Ultrasound Solutions

Commercial Document DC.T008.FAQ.001

Hearing Risks Related to SDT Ultrasound Emitters (SDT8, SDT200mW)

1 Introduction and applicable international standards

Today (2014) there is no proof that (medium power) ultrasound do – or do not cause hearing loss in humans.
The solution is to limit human exposure.

SPL (Sound pressure Level) exposure limits differ somewhat for ultrasound and audio frequencies.
In short:

- Reference 1 : Heath Canada :
  Max 110 dB_{spl} for frequencies from 25 kHz to 50 kHz (dB_{spl} refers to 0 $dB_{spl} \equiv 20\ \mu Pa$).
  This exposure limit is independent of time.
- Reference 2 : International standard IEC 61010-1 = EN 61010-1 :
  max 110dB_{spl} from 20 kHz to 100 kHz.

2 Application to SDT SDT200mW and SDT8 emitters

Laboratory measurements on several calibrated devices emitting in open air show that,
in order to keep SPL below 110 dB_{spl} :

- When using a SDT200mW at its highest emission level, the operator shall
  either stay at a distance larger than 1.2m (4 feet) from the emitter, or wear ear protection.
- When using a SDT8 at its highest emission level, the operator shall
  either stay at a distance larger than 3m (10 feet) from the emitter, or wear ear protection.

Ear protection for U.S. is very simple and very effective: ear muffs or headphones will fit, e.g. the SDT headphone; rubber – or foam ear plugs will also fit.
If the emitter is placed inside a closed volume (for example inside a car) and the operator stays outside, ultrasound outside the volume are so strongly attenuated that an operator outside the closed volume (outside the car) doesn't incur any risk.

3 Side note: SDT ultrasound detectors

The SDT ultrasound detectors (e.g. SDT170, SDT200, SDT270) are passive: they do not emit, they just listen.

4 References

1. Health Canada: (exposure limits: see table 5)
   www.hc-sc.gc.ca/ewh-semt/pubs/radiation/safety-code_24-securite/index-eng.php (English)
   www.hc-sc.gc.ca/ewh-semt/pubs/radiation/safety-code_24-securite/index-fra.php (French)
2. International Standards EN 61010-1: 2010 = IEC 61010-1: 2010 http://webstore.ansi.org/

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