



## RF EXPOSURE REPORT



**Applicant:** Quanta Computer Inc.  
No. 188, Wenhua 2nd Road, Guishan District, Taoyuan City  
33377, Taiwan

**Product Name:** Clover Mini

**Brand Name:** clover

**Model No.:** C302U

**HVIN:** C302W

**Model Difference:** N/A

**Report Number:** E2/2021/60029

**FCC ID** HFS-C302W

**IC:** 1787B-C302W

**Issue Date:** August 4, 2021

**Date of EUT Received:** June 10, 2021

John Teh

Approved By

John Yeh

### We hereby certify that:

The above equipment was evaluate by SGS Taiwan Ltd. The evaluation in this report is in compliance with FCC Rule Part §2.1091 and RSS-102.

The results of this report relate only to the sample identified in this report.

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## Revision History

| Report Number | Revision | Description | Issue Date     | Revised By |
|---------------|----------|-------------|----------------|------------|
| E2/2021/60029 | 00       | Original    | August 4, 2021 | Susan Lin  |
|               |          |             |                |            |
|               |          |             |                |            |
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## 1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

### 1.1 Product Description

|                   |                        |
|-------------------|------------------------|
| Product Name:     | Clover Mini            |
| Brand Name:       | clover                 |
| Model No.:        | C302U                  |
| HVIN:             | C302W                  |
| Model Difference: | N/A                    |
| Hardware Version: | C302W                  |
| Firmware Version: | N/A                    |
| EUT Series No.:   | PJ216092003            |
| Power Supply:     | 12V from AC/DC Adapter |

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## 1.2 Antenna Information:

### 1.2.1 BT

| Antenna Type | Supplier     | Antenna Part No. | Freq. (MHz) | Peak Antenna Gain (dBi) | Worst Antenna Gain |
|--------------|--------------|------------------|-------------|-------------------------|--------------------|
| PIFA         | SAA          | GD9321-15-001-R  | 2402~2480   | -0.20                   |                    |
|              | Luxshare-ICT | LA81FP018-1H     | 2402~2480   | 0.9                     | V                  |

### 1.2.2 WLAN 2.4GHz

| Antenna Type | Supplier     | Antenna Part No. | Freq. (MHz) | Peak Antenna Gain (dBi) | Worst Antenna Gain |
|--------------|--------------|------------------|-------------|-------------------------|--------------------|
| PIFA         | SAA          | GD9320-15-001-R  | 2402~2480   | 1.15                    |                    |
|              | SAA          | GD9321-15-001-R  | 2402~2480   | -0.2                    |                    |
|              | Luxshare-ICT | LA81FP017-1H     | 2402~2480   | 2.1                     | V                  |
|              | Luxshare-ICT | LA81FP018-1H     | 2402~2480   | 0.9                     |                    |

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## 1.2.3 WLAN 5GHz

| Antenna Type | Supplier     | Antenna Part No. | Freq. (MHz) | Peak Antenna Gain (dBi) | Worst Antenna Gain |
|--------------|--------------|------------------|-------------|-------------------------|--------------------|
| PIFA         | SAA          | GD9320-15-001-R  | 5150~5250   | 5.43                    |                    |
|              |              |                  | 5250~5350   | 5.61                    | V                  |
|              |              |                  | 5470~5725   | 5.86                    | V                  |
|              |              |                  | 5725~5850   | 5.04                    |                    |
|              | SAA          | GD9321-15-001-R  | 5150~5250   | 5.88                    | V                  |
|              |              |                  | 5250~5350   | 4.73                    |                    |
|              |              |                  | 5470~5725   | 4.16                    |                    |
|              |              |                  | 5725~5850   | 4.28                    |                    |
|              | Luxshare-ICT | LA81FP017-1H     | 5150~5250   | 3.5                     |                    |
|              |              |                  | 5250~5350   | 4.8                     |                    |
|              |              |                  | 5470~5725   | 4.9                     |                    |
|              |              |                  | 5725~5850   | 4.9                     |                    |
|              | Luxshare-ICT | LA81FP018-1H     | 5150~5250   | 4.3                     |                    |
|              |              |                  | 5250~5350   | 4.6                     |                    |
|              |              |                  | 5470~5725   | 4.8                     |                    |
|              |              |                  | 5725~5850   | 5.1                     | V                  |

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## 2 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### 2.1 FCC Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for Maximum Permissible Exposure (MPE)

| Frequency Range<br>(MHz)                            | Electric Field<br>Strength (V/m) | Magnetic Field<br>Strength (A/m) | Power Density<br>(mW/cm <sup>2</sup> ) | Averaging Time<br>(minute) |
|-----------------------------------------------------|----------------------------------|----------------------------------|----------------------------------------|----------------------------|
| Limits for General Population/Uncontrolled Exposure |                                  |                                  |                                        |                            |
| 0.3-1.34                                            | 614                              | 1.63                             | *(100)                                 | 30                         |
| 1.34-30                                             | 824/f                            | 2.19/f                           | *(180/f <sup>2</sup> )                 | 30                         |
| 30-300                                              | 27.5                             | 0.073                            | 0.2                                    | 30                         |
| 300-1500                                            | /                                | /                                | f/1500                                 | 30                         |
| 1500-100000                                         | /                                | /                                | 1.0                                    | 30                         |

f = frequency in MHz

\* = Plane-wave equipment power density

Prediction of MPE limit at a given distance

$$S = PG/4\pi R^2$$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

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## 2.2 ISED Standard Applicable

This submittal(s) (test report) is intended to comply with RSS-102 issue 5 Radio frequency Radiation Exposure requirement.

This is a Mobile device, the MPE is required.

Limits for Maximum Permissible Exposure (MPE)

| RF Field Strength Limits for Devices Used by the General Public<br>(Uncontrolled Environment) |                          |                                   |                                   |                            |
|-----------------------------------------------------------------------------------------------|--------------------------|-----------------------------------|-----------------------------------|----------------------------|
| Frequency Range (MHz)                                                                         | Electric Field (V/m rms) | Magnetic Field Strength (A/m rms) | Power Density (W/m <sup>2</sup> ) | Reference Period (minutes) |
| 0.003-10                                                                                      | 83                       | 90                                | -                                 | Instantaneous*             |
| 0.1-10                                                                                        | -                        | $0.73/f$                          | -                                 | 6**                        |
| 1.1-10                                                                                        | $87/f^{0.5}$             | -                                 | -                                 | 6**                        |
| 10-20                                                                                         | 27.46                    | 0.0728                            | 2                                 | 6                          |
| 20-48                                                                                         | $58.07/f^{0.25}$         | $0.1540/f^{0.25}$                 | $8.944/f^{0.5}$                   | 6                          |
| 48-300                                                                                        | 22.06                    | 0.05852                           | 1.291                             | 6                          |
| 300-6000                                                                                      | $3.142 f^{0.3417}$       | $0.008335 f^{0.3417}$             | $0.02619 f^{0.6834}$              | 6                          |
| 6000-15000                                                                                    | 61.4                     | 0.163                             | 10                                | 6                          |
| 15000-150000                                                                                  | 61.4                     | 0.163                             | 10                                | $616000/f^{1.2}$           |
| 150000-300000                                                                                 | $0.158 f^{0.5}$          | $4.21 \times 10^{-4} f^{0.5}$     | $6.67 \times 10^{-5} f$           | $616000/f^{1.2}$           |

F = frequency in MHz

\* = Based on nerve stimulation (NS).

\*\* = Based on specific absorption rate (SAR)

Maximum Permissible Exposure (MPE) Evaluation

Prediction of MPE limit at a given distance

$$S = PG/4\pi R^2$$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

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## 2.3 Power Density Calculation (Worst Case)

### FCC Standalone MPE

| Operation Mode | Evaluation Frequency (MHz) | Operation Distance (cm) | Max. output Power (dBm) | Antenna Gain (dBi) | Max. output Power EIRP (mW) | Power Density (PD) (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Pass / Fail | Power Density / Limit |
|----------------|----------------------------|-------------------------|-------------------------|--------------------|-----------------------------|------------------------------------------|-----------------------------|-------------|-----------------------|
| BT             | 2402.00                    | 20                      | 2.23                    | 0.90               | 2.06                        | 0.0004                                   | 1.000                       | Pass        | 0.0004                |
| WLAN 2.4G      | 2412.00                    | 20                      | 18.47                   | 4.53               | 199.53                      | 0.040                                    | 1.000                       | Pass        | 0.0400                |
| WLAN 5G        | 5320.00                    | 20                      | 18.97                   | 8.19               | 520.00                      | 0.104                                    | 1.000                       | Pass        | 0.1040                |

### ISED Standalone MPE

| Operation Mode | Evaluation Frequency (MHz) | Operation Distance (cm) | Max. output Power (dBm) | Antenna Gain (dBi) | Output Power EIRP (mW) | Power Density (PD) (W/m <sup>2</sup> ) | Limit (W/m <sup>2</sup> ) | Pass / Fail | Power Density / Limit |
|----------------|----------------------------|-------------------------|-------------------------|--------------------|------------------------|----------------------------------------|---------------------------|-------------|-----------------------|
| BT             | 2402.00                    | 20                      | 2.23                    | 0.90               | 2.06                   | 0.004                                  | 5.351                     | Pass        | 0.0010                |
| WLAN 2.4G      | 2412.00                    | 20                      | 18.47                   | 4.53               | 199.53                 | 0.397                                  | 5.366                     | Pass        | 0.0740                |
| WLAN 5G        | 5320.00                    | 20                      | 18.97                   | 8.19               | 520.00                 | 1.035                                  | 9.213                     | Pass        | 0.1123                |

~ End of Report ~

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