

RF EXPOSURE REPORT

OF

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

Product Name: Clover Station Solo

Brand Name: clover

Model No.: C501

Model Difference: N/A

Report Number: E2/2021/10025

FCC ID HFS-C501

FCC Rule Part Part 2.1091

Issue Date: February 24, 2021

We hereby certify that:

The above equipment was verified by SGS Taiwan Ltd. The evaluation in this report is in compliance with the above rule(s).

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

Approved By: _____

John Yeh / Asst. Manager

John Yeh



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Revision History

Report Number	Revision	Description	Issue Date	Revised By
E2/2021/10025	Rev.00	Original.	February 24, 2021	Susan Lin

Note:

1、Disclaimer

Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

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1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

1.1 General:

Product Name:	Clover Station Solo
Brand Name:	clover
Model No.:	C501
Model Difference:	N/A
Hardware Version:	N/A
Software Version:	N/A
Power Supply:	24Vdc from AC/DC Adapter

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1.2 Antenna Information:

1.2.1 BT / WLAN 2.4GHz

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)	Worst Antenna Gain
PCB	Quanta	WIFI-1 antenna	2.4GHz	-1.04	
		WIFI-2 antenna	2.4GHz	1.27	V

1.2.2 WLAN 5GHz

Antenna Type	Supplier	Antenna Part No.	Frequency (MHz)	Peak Antenna Gain (dBi)	Worst Antenna Gain
PCB	Quanta	WIFI-1 antenna	5150~5250	0.41	
			5250~5350	0.41	
			5470~5725	0.43	
			5725~5850	0.54	
		WIFI-2 antenna	5150~5250	3.96	V
			5250~5350	3.96	V
			5470~5725	3.86	V
			5725~5850	3.95	V

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1.2.3 WWAN

Antenna Type	Antenna Part No.
PIFA	N/A

Operating Frequency (MHz)		Peak Gain (dBi)
LTE-Band 2	1850.0 ~ 1910.0	1.89
LTE-Band 4	1710.0 ~ 1755.0	1.83
LTE-Band 12	699.0 ~ 716.0	-0.63

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1.3 Rated Power

1.3.1 Bluetooth / WLAN 2.4GHz

Modulation	Freq. Range (MHz)	Channels	Modulation Technology	Maximum output power (dBm)	Worst Antenna Gain (dBi)	EIRP (dBm)	Worst Case
BR+EDR	2402-2480	79	GFSK + $\pi/4$ DQPSK + 8DPSK	5.86	1.27	7.13	V
BLE	2402-2480	40	GFSK	0.99	1.27	2.26	
802.11b/g/n_HT20/n_HT40	2412-2462	11	DSSS & OFDM	17.60	1.27	18.87	V
Modulation type:		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM					

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1.3.2 WLAN 5GHz:

802.11	Freq. Range (MHz)	Modulation Technology	Max. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Worst Case
a	5150~5250	OFDM	14.94	3.96	18.90	
	5250~5350		14.80	3.96	18.76	
	5470~5725		14.79	3.86	18.65	
	5725~5850		14.69	3.95	18.64	
n HT20 ac VHT20	5150~5250		18.51	3.96	22.47	V
	5250~5350		18.51	3.96	22.47	V
	5470~5725		18.49	3.86	22.35	
	5725~5850		18.36	3.95	22.31	
n HT40 ac VHT40	5150~5250		17.82	3.96	21.78	
	5250~5350		17.97	3.96	21.93	
	5470~5725		17.64	3.86	21.50	
	5725~5850		17.55	3.95	21.50	
ac VHT80	5150~5250		16.09	3.96	20.05	
	5250~5350		14.06	3.96	18.02	
	5470~5725		17.00	3.86	20.86	
	5725~5850		15.62	3.95	19.57	

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1.3.3 WWAN:

					FCC			
Operating Frequency (MHz)		Max. Output Power (dBm)	Antenna Gain (dBi)	EIRP / ERP (dBm)	Operation Distance (cm)	Power Density (mW/cm ²)	Margin	FCC Worst Case
LTE-Band 2	1850 ~ 1910	23.11	1.89	25.00	20	0.06	-0.94	
LTE-Band 4	1710 ~ 1755	23.19	1.83	25.02	20	0.06	-0.94	
LTE-Band 12	699 ~ 716	22.93	-0.63	22.30	20	0.03	-0.43	V

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2 FCC 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
1500-15000	/	/	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 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	Collocated MPE
BT	2480.00	20	5.86	1.27	5.16	0.001	1.000	Pass	0.001	V
WLAN 2.4G	2437.00	20	17.60	1.27	77.09	0.015	1.000	Pass	0.015	
WLAN 5G	5240.00	20	18.51	3.96	176.60	0.035	1.000	Pass	0.035	V
LTE-Band 2	1902.50	20	23.11	1.89	316.23	0.063	1.000	Pass	0.063	
LTE-Band 4	1750.00	20	23.19	1.83	317.69	0.063	1.000	Pass	0.063	
LTE-Band 12	707.50	20	22.93	-0.63	169.82	0.034	0.472	Pass	0.072	V

Note: For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band.

2.3 Collocated Power Density Calculation

FCC Collocated MPE

Max BT PD / Limit	Max WLAN PD / Limit	Max WWAN PD / Limit	Σ (Power Density / Limit) of BT+ WLAN + WWAN
0.001	0.035	0.072	0.108

Note:

1. Σ (E- Field Strength / Limit): This is a summation of [(E- Field Strength for each transmitter/antenna included in the simultaneous transmission) / (corresponding MPE limit)].
2. Considering the collocated transmitters, the aggregated (E- Field Strength /limit) is smaller than 1, and MPE of collocated transmitters is compliant

~ End of Report ~

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