RF Exposure

The equipment under test (EUT) is a Wireless Subwoofer with Bluetooth 5.3 EDR+BLE (Dual Mode) function operating in 2402-2480MHz. The EUT is powered by AC 100-240V~50/60Hz. For more detail information pls. Refer to the user manual.

Bluetooth Version: 5.3 EDR
Antenna Type: Integral antenna
Antenna Gain: -0.13 dBi max
Modulation Type: GFSK, π/4DQPSK, and 8-DPSK

The nominal radiated output power (e.i.r.p) specified: 3dBm (Tolerance: +/- 2dB)
The nominal conducted output power specified: 3.13dBm (Tolerance: +/- 2dB)

According to the KDB 447498 D04 v01:
The maximun peak radiated emission for the EUT is 99.7 dBμV/m at 3m in the frequency 2402MHz
The EIRP = [(FS*D) ^2 / 30] mW = 4.47 dBm
which is within the production variation.

The minimum peak radiated emission for the EUT is 97.3 dBμV/m at 3m in the frequency 2480MHz
The EIRP = [(FS*D) ^2 / 30] mW = 2.07 dBm
which is within the production variation.

According to FCC Part 2.1091, this unlicensed transmitting devices is categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, According to the KDB 447498 D04 v01 and OET 65, the simple calculation as below:

The source-based time averaged maximum conducted power = 3.13dBm+2dB= 5.13dBm = 3.26mW

The maximum ERP= 3dBm+2dBm-2.15dBm=2.85dBm= 1.93mW

At the distance (R) of 20cm to 40cm and in 0.3 GHz to 6 GHz, MPE Exclusion Threshold Level:

$$P_{\text{th}}\,(\text{mW}) = ERP_{20\text{ cm}}\,(\text{mW}) = \begin{cases} 2040f & 0.3\text{ GHz} \le f < 1.5\text{ GHz} \\ 3060 & 1.5\text{ GHz} \le f \le 6\text{ GHz} \end{cases}$$

The MPE Threshold is 3060mW for general population and uncontrolled exposure in the 2.4GHz frequency range according to FCC Part 1.1307. As the measured power density at 20cm from the transmitter is lower than the MPE Threshold, the compliance to the MPE Threshold can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.
Note: ERP is compared with the Exclusion Threshold.

BLE:

Bluetooth Version: 5.3 BLE
Antenna Type: Integral antenna
Antenna Gain: -0.13 dBi max
Modulation Type: GFSK

The nominal radiated output power (e.i.r.p) specified: -6dBm (Tolerance: +/- 4dB)
The nominal conducted output power specified: -5.87dBm (Tolerance: +/- 4dB)

According to the KDB 447498 D04 v01:

The maximun peak radiated emission for the EUT is 90.4dBμV/m at 3m in the frequency 2402MHz
The EIRP = [(FS*D) ^2 / 30] mW = -4.83dBm
which is within the production variation.

The minimum peak radiated emission for the EUT is 85.6dBμV/m at 3m in the frequency 2480MHz
The EIRP = [(FS*D) ^2 / 30] mW = -9.63dBm
which is within the production variation.

According to FCC Part 2.1091, this unlicensed transmitting devices is categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, According to the KDB 447498 D04 v01 and OET 65, the simple calculation as below:

The source-based time averaged maximum conducted power = -5.87dBm+4dB= -1.87dBm = 0.65mW

The maximum ERP= -6dBm+4dBm-2.15dBm=-4.15dBm= 0.38mW

At the distance (R) of 20cm to 40cm and in 0.3 GHz to 6 GHz, MPE Exclusion Threshold Level:

$$P_{\text{th}}\ (\text{mW}) = ERP_{20\ \text{cm}}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

The MPE Threshold is 3060mW for general population and uncontrolled exposure in the 2.4GHz frequency range according to FCC Part 1.1307. As the measured power density at 20cm from the transmitter is lower than the MPE Threshold, the compliance to the MPE Threshold can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

Note: ERP is compared with the Exclusion Threshold.