

RF exposure Estimation

1. Introduction

Product: True Wireless Stereo Earphones

Model No.: ASTRUM XZ PRO, ASTRUM XZ PIA, ET310, ET330, ET340, ET360, TW110, TW210, TW220, TW300

FCC ID: 2BFJ5-ASTRUMXZPRO

The EUT is a True Wireless Stereo Earphones, which contain BT function inside.

Note: All models have the same technical construction including circuit diagram, PCB layout, components and component layout. Only the outlook/color are different. So RF exposure evaluation only applied on ASTRUM XZ PRO, other models are deemed to fulfill the requirement.

2. Limit and Guidelines on Exposure to Electromagnetic Fields

According to §15.247(e)(i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 Mobile Portable RF Exposure v05r02, no SAR required if power is lower than the flowing threshold:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$\left[\frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} \right]$$

$$\sqrt{f(\text{GHz})} \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where}$$

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation²⁵
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz.

3. Calculation method

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$

Conducted Power + tune up tolerance = 3.83dBm = 2.415mW

Distance = 5 mm

f = 2.441 GHz

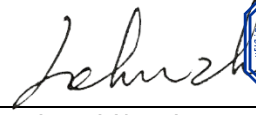
$$[2.415/5] \cdot \text{SQRT}(2.441) = 0.755$$

$$0.755 \leq 3.0$$

Therefore, excluded from SAR testing.

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