

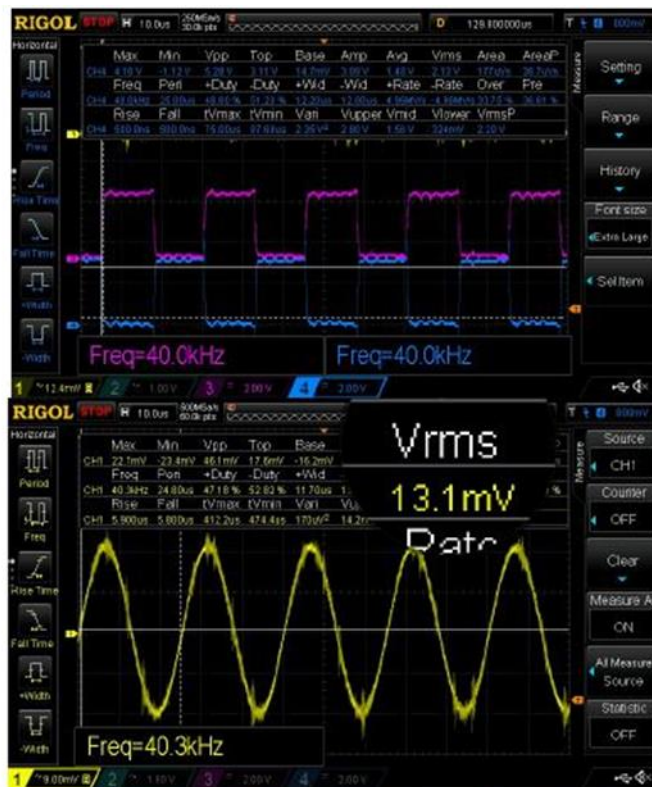
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## DECLARATION OF TICKLESS ULTRASONIC TICK AND FLEA REPELLENT EFFECTS ON HUMAN BODY

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**TICKLESS** is an ultrasonic tick and flea repeller. The device emits ultrasonic pulses that are imperceptible to humans and pets but disturb ticks and fleas, thus keeping them away.

Here is the picture from the test was taken with **TICKLESS** devices:



The transmitted and received signal frequency was 40 kHz. The received signal  $V_{RMS} = 13.1 \text{ mV}$ , which means that the „link budget“ is:

$$SPL_{LB} = 20 * \lg\left(\frac{13.1 * 10^{-3} V_{RMS}}{3V_{RMS}}\right) + 68 \text{ dB} = 20.8 \text{ dB}$$

Theoretical value (27.56 dB) and measured value (20.8 dB) has a slight difference. It is likely that this is caused by the product’s housing.

In this case, the device works with **13.1 mV** and emits ultrasonic waves in **40 KHz** with **20.8 decibels**.

In the long run, hearing above 75 decibels can be annoying. The only requirement is a measurement range between 80 and 140 decibels and the pulse range response as defined in IEC 60804-1985 must be at least 63 decibels. The frequency response must be equivalent to or better than a type 2 instrument. No exposures of an unprotected ear in excess of a C-weighted peak sound pressure level of 140 decibels should be permitted. (*World Health Organization, Occupational exposure to noise evaluation, prevention and control, PDF*)

#### Medical ultrasound compared to our ultrasonic devices

**The frequency of diagnostic ultrasounds is roughly 1 000-10 000 KHz.** It is a form of energy and, as such, may have effects in tissues it traverses. Any consequences occurring in living tissues secondary to an external influence are called biological effects or bioeffects. This term does not imply damage or harm. Diagnostic sonography (ultrasonography) is an ultrasound-based diagnostic imaging technique used to visualize subcutaneous body structures including tendons, muscles, joints, vessels and internal organs for possible pathology or lesions. This ultrasound can be used for scanning your baby too. (<https://www.ncbi.nlm.nih.gov/pubmed/22700164>) The moderately loud sound is 60-70 decibels.

#### Conclusion

We can conclude that the **TICKLESS** ultrasonic tick and flea repellents emit ultrasonic waves **on 40 KHz with 20.8 decibel**. As mentioned before, the frequency of diagnostic ultrasounds is between 1 000-10 000 KHz, which are stronger than the devices, and the decibel is also below the range (80-140) which can cause hearing damage. According to these researches, we can declare that **TICKLESS** is safe to use for everyone even for kids, pregnant women, ill or elderly people.

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