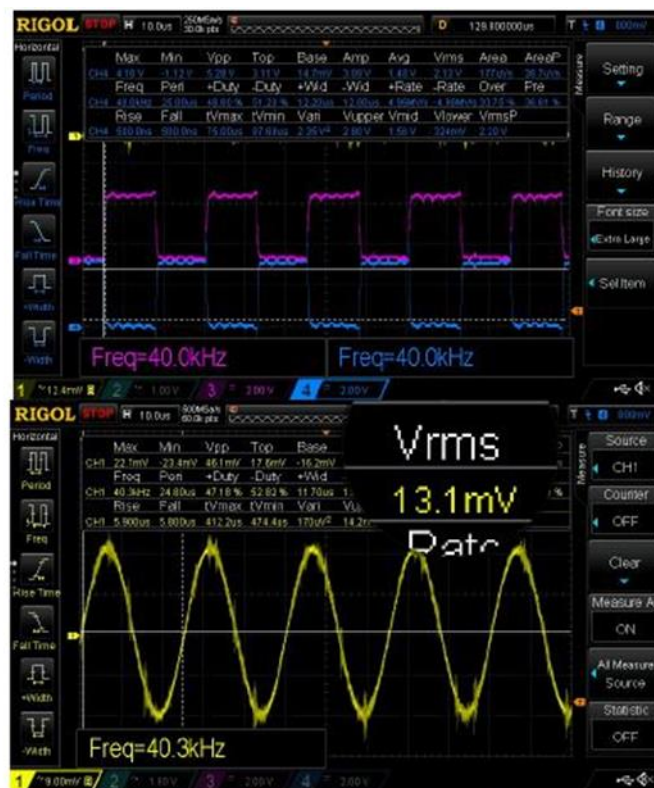


DECLARATION OF TICKLESS ULTRASONIC TICK AND FLEA REPELLENT EFFECTS ON DOGS AND CATS

TICKLESS is an ultrasonic tick and flea repeller. The device emits ultrasonic pulses that are imperceptible to humans and pets but disturb these parasites, 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**.

Lots of studies reveal that the response of animals to ultrasound is very diverse: **dogs and cats respond to 22-25 kHz sounds.** Mosquitoes, fleas, ticks, mites, house fly, spiders, cockroaches are responding to 38-44 kHz; lizards and rats respond to sounds above 52 kHz.

It is possible to generate sound fields intense enough to cause both auditory and non-auditory adverse effects, in both the 10–20 kHz and the less-researched 20–25 kHz ranges. Given that we know there is great variation between individuals in hearing acuity and frequency range, with a tendency for greater high frequency acuity in the younger population, a single cut-off frequency for all is clearly too simplistic. (Leighton, 2016)¹ However, dogs and cats could hear ultrasound, not the frequency but the **decibels (noise level) matter when we are talking about what levels of ultrasound are disturbing them.**

Humans can hear frequencies between 20 Hz and 20 kHz. Dogs can hear frequencies usually around 67 Hz to 45 kHz and can reach 60 kHz, depending on the dog's breed and age. In long run, hearing **above 75 decibels can be annoying,** and for both dogs and humans hearing **above 85 decibels can cause hearing damage.**² Although dogs and cats could hear ultrasound, not the frequency but **the decibels (noise level) are important** when we are testing what levels of ultrasound are disturbing them.

¹ Leighton, T. G., (2016) Are some people suffering as a result of increasing mass exposure of the public to ultrasound in air? NCBI, National Institutes of Health

² Dr D.L. Johnson, Dr. P. Papadopoulos, Dr N. Watfa and Dr J. Takala, Occupational exposure to noise evaluation, prevention and control; World Health Organisation

Conclusion

We can conclude that TICKLESS devices are working on **40 KHz with 20,8 decibels.**

As mentioned before, the frequency what dogs may be hear is between 40Hz and 60 kHz, but it is more important how much decibels is the emitted sound.

The emitted 20,8 decibels by the TICKLESS devices are much below than the range of disturbance, which is 75 decibels.

According to the information mentioned above we can declare that TICKLESS devices are not disturbing or harmful for pets even they might hear the emitted ultrasound, because of the low noise level of the device.

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Daniel Kiss
CEO, ProtectONE Ltd.