

Our Ref: E05110518 Your Ref:

# NPL

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Dear Mr Stapleton

You requested an opinion on the measurements reported in our Test Report reference S5341 in relation to specified safety limits for high frequency sound. I hope the following fulfils this request.

HSE Report 343/2001[1] reviews the limits prescribed internationally for levels of very high frequency sound (8 kHz - 20 kHz) and ultrasound (above 20 kHz), from the 1960s to present. A mixture of limits are reported relating to both the onset of unpleasant, but not necessarily harmful, subjective effects, and actual hearing damage. Indeed the report's conclusion on limits, states that limits were mostly 'set to avoid unpleasant subjective effects'. The specified limits vary between 75-90 dB. The lowest limit of 75 dB derives from one particular researcher (Action, 1968) and is stated as being applicable to subjective effects. Interestingly, the limits are given in terms of unweighted sound pressure level (dB), rather than A-weighted levels (dBA). The corresponding figure for the Mosquito at 3 m is 83.2 dB.

Limits for occupational hearing damage in the context of an 8 hour working day are also given as between 75-85 dB and between 84-97 dB for 1 hour exposure. These '1 hour exposure' limits are perhaps the most relevant in the report and the Mosquito is seen to be just under this.

An alternative point of view can be to consider current UK Noise at Work regulations[2] which specify a level of 85 dBA for an 8 hour working day, equivalent to 94 dBA for 1 hour. **At 76 dBA at 3 m the Mosquito clearly would not present as noise hazard under the terms of these regulations.** Even when the 8 hour limit is reduced to 80 dBA in 2006, over 16 hours of exposure to a level of 76 dBA is required to reach the daily noise limit. However consideration must be given to differences in the acoustical environment, the reproducibility of the acoustic output of the device and the actual distance to the observer in-situ.

#### References

[1] [http://www.hse.gov.uk/research/crr\\_pdf/2001/ci7-01343.pdf](http://www.hse.gov.uk/research/crr_pdf/2001/ci7-01343.pdf) [2] [http://www.opsi.gov.uk/si/si1989/Uksi\\_19891790\\_en\\_1.htm](http://www.opsi.gov.uk/si/si1989/Uksi_19891790_en_1.htm)

Yours sincerely

Richard Barham

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