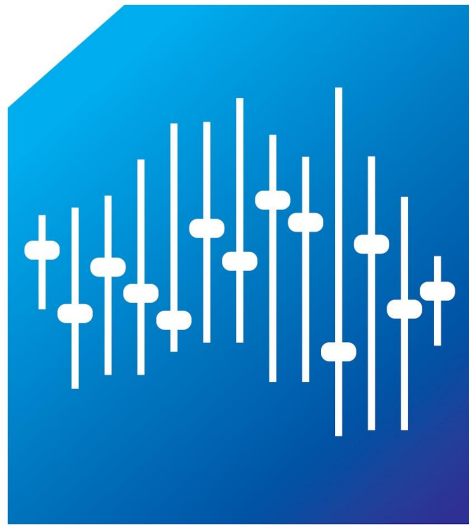


AUDIO REPORT

Forensic Audio Australia report 19/12/2023



**FORENSIC
AUDIO
AUSTRALIA**

James Raper - Principal Engineer

NAME AND ADDRESS:

James Thomas Raper

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QUALIFICATIONS:

I hold the degree of Bachelor of Popular Music majoring in Audio Production from the Queensland Conservatorium at Griffith University. I have also gained the title Avid Instructor. This certification is awarded upon completion of Avid's 110 exam and verifies that you possess a fundamental understanding of and the capability to use Avid Pro Tools to engineer a project through to completion, with all of the fundamental operational skills to record, edit, mix and output the finished session as well as teach all said skills.

My thirteen years of experience have allowed me to work in roles within various facets of the music and post production industry. For the past eight years, I have been part of the Audio lecturer team at JMC Academy in Ultimo, Sydney. I specialise in recording, editing, mixing, mastering and post production techniques. I have worked on television sets, with major record labels, law firms and insurance companies. I have worked extensively with the software referenced in this report. I was first instructed on the techniques and operations of said software during my time at Griffith University and have since used them in the same manner as described below.

I have been the principal engineer and owner of Forensic Audio Australia for three years. In that time I have worked with private investigators, international law firms, and varying levels of Australian law enforcement. My work has been used as evidence in the NSW Supreme Court.

This report has been written in accordance with the Schedule 7 - Expert Witness Code of Conduct of the Uniform Civil Procedure Rules 2005. As required by paragraph 3(b) of the Code, I state that I have read the Code and agree to be bound by it. As required by paragraph 3(i) of the Code, I declare that I have made all the enquiries which I believe are desirable and appropriate and that no matters of significance which I regard as relevant have, to my knowledge, been withheld from the court.

INTRODUCTION

The purpose of this report is to document the application of enhancement techniques to the recording from Sky News broadcast uploaded to Youtube by the Australian Jewish Association on the 14th December 2023.

<https://www.youtube.com/watch?v=XGdM6FcSYXw>

The area of concern is 2:24 - 2:40 *mm:ss* and this report will breakdown the process undertaken to enhance the audio.

Upon review, it was determined that the recording required enhancement to optimise its audibility. Consequently, the following audio enhancement techniques were employed to address this issue:

1. Filtering: Selective filtering techniques were applied to attenuate extraneous sounds and narrow the focus on the primary audio source, facilitating better audibility.
2. Dynamic range compression: By employing specialised compression and limiting algorithms, the varying levels of loudness within the recording were normalised, ensuring a consistent and more intelligible listening experience.
3. Neural Network powered noise reduction: Reducing the echo or “reverb” from a recording ensures that the clarity and intelligibility of speech is increased by mitigating acoustical environmental factors.

Along with the provided video and the required enhancement, I was asked for my assessment of the following questions:

1. *Does any part of any of the audio recordings have the crowd or any individual/s chant “gas the jews!”.*
2. *With reference to the part of the video that is subtitled “gas the jews” are you able to tell what words are used?*

This report serves to document the audio enhancement request and the techniques employed to enhance the clarity and intelligibility of the recording.

METHOD

The video file was imported into two Digital Audio Workstations (DAW) so as to be sure that there were no discrepancies between each of our testing setups.

They are **Pro Tools Ultimate 2021.7** and **Izotope RX 10 Advanced**.

These two DAW's allow the audio to be probed with various software tools to ascertain the information that the client required in their initial brief.

The audio was kept at its original sample rate and bit depth to preserve the recording's fidelity.

PROCESS

The first instance of processing is an equaliser in an attempt to re-balance the frequency content of the provided recording. In the image below, we see a low filter applied to remove low frequency rumble.

By applying this filter and removing low frequency content, we increase intelligibility of the voices heard in the recording by putting more emphasis on the midrange and high end frequencies.



The next instance of processing was employing the use of a neural network based noise reduction application for speech.

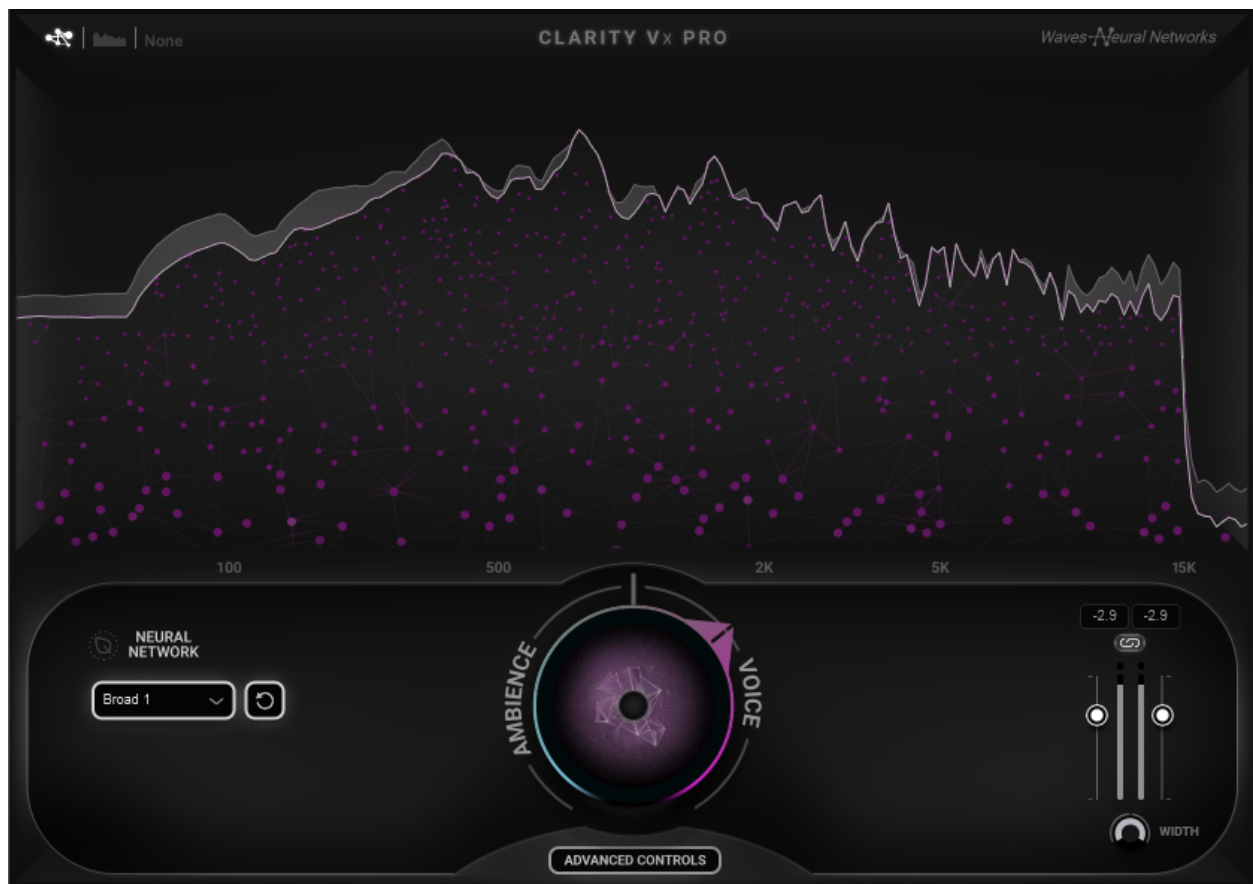
The application is trained on the audio file and looks for consistent noise throughout the recording.

It is able to decipher what frequencies are being represented from speech, and which are factors of the environment.

We are able to process and affect each frequency band separately so as to remove unwanted noise from some areas of the recording, while minimally, if at all affecting other areas.

I have done a small amount of noise reduction on the areas where the main frequencies for human speech are not located.

This is to ensure that no speech is affected. Only the parts of the recording that may interfere with the clarity and intelligibility of the recording.



The third step in the process is using a multi-band compressor to reduce the dynamic range of specific frequency ranges of the recording.

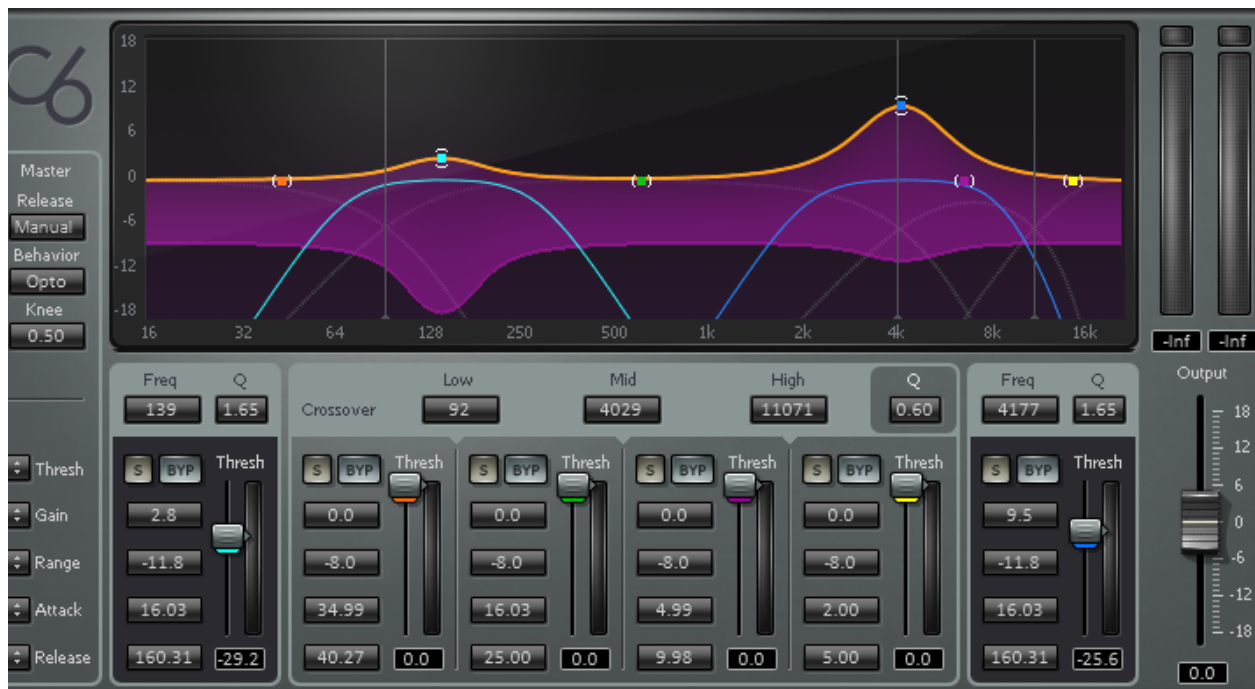
By compressing the louder portions of the conversation while leaving quieter parts relatively untouched, a more balanced and consistent level can be achieved throughout.

This helps to ensure that no important information is lost due to drastic volume variations.

A multi-band compressor allows you to independently process each frequency band, effectively reducing unwanted elements without affecting the clarity of desired speech.

By fine-tuning the compression settings for each band, you can achieve a more intelligible and focused audio representation.

Once the compression has been applied to each band at varying levels depending on their dynamic range, I increased the volume of each band with the goal of increasing clarity and intelligibility of the recording.



The final step in this process is applying a limiter.

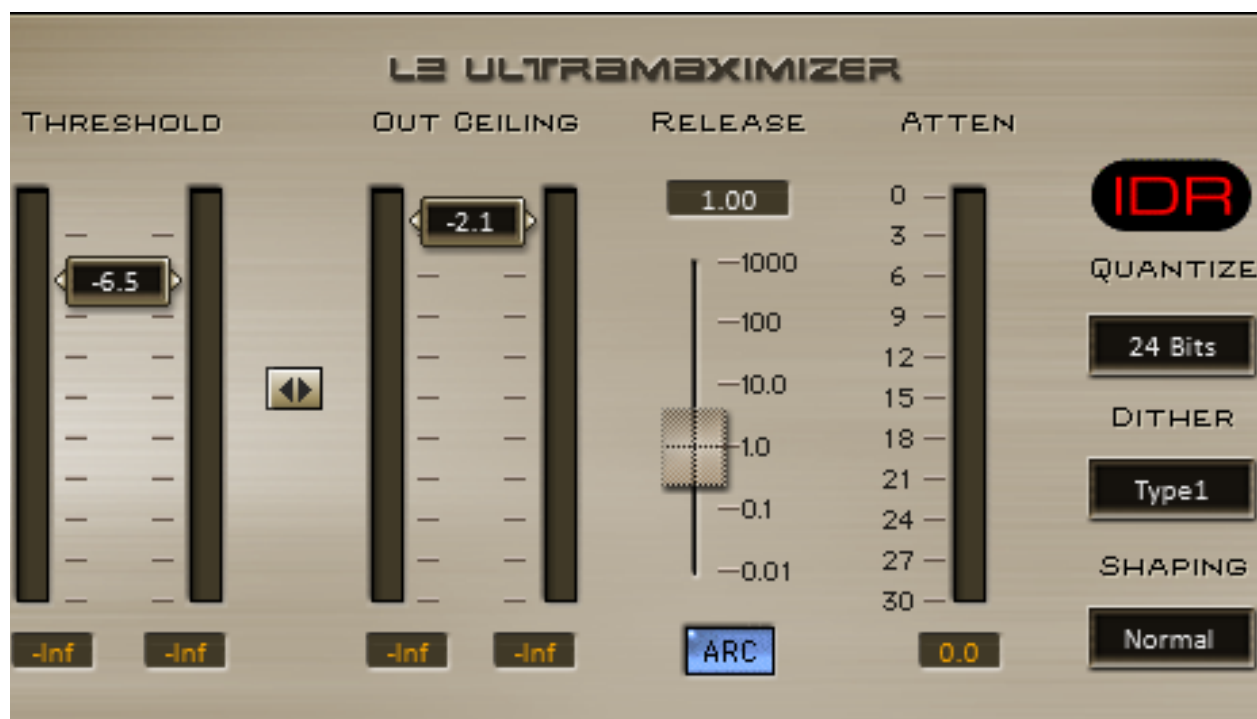
Limiters are used to increase perceived loudness by increasing the softest parts of an audio signal while also preventing the loudest parts from clipping and causing unwanted distortion.

We refer to the difference between the loudest parts of the recording and the softest parts as “Dynamic Range”.

When using this limiter, we limit the dynamic range of the recording.

This process facilitates the amplification of background voices and noises to a level more aligned with the primary content, enhancing their clarity and making them more audible.

This approach ensures a consistent playback level, eliminating the need for frequent volume adjustments.



FINDINGS

By employing the use of the above mentioned processing, the clarity and intelligibility of the recorded event and its participants has greatly increased.

It is important to note that all use of equalisation, limiting, compression and noise reduction processing **does not** remove or alter the conversation.

The application of these enhancement techniques resulted in notable improvements to the audio recording, allowing for clearer and more intelligible playback.

It is important to note that while these techniques have enhanced the overall quality of the audio, limitations may still exist due to the inherent characteristics and quality of the original recording.

In my professional opinion, after applying the audio enhancement, the recording's contents are much more legible.

To answer the questions posed by the ACFL:

1. *Does any part of any of the audio recordings have the crowd or any individual/s chant "gas the jews!".*

There is no instance within the audio recording where the crowd or any specific individual/s can be heard changing the phrase "gas the jews," based on my professional analysis of the recording.

2. *With reference to the part of the video that is subtitled "gas the jews!" Are you able to tell what words are used?*

Regarding the segment of the video subtitled as "gas the jews!". My professional assessment indicates that the words being vocalised are more accurately interpreted as "Where's the jews?" rather than "gas the jews!".

I have provided both the original audio and enhanced audio along with this report.

They are titled **FAA - ACFL ORIGINAL** and **FAA - ACFL ENHANCED**.

Date: 19/12/2023

A handwritten signature in black ink, appearing to be 'J.R. Per' or similar, written in a cursive style.

Signed: