



204 West 84th Street
New York, New York 10024
Vox 212-873-8772 Fax 212-873-7680
www.legalaudio.com

Frank Piazza
fpiazza@legalaudio.com

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Jack Arseneault
Arseneault, Whipple, Farmer, Fassett & Azzarello, LLP
560 Main Street
Chatham, NJ 07928

Re. Al Lanuto Audio and Video Analysis

Mr. Arseneault;

The following is a detailed analysis of my examination of a VHS copy sent to me by your firm. At your request, I was asked to enhance the audio throughout the recording for your client Al Lanuto. This work was completed on September 22. I was asked again to further enhance certain sections of the recording. Additionally, I was asked to fully analyze the recording and determine the location of the Police Officers at certain times in the video. I was also asked to determine whether Mr. Lanuto and others were inside his home or outside on his property at certain times in the video. This work was completed on October 2.

Most of this incident took place off-camera. Mr. Lanuto was able to share many details about the incident with me. This included a description of the house and property, photographs of the house and property and dimensions of the entryway leading into his home. While my work was limited to the findings and characteristics on the video, the additional information provided by Mr. Lanuto assisted me with my findings.

It is important to understand that my opinions and findings are based on this tape copy only. Having access to the original tapes, additional tapes, devices, recorders would enable me to perform a more detailed analysis. Although optional, you can consider this step of the analysis if release of these materials can be arranged.

My analysis is laid out into four categories: 1. Physical Inspection – examination of tapes, recorders, wires, interfaces, cases, devices, etc. 2. Computer Analysis – examination of materials using software, waveform analysis, spectral analysis, graphic and waveform

display. 3. Hardware analysis – use of external hardware such as oscilloscopes, microscopes, digital cameras. 4. Critical Listening – playback aided by enhancement, digitization, professional monitoring systems at our lab.

Physical Inspection:

The VHS tape was manufactured by FUJI. Jacket reads; “High Quality Videocassette.” There were no labels on the shell of the tape. My initials and date of inspection appears on the clear plastic cover of the tape. The tape was in excellent condition. Playback performed well in our video deck.

There were no original recording devices or original tapes available for inspection.

Computer Analysis:

The tape was digitized and enhanced. Video deck used was a Panasonic AG 7350. The host computer used is an IMAC G5, DUAL 2.8 MHz. The signal from this tape was played in real time through a Panasonic DVC 30 Digital Recorder and captured into a digital editing program called Final Cut. The audio file was converted and imported into an audio editing program called Pro Tools. Within Pro Tools numerous plugins and software programs enable me to enhance the audio and forensically inspect the file. Once captured to the hard drive I was able to generate a visual of the waveform for additional analysis as well (waveform analysis).

A spectral analysis, software program was used to generate images and graphics. This software is used to assist me in confirming my findings. Findings such as tape length, tape frequencies, reverb length, amplitude, gain changes, file type and size can all be determined through this and other software programs.

Hardware Analysis:

I am satisfied that this tape was a copy made from either the original tape or copy of the original. Use of an oscilloscope or microscope was not needed for this analysis.

Critical Listening:

This section tells me the most about the recordings on the tapes. I am able to recognize inconsistencies or suspect areas based on my experience with audio playback. Some other aspects about the background noise can assist me in my findings as well. These

overall findings are supported by waveform analysis and spectral analysis. Additional computer and hardware analysis will take place when necessary.

Findings:

My findings are based on the inside room tone, outside environment, microphone proximity and any of these combinations. Only one officer's microphone is live during this incident. I will refer to him as ofc1. The second officer's microphone is not recording this incident. I will refer to him as ofc2. There are numerous times throughout the tape where persons are inside the home and outside the home. While it is difficult to obtain exact measurements without physically visiting the site I am comfortable that my findings are sufficient. I was able to determine the length of reflection or reverb of the entryway in two ways. First, measuring the decay and length of the reverb through waveform analysis, comparison and critical listening. And, by using a RT60 (Reverb Time) chart/calculator to measure the reflection in that space taking into consideration wall materials, flooring, ceiling height, absorption, etc... The outside environment had a 98hz frequency boost or hum noise that was present many times during the recording. This frequency boost was not present while the microphone was inside the home.

Ofc2 confronts Mr. Lanuto numerous times as his voice and Mr. Lanuto are recorded by the microphone worn by ofc1. I am able to place ofc2 in certain locations based on my analysis. I am also able to place ofc1 in certain locations as well. I was sent a transcript of the incident and I made markings around the dialog to determine when the persons were outside and inside the home.

I was asked to pay particular attention to the opening sequence of the video where the officers are both walking toward the house and then are off-camera. At approximately 1:30 a conversation begins between Mr. Lanuto and the officers. At this point they are outside. At approximately 1:34 Mr. Lanuto turns his head away from the direction of the microphone **(transcript) "no, no, I don't want to stay outside."** At approximately 1:37 I notice from the audio characteristics that immediately follow **(transcript) "sir, sir, sir"** it is detectable that ofc2 is in the entryway of the house. Ofc1 remains outside, approaches the doorway and remains in the doorway while Mr. Lanuto and ofc2 converse. The presence of the audio changes. At times Mr. Lanuto is facing ofc1 and then turns away to converse with ofc2. The microphone proximity changes as it is clear that Mr. Lanuto and ofc2 turn toward each other. This exchange takes place in the entryway. Ofc1 remains in the doorway as his microphone records the conversation. Because the incident takes place off-camera I cannot determine whether or not ofc2 does enter the home sooner than my time indication of 1:37. It is possible ofc2 was walking a few feet in front of ofc1 and naturally arrived at the house a few seconds sooner. Again, my findings are based on the audio and the changes I detect throughout the recording. They remain in this position until 4:48 where they go outside **(transcript) "won't have a problem then"** Conversation continues outside until 7:44 **(transcript) "okay"** they go inside. They do not go outside again until 9:56 **(transcript) He wants to talk to you"** Ofc1 turns away from Mrs. Lanuto. Ofc1 and Mrs. Lanuto return inside at 11:38

(transcript) “Yes he does” Ofc1 and Mrs. Lanuto carry on a conversation until 13:56
(transcript) “You know what? I’m coming too.”

Details:

These calculations were arrived by waveform analysis, mathematical analysis and critical listening techniques. The reverb or room reflection samples (5) were taken from random locations on the recording.

Samples:

298 ms (milliseconds),

352 ms,

240 ms,

272, ms,

197 ms

Average reverb time 271 ms

Comparison of software-generated reverb time at 271 ms

Reverb measurement of dimensions in entryway:

76” X 55” X 168”

Gypsum walls, Wood composite door, stairwell landing, tile flooring

RT60 calculator = 530 milliseconds

Allowing for absorption (ofc 1 and ofc2, Mr. Lanuto, clothing, open door, carpet on stairwell, open wall beyond entryway, Mrs. Lanuto)

It is estimated that a range of 40 – 60% of the natural reverb length would change or decrease.

These findings enable me to confirm that the conversation did indeed take place inside the entryway at certain times on the recording.

Summary:

Based on my analysis of this file it is my opinion that a police officer did enter the home at certain points during the incident. Additional support is that ofc1 stood in the doorway while Mr. Lanuto and ofc2 conversed. There is no physical way two grown men in

uniform could stand side by side in a doorway and converse with Mr. Lanuto. Again, this is supported by microphone proximity to ofc1, the direction of ofc2's voice and the direction of Mr. Lanuto's voice. I am clearly able to detect room reverberation taking place inside the entryway.

On file, I will keep a CD Rom of computer snapshots of waveforms, graphics, JPEG images, documents and other supportive materials used to do my analysis. If you would like a copy of these materials please contact me and I will distribute a copy to you.

If you have any questions feel free to reach me.

Sincerely,

Frank Piazza
President, Legal Audio