Exposure limit according to §15.247(i)

The Wireless sensor tag operates in 2402 – 2480 MHz band. The tag contains BLE module and Wi-Fi module operating according to section FCC section 15.247 (DTS).
The tag is classified as mobile device.

The limit for power density for general population/uncontrolled exposure in 2.4 GHz band is: **1 mW/cm²**

The power density was calculated as follows:

$$P \ (mW/cm^2) \ = \ P_T \ / \ 4\pi \ r^2$$

1) <u>Wi-Fi module (2412-2462 MHz):</u> P_T is the transmitted power, which is equal to the peak transmitter output power 13.39 dBm plus maximum antenna gain 5.3 dBi, the maximum equivalent isotropically radiated power EIRP is

$$P_T = 13.39 \ dBm + 5.3 \ dBi = 18.69 \ dBm = 74 \ mW.$$

The power density at 20 cm (minimum safe distance, required for mobile devices), calculated as follows:

$$74 \ mW \ / \ 4\pi \ (20 \ cm)^2 = 0.0147 \ mW/cm^2 << 1 \ mW/cm^2$$

2) <u>BLE module (2402-2480 MHz):</u> P_T is the transmitted power, which is equal to the peak transmitter output power
2.70 dBm plus maximum antenna gain 5.3 dBi, the maximum equivalent isotropically radiated power EIRP is

$$P_T = 8.0 \ dBm = 6.3 \ mW.$$

The power density at 20 cm (minimum safe distance, required for mobile devices), calculated as follows:

$$6.3 \ mW \ / \ 4\pi \ (20 \ cm)^2 = 0.0013 \ mW/cm^2 << 1 \ mW/cm^2$$

<u>Summation</u>
When all the antennas are at least 20 cm away from the user but individual antennas cannot be separated by 20 cm from each other, the following equation shall be fulfilled:

$$S1/Limit + S2/Limit < 1$$

$$0.0147 \ mW/cm^2 \ / \ 1 \ mW/cm^2 + 0.0013 \ mW/cm^2 \ / \ 1 \ mW/cm^2 = 0.0147+0.0013 = \ = 0.0160 < 1$$

Therefore, the tag complies with FCC RF exposure limit for mobile device for general population. General public cannot be exposed to dangerous RF level.