

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

Approved By _____

John Yeh

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 (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (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 ²)	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 (Uncontrolled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field Strength (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10	83	90	-	Instantaneous*
0.1-10	-	0.73/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ <i>f</i> ^{0.25}	0.1540/ <i>f</i> ^{0.25}	8.944/ <i>f</i> ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> ^{0.3417}	0.008335 <i>f</i> ^{0.3417}	0.02619 <i>f</i> ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000/ <i>f</i> ^{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 ²)	Limit (mW/cm ²)	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 ²)	Limit (W/m ²)	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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