

# RF EXPOSURE EVALUATION REPORT

**FCC ID** : E2KAX211NG  
**Equipment** : WLAN and BT, 2x2 PCIe M.2 2230 adapter card  
**Brand Name** : Dell  
**Model Name** : AX211NGW  
**Applicant** : Dell Inc.  
One Dell Way Round Rock, TX 78682, USA  
**Manufacturer** : Dell Inc.  
One Dell Way Round Rock, TX 78682, USA  
**Standard** : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part 2.1091 and it complies with applicable limit.

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC evaluation.

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Approved by: Cona Huang / Deputy Manager



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## History of this test report

| Report No. | Version | Description             | Issued Date   |
|------------|---------|-------------------------|---------------|
| FA280801B  | Rev. 01 | Initial issue of report | Oct. 17, 2022 |
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## 1. Description of Equipment Under Test (EUT)

| Product Feature & Specification         |                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT Type                                | WLAN and BT, 2x2 PCIe M.2 2230 adapter card                                                                                                                                                                                                                                                                                                    |
| Brand Name                              | Dell                                                                                                                                                                                                                                                                                                                                           |
| Model Name                              | AX211NGW                                                                                                                                                                                                                                                                                                                                       |
| FCC ID                                  | E2KAX211NG                                                                                                                                                                                                                                                                                                                                     |
| Wireless Technology and Frequency Range | WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz<br>WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz<br>WLAN 5.3GHz Band: 5250 MHz ~ 5350 MHz<br>WLAN 5.5GHz Band: 5470 MHz ~ 5725 MHz<br>WLAN 5.8GHz Band: 5725 MHz ~ 5855 MHz<br>WLAN 6E: 5925 MHz ~ 6425 MHz, 6425 MHz ~ 6525 MHz, 6525 MHz ~ 6875 MHz, 6875 MHz ~ 7125 MHz<br>Bluetooth: 2400 MHz ~ 2483.5 MHz |
| Mode                                    | WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160<br>Bluetooth BR/EDR/LE                                                                                                                                                                                                                                       |

| Host Information |                     |
|------------------|---------------------|
| Equipment Name   | Portable Computer   |
| Brand Name       | DELL                |
| Model Name       | P163G               |
| EUT Stage        | Identical Prototype |

Reviewed by: Jason Wang

Report Producer: Carlie Tsai

## 2. Maximum RF average output power among production units

| WLAN | Mode        | Frequency (MHz) | Ant 1<br>Maximum output power | Ant 2<br>Maximum output power |
|------|-------------|-----------------|-------------------------------|-------------------------------|
|      | WLAN 2.4GHz | 2412~2462       | 19.50                         | 19.50                         |
|      | WLAN 5GHz   | 5180~5825       | 17.50                         | 17.50                         |
|      | WLAN 6GHz   | 5925~7125       | 13.00                         | 13.00                         |

| BT | Mode      | Frequency (MHz) | Tune-up Limit (dBm) |      |
|----|-----------|-----------------|---------------------|------|
|    |           |                 | BR/ EDR             | BLE  |
|    | Bluetooth | 2402~2480       | 10.50               | 9.50 |

### 3. Determination of exemption

Per 1.1307(b)(3), (i) For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

- (A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);
- (B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold Pth (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by:

$$P_{th} \text{ (mW)} = ERP_{20cm} (d / 20)^x \text{ for distance } d \leq 20cm$$

$$P_{th} \text{ (mW)} = ERP_{20cm} \text{ for distance } 20cm < d \leq 40cm$$

$$x = -\log_{10} \left( \frac{60}{ERP_{20cm} \sqrt{f}} \right)$$

$$ERP_{20cm} \text{ (mW)} \begin{array}{ll} 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz:} & 2040 f \\ 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz:} & 3060 \end{array}$$

- (C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least  $\lambda/2\pi$ , where  $\lambda$  is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

| RF Source frequency (MHz) | Threshold ERP (watts) |
|---------------------------|-----------------------|
| 0.3-1.34                  | $1,920 R^2$ .         |
| 1.34-30                   | $3,450 R^2/f^2$ .     |
| 30-300                    | $3.83 R^2$ .          |
| 300-1,500                 | $0.0128 R^2 f$ .      |
| 1,500-100,000             | $19.2 R^2$ .          |

## 4. RF Exposure Evaluation

### 4.1. Standalone assessment

**General Note:**

1.  $P_i$  is mean the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source  $i$  at a distance between 0.5 cm and 40 cm
2.  $P_{th}$  is mean the exemption threshold power ( $P_{th}$ ) according to the § 1.1307(b)(3)(i)(B) formula for fixed, mobile, or portable RF source  $i$ .
3. In this report was used Part1.1307(b)(3)(i)(B) perfrom RF Exposure evaluation
4. The distance of 20cm is for this device

| Band             | Antenna Gain (dBi) | Maximum Conducted Power (dBm) | Maximum EIRP (dBm) | Maximum ERP (dBm) | Maximum EIRP (mW) | Maximum ERP (mW) | $P_i$ (dBm) | $P_i$ (mW) | Part1.1307 option(b) Threshold (mW) | Part1.1307 option(b) $P_i/P_{th}$ |
|------------------|--------------------|-------------------------------|--------------------|-------------------|-------------------|------------------|-------------|------------|-------------------------------------|-----------------------------------|
| WLAN2.4GHz Ant 1 | 1.57               | 19.50                         | 21.1               | 18.92             | 127.94            | 77.98            | 19.50       | 89.13      | 3060.000                            | 0.029                             |
| WLAN2.4GHz Ant 2 | 2.06               | 19.50                         | 21.6               | 19.41             | 143.22            | 87.30            | 19.50       | 89.13      | 3060.000                            | 0.029                             |
| WLAN5GHz Ant 1   | 4.01               | 17.50                         | 21.5               | 19.36             | 141.58            | 86.30            | 19.36       | 86.30      | 3060.000                            | 0.028                             |
| WLAN5GHz Ant 2   | 4.17               | 17.50                         | 21.7               | 19.52             | 146.89            | 89.54            | 19.52       | 89.54      | 3060.000                            | 0.029                             |
| WLAN6GHz Ant 1   | 4.66               | 13.00                         | 17.7               | 15.51             | 58.34             | 35.56            | 15.51       | 35.56      | 3060.000                            | 0.012                             |
| WLAN6GHz Ant 2   | 4.34               | 13.00                         | 17.3               | 15.19             | 54.20             | 33.04            | 15.19       | 33.04      | 3060.000                            | 0.011                             |
| Bluetooth        | 2.06               | 10.50                         | 12.6               | 10.41             | 18.03             | 10.99            | 10.50       | 11.22      | 3060.000                            | 0.004                             |

### 4.2. Collocated assessment

**General Note:**

1. Either MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (*Evaluated<sub>k</sub>* term) shall be used to determine exemption for simultaneous transmission according to Formula (C.1).
2. The sum of the ratios of the applicable terms for MPE-based and MPE shall be less than 1, to determine WLAN + BT simultaneous transmission exposure compliance.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1 \quad (C.1)$$

| WLAN Ant 1<br>$P_i/P_{th}$<br>Ratio | WLAN Ant 2<br>$P_i/P_{th}$<br>Ratio | Bluetooth<br>$P_i/P_{th}$<br>Ratio | $\Sigma$ ( $P_i/P_{th}$ Ratio)<br>of<br>WLAN Ant 1 + WLAN Ant 2 + Bluetooth |
|-------------------------------------|-------------------------------------|------------------------------------|-----------------------------------------------------------------------------|
| 0.029                               | 0.029                               | 0.004                              | 0.062                                                                       |

## Conclusion:

According to 47 CFR §1.1307, the RF exposure analysis concludes that the RF Exposure is FCC compliant.