

RF Exposure Considerations for the u-sense vibration

FCC ID: 2BAKG-US67-V1T-BLE

The u-sense vibration equipment operates using 2.4GHz Bluetooth LE

The following FCC Rule Parts are applicable:

Part 2.1091 – Radiofrequency radiation exposure evaluation: mobile devices

Part 1.1307(b)(3)(i)(C) - SAR test exemption (ii)

Part 1.1307(b)(3)(i)(B) - SAR test exemption (iii)

KDB 447498 D04 – RF Exposure Procedures

For the u-sense vibration

BT Operating Frequency: 2402 – 2480MHz

Tx Power: +8.0dBm

Antenna gain 0.5dBi

EIRP = +8.5dBm

ERP = 8.5 - 2.15dBm = 6.35dBm (4.31mW)

Minimum separation distance (R) = 20cm (0.2m)

Evaluation

From Part 2.1093(c)(1). RF exemption applies if the maximum transmitted power is less than the maximum of the following three criteria:

- i) Less than 1 mw Blanket exemption. $P_{TH} = 0.001 \text{ W}$ – (The BT32D is not compliant)
- ii) determination of exemption under the MPE-based §1.1307(b)(3)(i)(C), if i) not met
- iii) determination of exemption under the SAR-based §1.1307(b)(3)(i)(B) if both i) and ii) are not met;

Determination of threshold power (P_{TH}) under the MPE-based §1.1307(b)(3)(i)(C)

This is only applicable at a separation distance greater than $\lambda/2\pi$

For the u-sense vibration:

2.4GHz operation - $\lambda/2\pi = 0.02\text{m}$

The separation distance is 0.2m, therefore §1.1307(b)(3)(i)(C), is applicable

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From §1.1307(b)(3)(i)(C), Table 1:

$$\text{Threshold ERP } P_{\text{TH}} (2.4\text{GHz}) = 19.2R^2 \text{ watts (R = metres)}$$

ie: $P_{\text{TH}} = 19.2 \times 0.2^2$

$$P_{\text{TH}} = 0.768\text{W}$$

ie: Threshold Power $P_{\text{TH}} = 768\text{mW ERP}$

The u-sense vibration max. transmitter power = 4.31mW, so is therefore exempt from MPE evaluation in accordance with §1.1307(b)(3)(i)(C).