n (20M) | 22            | 158.49       | \                                | 0.287                    | Excluded |

Note:

1) The highest reported SAR for DSSS adjusted by the ratio of OFDM 802.11g/n to DSSS specified maximum output power and the adjusted SAR is  $\leq 2.4$  W/kg, so SAR evaluation for 802.11g/n is not required.

OFDM mode SAR evaluation exclusion analysis for 1-g SAR for ANT.2

| Mode          | Tune-up (dBm) | Tune-up (mW) | Highest Reported SAR 1-g (W/Kg) | Adjusted SAR 1-g (W/Kg) | SAR test |
|---------------|---------------|--------------|---------------------------------|-------------------------|----------|
| 802.11b       | 22            | 158.49       | 0.608                           | \                       | \        |
| 802.11g       | 22            | 158.49       | \                               | 0.608                   | Excluded |
| 802.11n (20M) | 22            | 158.49       | \                               | 0.608                   | Excluded |

Note:

1) The highest reported SAR for DSSS adjusted by the ratio of OFDM 802.11g/n to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg, so SAR evaluation for 802.11g/n is not required.

OFDM mode SAR evaluation exclusion analysis for 10-g SAR for ANT.2

| Mode          | Tune-up (dBm) | Tune-up (mW) | Highest Reported SAR 10-g (W/Kg) | Adjusted SAR 10-g (W/Kg) | SAR test |
|---------------|---------------|--------------|----------------------------------|--------------------------|----------|
| 802.11b       | 22            | 158.49       | 0.255                            | \                        | \        |
| 802.11g       | 22            | 158.49       | \                                | 0.255                    | Excluded |
| 802.11n (20M) | 22            | 158.49       | \                                | 0.255                    | Excluded |

Note:

1) The highest reported SAR for DSSS adjusted by the ratio of OFDM 802.11g/n to DSSS specified maximum output power and the adjusted SAR is  $\leq 2.4$  W/kg, so SAR evaluation for 802.11g/n is not required.

## 11.2. SAR Test Results of 5G Wi-Fi

| Test Position<br>(Body 10mm) | Test Mode   | Channel/<br>Frequency | Power (dBm) |       | SAR Value     | Power<br>Drift | Duty<br>Factor<br>(%) | Scaled 1-g<br>(W/Kg) |
|------------------------------|-------------|-----------------------|-------------|-------|---------------|----------------|-----------------------|----------------------|
|                              |             |                       | Tune-up     | Meas. | 1-g<br>(W/Kg) |                |                       |                      |
| ANT.1                        |             |                       |             |       |               |                |                       |                      |
| U-NII-1                      |             |                       |             |       |               |                |                       |                      |
| Top Surface                  | 802.11n 40M | 38/5190               | 16.00       | 15.52 | 0.242         | -0.04          | 86.0                  | 0.314                |
| Right Side                   | 802.11n 40M | 38/5191               | 16.00       | 15.52 | 0.356         | -0.07          | 86.0                  | <b>0.462</b>         |
| Front Side                   | 802.11n 40M | 38/5190               | 16.00       | 15.52 | 0.054         | 0.16           | 86.0                  | 0.070                |
| Back Side                    | 802.11n 40M | 38/5190               | 16.00       | 15.52 | 0.114         | -0.11          | 86.0                  | 0.148                |
| U-NII-2A                     |             |                       |             |       |               |                |                       |                      |
| Top Surface                  | 802.11a     | 60/5300               | 16.00       | 15.83 | 0.366         | -0.08          | 93.0                  | 0.409                |
| Right Side                   | 802.11a     | 60/5300               | 16.00       | 15.83 | 0.544         | -0.05          | 93.0                  | <b>0.608</b>         |
| Front Side                   | 802.11a     | 60/5300               | 16.00       | 15.83 | 0.092         | 0.01           | 93.0                  | 0.103                |
| Back Side                    | 802.11a     | 60/5300               | 16.00       | 15.83 | 0.200         | 0.16           | 93.0                  | 0.224                |
| U-NII-2C                     |             |                       |             |       |               |                |                       |                      |
| Top Surface                  | 802.11n 40M | 102/5510              | 16.00       | 15.23 | 0.290         | -0.14          | 86.0                  | 0.403                |
| Right Side                   | 802.11n 40M | 102/5510              | 16.00       | 15.23 | 0.443         | -0.01          | 86.0                  | <b>0.615</b>         |
| Front Side                   | 802.11n 40M | 102/5510              | 16.00       | 15.23 | 0.036         | 0.00           | 86.0                  | 0.051                |
| Back Side                    | 802.11n 40M | 102/5510              | 16.00       | 15.23 | 0.082         | -0.17          | 86.0                  | 0.114                |
| U-NII-3                      |             |                       |             |       |               |                |                       |                      |
| Top Surface                  | 802.11a     | 161/5805              | 16.50       | 16.31 | 0.441         | -0.13          | 93.0                  | 0.495                |
| Right Side                   | 802.11a     | 161/5805              | 16.50       | 16.31 | 0.952         | -0.01          | 93.0                  | <b>1.069</b>         |
| Front Side                   | 802.11a     | 161/5805              | 16.50       | 16.31 | 0.085         | -0.18          | 93.0                  | 0.096                |
| Back Side                    | 802.11a     | 161/5805              | 16.50       | 16.31 | 0.144         | 0.04           | 93.0                  | 0.162                |
| Right Side                   | 802.11a     | 157/5785              | 16.50       | 15.94 | 0.864         | -0.01          | 93.0                  | 1.057                |
| Right Side-Repeated          | 802.11a     | 161/5805              | 16.50       | 16.31 | 0.863         | 0.00           | 93.0                  | 0.969                |
| ANT.2                        |             |                       |             |       |               |                |                       |                      |
| U-NII-1                      |             |                       |             |       |               |                |                       |                      |
| Top Surface                  | 802.11n 40M | 38/5190               | 16.00       | 15.44 | 0.274         | 0.18           | 86.0                  | 0.362                |
| Left Side                    | 802.11n 40M | 38/5190               | 16.00       | 15.44 | 0.379         | 0.15           | 86.0                  | <b>0.501</b>         |
| Front Side                   | 802.11n 40M | 38/5191               | 16.00       | 15.44 | 0.096         | 0.14           | 86.0                  | 0.127                |
| Back Side                    | 802.11n 40M | 38/5192               | 16.00       | 15.44 | 0.153         | 0.18           | 86.0                  | 0.202                |
| U-NII-2A                     |             |                       |             |       |               |                |                       |                      |
| Top Surface                  | 802.11a     | 60/5300               | 16.00       | 15.99 | 0.317         | -0.18          | 93.0                  | 0.342                |
| Left Side                    | 802.11a     | 60/5300               | 16.00       | 15.99 | 0.470         | 0.04           | 93.0                  | <b>0.507</b>         |
| Front Side                   | 802.11a     | 60/5300               | 16.00       | 15.99 | 0.121         | 0.05           | 93.0                  | 0.130                |
| Back Side                    | 802.11a     | 60/5300               | 16.00       | 15.99 | 0.142         | 0.13           | 93.0                  | 0.153                |
| U-NII-2C                     |             |                       |             |       |               |                |                       |                      |
| Top Surface                  | 802.11n 40M | 102/5510              | 16.00       | 14.78 | 0.229         | -0.19          | 86.0                  | 0.353                |
| Left Side                    | 802.11n 40M | 102/5510              | 16.00       | 14.78 | 0.636         | 0.01           | 86.0                  | <b>0.979</b>         |
| Front Side                   | 802.11n 40M | 102/5510              | 16.00       | 14.78 | 0.054         | 0.05           | 86.0                  | 0.083                |
| Back Side                    | 802.11n 40M | 102/5510              | 16.00       | 14.78 | 0.115         | 0.02           | 86.0                  | 0.177                |
| Left Side                    | 802.11n 40M | 140/5700              | 16.00       | 14.75 | 0.526         | 0.12           | 86.0                  | 0.816                |
| U-NII-3                      |             |                       |             |       |               |                |                       |                      |
| Top Surface                  | 802.11a     | 161/5805              | 16.50       | 16.34 | 0.338         | 0.14           | 93.0                  | 0.377                |
| Left Side                    | 802.11a     | 161/5805              | 16.50       | 16.34 | 0.943         | 0.15           | 93.0                  | 1.052                |
| Front Side                   | 802.11a     | 161/5805              | 16.50       | 16.34 | 0.081         | -0.17          | 93.0                  | 0.090                |

|                     |         |          |       |       |       |      |      |              |
|---------------------|---------|----------|-------|-------|-------|------|------|--------------|
| Back Side           | 802.11a | 161/5805 | 16.50 | 16.34 | 0.199 | 0.09 | 93.0 | 0.222        |
| Left Side           | 802.11a | 157/5785 | 16.50 | 16.01 | 0.704 | 0.16 | 93.0 | 0.847        |
| Right Side-Repeated | 802.11a | 161/5805 | 16.50 | 16.34 | 1.010 | 0.20 | 93.0 | <b>1.127</b> |

Subsequent test configuration SAR evaluation exclusion analysis for 1-g SAR for ANT.1 (U-NII-1)

| Mode         | Tune-up (dBm) | Tune-up (mW) | Highest Reported SAR 1-g (W/Kg) | Adjusted SAR 1-g (W/Kg) | SAR test |
|--------------|---------------|--------------|---------------------------------|-------------------------|----------|
| 802.11n 40M  | 16            | 39.81        | 0.462                           | \                       | \        |
| 802.11a      | 16            | 39.81        | \                               | 0.462                   | Excluded |
| 802.11n 20M  | 16            | 39.81        | \                               | 0.462                   | Excluded |
| 802.11ac 20M | 15            | 31.62        | \                               | 0.367                   | Excluded |
| 802.11ac 40M | 14            | 25.12        | \                               | 0.292                   | Excluded |
| 802.11ac 80M | 14            | 25.12        | \                               | 0.292                   | Excluded |

Note:

The 802.11n 40M mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg, SAR test for the other 802.11 modes are not required.

Subsequent test configuration SAR evaluation exclusion analysis for 1-g SAR for ANT.1 (U-NII-2A)

| Mode         | Tune-up (dBm) | Tune-up (mW) | Highest Reported SAR 1-g (W/Kg) | Adjusted SAR 1-g (W/Kg) | SAR test |
|--------------|---------------|--------------|---------------------------------|-------------------------|----------|
| 802.11a      | 16            | 39.81        | 0.608                           | \                       | \        |
| 802.11n 20M  | 12            | 15.85        | \                               | 0.242                   | Excluded |
| 802.11n 40M  | 15            | 31.62        | \                               | 0.483                   | Excluded |
| 802.11ac 20M | 12            | 15.85        | \                               | 0.242                   | Excluded |
| 802.11ac 40M | 13            | 19.95        | \                               | 0.305                   | Excluded |
| 802.11ac 80M | 14            | 25.12        | \                               | 0.384                   | Excluded |

Note:

The 802.11a mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg, SAR test for the other 802.11 modes are not required.

Subsequent test configuration SAR evaluation exclusion analysis for 1-g SAR for ANT.1 (U-NII-2C)

| Mode         | Tune-up (dBm) | Tune-up (mW) | Highest Reported SAR 1-g (W/Kg) | Adjusted SAR 1-g (W/Kg) | SAR test |
|--------------|---------------|--------------|---------------------------------|-------------------------|----------|
| 802.11n 40M  | 16            | 39.81        | 0.615                           | \                       | \        |
| 802.11a      | 16            | 39.81        | \                               | 0.615                   | Excluded |
| 802.11n 20M  | 15            | 31.62        | \                               | 0.489                   | Excluded |
| 802.11ac 20M | 15            | 31.62        | \                               | 0.489                   | Excluded |
| 802.11ac 40M | 13            | 19.95        | \                               | 0.308                   | Excluded |
| 802.11ac 80M | 14            | 25.12        | \                               | 0.388                   | Excluded |

Note:

The 802.11n 40M mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg, SAR test for the other 802.11 modes are not required.

Subsequent test configuration SAR evaluation exclusion analysis for 1-g SAR for ANT.1 (U-NII-3)

| Mode         | Tune-up (dBm) | Tune-up (mW) | Highest Reported SAR 1-g (W/Kg) | Adjusted SAR 1-g (W/Kg) | SAR test |
|--------------|---------------|--------------|---------------------------------|-------------------------|----------|
| 802.11a      | 16.5          | 44.67        | 1.069                           | \                       | \        |
| 802.11n 20M  | 15.5          | 35.48        | \                               | 0.849                   | Excluded |
| 802.11n 40M  | 16            | 39.81        | \                               | 0.953                   | Excluded |
| 802.11ac 20M | 15.5          | 35.48        | \                               | 0.849                   | Excluded |
| 802.11ac 40M | 14            | 25.12        | \                               | 0.601                   | Excluded |
| 802.11ac 80M | 14            | 25.12        | \                               | 0.601                   | Excluded |

Note:

The 802.11a mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg, SAR test for the other 802.11 modes are not required.

Subsequent test configuration SAR evaluation exclusion analysis for 1-g SAR for ANT.2 (U-NII-1)

| Mode         | Tune-up (dBm) | Tune-up (mW) | Highest Reported SAR 1-g (W/Kg) | Adjusted SAR 1-g (W/Kg) | SAR test |
|--------------|---------------|--------------|---------------------------------|-------------------------|----------|
| 802.11n 40M  | 16            | 39.81        | 0.501                           | \                       | \        |
| 802.11a      | 16            | 39.81        | \                               | 0.501                   | Excluded |
| 802.11n 20M  | 16            | 39.81        | \                               | 0.501                   | Excluded |
| 802.11ac 20M | 15            | 31.62        | \                               | 0.398                   | Excluded |
| 802.11ac 40M | 14            | 25.12        | \                               | 0.316                   | Excluded |
| 802.11ac 80M | 14            | 25.12        | \                               | 0.316                   | Excluded |

Note:

The 802.11n 40M mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg, SAR test for the other 802.11 modes are not required.

Subsequent test configuration SAR evaluation exclusion analysis for 1-g SAR for ANT.2 (U-NII-2A)

| Mode         | Tune-up (dBm) | Tune-up (mW) | Highest Reported SAR 1-g (W/Kg) | Adjusted SAR 1-g (W/Kg) | SAR test |
|--------------|---------------|--------------|---------------------------------|-------------------------|----------|
| 802.11a      | 16            | 39.81        | 0.507                           | \                       | \        |
| 802.11n 20M  | 12            | 15.85        | \                               | 0.202                   | Excluded |
| 802.11n 40M  | 15            | 31.62        | \                               | 0.403                   | Excluded |
| 802.11ac 20M | 12            | 15.85        | \                               | 0.202                   | Excluded |
| 802.11ac 40M | 13            | 19.95        | \                               | 0.254                   | Excluded |
| 802.11ac 80M | 14            | 25.12        | \                               | 0.320                   | Excluded |

Note:

The 802.11a mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg, SAR test for the other 802.11 modes are not required.

Subsequent test configuration SAR evaluation exclusion analysis for 1-g SAR for ANT.2 (U-NII-2C)

| Mode         | Tune-up (dBm) | Tune-up (mW) | Highest Reported SAR 1-g (W/Kg) | Adjusted SAR 1-g (W/Kg) | SAR test |
|--------------|---------------|--------------|---------------------------------|-------------------------|----------|
| 802.11n 40M  | 16            | 39.81        | 0.979                           | \                       | \        |
| 802.11a      | 16            | 39.81        | \                               | 0.979                   | Excluded |
| 802.11n 20M  | 15            | 31.62        | \                               | 0.778                   | Excluded |
| 802.11ac 20M | 15            | 31.62        | \                               | 0.778                   | Excluded |
| 802.11ac 40M | 13            | 19.95        | \                               | 0.491                   | Excluded |
| 802.11ac 80M | 14            | 25.12        | \                               | 0.618                   | Excluded |

Note:

The 802.11n 40M mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg, SAR test for the other 802.11 modes are not required.

Subsequent test configuration SAR evaluation exclusion analysis for 1-g SAR for ANT.2 (U-NII-3)

| Mode         | Tune-up (dBm) | Tune-up (mW) | Highest Reported SAR 1-g (W/Kg) | Adjusted SAR 1-g (W/Kg) | SAR test |
|--------------|---------------|--------------|---------------------------------|-------------------------|----------|
| 802.11a      | 16.5          | 44.67        | 1.127                           | \                       | \        |
| 802.11n 20M  | 15.5          | 35.48        | \                               | 0.895                   | Excluded |
| 802.11n 40M  | 16            | 39.81        | \                               | 1.004                   | Excluded |
| 802.11ac 20M | 15.5          | 35.48        | \                               | 0.895                   | Excluded |
| 802.11ac 40M | 14            | 25.12        | \                               | 0.634                   | Excluded |
| 802.11ac 80M | 14            | 25.12        | \                               | 0.634                   | Excluded |

Note:

The 802.11a mode is selected as Initial Test Configuration for SAR test according to the specified maximum output power. As the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg, SAR test for the other 802.11 modes are not required.

## 12. Simultaneous Transmission SAR Analysis

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.

The antenna 1 supports 2.4 Wi-Fi and 5G Wi-Fi, the antenna 2 supports 2.4 Wi-Fi, 5G Wi-Fi and BT. The two antennas can always transmit simultaneously. The work mode combination is showed as below table.

| Combination NO. | Mode                                         |
|-----------------|----------------------------------------------|
| 1               | 2.4G Wi-Fi(antenna 1)+ 2.4G Wi-Fi(antenna 2) |
| 2               | 2.4G Wi-Fi(antenna 1)+ 5G Wi-Fi(antenna 2)   |
| 3               | 2.4G Wi-Fi(antenna 1)+ BT(antenna 2)         |
| 4               | 5G Wi-Fi(antenna 1)+ 2.4G Wi-Fi(antenna 2)   |
| 5               | 5G Wi-Fi(antenna 1)+ 5G Wi-Fi(antenna 2)     |
| 6               | 5G Wi-Fi(antenna 1)+ BT(antenna 2)           |

### 12.1. Estimated SAR

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

- 1) (max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)].  
[ $\sqrt{f(\text{GHz})/x}$ ] W/kg for test separation distances  $\leq 50$  mm, where  $x = 7.5$  for 1-g SAR and  $x = 18.75$  for 10-g SAR.
- 2) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distance is  $> 50$  mm.

When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm is applied.

Estimated 10-g SAR calculated result of 5G Wi-Fi

| Position                 | Frequency (GHz) | Power (dBm) | Power (mW) | Separation Distance (mm) | Estimate 10g SAR (W/Kg) |
|--------------------------|-----------------|-------------|------------|--------------------------|-------------------------|
| Top surface              | 0.5825          | 16.50       | 44.67      | 20                       | 0.091                   |
| Bottom surface           | 0.5825          | 16.50       | 44.67      | 135                      | 1.000                   |
| Left side for antenna 1  | 0.5825          | 16.50       | 44.67      | 85                       | 1.000                   |
| Left side for antenna 2  | 0.5825          | 16.50       | 44.67      | 15                       | 0.121                   |
| Right side for antenna 1 | 0.5825          | 16.50       | 44.67      | 15                       | 0.121                   |
| Right side for antenna 2 | 0.5825          | 16.50       | 44.67      | 85                       | 1.000                   |
| Front side               | 0.5825          | 16.50       | 44.67      | 30                       | 0.061                   |
| Back side                | 0.5825          | 16.50       | 44.67      | 30                       | 0.061                   |

## 12.2. Simultaneous Transmission calculation for 1-g SAR

For Combination NO.1 1-g SAR

| Test Position  | 2.4G Wi-Fi<br>(antenna 1)<br>1-g SAR (W/Kg) | 2.4G Wi-Fi<br>(antenna 2)<br>1-g SAR (W/Kg) | SUM<br>1-g SAR (W/Kg) | SPLSR    |
|----------------|---------------------------------------------|---------------------------------------------|-----------------------|----------|
| Top Surface    | 0.201                                       | 0.199                                       | 0.400                 | Excluded |
| Bottom Surface | 0.400                                       | 0.400                                       | 0.800                 | Excluded |
| Left Side      | 0.400                                       | 0.608                                       | 1.008                 | Excluded |
| Right Side     | 0.705                                       | 0.400                                       | 1.105                 | Excluded |
| Front Side     | 0.173                                       | 0.169                                       | 0.342                 | Excluded |
| Back Side      | 0.111                                       | 0.140                                       | 0.251                 | Excluded |

Note:

Because the maximum SUM 1-g SAR  $\leq 1.6$  W/Kg, so the SPLSR analysis is not required.

For Combination NO.2 1-g SAR

| Test Position  | 2.4G Wi-Fi<br>(antenna 1)<br>1-g SAR (W/Kg) | 5G Wi-Fi<br>(antenna 2)<br>1-g SAR (W/Kg) | SUM<br>1-g SAR (W/Kg) | SPLSR    |
|----------------|---------------------------------------------|-------------------------------------------|-----------------------|----------|
| Top Surface    | 0.201                                       | 0.377                                     | 0.578                 | Excluded |
| Bottom Surface | 0.400                                       | 0.400                                     | 0.800                 | Excluded |
| Left Side      | 0.400                                       | 1.127                                     | 1.527                 | Excluded |
| Right Side     | 0.705                                       | 0.400                                     | 1.105                 | Excluded |
| Front Side     | 0.173                                       | 0.130                                     | 0.303                 | Excluded |
| Back Side      | 0.111                                       | 0.222                                     | 0.333                 | Excluded |

Note:

Because the maximum SUM 1-g SAR  $\leq 1.6$  W/Kg, so the SPLSR analysis is not required.

For Combination NO.3 1-g SAR

| Test Position  | 2.4G Wi-Fi<br>(antenna 1)<br>1-g SAR (W/Kg) | BT<br>(antenna 2)<br>1-g SAR (W/Kg) | SUM<br>1-g SAR (W/Kg) | SPLSR    |
|----------------|---------------------------------------------|-------------------------------------|-----------------------|----------|
| Top Surface    | 0.201                                       | 0.013                               | 0.214                 | Excluded |
| Bottom Surface | 0.400                                       | 0.400                               | 0.800                 | Excluded |
| Left Side      | 0.400                                       | 0.018                               | 0.418                 | Excluded |
| Right Side     | 0.705                                       | 0.400                               | 1.105                 | Excluded |
| Front Side     | 0.173                                       | 0.009                               | 0.182                 | Excluded |
| Back Side      | 0.111                                       | 0.009                               | 0.120                 | Excluded |

Note:

Because the maximum SUM 1-g SAR  $\leq 1.6$  W/Kg, so the SPLSR analysis is not required.

For Combination NO.4 1-g SAR

| Test Position  | 5G Wi-Fi<br>(antenna 1)<br>1-g SAR (W/Kg) | 2.4G Wi-Fi<br>(antenna 2)<br>1-g SAR (W/Kg) | SUM<br>1-g SAR (W/Kg) | SPLSR    |
|----------------|-------------------------------------------|---------------------------------------------|-----------------------|----------|
| Top Surface    | 0.495                                     | 0.199                                       | 0.694                 | Excluded |
| Bottom Surface | 0.400                                     | 0.400                                       | 0.800                 | Excluded |
| Left Side      | 0.400                                     | 0.608                                       | 1.008                 | Excluded |
| Right Side     | 1.069                                     | 0.400                                       | 1.469                 | Excluded |
| Front Side     | 0.103                                     | 0.169                                       | 0.272                 | Excluded |
| Back Side      | 0.224                                     | 0.140                                       | 0.364                 | Excluded |

Note:

Because the maximum SUM 1-g SAR  $\leq 1.6$  W/Kg, so the SPLSR analysis is not required.

For Combination NO.5 1-g SAR

| Test Position  | 5G Wi-Fi<br>(antenna 1)<br>1-g SAR (W/Kg) | 5G Wi-Fi<br>(antenna 2)<br>1-g SAR (W/Kg) | SUM<br>1-g SAR (W/Kg) | SPLSR    |
|----------------|-------------------------------------------|-------------------------------------------|-----------------------|----------|
| Top Surface    | 0.495                                     | 0.377                                     | 0.872                 | Excluded |
| Bottom Surface | 0.400                                     | 0.400                                     | 0.800                 | Excluded |
| Left Side      | 0.400                                     | 1.127                                     | 1.527                 | Excluded |
| Right Side     | 1.069                                     | 0.400                                     | 1.469                 | Excluded |
| Front Side     | 0.103                                     | 0.130                                     | 0.233                 | Excluded |
| Back Side      | 0.224                                     | 0.222                                     | 0.446                 | Excluded |

Note:

Because the maximum SUM 1-g SAR  $\leq 1.6$  W/Kg, so the SPLSR analysis is not required.

For Combination NO.6 1-g SAR

| Test Position  | 5G Wi-Fi<br>(antenna 1)<br>1-g SAR (W/Kg) | BT<br>(antenna 2)<br>1-g SAR (W/Kg) | SUM<br>1-g SAR (W/Kg) | SPLSR    |
|----------------|-------------------------------------------|-------------------------------------|-----------------------|----------|
| Top Surface    | 0.495                                     | 0.013                               | 0.495                 | Excluded |
| Bottom Surface | 0.400                                     | 0.400                               | 0.400                 | Excluded |
| Left Side      | 0.400                                     | 0.018                               | 0.400                 | Excluded |
| Right Side     | 1.069                                     | 0.400                               | 1.069                 | Excluded |
| Front Side     | 0.103                                     | 0.009                               | 0.103                 | Excluded |
| Back Side      | 0.224                                     | 0.009                               | 0.224                 | Excluded |

Note:

Because the maximum SUM 1-g SAR  $\leq 1.6$  W/Kg, so the SPLSR analysis is not required.

### 12.3. Simultaneous Transmission calculation for 10-g SAR

For Combination NO.1 10-g SAR

| Test Position  | 2.4G Wi-Fi<br>(antenna 1)<br>10-g SAR (W/Kg) | 2.4G Wi-Fi<br>(antenna 2)<br>10-g SAR (W/Kg) | SUM<br>10-g SAR (W/Kg) | SPLSR    |
|----------------|----------------------------------------------|----------------------------------------------|------------------------|----------|
| Top Surface    | 0.095                                        | 0.092                                        | 0.187                  | Excluded |
| Bottom Surface | 1.000                                        | 1.000                                        | 2.000                  | Excluded |
| Left Side      | 1.000                                        | 0.255                                        | 1.255                  | Excluded |
| Right Side     | 0.287                                        | 1.000                                        | 1.287                  | Excluded |
| Front Side     | 0.086                                        | 0.084                                        | 0.170                  | Excluded |
| Back Side      | 0.051                                        | 0.067                                        | 0.118                  | Excluded |

Note:

Because the maximum SUM 10-g SAR  $\leq 4.0$  W/kg, so the SPLSR analysis is not required.

For Combination NO.2 10-g SAR

| Test Position  | 2.4G Wi-Fi<br>(antenna 1)<br>10-g SAR (W/Kg) | 5G Wi-Fi<br>(antenna 2)<br>10-g SAR (W/Kg) | SUM<br>10-g SAR (W/Kg) | SPLSR    |
|----------------|----------------------------------------------|--------------------------------------------|------------------------|----------|
| Top Surface    | 0.095                                        | 0.091                                      | 0.186                  | Excluded |
| Bottom Surface | 1.000                                        | 1.000                                      | 2.000                  | Excluded |
| Left Side      | 1.000                                        | 0.121                                      | 1.121                  | Excluded |
| Right Side     | 0.287                                        | 1.000                                      | 1.287                  | Excluded |
| Front Side     | 0.086                                        | 0.061                                      | 0.147                  | Excluded |
| Back Side      | 0.051                                        | 0.061                                      | 0.112                  | Excluded |

Note:

Because the maximum SUM 10-g SAR  $\leq 4.0$  W/kg, so the SPLSR analysis is not required.

For Combination NO.3 10-g SAR

| Test Position  | 2.4G Wi-Fi<br>(antenna 1)<br>10-g SAR (W/Kg) | BT<br>(antenna 2)<br>10-g SAR (W/Kg) | SUM<br>10-g SAR (W/Kg) | SPLSR    |
|----------------|----------------------------------------------|--------------------------------------|------------------------|----------|
| Top Surface    | 0.095                                        | 0.005                                | 0.100                  | Excluded |
| Bottom Surface | 1.000                                        | 1.000                                | 2.000                  | Excluded |
| Left Side      | 1.000                                        | 0.007                                | 1.007                  | Excluded |
| Right Side     | 0.287                                        | 1.000                                | 1.287                  | Excluded |
| Front Side     | 0.086                                        | 0.004                                | 0.090                  | Excluded |
| Back Side      | 0.051                                        | 0.004                                | 0.055                  | Excluded |

Note:

Because the maximum SUM 10-g SAR  $\leq 4.0$  W/kg, so the SPLSR analysis is not required.

For Combination NO.4 10-g SAR

| Test Position  | 5G Wi-Fi<br>(antenna 1)<br>10-g SAR (W/Kg) | 2.4G Wi-Fi<br>(antenna 2)<br>10-g SAR (W/Kg) | SUM<br>10-g SAR (W/Kg) | SPLSR    |
|----------------|--------------------------------------------|----------------------------------------------|------------------------|----------|
| Top Surface    | 0.091                                      | 0.092                                        | 0.183                  | Excluded |
| Bottom Surface | 1.000                                      | 1.000                                        | 2.000                  | Excluded |
| Left Side      | 1.000                                      | 0.255                                        | 1.255                  | Excluded |
| Right Side     | 0.121                                      | 1.000                                        | 1.121                  | Excluded |
| Front Side     | 0.061                                      | 0.084                                        | 0.145                  | Excluded |
| Back Side      | 0.061                                      | 0.067                                        | 0.128                  | Excluded |

Note:

Because the maximum SUM 10-g SAR  $\leq 4.0$  W/kg, so the SPLSR analysis is not required.

For Combination NO.5 10-g SAR

| Test Position  | 5G Wi-Fi<br>(antenna 1)<br>10-g SAR (W/Kg) | 5G Wi-Fi<br>(antenna 2)<br>10-g SAR (W/Kg) | SUM<br>10-g SAR (W/Kg) | SPLSR    |
|----------------|--------------------------------------------|--------------------------------------------|------------------------|----------|
| Top Surface    | 0.091                                      | 0.092                                      | 0.183                  | Excluded |
| Bottom Surface | 1.000                                      | 1.000                                      | 2.000                  | Excluded |
| Left Side      | 1.000                                      | 0.255                                      | 1.255                  | Excluded |
| Right Side     | 0.121                                      | 1.000                                      | 1.121                  | Excluded |
| Front Side     | 0.061                                      | 0.084                                      | 0.145                  | Excluded |
| Back Side      | 0.061                                      | 0.067                                      | 0.128                  | Excluded |

Note:

Because the maximum SUM 10-g SAR  $\leq 4.0$  W/kg, so the SPLSR analysis is not required.

For Combination NO.6 10-g SAR

| Test Position  | 5G Wi-Fi<br>(antenna 1)<br>10-g SAR (W/Kg) | BT<br>(antenna 2)<br>10-g SAR (W/Kg) | SUM<br>10-g SAR (W/Kg) | SPLSR    |
|----------------|--------------------------------------------|--------------------------------------|------------------------|----------|
| Top Surface    | 0.091                                      | 0.092                                | 0.183                  | Excluded |
| Bottom Surface | 1.000                                      | 1.000                                | 2.000                  | Excluded |
| Left Side      | 1.000                                      | 0.255                                | 1.255                  | Excluded |
| Right Side     | 0.121                                      | 1.000                                | 1.121                  | Excluded |
| Front Side     | 0.061                                      | 0.084                                | 0.145                  | Excluded |
| Back Side      | 0.061                                      | 0.067                                | 0.128                  | Excluded |

Note:

Because the maximum SUM 10-g SAR  $\leq 4.0$  W/kg, so the SPLSR analysis is not required.

## **Appendixes**

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

**4788325650-2\_App A Photo**

**4788325650-2\_App B System Check Plots**

**4788325650-2\_App C Highest Test Plots**

**4788325650-2\_App D Cal. Certificates**

-----End of Report-----