



SAR EVALUATION REPORT

FCC 47 CFR § 2.1093
IEEE Std 1528-2013

For
USB dongle

FCC ID: 2AYYS-UD2202U
Model Name: UD2202u

Report Number: 4789961485-US-S0-V0
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REVISION HISTORY

| Rev. | Date | Revisions | Revised By |
|------|-----------|---------------|------------|
| V0 | 12/7/2021 | Initial Issue | Sally Lu |
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1. Attestation of Test Results

| | |
|---|--|
| Applicant Name | Luxshare Precision Industry Co., Ltd. |
| FCC ID | 2AYYS-UD2202U |
| Model Name | UD2202u |
| Exposure Category | General Population/Uncontrolled Exposure |
| Applicable Standards | FCC 47 CFR § 2.1093 Published RF exposure KDB procedures IEEE Std 1528-2013 |
| Exposure Category | SAR Limits (W/Kg) |
| | Peak spatial-average(1g of tissue) |
| General population/Uncontrolled exposure | 1.6 |
| RF Exposure Conditions | Equipment Class - Highest Reported SAR (W/kg) |
| | Bluetooth |
| Body | 0.091 |
| Date Tested | 11/3/2021 |
| Test Results | Pass |
| <p>Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p> <p>Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of any government. This report is written to support regulatory compliance of the applicable standards stated above.</p> | |
| Approved and Authorized By: | Prepared By: |
|  |  |
| Jeff Shih Senior Project Engineer Underwriters Laboratories Taiwan Co., Ltd. | Sally Lu Project Handler Underwriters Laboratories Taiwan Co., Ltd. |

2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE STD 1528-2013, the following FCC Published RF exposure [KDB](#) procedures:

- 447498 D01 General RF Exposure Guidance v06
- 447498 D02 SAR Procedures for Dongle Xmtr v02r01
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02

3. Facilities and Accreditation

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

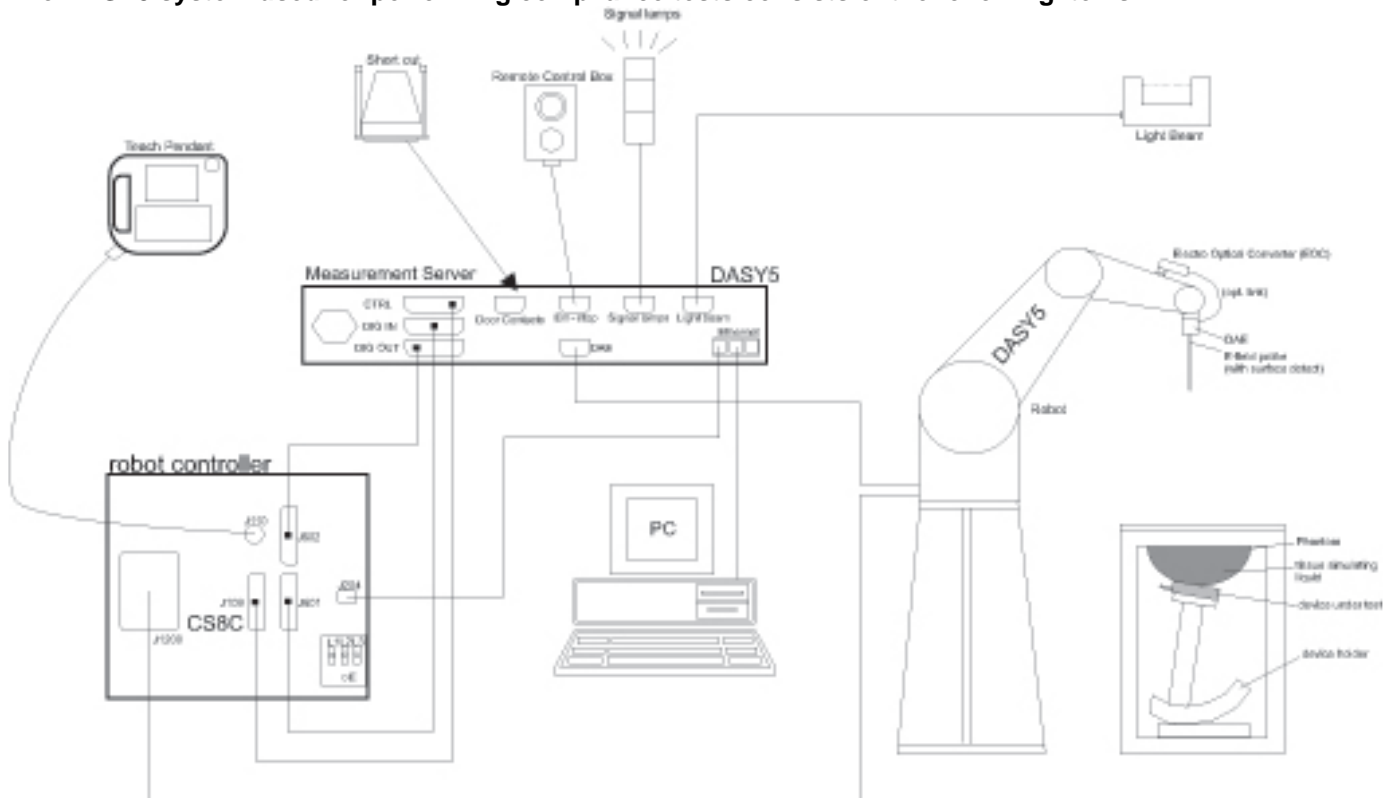
| |
|--|
| Underwriters Laboratories Taiwan Co., Ltd., |
| SAR Room |

Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398.

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 or Win10 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

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

Step 2: Area Scan

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

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

| | ≤ 3 GHz | > 3 GHz |
|--|--|--|
| Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface | 5 ± 1 mm | $\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ 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: Δx_{Area} , Δy_{Area} | ≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm | $3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 10 mm |
| | When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be \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 SAR Measurement 100 MHz to 6 GHz

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

Step 4: Power drift measurement

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

4.3. Test Equipment

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

Dielectric Property Measurements

| Name of Equipment | Manufacturer | Type/Model | Serial No. | Cal. Due Date |
|---------------------------|--------------|------------|------------|---------------|
| Network Analyzer | Anritsu | MS46322B | 1740002 | 2022/1/7 |
| Dielectric Assessment Kit | SPEAG | DAK-3.5 | 1250 | 2022/9/23 |
| Thermometer | DER EE | DE-3003 | P0006880 | 2021/12/21 |

System Check

| Name of Equipment | Manufacturer | Type/Model | Serial No. | Cal. Due Date |
|----------------------------------|-----------------------|------------|------------|---------------|
| EXG-B RF Vector Signal Generator | Keysight Technologies | N5172B | MY56200315 | 2022/5/26 |
| Power Meter | Keysight Technologies | N1914A | MY56360007 | 2021/12/20 |
| Power Sensor | Keysight Technologies | N8481H | MY56350009 | 2021/12/20 |
| Power Meter | Anritsu | ML2495A | 1645002 | 2021/12/20 |
| Power Sensor | Anritsu | MA2411B | 1531202 | 2021/12/20 |
| Dosimetric E-Field Probe | SPEAG | EX3DV4 | 3826 | 2022/7/28 |
| Data Acquisition Electronice | SPEAG | DAE3 | 528 | 2022/7/26 |
| System Validation Dipole | SPEAG | D2450V2 | 988 | 2021/11/9 |
| Humidity/Temp meter | TECPEL | DTM-20 | 17020735 | 2022/4/11 |
| Thermometer | DER EE | DE-3003 | P0006880 | 2021/12/21 |

UL Software

| Software Version |
|---------------------------|
| DASY NEO52 D10.4 S14.6.14 |
| SEMCAD-X-PostPro |

5. Measurement Uncertainty

Measurement uncertainty for 300 MHz to 3 GHz

| Source of Uncertainty | Tolerance (± %) | Probability Distribution | Divisor | Ci (1g) | Ci (10g) | Standard Uncertainty (± %, 1g) | Standard Uncertainty (± %, 10g) |
|---|--------------------|-----------------------------|---------|------------|-------------|--------------------------------------|---------------------------------------|
| Measurement System | | | | | | | |
| Probe Calibration | 6.00 | Normal | 1 | 1 | 1 | 6.00 | 6.00 |
| Axial Isotropy | 4.70 | Rectangular | 1.732 | 0.7 | 0.7 | 1.90 | 1.90 |
| Hemispherical Isotropy | 9.60 | Rectangular | 1.732 | 0.7 | 0.7 | 3.88 | 3.88 |
| Boundary Effect | 1.00 | Rectangular | 1.732 | 1 | 1 | 0.58 | 0.58 |
| Probe Linearity | 4.70 | Rectangular | 1.732 | 1 | 1 | 2.71 | 2.71 |
| System Detection Limits | 0.25 | Rectangular | 1.732 | 1 | 1 | 0.14 | 0.14 |
| Readout Electronics | 0.30 | Normal | 1 | 1 | 1 | 0.30 | 0.30 |
| Probe Modulation Response | 2.40 | Rectangular | 1.732 | 1 | 1 | 1.39 | 1.39 |
| Response Time | 0.00 | Rectangular | 1.732 | 1 | 1 | 0.00 | 0.00 |
| Integration Time | 2.60 | Rectangular | 1.732 | 1 | 1 | 1.50 | 1.50 |
| RF Ambient Conditions – Noise | 3.00 | Rectangular | 1.732 | 1 | 1 | 1.73 | 1.73 |
| RF Ambient Conditions – Reflections | 3.00 | Rectangular | 1.732 | 1 | 1 | 1.73 | 1.73 |
| Probe Positioner Mechanical Restrictions | 0.40 | Rectangular | 1.732 | 1 | 1 | 0.23 | 0.23 |
| Probe Positioning with Respect to Phantom Shell | 2.90 | Rectangular | 1.732 | 1 | 1 | 1.67 | 1.67 |
| Interpolation, Extrapolation and Averaged SAR calculation algorithms of the Postprocessor | 2.00 | Rectangular | 1.732 | 1 | 1 | 1.15 | 1.15 |
| Test Sample Related | | | | | | | |
| Device Positioning | 2.90 | Normal | 1 | 1 | 1 | 2.90 | 2.90 |
| Device Holder Disturbance | 3.60 | Normal | 1 | 1 | 1 | 3.60 | 3.60 |
| DUT Power Drift of Measured SAR | 5.00 | Rectangular | 1.732 | 1 | 1 | 2.89 | 2.89 |
| SAR Scaling | 0.00 | Rectangular | 1.732 | 1 | 1 | 0.00 | 0.00 |
| Phantom and Setup | | | | | | | |
| Phantom Uncertainty - Shape, Thickness and Permittivity | 7.20 | Rectangular | 1.732 | 1 | 1 | 4.16 | 4.16 |
| SAR Correction for Deviations in Permittivity and Conductivity | 1.90 | Normal | 1 | 1 | 0.84 | 1.90 | 1.60 |
| Liquid Conductivity - measurement(DAK) | 2.50 | Normal | 1 | 0.78 | 0.71 | 1.95 | 1.78 |
| Liquid Permittivity - measurement(DAK) | 2.50 | Normal | 1 | 0.23 | 0.26 | 0.58 | 0.65 |
| Liquid Conductivity – Temperature Uncertainty | 3.40 | Rectangular | 1.732 | 0.78 | 0.71 | 1.53 | 1.39 |
| Liquid Permittivity – Temperature Uncertainty | 0.40 | Rectangular | 1.732 | 0.23 | 0.26 | 0.05 | 0.06 |
| Combined Standard Uncertainty (K=1) | | | | | | 11.57 | 11.48 |
| Expanded Uncertainty U (K=2) | | | | | | 23.14 | 22.97 |

Measurement uncertainty for 3 GHz to 6 GHz

| Source of Uncertainty | Tolerance (± %) | Probability Distribution | Divisor | Ci (1g) | Ci (10g) | Standard Uncertainty (± %, 1g) | Standard Uncertainty (± %, 10g) |
|---|--------------------|-----------------------------|---------|------------|-------------|--------------------------------------|---------------------------------------|
| Measurement System | | | | | | | |
| Probe Calibration | 6.55 | Normal | 1 | 1 | 1 | 6.55 | 6.55 |
| Axial Isotropy | 4.70 | Rectangular | 1.732 | 0.7 | 0.7 | 1.90 | 1.90 |
| Hemispherical Isotropy | 9.60 | Rectangular | 1.732 | 0.7 | 0.7 | 3.88 | 3.88 |
| Boundary Effect | 2.00 | Rectangular | 1.732 | 1 | 1 | 1.15 | 1.15 |
| Probe Linearity | 4.70 | Rectangular | 1.732 | 1 | 1 | 2.71 | 2.71 |
| System Detection Limits | 0.25 | Rectangular | 1.732 | 1 | 1 | 0.14 | 0.14 |
| Readout Electronics | 0.30 | Normal | 1 | 1 | 1 | 0.30 | 0.30 |
| Probe Modulation Response | 2.40 | Rectangular | 1.732 | 1 | 1 | 1.39 | 1.39 |
| Response Time | 0.00 | Rectangular | 1.732 | 1 | 1 | 0.00 | 0.00 |
| Integration Time | 2.60 | Rectangular | 1.732 | 1 | 1 | 1.50 | 1.50 |
| RF Ambient Conditions – Noise | 3.00 | Rectangular | 1.732 | 1 | 1 | 1.73 | 1.73 |
| RF Ambient Conditions – Reflections | 3.00 | Rectangular | 1.732 | 1 | 1 | 1.73 | 1.73 |
| Probe Positioner Mechanical Restrictions | 0.40 | Rectangular | 1.732 | 1 | 1 | 0.23 | 0.23 |
| Probe Positioning with Respect to Phantom Shell | 6.70 | Rectangular | 1.732 | 1 | 1 | 3.87 | 3.87 |
| Interpolation, Extrapolation and Averaged SAR calculation algorithms of the Postprocessor | 4.00 | Rectangular | 1.732 | 1 | 1 | 2.31 | 2.31 |
| Test Sample Related | | | | | | | |
| Device Positioning | 2.90 | Normal | 1 | 1 | 1 | 2.90 | 2.90 |
| Device Holder Disturbance | 3.60 | Normal | 1 | 1 | 1 | 3.60 | 3.60 |
| DUT Power Drift of Measured SAR | 5.00 | Rectangular | 1.732 | 1 | 1 | 2.89 | 2.89 |
| SAR Scaling | 0.00 | Rectangular | 1.732 | 1 | 1 | 0.00 | 0.00 |
| Phantom and Setup | | | | | | | |
| Phantom Uncertainty - Shape, Thickness and Permittivity | 7.60 | Rectangular | 1.732 | 1 | 1 | 4.39 | 4.39 |
| SAR Correction for Deviations in Permittivity and Conductivity | 1.90 | Normal | 1 | 1 | 0.84 | 1.90 | 1.60 |
| Liquid Conductivity - measurement(DAK) | 2.50 | Normal | 1 | 0.78 | 0.71 | 1.95 | 1.78 |
| Liquid Permittivity - measurement(DAK) | 2.50 | Normal | 1 | 0.23 | 0.26 | 0.58 | 0.65 |
| Liquid Conductivity – Temperature Uncertainty | 3.40 | Rectangular | 1.732 | 0.78 | 0.71 | 1.53 | 1.39 |
| Liquid Permittivity – Temperature Uncertainty | 0.40 | Rectangular | 1.732 | 0.23 | 0.26 | 0.05 | 0.06 |
| Combined Standard Uncertainty (K=1) | | | | | | 12.65 | 12.57 |
| Expanded Uncertainty U (K=2) | | | | | | 25.29 | 25.13 |

6. Device Under Test (DUT) Information

6.1. DUT Description

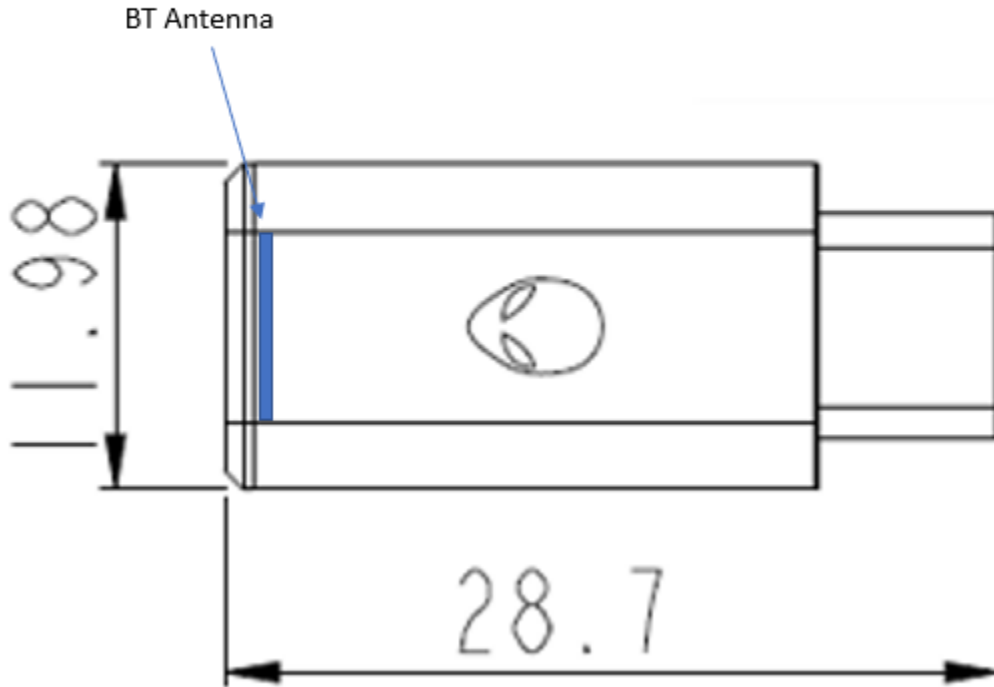
| | |
|----------------------------|-----------------------------|
| Product | USB dongle |
| Brand Name | ALIENWARE |
| Model Name | UD2202u |
| Operating Frequency | 2402MHz ~ 2480MHz |
| Modulation | GFSK, 8DPSK, $\pi/4$ -DQPSK |
| Transfer Rate | Up to 3 Mbps |
| Sample ID | 4324278 |
| Hardware Version | NA |
| Software Version | NA |
| Received Date | 2021/6/27 |

6.2. Wireless Technologies

| Wireless technologies | Frequency bands | Operating mode | Duty Cycle used for SAR testing |
|-----------------------|-----------------|----------------|---------------------------------|
| Bluetooth | 2.4 GHz | BT-BR | 76.53% |
| Bluetooth | 2.4 GHz | BT-EDR | 76.60% |
| Bluetooth | 2.4 GHz | BT-LE | 84.40% |
| | | | 42.23% |

7. Antenna Location

Horizontal-Up View



| Antenna | To Horizontal-Up | To Horizontal-Down | To Vertical-Front | To Vertical-Back | To Tip |
|-----------|------------------|--------------------|-------------------|------------------|--------|
| Bluetooth | 1.1 | 3.5 | 2.1 | 2.1 | 1.8 |

Unit : mm

8. RF Exposure Conditions (Test Configurations)

| Wireless technologies | RF Exposure Conditions | DUT to User Separation | Test Position | Antenna to edge/surface | SAR Required | Note |
|-----------------------|------------------------|------------------------|-----------------|-------------------------|--------------|------|
| Bluetooth | Body | 1.1 | Horizontal-Up | <5mm | Yes | |
| | | 3.5 | Horizontal-Down | <5mm | Yes | |
| | | 2.1 | Vertical-Front | <5mm | Yes | |
| | | 2.1 | Vertical-Back | <5mm | Yes | |
| | | 1.8 | Tip | <5mm | Yes | |

9. Dielectric Property Measurements & System Check

9.1. 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.

The dielectric constant (ϵ_r) and conductivity (σ) of typical tissue-equivalent media recipes are expected to be within $\pm 5\%$ of the required target values; but for SAR measurement systems that have implemented the SAR error compensation algorithms documented in IEEE Std 1528-2013, to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, the tolerance for ϵ_r and σ may be relaxed to $\pm 10\%$. This is limited to frequencies ≤ 3 GHz.

Tissue Dielectric Parameters

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

| Target Frequency (MHz) | Head | |
|------------------------|--------------|----------------|
| | ϵ_r | σ (S/m) |
| 150 | 52.3 | 0.76 |
| 300 | 45.3 | 0.87 |
| 450 | 43.5 | 0.87 |
| 835 | 41.5 | 0.90 |
| 900 | 41.5 | 0.97 |
| 915 | 41.5 | 0.98 |
| 1450 | 40.5 | 1.20 |
| 1610 | 40.3 | 1.29 |
| 1800 – 2000 | 40.0 | 1.40 |
| 2450 | 39.2 | 1.80 |
| 3000 | 38.5 | 2.40 |

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

Dielectric Property Measurements Results:

| Date | Tissue Type | Frequency (MHz) | Relative Permittivity (ϵ_r) | | | Conductivity (σ) | | |
|-----------|-------------|-----------------|--|--------|-----------|---------------------------|--------|-----------|
| | | | Measured | Target | Delta (%) | Measured | Target | Delta (%) |
| 2021/11/3 | Head | 2400 | 40.42 | 39.29 | 2.87 | 1.763 | 1.76 | 0.42 |
| | | 2402 | 40.40 | 39.29 | 2.85 | 1.764 | 1.76 | 0.37 |
| | | 2441 | 40.31 | 39.22 | 2.78 | 1.814 | 1.79 | 1.22 |
| | | 2450 | 40.28 | 39.20 | 2.74 | 1.822 | 1.80 | 1.24 |
| | | 2480 | 40.20 | 39.16 | 2.66 | 1.850 | 1.83 | 0.95 |
| | | 2500 | 40.12 | 39.14 | 2.51 | 1.871 | 1.85 | 0.89 |

9.2. 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 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.

| Date | Tissue Type | Dipole S/N | Input Power (mW) | Measured 1g SAR (W/kg) | Targeted 1g SAR (W/kg) | Normalized 1g SAR (W/kg) | Delta 1g ± 10 (%) | Measured 10g SAR (W/kg) | Targeted 10g SAR (W/kg) | Normalized 10g SAR (W/kg) | Delta 10g ± 10 (%) | Plot No. |
|-----------|-------------|-------------|------------------|------------------------|------------------------|--------------------------|-----------------------|-------------------------|-------------------------|---------------------------|------------------------|----------|
| 2021/11/3 | Head | D2450V2-988 | 250 | 12.9 | 52.20 | 51.6 | -1.15 | 5.94 | 23.90 | 23.76 | -0.59 | 1 |

10. Conducted Output Power Measurements

10.1. Bluetooth

Average Power Measured Results

| Band | Mode | Data Rate | Ch # | Freq. (MHz) | Meas. Avg Pwr (dBm) | Tune-up Limit (dBm) | SAR Test (Yes/No) |
|-----------|------|-----------|------|-------------|---------------------|---------------------|-------------------|
| Bluetooth | BR | 1 Mbps | 0 | 2402 | 9.68 | 10.0 | No |
| | | | 39 | 2441 | 9.58 | 10.0 | |
| | | | 78 | 2480 | 9.85 | 10.0 | |
| | EDR | 2 Mbps | 0 | 2402 | 9.45 | 10.0 | No |
| | | | 39 | 2441 | 9.75 | 10.0 | |
| | | | 78 | 2480 | 9.88 | 10.0 | |
| | | 3 Mbps | 0 | 2402 | 9.86 | 10.0 | Yes |
| | | | 39 | 2441 | 9.91 | 10.0 | |
| | | | 78 | 2480 | 9.67 | 10.0 | |
| Bluetooth | BLE | 1 Mbps | 0 | 2402 | 9.87 | 10.0 | No |
| | | | 19 | 2440 | 9.83 | 10.0 | |
| | | | 39 | 2480 | 9.64 | 10.0 | |
| | | 2 Mbps | 0 | 2402 | 9.88 | 10.0 | No |
| | | | 19 | 2440 | 9.64 | 10.0 | |
| | | | 39 | 2480 | 9.85 | 10.0 | |

11. Measured and Reported (Scaled) SAR Results

SAR Test Reduction criteria are as follows:

KDB 447498 D01 General RF Exposure Guidance:

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

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

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

11.1. Test Condition

| Test Item | Test Site No. | Environmental Condition | Test Date | Tested by |
|-----------|---------------|-------------------------|-----------|-----------|
| SAR | SAR1 | 22.3°C | 2021/11/3 | Edison Hu |

11.2. Bluetooth

| Mode | Dist. (mm) | Test Position | Ch #. | Freq. (MHz) | Duty Cycle | Power (dBm) | | Power draft | 1-g SAR (W/kg) | | Plot No. |
|-----------|------------|-----------------|-------|-------------|------------|---------------|-------|-------------|----------------|--------------|----------|
| | | | | | | Tune-up Limit | Meas. | | Meas. | Scaled | |
| Bluetooth | 5 | Horizontal-Up | 39 | 2441 | 76.60% | 10.0 | 9.91 | 0.15 | 0.035 | 0.047 | |
| Bluetooth | 5 | Horizontal-Down | 39 | 2441 | 76.60% | 10.0 | 9.91 | -0.02 | 0.057 | 0.076 | |
| Bluetooth | 5 | Horizontal-Down | 0 | 2402 | 76.60% | 10.0 | 9.86 | 0.08 | 0.039 | 0.053 | |
| Bluetooth | 5 | Horizontal-Down | 78 | 2480 | 76.60% | 10.0 | 9.67 | 0.10 | 0.065 | 0.091 | 1 |
| Bluetooth | 5 | Vertical-Front | 39 | 2441 | 76.60% | 10.0 | 9.91 | 0.06 | 0.031 | 0.041 | |
| Bluetooth | 5 | Vertical-Back | 39 | 2441 | 76.60% | 10.0 | 9.91 | -0.05 | 0.029 | 0.039 | |
| Bluetooth | 5 | Tip | 39 | 2441 | 76.60% | 10.0 | 9.91 | -0.03 | 0.006 | 0.008 | |

Appendixes

Refer to separated files for the following appendixes.

4789961485-US-S0-V0_Appendix A: DUT and SAR Setup Photos

4789961485-US-S0-V0_Appendix B: SAR System Check Plots

4789961485-US-S0-V0_Appendix C: Highest SAR Test Plots

4789961485-US-S0-V0_Appendix D: SAR Probe and Dipole Calibration Certificates

END OF REPORT