

## **SAR EVALUATION REPORT**

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

*For*

**XAG Agricultural Control Stick 4**

**MODEL NUMBER: M3ACS4A**

**REPORT NUMBER: 4791519692-1-SAR-1**

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Revision History

| Rev. | Issue Date        | Revisions     | Revised By |
|------|-------------------|---------------|------------|
| V0   | November 14, 2024 | Initial Issue | \          |

## Note:

- 1) This test report is only published to and used by the applicant, and it is not for evidence purpose in China.
- 2) The measurement result for the sample received is <Pass> according to < IEEE Std. 1528>when <Simple Acceptance> decision rule is applied.

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## 1. Attestation of Test Results

|                                                                  |                                                                                    |                                                                         |
|------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Applicant Name                                                   | Guangzhou Xaircraft Technology CO.,LTD                                             |                                                                         |
| Address                                                          | Block C, No.115, Gaopu Road, Tianhe District, Guangzhou City, Guangdong, P.R.China |                                                                         |
| Manufacturer                                                     | Guangzhou Xaircraft Technology CO.,LTD                                             |                                                                         |
| Address                                                          | Block C, No.115, Gaopu Road, Tianhe District, Guangzhou City, Guangdong, P.R.China |                                                                         |
| EUT Name                                                         | XAG Agricultural Control Stick 4                                                   |                                                                         |
| Brand                                                            | XAG                                                                                |                                                                         |
| Model                                                            | M3ACS4A                                                                            |                                                                         |
| Sample Received Date                                             | November 1, 2024                                                                   |                                                                         |
| Sample Status                                                    | Normal                                                                             |                                                                         |
| Sample ID                                                        | /                                                                                  |                                                                         |
| Date of Tested                                                   | November 12, 2024                                                                  |                                                                         |
| 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<br>(1g of tissue)                                             | Extremities (hands, wrists, ankles,<br>etc.)<br>(10g of tissue)         |
| General population /<br>Uncontrolled exposure                    | 1.6                                                                                | 4                                                                       |
| Occupational / Controlled exposure                               | 8                                                                                  | 20                                                                      |
| <b>The Highest Reported SAR (W/kg)</b>                           |                                                                                    |                                                                         |
| RF Exposure Conditions                                           | Equipment Class                                                                    |                                                                         |
|                                                                  | DTS                                                                                |                                                                         |
| Body 1-g (5 mm)                                                  | 0.963                                                                              |                                                                         |
| Simultaneous Transmission (1-g)                                  | /                                                                                  |                                                                         |
| Test Results                                                     | Pass                                                                               |                                                                         |
| Prepared By:<br><i>Burt Hu</i><br>Burt Hu<br>Laboratory Engineer | Reviewed By:<br><i>Kebo Zhang</i><br>Kebo Zhang<br>Senior Project Engineer         | Approved By:<br><i>Stephen Guo</i><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 and the following FCC Published RF exposure KDB procedures:

- 447498 D01 General RF Exposure Guidance v06
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 248227 D01 802.11 Wi-Fi SAR v02r02

### 3. Facilities and Accreditation

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 | <p><b>A2LA (Certificate No.: 4102.01)</b><br/>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p><b>FCC (FCC Designation No.: CN1187)</b><br/>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.</p> <p><b>ISED (Company No.: 21320)</b><br/>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED.<br/>The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046.</p> <p><b>VCCI (Registration No.: G-20192, C-20153, T-20155 and R-20202)</b><br/>UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793.<br/>Facility Name:<br/>Chamber D, the VCCI registration No. is G-20192 and R-20202<br/>Shielding Room B, the VCCI registration No. is C-20153 and T-20155</p> |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |



## 4.2. 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 mm $\pm$ 1 mm                                                                                                                                                                                                                                                        | $\frac{1}{2} \cdot \delta \cdot \ln(2)$ mm $\pm$ 0.5 mm |
| Maximum probe angle from probe axis to phantom surface normal at the measurement location              | $30^\circ \pm 1^\circ$                                                                                                                                                                                                                                                 | $20^\circ \pm 1^\circ$                                  |
| 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. |                                                         |
| 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*      |

### 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                                   | $\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$ mm      |                                                                               |
| Minimum zoom scan volume                                                                                                                                                                                                                                                                                                | x, y, z                                   |                                                                                             | $\geq 30$ mm                                         | 3 – 4 GHz: $\geq 28$ mm<br>4 – 5 GHz: $\geq 25$ mm<br>5 – 6 GHz: $\geq 22$ mm |
| Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.                                                                                                                                                                                   |                                           |                                                                                             |                                                      |                                                                               |
| * When zoom scan is required and the <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB Publication 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz. |                                           |                                                                                             |                                                      |                                                                               |

### 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 | 2025.09.27    |
| Dielectric Probe kit          | SPEAG                | SM DAK 040 SA          | 1155       | 2025.02.27    |
| DC power supply               | Keysight             | E36103A                | MY55350020 | 2025.09.27    |
| Signal Generator              | Rohde & Schwarz      | SME06                  | 837633\001 | 2025.08.05    |
| BI-Directional Coupler        | KRYTAR               | 1850                   | 54733      | 2025.09.27    |
| Peak and Average Power Sensor | Keysight             | E9325A                 | MY62220002 | 2025.09.27    |
| Peak and Average Power Sensor | Keysight             | E9325A                 | MY62220003 | 2025.09.27    |
| Dual Channel PK Power Meter   | Keysight             | N1912A                 | MY55416024 | 2025.09.27    |
| Amplifier                     | CORAD TECHNOLOGY LTD | AMF-4D-00400600-50-30P | 1983561    | NCR           |
| Dosimetric E-Field Probe      | SPEAG                | EX3DV4                 | 7733       | 2025.02.20    |
| Data Acquisition Electronic   | SPEAG                | DAE4                   | 1739       | 2025.01.22    |
| Dipole Kit 2450 MHz           | SPEAG                | D2450V2                | 977        | 2024.12.16    |
| Software                      | SPEAG                | DASY8                  | N/A        | NCR           |
| Phantom                       | SPEAG                | SAM V8.0               | 2100       | NCR           |
| Thermometer                   | /                    | GX-138                 | 150709653  | 2025.10.7     |
| Thermometer                   | VICTOR               | ITHX-SD-5              | 18470005   | 2025.10.7     |

**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.

a) There is no physical damage on the dipole;

b) System check with specific dipole is within 10% of calibrated value;

c) The most recent return-loss result, measured at least annually, deviates by no more than 20% from the previous measurement.

d) 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 and the measured 10-g SAR within a frequency band is  $< 3.75$  W/kg. The expanded SAR measurement uncertainty must be  $\leq 30\%$ , for a confidence interval of  $k = 2$ . If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std. 1528-2013 is not required in SAR reports submitted for equipment approval.

Therefore, the measurement uncertainty is not required.

## 6. Device Under Test (DUT) Information

### 6.1. DUT Description

|                                                                                                    |  |
|----------------------------------------------------------------------------------------------------|--|
| The DUT is the XAG Agricultural Control Stick 4 with Wi-Fi 2.4GHz and BLE 1/2M wireless capability |  |
|----------------------------------------------------------------------------------------------------|--|

|               |                                                               |
|---------------|---------------------------------------------------------------|
| DUT Dimension | Overall (Length x Width x Height): 167.5 mm x 39.5 mm x 48 mm |
|---------------|---------------------------------------------------------------|

### 6.2. Wireless Technology

| Wireless technology | Frequency band |
|---------------------|----------------|
| Wi-Fi               | 2.4 GHz        |
| BLE                 | 2.4 GHz        |

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

### 7.1. Test Results of Wi-Fi 2.4GHz

| Mode      | Frequency (MHz) | AV Power (dBm) | Tune-up Limit (dBm) |
|-----------|-----------------|----------------|---------------------|
| 802.11b   | 2412            | 11.05          | 12.0                |
| 802.11b   | 2437            | 11.04          |                     |
| 802.11b   | 2462            | 11.35          |                     |
| 802.11g   | 2412            | 14.23          | 15.0                |
| 802.11g   | 2437            | 14.54          |                     |
| 802.11g   | 2462            | 14.68          |                     |
| 802.11n20 | 2412            | 14.44          | 15.5                |
| 802.11n20 | 2437            | 14.87          |                     |
| 802.11n20 | 2462            | 15.32          |                     |

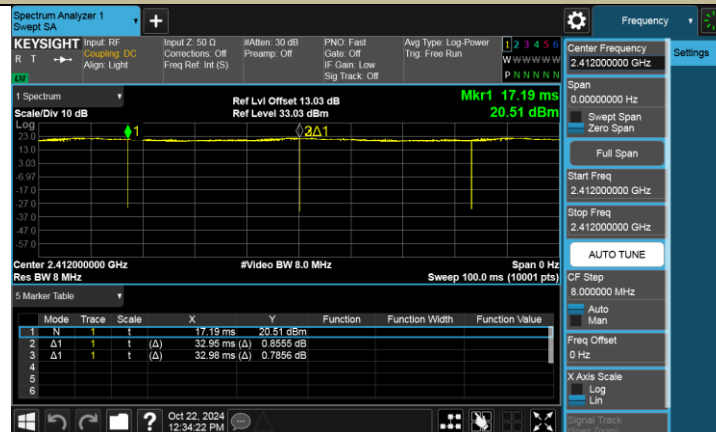
## 7.2. Test Results of BLE

| Mode   | Frequency (MHz) | AV Power (dBm) | Tune-up Limit (dBm) |
|--------|-----------------|----------------|---------------------|
| BLE_1M | 2402            | 2.03           | 4.0                 |
|        | 2440            | 3.32           |                     |
|        | 2480            | 3.69           |                     |
| BLE_2M | 2402            | 2.01           | 4.0                 |
|        | 2440            | 3.22           |                     |
|        | 2480            | 3.63           |                     |

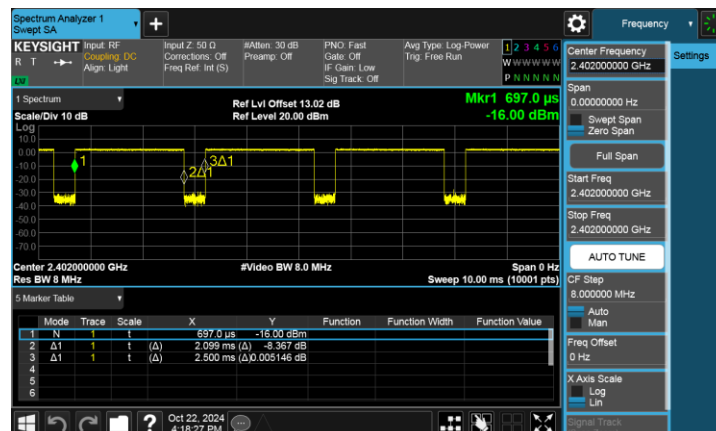
### 7.3. Duty Cycle

| Test Mode | On Time (msec) | Period (msec) | Duty Cycle x (Linear) | Duty Cycle (%) |
|-----------|----------------|---------------|-----------------------|----------------|
| 11b       | 32.95          | 32.98         | 0.9991                | 99.91          |
| BLE 1M    | 2.099          | 2.5           | 0.8396                | 83.96          |

#### 11b 2412MHz



#### BLE 1M 2402MHz



## 8. Test Configuration

### 8.1.2.4GHz Wi-Fi SAR Test Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions.

#### A) 802.11b DSSS SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

- 1) When the reported SAR of the highest measured maximum output power channel (section 3.1 of KDB 248227D01) for the exposure configuration is  $\leq 0.8$  W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
- 2) When the reported SAR is  $> 0.8$  W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is  $> 1.2$  W/kg, SAR is required for the third channel i.e., all channels require testing.

### 8.2.2.4GHz 802.11g/n OFDM SAR Test Exclusion Requirements

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3 of KDB 248227D01). SAR is not required for the following 2.4 GHz OFDM conditions.

- 1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
- 2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg.

### 8.3.2.4GHz BLE SAR Test Requirements

2.4GHz BT operating modes are tested independently according to the service requirements in each frequency band for each antenna. 1M/2M SISO modes are tested on the maximum average output power mode.

## 8.4.Repeated measurements

Repeated measurements are required only when the measured SAR is  $\geq 0.80$  W/kg.<sup>18</sup> If the measured SAR value of the initial repeated measurement is  $< 1.45$  W/kg with  $\leq 20\%$  variation, only one repeated measurement is required to reaffirm that the results are not expected to have substantial variations, which may introduce significant compliance concerns. A second repeated measurement is required only if the measured result for the initial repeated measurement is within 10% of the SAR limit and vary by more than 20%, which are often related to device and measurement setup difficulties. The following procedures are applied to determine if repeated measurements are required. The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.<sup>19</sup> The repeated measurement results must be clearly identified in the SAR report. All measured SAR, including the repeated results, must be considered to determine compliance and for reporting according to KDB Publication 690783.

- 1) Repeated measurement is not required when the original highest measured SAR is  $< 0.80$  W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is  $\geq 0.80$  W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is  $> 1.20$  or when the original or repeated measurement is  $\geq 1.45$  W/kg ( $\sim 10\%$  from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .

## 9. Antenna location diagram

Referred to 4791519692-1-SAR-1\_App A Photo.

## 10.RF Exposure Conditions

| Wireless technologies | RF Exposure Conditions | DUT-to-User Separation |
|-----------------------|------------------------|------------------------|
| Wi-Fi/BLE             | Body                   | 5 mm                   |

## 11. Dielectric Property Measurements & System Check

### 11.1. 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 |      |                |      | Deviation(%)   |      | Limit (%) | Temp. (°C) | Test Date         |
|-----------|-------|-------------------|------|----------------|------|----------------|------|-----------|------------|-------------------|
|           |       | Measured          |      | Target         |      |                |      |           |            |                   |
|           |       | ϵ <sub>r</sub>    | σ    | ϵ <sub>r</sub> | σ    | ϵ <sub>r</sub> | σ    |           |            |                   |
| Head 2450 | 2360  | 40.50             | 1.73 | 39.36          | 1.72 | 2.90           | 0.58 | ±5        | 21.3       | November 12, 2024 |
|           | 2450  | 40.40             | 1.84 | 39.20          | 1.80 | 3.06           | 2.22 |           |            |                   |
|           | 2540  | 39.90             | 1.94 | 39.09          | 1.90 | 2.07           | 2.11 |           |            |                   |

## 11.2. 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 10 mm (above 1GHz) and 15 mm (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 10 mm in x- and y- dimension (4-6GHz).
- For zoom scan,  $\Delta x_{\text{zoom}}, \Delta y_{\text{zoom}} \leq 2$  GHz -  $\leq 8$  mm, 2-4 GHz -  $\leq 5$  mm and 4-6 GHz -  $\leq 4$  mm;  $\Delta z_{\text{zoom}} \leq 3$  GHz -  $\leq 5$  mm, 3-4 GHz -  $\leq 4$  mm and 4-6 GHz -  $\leq 2$  mm.
- Distance between probe sensors and phantom surface was set to 3 mm except for 5 GHz band. For 5 GHz 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.

| T.S. Liquid |      | Messured Results    |                                 | Target<br>(Ref.<br>value) | Delta<br>(%) | Limit<br>(%) | Temp.<br>(°C) | Test Date         |
|-------------|------|---------------------|---------------------------------|---------------------------|--------------|--------------|---------------|-------------------|
|             |      | Zoom Scan<br>(W/Kg) | Normalize<br>to<br>1W<br>(W/Kg) |                           |              |              |               |                   |
| Head 2450   | 1-g  | 5.140               | 51.40                           | 54.60                     | -5.86        | $\pm 10$     | 21.3          | November 12, 2024 |
|             | 10-g | 2.400               | 24.00                           | 24.20                     | -0.83        |              |               |                   |

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

- Reported SAR(W/kg) = Measured SAR \* Tune-up scaling factor \* Duty Cycle scaling factor

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

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

A) Per KDB447498 D01, 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.

## 12.1.SAR Test Results of Wi-Fi 2.4GHz

| Test Position<br>(Body 5mm) | Test Mode | Channel/<br>Frequency | Power<br>(dBm) |       | Measured<br>SAR Value | Power<br>Drift | Duty<br>Cycle<br>(%) | Scaled<br>(W/Kg) |
|-----------------------------|-----------|-----------------------|----------------|-------|-----------------------|----------------|----------------------|------------------|
|                             |           |                       | Tune-up        | Meas. | 1-g (W/Kg)            |                |                      |                  |
| Front Surface               | 11b       | 11/2462               | 12.0           | 11.35 | 0.010                 | -0.02          | 99.91                | 0.012            |
| Back Surface                | 11b       | 11/2462               | 12.0           | 11.35 | 0.124                 | -0.01          | 99.91                | 0.144            |
| Left Edge                   | 11b       | 11/2462               | 12.0           | 11.35 | 0.127                 | -0.03          | 99.91                | 0.148            |
| Right Edge                  | 11b       | 11/2462               | 12.0           | 11.35 | 0.059                 | -0.05          | 99.91                | 0.069            |
| Top Edge                    | 11b       | 11/2462               | 12.0           | 11.35 | 0.269                 | -0.05          | 99.91                | 0.313            |
| Bottom Edge                 | 11b       | 11/2462               | 12.0           | 11.35 | 0.002                 | -0.05          | 99.91                | 0.002            |
| Top Edge                    | 11b       | 1/2412                | 12.0           | 11.05 | 0.345                 | -0.02          | 99.91                | 0.430            |
| Top Edge                    | 11b       | 6/2437                | 12.0           | 11.04 | 0.291                 | -0.06          | 99.91                | 0.363            |

Note:

- 1) The SAR testing was set to transmit at maximum power for all tests.

| Mode          | Tune-up<br>(dBm) | Tune-up<br>(mW) | Highest<br>Reported<br>SAR<br>(W/Kg) | Adjusted<br>SAR<br>(W/Kg) | SAR<br>Test |
|---------------|------------------|-----------------|--------------------------------------|---------------------------|-------------|
| 802.11b       | 12               | 15.85           | 0.430                                | \                         | \           |
| 802.11g       | 15               | 31.62           | \                                    | 0.858                     | Excluded    |
| 802.11n (20M) | 15.5             | 35.48           | \                                    | 0.963                     | Excluded    |

Note:

- 1) The 802.11b 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 is not required.

## 12.2.SAR Test Results of BLE

| Test Position<br>(Body 5mm) | Test Mode | Channel/<br>Frequency | Power<br>(dBm) |       | Measured<br>SAR Value | Power<br>Drift | Duty<br>Cycle<br>(%) | Scaled<br>(W/Kg) |
|-----------------------------|-----------|-----------------------|----------------|-------|-----------------------|----------------|----------------------|------------------|
|                             |           |                       | Tune-up        | Meas. | 1-g (W/Kg)            |                |                      |                  |
| Front Surface               | BLE 1M    | 39/2480               | 4.0            | 3.69  | 0.002                 | -0.02          | 83.96                | 0.003            |
| Back Surface                | BLE 1M    | 39/2480               | 4.0            | 3.69  | 0.016                 | 0.01           | 83.96                | 0.020            |
| Left Edge                   | BLE 1M    | 39/2480               | 4.0            | 3.69  | 0.016                 | -0.06          | 83.96                | 0.020            |
| Right Edge                  | BLE 1M    | 39/2480               | 4.0            | 3.69  | 0.009                 | -0.02          | 83.96                | 0.012            |
| Top Edge                    | BLE 1M    | 39/2480               | 4.0            | 3.69  | 0.040                 | -0.04          | 83.96                | 0.051            |
| Bottom Edge                 | BLE 1M    | 39/2480               | 4.0            | 3.69  | 0.001                 | -0.02          | 83.96                | 0.001            |
| Top Edge                    | BLE 1M    | 0/2402                | 4.0            | 2.03  | 0.066                 | -0.08          | 83.96                | 0.124            |
| Top Edge                    | BLE 1M    | 19/2440               | 4.0            | 3.32  | 0.047                 | -0.03          | 83.96                | 0.065            |

Note:

- 1) The SAR testing was set to transmit at maximum power for all tests.

### 13. Simultaneous Transmission SAR Analysis

There is only one antenna, so simultaneous transmission does not exist.

## Appendixes

Refer to separated files for the following appendixes.

4791519692-1-SAR-1\_App A Photo

4791519692-1-SAR-1\_App B System Check Plots

4791519692-1-SAR-1\_App C Highest Test Plots

4791519692-1-SAR-1\_App D Cal. Certificates

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