RF Exposure

The equipment under test (EUT) is a 5.1.4CH Soundbar With Wireless Subwoofer with Bluetooth 5.3 (Dual Mode) function operating in 2402-2480MHz and 5.8GHz function operating in 5729-5848MHz. The EUT is powered by AC 100-240V~50/60Hz. For more detail information pls. refer to the user manual.

Modulation Type: GFSK, π /4DQPSK, and 8-DPSK
Bluetooth Version: 5.3 EDR
Antenna Type: Integral antenna
Antenna Gain: 2.86dBi (This information is provided by applicant, and the applicant is responsible for the authenticity of the provided information.)
The nominal radiated output power (e.i.r.p) specified: -1dBm (Tolerance: +/- 2dB)
The nominal conducted output power specified: -3.86dBm (Tolerance: +/- 2dB)

According to the KDB 447498 D04 V01:
The maximun peak radiated emission for the EUT is 95.2 dBμV/m at 3m in the frequency 2402MHz
The EIRP = [(FS*D) ^2 / 30] mW = -0.03 dBm
which is within the production variation.

The minimum peak radiated emission for the EUT is 92.9 dBμV/m at 3m in the frequency 2480MHz
The EIRP = [(FS*D) ^2 / 30] mW = -2.33 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 radiated power = -1dBm+2dB= 1dBm = 1.26mW

The maximum ERP= -1dBm+2dB-2.15dB= -1.15dBm= 0.77mW

At the distance (R) of 20cm to 40cm and in 0.3 GHz to 6 GHz, ERP 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 ERP Threshold is 3060mW for general population and uncontrolled exposure in the 2.4GHz frequency range according to FCC Part 1.1307. As the maximum ERP at 20cm from the transmitter is lower than the ERP Threshold, the compliance to the ERP Threshold can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

BLE:

Modulation Type: GFSK
Bluetooth Version: 5.3 BLE
Antenna Type: Integral antenna
Antenna Gain: 2.86dBi (This information is provided by applicant, and the applicant is responsible for the authenticity of the provided information.)
The nominal radiated output power (e.i.r.p) specified: -1dBm (Tolerance: +/- 2dB)
The nominal conducted output power specified: -3.86dBm (Tolerance: +/- 2dB)

According to the KDB 447498 D04 V01:

The maximun peak radiated emission for the EUT is 94.7dBμV/m at 3m in the frequency 2402MHz
The EIRP = [(FS*D) ^2 / 30] mW = -0.53dBm
which is within the production variation.

The minimum peak radiated emission for the EUT is 92.9dBμV/m at 3m in the frequency 2480MHz
The EIRP = [(FS*D) ^2 / 30] mW = -2.33dBm
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 radiated power = -1dBm+2dB= 1dBm = 1.26mW

The maximum ERP= -1dBm+2dB-2.15dB= -1.15dBm= 0.77mW

At the distance (R) of 20cm to 40cm and in 0.3 GHz to 6 GHz, ERP 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 ERP Threshold is 3060mW for general population and uncontrolled exposure in the 2.4GHz frequency range according to FCC Part 1.1307. As the maximum ERP at 20cm from the transmitter is lower than the ERP Threshold, the compliance to the ERP Threshold can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

5.8G:

Modulation Type: GFSK
Antenna Type: Integral antenna
Antenna Gain: 5.07dBi (This information is provided by applicant, and the applicant is responsible for the authenticity of the provided information.)
The nominal radiated output power (e.i.r.p) specified: -1dBm (Tolerance: +/- 2dB)
The nominal conducted output power specified: -6.07dBm (Tolerance: +/- 2dB)

According to the KDB 447498 D04 V01:

The maximun peak radiated emission for the EUT is 93.2dBμV/m at 3m in the frequency 5729MHz
The EIRP = [(FS*D) ^2 / 30] mW = -2.03dBm
which is within the production variation.

The minimum peak radiated emission for the EUT is 92.8dBμV/m at 3m in the frequency 5789MHz
The EIRP = [(FS*D) ^2 / 30] mW = -2.43dBm
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 radiated power = -1dBm+2dB= 1dBm = 1.26mW

The maximum ERP= -1dBm+2dB-2.15dB= -1.15dBm= 0.77mW

At the distance (R) of 20cm to 40cm and in 0.3 GHz to 6 GHz, ERP 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 ERP Threshold is 3060mW for general population and uncontrolled exposure in the 5.8GHz frequency range according to FCC Part 1.1307. As the maximum ERP at 20cm from the transmitter is lower than the ERP Threshold, the compliance to the ERP Threshold can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

For Simultaneous transmitting of EDR and 5.8G, According to 865664D02 2.2 d) 1):
The sum of the ratios of the spatially averaged results to the applicable frequency dependent ERP ratio = 0.77/3060 + 0.77/3060= 0.0005< 1

Since the sum of the ERP ratios for all simultaneously transmitting antennas incorporated in the device is ≤ 1.0, the EUT is considered to satisfy ERP compliance for simultaneous transmission operations.

The following RF exposure statement or similar sentence is proposed to be included in the user manual:
“FCC RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.”