# 1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

## 1.1 General Information

**Client Information**

| | |
|---|---|
| Applicant: | Aviron Interactive. |
| Address of applicant: | 780 Birchmount Rd. Unit 16, Toronto, ON M1K 5H4, Canada |
| Manufacturer: | Aviron Interactive. |
| Address of manufacturer: | 780 Birchmount Rd. Unit 16, Toronto, ON M1K 5H4, Canada |

**General Description of EUT:**

| | |
|---|---|
| Product Name: | Aviron Touchscreen |
| Trade Name: | Aviron Interactive Inc. |
| Model No.: | ATS1 |
| FCC ID: | 2ASJ3-ATS1 |
| Rated Voltage: | DC19V |

**Technical Characteristics of EUT:**

**Wi-Fi 5G**

| | |
|---|---|
| Support Standards: | 802.11a, 802.11n(HT20) , 802.11n-HT40, 802.11ac-VH80 |
| Frequency Range: | 5150-5250MHz, 5725-5850MHz |
| RF Output Power: | 15.41dBm (Conducted) |
| Type of Modulation: | BPSK, QPSK,16QAM,64QAM, 256QAM |
| Data Rate: | 6-54Mbps, up to 867Mbps |
| Type of Antenna: | Integral Antenna |
| Antenna Gain: | 0dBi |

**Wi-Fi 2.4G**

| | |
|---|---|
| Support Standards: | 802.11b, 802.11g, 802.11n(HT20) |
| Frequency Range: | 2412-2462MHz |
| RF Output Power: | 16.35dBm (Conducted) |
| Type of Modulation: | DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM |
| Data Rate: | 1-11Mbps, 6-54Mbps, up to 144.4Mbps |
| Quantity of Channels: | 11 |
| Channel Separation: | 5MHz |
| Type of Antenna: | Integral  Antenna |
| Antenna Gain: | 0dBi |

**Bluetooth**

| | |
|---|---|
| Bluetooth Version: | V4.1 |
| Frequency Range: | 2402-2480MHz |
| RF Output Power: | 7.419dBm (Conducted) |
| Data Rate: | 1Mbps, 2Mbps, 3Mbps |
| Modulation: | GFSK, Pi/4 QDPSK, 8DPSK |

| Quantity of Channels: | 79/40 |
| Channel Separation: | 1/2MHz |
| Type of Antenna: | Integral Antenna |
| Antenna Gain: | 0dBi |

## 1.2 Standard Applicable

According to §1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(a) Limits for Occupational / Controlled Exposure

| Frequency range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm$^2$) | Averaging Times $\lvert E \rvert^2, \lvert H \rvert^2$ or S (minutes) |
|---|---|---|---|---|
| 0.3-3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0-30 | 1842/f | 4.89/f | (900/f)* | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | / | / | F/300 | 6 |
| 1500-100000 | / | / | 5 | 6 |

(b) Limits for General Population / Uncontrolled Exposure

| Frequency range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm$^2$) | Averaging Times $\lvert E \rvert^2, \lvert H \rvert^2$ or S (minutes) |
|---|---|---|---|---|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | / | / | F/1500 | 30 |
| 1500-100000 | / | / | 1 | 30 |

Note: f = frequency in MHz: * = Plane-wave equivalents power density

## 1.3 MPE Calculation Method

$S = (30*P*G) / (377*R^2)$

S = power density (in appropriate units, e.g., mw/cm$^2$)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator,
    the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

## 1.4 MPE Calculation Result

Wi-Fi 5G

Maximum Tune-Up output power: <u>16 (dBm)</u>

Maximum peak output power at antenna input terminal: <u>39.81 (mW)</u>

Prediction distance: <u>>20(cm)</u>

Prediction frequency: <u>5825 (MHz)</u>

Antenna gain:<u>0 (dBi)</u>

Directional gain (numeric gain): <u>1</u>

The worst case is power density at prediction frequency at 20cm: <u>0.008(mw/cm$^2$)</u>

MPE limit for general population exposure at prediction frequency: <u>1 (mw/cm$^2$)</u>

Wi-Fi 2.4G

Maximum Tune-Up output power: <u>17 (dBm)</u>

Maximum peak output power at antenna input terminal: <u>50.12 (mW)</u>

Prediction distance: <u>>20(cm)</u>

Prediction frequency: <u>2462 (MHz)</u>

Antenna gain:<u>0 (dBi)</u>

Directional gain (numeric gain): <u>1</u>

The worst case is power density at prediction frequency at 20cm: <u>0.010(mw/cm$^2$)</u>

MPE limit for general population exposure at prediction frequency: <u>1 (mw/cm$^2$)</u>

BT

Maximum Tune-Up output power: <u>8 (dBm)</u>

Maximum peak output power at antenna input terminal: <u>6.31 (mW)</u>

Prediction distance: <u>>20(cm)</u>

Prediction frequency: <u>2462 (MHz)</u>

Antenna gain:<u>0 (dBi)</u>

Directional gain (numeric gain): <u>1</u>

The worst case is power density at prediction frequency at 20cm: <u>0.001(mw/cm$^2$)</u>

MPE limit for general population exposure at prediction frequency: <u>1 (mw/cm$^2$)</u>

**Not support WiFi and BT transmit simultaneously.**

Result: Pass