

Summary

This report relates to the HSL ANR (Active Noise Reduction) equipped Alpha helmets supplied for use with helicopter used by North Midlands Police Air Support Unit (ASU). The measurements presented here indicate that these are operating as expected. The helicopter is an EC135ST2 supplied and maintained by McAlpine Helicopters Ltd.

Background

It had been reported that the ANR function fitted to the Alpha helmets supplied for use in the North Midlands Police ASU helicopter were not producing adequate noise reduction. On Friday 25th November 2005 the helicopter was at the McAlpine works at Oxford Airport. The opportunity was taken to make a formal assessment of the ANR efficiency.

Measurement Method

Measurement was made using a real ear fitted with a small microphone to monitor the sound field close to the entry to the ear canal. The subject was seated in the left hand rear seat of the helicopter while it was taken through its startup sequence, run at ground idle, then at flight idle.



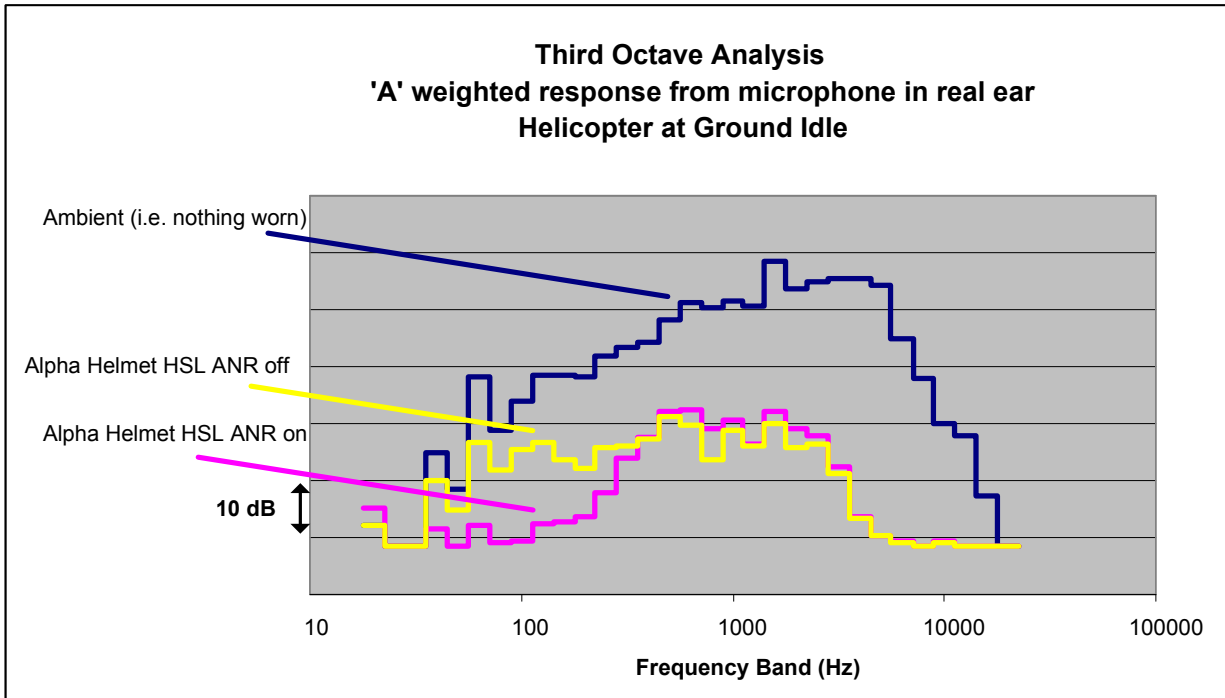
The microphone output was monitored and analysed using the real time third octave analysis mode on an NTI AL-1 ('Acoutilyser'). For each measurement condition the analyser was set to store the average (Leq) third octave band level over a 30 second period. During the measurement period care was taken that no speech was present on the aircraft intercom. No attempt was made to determine the precise relationship between the recorded results and absolute sound pressure as this is not required for the determination of noise reduction efficiency

Measurements were made with:

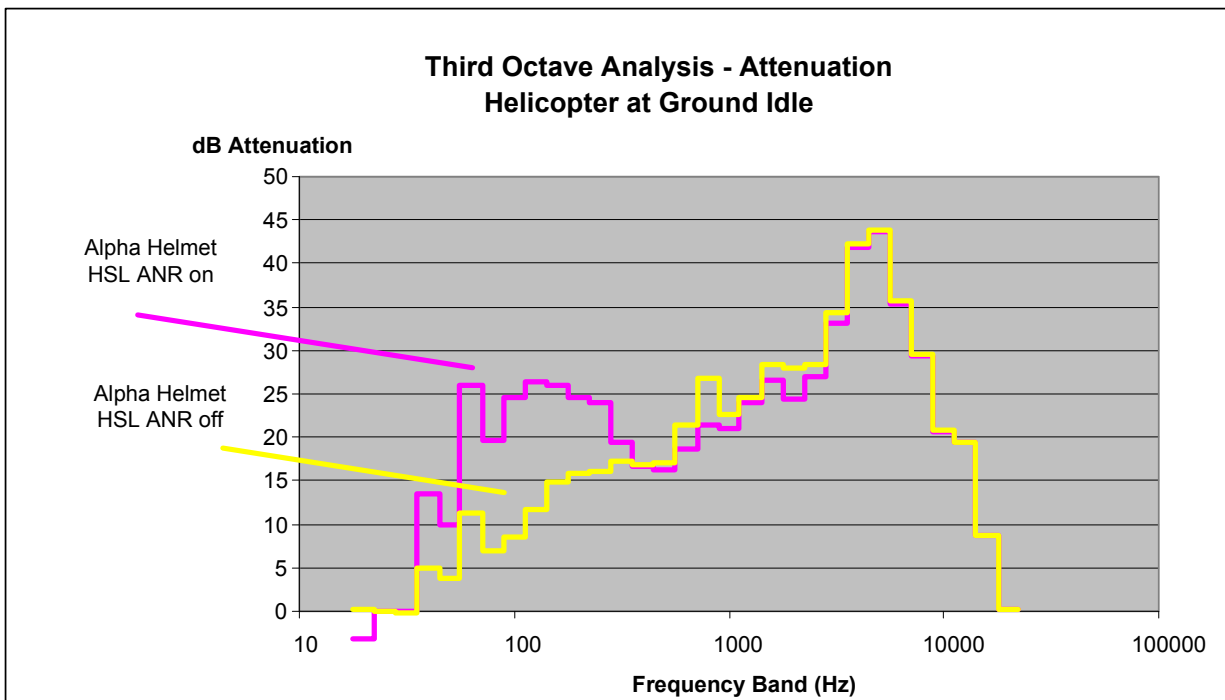
- Aircraft running at ground idle with nothing worn (ambient sound field)
- Aircraft running at ground idle wearing an Alpha ANR helmet with ANR switch off
- Aircraft running at ground idle wearing an Alpha ANR helmet with ANR switch on
- Aircraft running at flight idle with nothing worn (ambient sound field)
- Aircraft running at flight idle wearing an Alpha ANR helmet with ANR switch off
- Aircraft running at flight idle wearing an Alpha ANR helmet with ANR switch on

Results

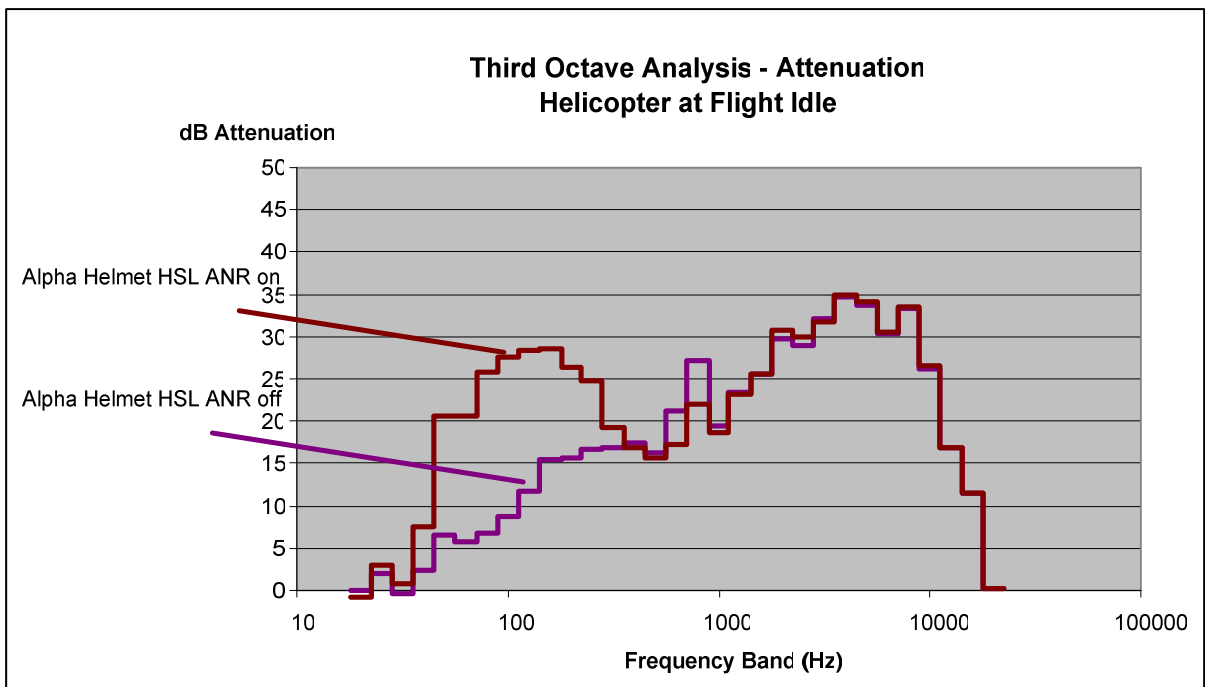
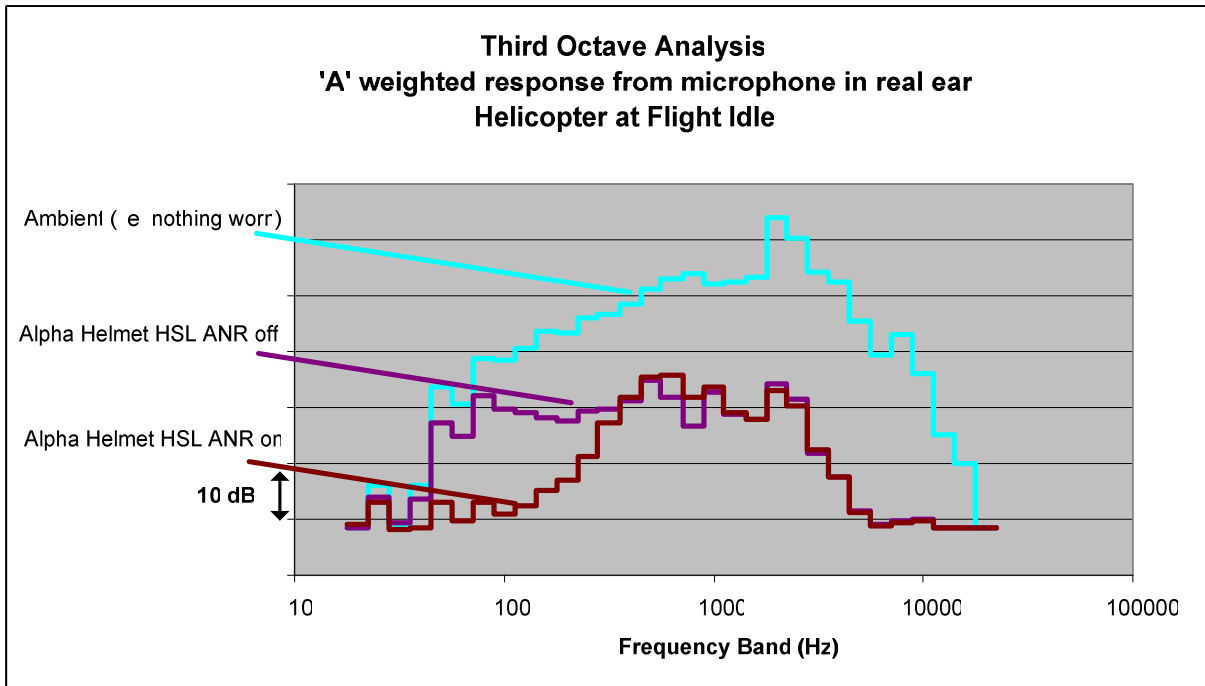
The following graph shows the recorded output from the measurement microphone with the helicopter running at ground idle.



The levels recorded with the ANR off and on were subtracted from the ambient (nothing worn) measurements made immediately before. This provides the following indication of attenuation.



The following two graphs show the measured levels and derived attenuation for the measurements made with the helicopter running at flight idle.



Conclusions

The measurements reflect that the HSL ANR fitted into helmets provides a noise reduction efficiency similar to communications headsets with ANR. Specifically the ANR provides significant noise reduction in the frequency range where passive attenuation has limited effectiveness. In this case in the 40 to 200 Hz region the additional attenuation is in the region of 10 to 15dB. Other measurements have shown the passive attenuation to be similar to a helmet fitted with receivers that do not provide ANR.