



RF Exposure Evaluation Report

APPLICANT : Quanta Computer Inc.
EQUIPMENT : Clover Station 1.0
BRAND NAME : Clover
MODEL NUMBER : P100/C101
FCC ID : HFS-CS101
STANDARD : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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1. Administration Data

1.1. Testing Laboratory

Test Site	SPORTON INTERNATIONAL INC.
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1.2. Applicant

Company Name	Quanta Computer Inc.
Address	211, Wen Hwa 2nd Rd., Kuei Shan, Tao Yuan 33377, Taiwan

1.3. Manufacturer

Company Name	Quanta Computer Inc.
Address	211, Wen Hwa 2nd Rd., Kuei Shan, Tao Yuan 33377, Taiwan



2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Clover Station 1.0
Brand Name	Clover
Model Number	P100/C101
FCC ID	HFS-CS101
IMEI Code	354524040996911
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	<ul style="list-style-type: none">• GPRS/EGPRS• RMC 12.2Kbps Rel 99• HSDPA Rel 7, Cat14• 802.11 a/b/g/n HT20/HT40• Bluetooth v3.0 + EDR
Antenna Type	WWAN: PCB Antenna WLAN: PCB Antenna Bluetooth: PCB Antenna
HW Version	D
SW Version	SW: shipping image: 148, factory image: 20E09.
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



3. Maximum RF average output power among production units

Mode	GSM 850	GSM 1900
	Average power(dBm)	
GPRS (GMSK, 1 Tx slot)	33.0	30.0
GPRS (GMSK, 2 Tx slots)	33.0	30.0
EDGE (8PSK, 1 Tx slot)	28.0	27.0
EDGE (8PSK, 2 Tx slots)	28.0	27.0
EDGE (8PSK, 3 Tx slots)	28.0	27.0
EDGE (8PSK, 4 Tx slots)	28.0	27.0

Mode	WCDMA Band V	WCDMA Band II
	Average power(dBm)	
RMC 12.2K	24.0	23.5
HSDPA Subtest-1	24.0	23.5

Mode / Band	Average Power (dBm)		
	1Mbps (GFSK)	2Mbps ($\pi/4$ -DQPSK)	3Mbps (8-DPSK)
2.4 GHz Bluetooth	10.0	8.0	8.0

Band / Frequency (MHz)	IEEE 802.11 Average Power (dBm)						
	Ant 0			Ant 1			Ant 0+1
	11b	11g	HT20	11b	11g	HT20	HT20
2.4GHz Band	15.0	13.0	13.0	15.0	13.0	13.0	16.0



Band / Frequency (MHz)		IEEE 802.11 Average Power (dBm)							
		Ant 0			Ant 1			Ant 0+1	
		11a	HT20	HT40	11a	HT20	HT40	HT20	HT40
5.2GHz Band	5180	15.0	13.0	13.0	15.0	13.0	13.0	16.0	
	5190								13.0
	5200								
	5220								
	5230								16.0
	5240								
5.3GHz Band		15.0	13.0	13.0	15.0	13.0	13.0	16.0	16.0
5.5GHz Band	5500	15.0	13.0	13.0	15.0	13.0	13.0	16.0	16.0
	5510								
	5520				15.0				
	5540				15.0				
	5550								
	5560				15.0				
	5580				15.0				
	5600				15.0				
	5620				15.0				
	5630								
	5640				15.0				
	5660				15.0				
	5670								
	5680				15.0				
5700	11.0								
5.8GHz Band		15.0	13.0	13.0	15.0	13.0	13.0	16.0	16.0



4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) 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
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



5. Radio Frequency Radiation Exposure Evaluation

5.1. Power Density Calculations

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
GPRS 850 (1 Tx slot)	824.2	1.49	33.0	0.07	0.55	0.13
GPRS 850 (2 Tx slots)	824.2	1.49	33.0	0.14	0.55	0.26
EGPRS 850 (1 Tx slot)	824.2	1.49	28.0	0.02	0.55	0.04
EGPRS 850 (2 Tx slots)	824.2	1.49	28.0	0.02	0.55	0.04
EGPRS 850 (3 Tx slots)	824.2	1.49	28.0	0.07	0.55	0.12
EGPRS 850 (4 Tx slots)	824.2	1.49	28.0	0.09	0.55	0.16
GPRS 1900 (1 Tx slot)	1850.2	1.58	30.0	0.04	1.00	0.04
GPRS 1900 (2 Tx slots)	1850.2	1.58	30.0	0.07	1.00	0.07
EGPRS 1900 (1 Tx slot)	1850.2	1.58	27.0	0.02	1.00	0.02
EGPRS 1900 (2 Tx slots)	1850.2	1.58	27.0	0.04	1.00	0.04
EGPRS 1900 (3 Tx slots)	1850.2	1.58	27.0	0.05	1.00	0.05
EGPRS 1900 (4 Tx slots)	1850.2	1.58	27.0	0.07	1.00	0.07
WCDMA Band 5	826.4	1.49	24.0	0.07	0.55	0.13
WCDMA Band 2	1852.4	1.58	23.5	0.06	1.00	0.06
WLNA2.4GHz Band	2412.0	3.12	16.0	0.02	1.00	0.02
WLNA5GHz Band	5180.0	3.86	16.0	0.02	1.00	0.02
Bluetooth	2402.0	3.12	10.0	0.00	1.00	0.004

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

Wireless Interface	Maximum Power Density / Limit	Σ (Power Density / Limit) of WWAN+WLAN +Bluetooth
WWAN	0.26	0.284
WLAN	0.02	
Bluetooth	0.04	

Note:

- For collocation analysis, GPRS 850 (2 Tx slots) is chosen for summation due to the highest (power density/limit) among all WWAN wireless modes.
- Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + WLAN + Bluetooth.
- Considering the WWAN module collocation with the WLAN and Bluetooth transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 3 collocated transmitters is compliant

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.