RF Exposure Report

The Equipment Under Test (EUT) is a RGBIC LED Strip Lights, RGBIC LED Strip Lights with BT5.0 (BLE only) operating in 2402-2480MHz, 2.4G Wi-Fi function operating at 2412-2462MHz. The EUT is powered by AC 100-240V. Bluetooth and WIFI transmitters use different antennas and can transmit simultaneously, For more detailed features description, please refer to the user's manual.

Bluetooth Version: 5.0 BLE
Antenna Type: Internal antenna
Antenna Gain: 2.1dBi.
Modulation Type: GFSK
The normal radiated output power (e.i.r.p) is: -0.9 dBm (tolerance: ± 4dB).
The normal conducted output power is: -3 dBm (tolerance: ± 4dB).

According to the KDB 447498:
The Maximum peak radiated emission for the EUT is 96.2dBμV/m at 3m in the frequency 2402MHz
The EIRP = [(FS*D) ^2 / 30] mW = 0.97 dBm
which is within the production variation.

The Minimum peak radiated emission for the EUT is 91.8 dBμV/m at 3m in the frequency 2480MHz
The EIRP = [(FS*D) ^2 / 30] mW = -3.43 dBm
which is within the production variation.

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

The maximum radiated power = 3.1dBm = 2.0417mW

From above data, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna for 2.4GHz band can be calculated according to OET 65 as follow:
= 2.0417mW/ 4πR^2
= 0.0004 mW/cm^2

The MPE limit is 1.0 mW/cm^2 for general population and uncontrolled exposure in the 2.4GHz frequency range according to FCC Part 1.1310. As the measured power density at 20cm from the transmitter is lower than the MPE limit, the compliance to the MPE limit can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

2.4G WIFI Function:

Modulation Type: CCK, BPSK, QPSK, 16QAM, 64QAM, DQPSK, DBPSK
Antenna Type: Internal antenna
Antenna Gain: 1.5 dBi
The nominal conducted output power specified: 17dBm (Tolerance: ± 1.2dB)
The nominal radiated output power specified: 18.5dBm (Tolerance: ± 1.2dB)

The maximum conducted output power for the EUT is 18.08 dBm in the frequency 2.462GHz 802.11b mode which is within the production variation.

The minimum conducted output power for the EUT is 17.43 dBm in the frequency 2.412GHz 802.11g mode 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 and OET 65, the simple calculation as below:

For Maximum Permissible Exposure (MPE) evaluation of the product, the maximum power density at 20 cm from this transmitter shall be less than the General Population / Uncontrolled MPE limit in OET Bulletin 65.

The maximum E.I.R.P = 17dBm+1.2dB+1.5dBi=19.7dBm=93.33mW
The source-based time averaged maximum radiated power = 93.33mW x Duty Cycle = 93.33mW

From above data, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:
= 93.33mW / 4πR^2
= 0.019 mW/cm^2

The MPE limit is 1.0 mW/cm^2 for general population and uncontrolled exposure in the Wi-Fi frequency range according to FCC Part 1.1310. As the measured power density at 20cm from the transmitter is lower than the MPE limit, the compliance to the MPE limit can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

Transmitter Duty Cycle Calculation
The EUT transmit continuously during the test, the duty cycle is 1.

Simultaneous Transmission Evaluation

For Simultaneous transmitting of 2.4GHz WiFi and Bluetooth transmitters, According to 865664D02 2.2 d) 1):

The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits = 0.0004/1 + 0.019/1 = 0.0194 < 1

Since the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in the device is ≤ 1.0, the EUT is considered to satisfy MPE 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."