

**BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO**

In the Matter of the Commission’s Investigation)	
Into RPA Energy, Inc dba Green Choice)	Case No. 22-0441-GE-COI
Energy’s Compliance with the Ohio)	
Administrative Code and Potential Remedial)	
Actions for Non-Compliance)	

**EXPERT TESTIMONY
OF**

JENNIFER E. OWEN

STAFF EXHIBIT ____

September 30, 2022

Farris Sales Call mp3

Call22

005103301_5137970051

Barbara Bossart_006133054_6144065912.

August 19 ,2022

Owen Forensic Services, LLC

Jennifer E. Owen

What is a video or audio forensic expert?

A Video/Audio Forensic Expert has the scientific knowledge, training, and expertise necessary to enhance and authenticate the video/audio recordings that are being used in a criminal or civil court case. The expert witness has previous court room experience testifying and helps the trier of fact understand the video/audio evidence that is offered in litigation.

What is Forensic Audio Analysis?

The scientific examination, comparison, and evaluation of recorded evidence in legal matters

Statement of Duty: “I understand that my duty as an expert witness is to assist the court by providing impartial, objective, unbiased and independent opinions uninfluenced by the party who has retained me or called me as a witness.

What is Audio Authentication?

“The purpose of this examination is to provide the background, technical considerations, and potential criteria upon which to conduct forensic authentic examinations of digital audio when its provenance and /or integrity is in question.” Included in this analysis is an analysis of whether the recording as presented is consistent with the device used at the time the was altered or modified.

“The term authentication is often used in a legal context to describe the establishment of a proper legal foundation for the admission of a recording as evidence into a judicial proceeding. This is generally accomplished by a party involved by a party involved in the events recorded or involved in the recording process affirming that the events heard during playback of the recording are consistent with that party’s recollection of the events as they transpired. When this is contested or cannot be accomplished, a scientific analysis may be conducted to test disputed claims concerning authenticity of the recording.”

SWGDE Audio Authentication Best Practices

Scientific Working Group of Digital Evidence

(Document attached in appendix)

The following images and recordings in this document are a true and accurate representation of the data acquired from The Public Utilities Commission of Ohio. The observations, analyses, and findings in this report are based on the data and documents that were provided by The Public Utilities Commission of Ohio.

Images may have been cropped or resized to fit the format of this document.

August 19, 2022

Barbara Bossart
Chief, Reliability and Service Analysis Division
Service Monitoring and Enforcement Department
614-466-0793
www.PUCO.ohio.gov

RE: Farris Sales Call/Call 22/005103301_5137970051/Barbara
Bossart_006133054_6144065912

Introduction:

My name is Jennifer Owen, and I am the President of Owen Forensic Services, LLC. I have a master's degree in Criminology and have attended training and continuing education for over 25 years in the areas of audio and video analysis. My Curriculum vitae is attached and can also be found online at www.owenforensicservices.com. My area of expertise is audio clarification and authenticity, video clarification and authenticity, imaging forensics, clarification and authenticity, voice comparison analysis, and speaker recognition. In this capacity, my work involves the scientific examination, comparison and evaluation and clarification of recorded evidence, which includes audio. I have been admitted as an expert in New Jersey, New York, Georgia, Kansas, and Florida several times in audio clarification and authentication, video clarification and authentication, image analysis and authentication.

Scope of Work: Owen Forensic Services has been retained to examine and authenticate the contents of the recording labelled: Farris Sales Call. mp3, Call22, 005103301_5137970051 and Barbara Bossart_006133054_6144065912.

These recordings were produced by Public Utilities Commission of Ohio via Share file.

Media Information and Metadata: the Farris Sales Call

MediaArea.net/MediaInfo

C:\Users\Uen Owen\Desktop\Barbara Bossart April 7th meeting\FARRIS SALES CALL.mp3

File

View

Options

Help

Language

1.6 new version is available

Diagrams website

C:\Users\Uen Owen\Desktop\Barbara Bossart April 7th meeting\FARRIS SALES CALL.mp3

General

Complete name: C:\Users\Uen Owen\Desktop\Barbara Bossart April 7th meeting\FARRIS SALES CALL.mp3

Format: MPEG Audio

File size: 1.34 MB

Duration: 11 min

Overall bit rate mode: Constant

Overall bit rate: 16.0 Kbps

Writing library: LAMEUUA_LAME3.99.5

Audio

Format: MPEG Audio

Format version: Version 2.5

Format profile: Layer 3

Duration: 11 min

Bit rate mode: Constant

Bit rate: 16.0 kbps

Channels(s): 1 channel

Sampling rate: 8.000 Hz

Compression mode: Lossy

Stream size: 1.34 MB (100%)

Writing library: LAMEUUA_LAME3.99.5

Frame: 111644

00:00:07.490

POS: 0

01:00

02:00

03:00

04:00

05:00

06:00

07:00

08:00

File Metadata

File Information

File Name FARRIS SALES CALL.mp3

File Size 1.34 MB

File Hash 4fda65aa7482c2ad573a102467bb4c33

Audio Stream # 1

Audio Codec mp3

Number of Channels 1

Audio Bit Rate 16000

Stream Hash 22fde5ceb110bed73fd13166b09586db

- All Hexadecimal Data can be furnished upon request for each file.

Metadata:

File Metadata

File Information

File Name FARRIS SALES CALL.mp3

File Size 1.34 MB

File Hash 4fda65aa7482c2ad573a102467bb4c33

Audio Stream # 1

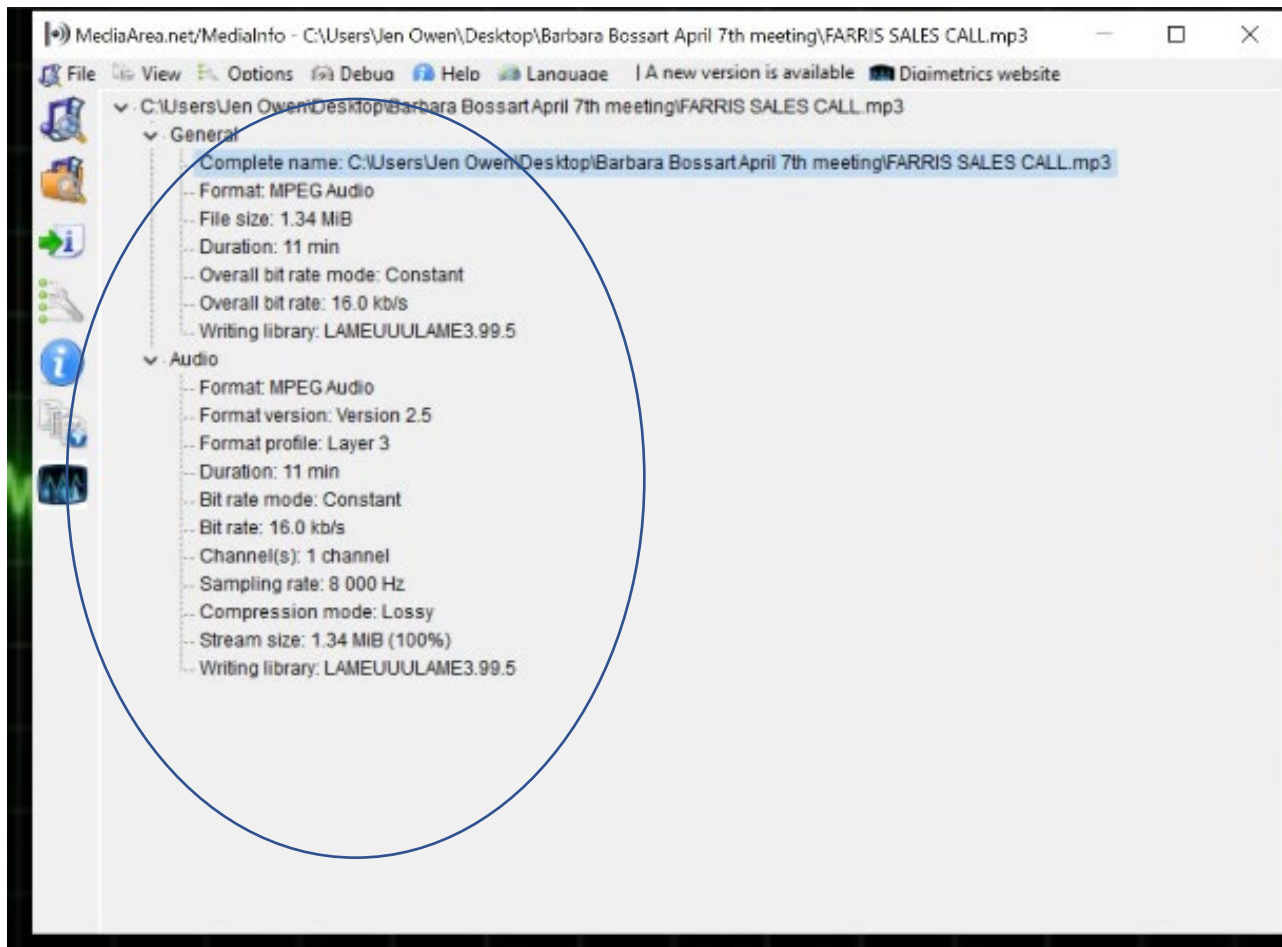
Audio Codec mp3

Number of Channels 1

Audio Bit Rate 16000

Stream Hash 22fde5ceb110bed73fd13166b09586db

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What is metadata and media information and why is it relevant?

Metadata is data about the data.

Metadata provides clarity about data origins and data histories, and ensures workflows and processes are properly followed and administered.

In other words, metadata organizes and tracks the entire digital lifecycle of important information, (data about the data) including the processes, procedures and users that affect it, providing a precise audit trail that can prove invaluable or mandatory, to your case at any point in time. Protecting and organizing this audit trail is yet another reason why metadata should be a cornerstone of your acquisition and retrieval strategy.

Hash Value, Hash Calc, (also called as Hashes or Checksum) is a string value (of specific length), which is the result of calculation of a Hashing Algorithm. Hash Values have different uses. One of the main uses of Hash Values is to determine the Integrity of any Data (which can be a file, folder, email, attachments, downloads). The most wonderful character of Hash Values is that they are highly unique. No two data can theoretically have same Hash Value.

The Hexadecimal Data is a system is comprised of 16 symbols: 0-9 and A-F. Typically it's used by programmers to condense and communicate large binary numbers easily. It's also used to communicate data about each file. It can aid in an investigation when you want to compare known and unknowns of particular make, model, date, time and other informative aspects about a file.

So why is audio authentication so important? If audio evidence is found to be altered, it is not an accurate representation of the events that occurred.

Media Information call (22).mp3

MediaArea.net/MediaInfo - C:\Users\Uen Owen\Desktop\Barbara Bossart April 7th meeting\call (22).mp3

FileViewOptionsDebugHeloLanguageA new version is availableDiigoMetrics website

C:\Users\Uen Owen\Desktop\Barbara Bossart April 7th meeting\call (22).mp3

General

Complete name: C:\Users\Uen Owen\Desktop\Barbara Bossart April 7th meeting\call (22).mp3

Format: MPEG Audio

File size: 1.08 MiB

Duration: 4 min

Overall bit rate mode: Variable

Overall bit rate: 30.4 kb/s

Writing library: LAME3.99r

Audio

Format: MPEG Audio

Format version: Version 2.5

Format profile: Layer 3

Duration: 4 min

Bit rate mode: Variable

Bit rate: 30.4 kb/s

Minimum bit rate: 8 000 b/s

Channel(s): 1 channel

Sampling rate: 8 000 Hz

Compression mode: Lossy

Stream size: 1.08 MiB (100%)

Writing library: LAME3.99r

Encoding settings: -m m -V 1 -q 0 -lowpass 4 --vbr-mt -b 8

Frame: 1Edit

00:00:08.625

POS: 0

01:0002:00

File Metadata

File Information	Audio Stream # 1
File Name call (22).mp3	Audio Codec mp3
File Size 1.08 MB	Number of Channels 1
File Hash 3ac5e5fb576971d1acd16bc0db842810	Audio Bit Rate 30394
	Stream Hash 7a218ce3bb4130cba5e0c3859ce95bc8

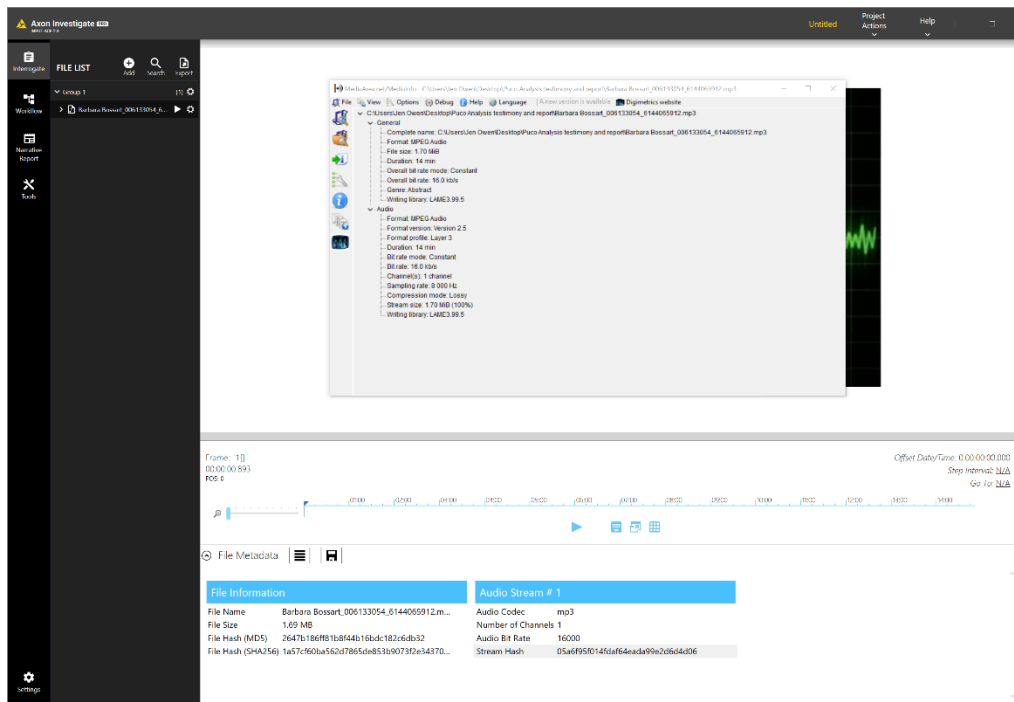
Media Information: 005103301_5137970051.mp3

The screenshot displays the INPUTACE media player interface. On the left is a dark sidebar with navigation icons for 'Interrogate', 'Workflow', 'Tools', and 'Settings'. The 'Workflow' section is active, showing a 'FILE LIST' with three items: '005103301_5137970051.mp3', 'ABRIS SALES CALL.mp3', and 'call (22).mp3'. The main window shows a preview of the selected file, '005103301_5137970051.mp3', with a waveform visualization. Below the preview is a timeline and a 'Frame: 1000000.248' indicator. At the bottom, a 'File Metadata' section is expanded, showing 'File Information' and 'Audio Stream # 1' details.

File Information	
File Name	005103301_5137970051.mp3
File Size	1.28 MB
File Hash	c966def7f221580324661e74a47bc51a

Audio Stream # 1	
Audio Codec	mp3
Number of Channels	1
Audio Bit Rate	16000
Stream Hash	990d549b566a885a06fdcca7eb316cca

Media Information: Barbara Bossart 006133054 6144065912.



Software for each phone call:

Undisclosed or Unknown for all four phone calls. The make, model, manual and software/hardware have been requested for all four phone calls by the company and vendor.

Software used in Analysis By Owen Forensic Services:

Axon Investigate 2.8

Media Info

Izotope RX9

File Integrity and Documentation

The process for authentication of digital audio recordings determines whether the recorded events were captured with integrity as well as can determine if the recording has been tampered with. In this age of digital audio, edits can be made and covered up very easily. There are free versions of audio editing software – such as Audacity or Wave pad– (and too many others to list) which are available online and can make edits that alter the events or conversations that originally occurred in digital audio recordings. In addition to editing applications, many recording devices like iPhones have editing capabilities directly in the Voice Memo app. These devices will leave behind clues that we analyze to determine the authenticity of a recording.

What we are seeing more of with the surplus of recorded audio evidence is mishandling of the recordings. Digital recordings are fragile by nature and contain delicate information that if not handled properly, can be stripped, altered, or deleted. This information is oftentimes crucial for investigation by an audio expert or the trier of fact.

When we provide authentication of digital audio recordings services, the first step is to establish a chain of custody. While it is the first step, a chain of custody does not, in and of itself, establish a recording as being authentic. I have seen audio evidence that was not authentic and was stored in a digital audio recorder.

1. The original recorder was not provided for inspection. The make and model were also not provided. The software and the systems that were requested were not provided.
2. Owen Forensic Services received no file verification or documentation upon receipt.
3. There was not an on-site inspection of the hardware or software. The make and model and manual of all recording systems software and hardware had been requested repeatedly and never produced.

Why is this such an important request?

4. Either from the obtained evidence recorder or from test recorders of the same manufacturer and model, test recordings can be made and compared against the evidence recording. In this way, the evidence can be assessed as to its consistency with a known, authentic file.

This digital information includes meta data, EXIF (exchangeable image file format) data as well as hexadecimal data. If a recording was loaded into a

software program capable of performing edits, there will often be a footprint left in the recording HEX information showing what software was used.

When examining the digital information, it is necessary to create an exemplar recording to compare the metadata with the original. An exemplar is a recording that is made in conditions that are as close to the original recording as possible, which include the same equipment and recording environment. Using this exemplar, the forensic expert can compare the metadata and HEX information of the two files. If there are inconsistencies in the data, that can also be a sign of tampering.

Owen Forensic Services Audio Authentication 12 Step Methodology

* Including but not limited to and in most cases only few of these methods are necessary depending on the relevance to the case, all scientifically peer reviewed methods listed below. This is a conformity of Best Practices that Owen Forensic Services has learned from various straining, associations and agencies but has adopted to reflect only Owen Forensic Services standard operating procedures.

1. Define the Scope & Purpose of Analysis.
2. Documentation of Evidence received.
3. Clarifying the request, assessing the request, and defining the test plan. File verification which includes, but which is not limited to file format analyses, and file structure. Hash, Hex, Media properties and other file format analysis.
4. Examination should include summary, assessment, and critical listening as well as viewing the Waveform display while listening and marking critical regions of interest for further exam.
5. Analyses: (Including but not limited to and in most cases only necessary depending on the relevance to the case, all scientifically peer reviewed methods listed below)
quantization level (QL)/Bit Depth analysis,
DC offset, long term spectral analysis, compression level analysis (CLA),
modified discrete cosine transform (MDCT) analysis, and electric network frequency (ENF) analysis. Waveform analysis, signal power, spectrographic analysis, butt-splice detection, and device verification.
6. Define the region of interest, suspect signatures, audio dropouts, all acoustic anomalies, and discrepancies. Use Markers to identify these regions.
7. Generate sample and test recordings. Use the same recorder app or device.
8. Compare anomalies found between the file in question and the sample recordings. Visually and audibly.
9. Take screenshots of the anomalies and compare digital signatures visually.
10. Make short term recordings that include the audio of both the file in question and the sample recordings.

11. Reporting Conclusions. Documenting components of examination, interpretation of observations and testing, presentation of relevant supporting data, and formulation of conclusions.
12. Preparation of a written report which conforms to the requirements of Rule 26 of the Federal Rules of Civil Procedure, and which satisfies Daubert standards for admissibility.

What is metadata and media information and why is it relevant?

Metadata is data about the data.

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Hash Value, Hash Calc, (also called as Hashes or Checksum) is a string value (of specific length), which is the result of calculation of a Hashing Algorithm. Hash Values have different uses. One of the main uses of Hash Values is to determine the Integrity of any Data (which can be a file, folder, email, attachments, downloads). The most wonderful character of Hash Values is that they are highly unique. No two data can theoretically have same Hash Value.

What is an acoustic anomaly?

An "anomaly" is a deviation from what is standard, normal, or expected. Anomalies can be categorized by type as follows:

1. Unusual noises or sounds, such as background, floor noise, inconsistent speech pacing, or a disconnect between a two-party conversation in terms of flow and pacing of a conversation.
2. Changes in the noise floor. The noise floor is a series of natural and electronic sounds that should be consistent throughout the recording. Some examples of noise floor can include, hum, HVAC, wind, hiss, and any other sounds or lack thereof that is not a part of the intended recording.
3. Visual inspection of a waveform can show signs of editing due to sudden breaks in the recording that can be seen, inversions in the waveform, breaks in the noise floor that can be seen visually. Changes in volume of the noise floor.

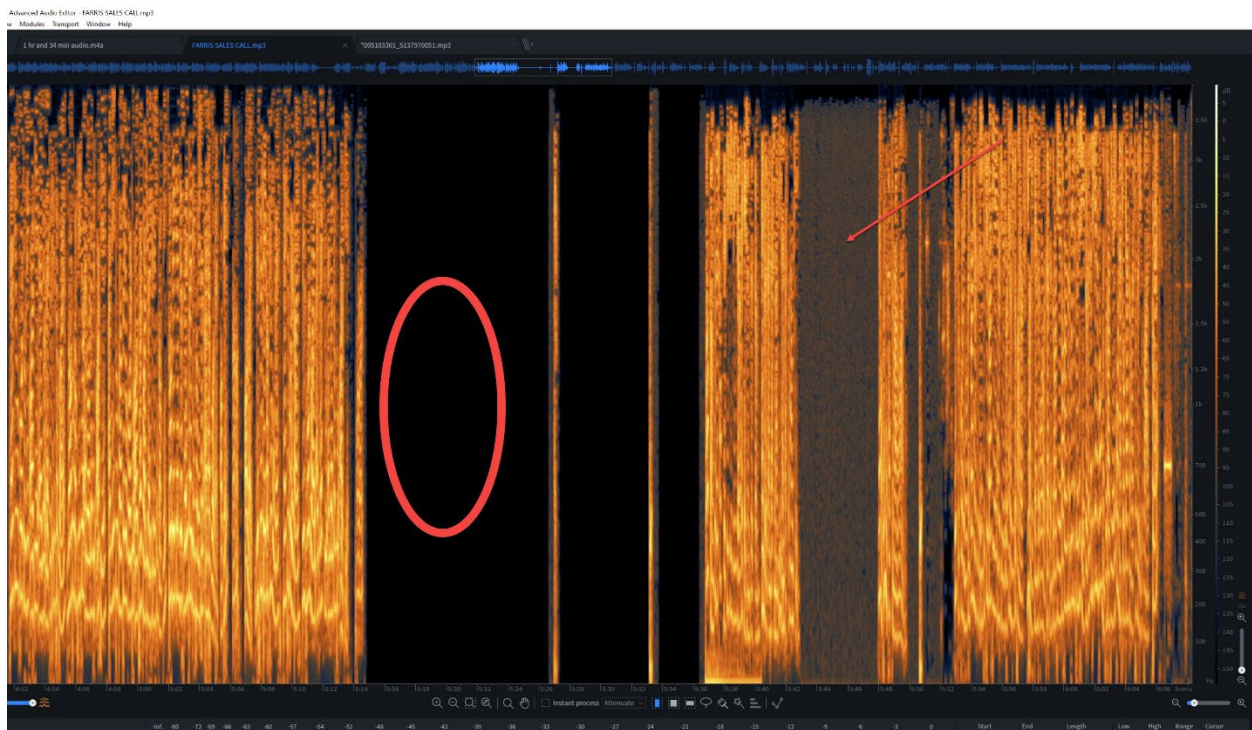
Findings:

The Farris Sales call, 005103301_5137970051.mp3, and Barbara Bossart_006133054_6144065912, appear to have similarities in their media info. They both have the same file format, audio bit rate, have one audio channel each, encoded by the same program for mp3's, and the same sampling rate. Call22 had different characteristics to its file and a different bit rate which suggests it may have been a different program or was exported or uploaded differently.

Acoustic Anomalies:

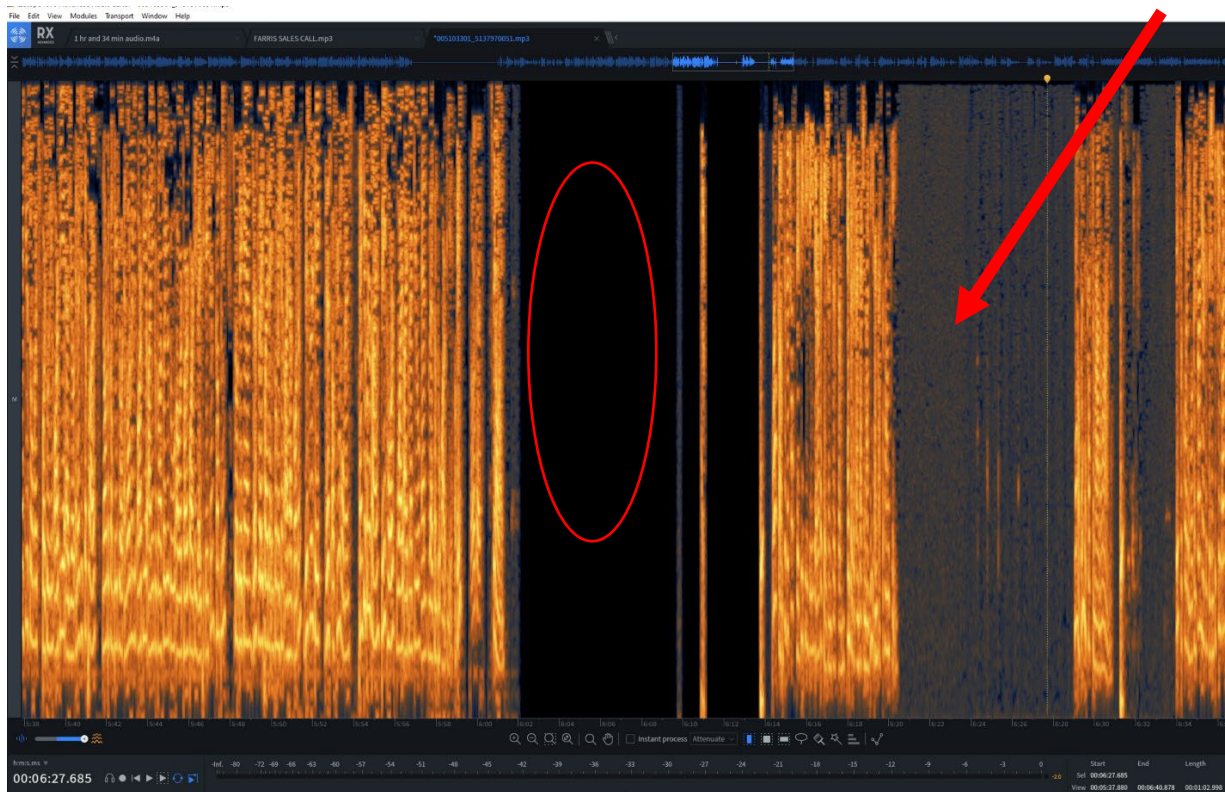
Looking at the waveform of the Farris recording, the arrow designates a section where the client was put on “hold” and their remained to have “floor noise and an audio signal that was present, even if it was one-sided. In several sections, that I labelled as acoustic anomalies (and is shown by the red circle) , there was complete lack of audio present. This is a picture of the Farris phone recording. The red circle indicates there was no “audio” from about 5:15 to 5:26 in the recording. This is a visual representation of what the audio “looks like” when different settings occur on the user end. All files show digital compression.

Farris:



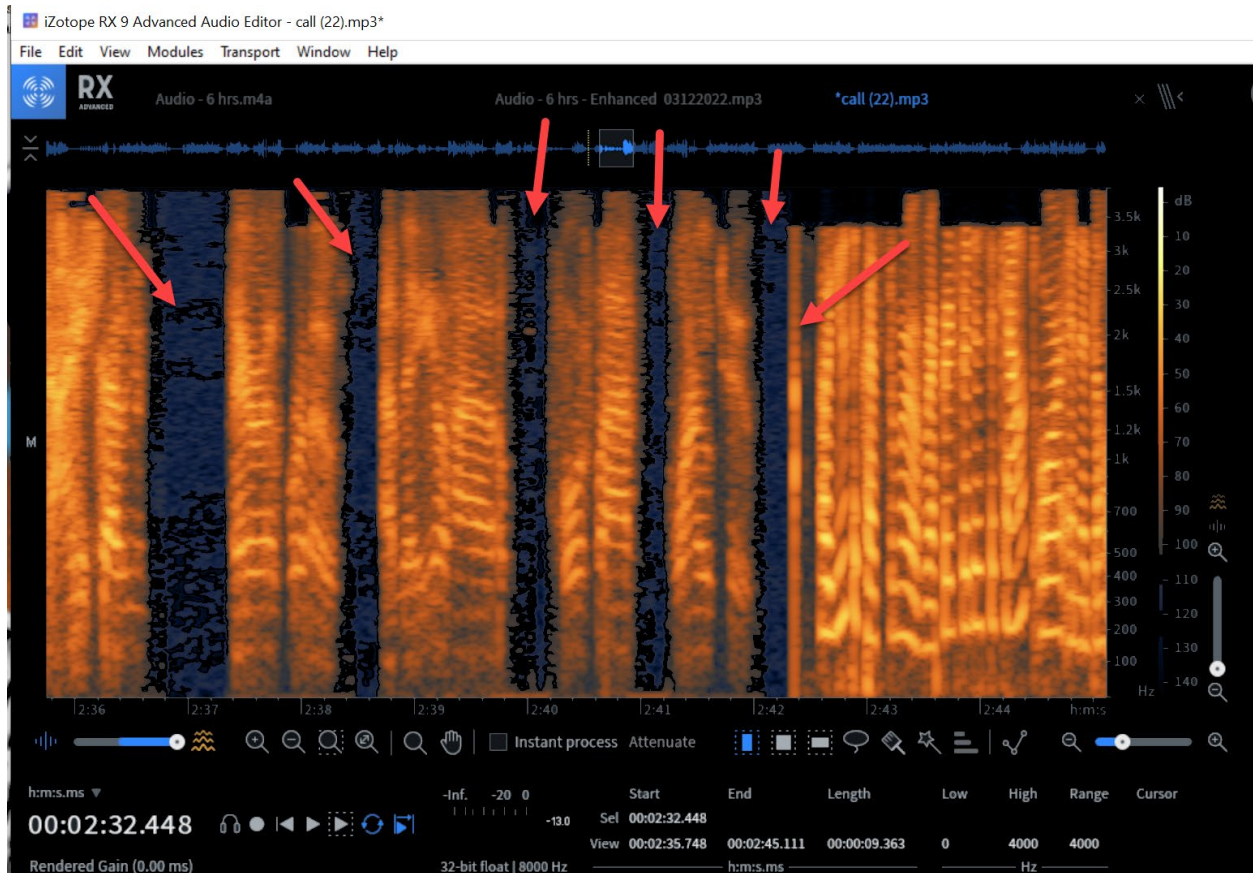
005103301_5137970051.mp3:

This phone call also has acoustic anomalies in the body of its recording. In this example there is no audio recording on either end, from 6:02 to about 6:10. Whereas there was still recording in the region of interest where the arrow is pointed in the Range of 6:20 to 6:27. Different functions (hold, mute, stop record etc.) leave different “signatures” on the waveform during a recording. This is one of many reasons it is imperative to know make, model and the complete audit trail of that file and its recorder to help authenticate and verify the integrity of the audio recording.

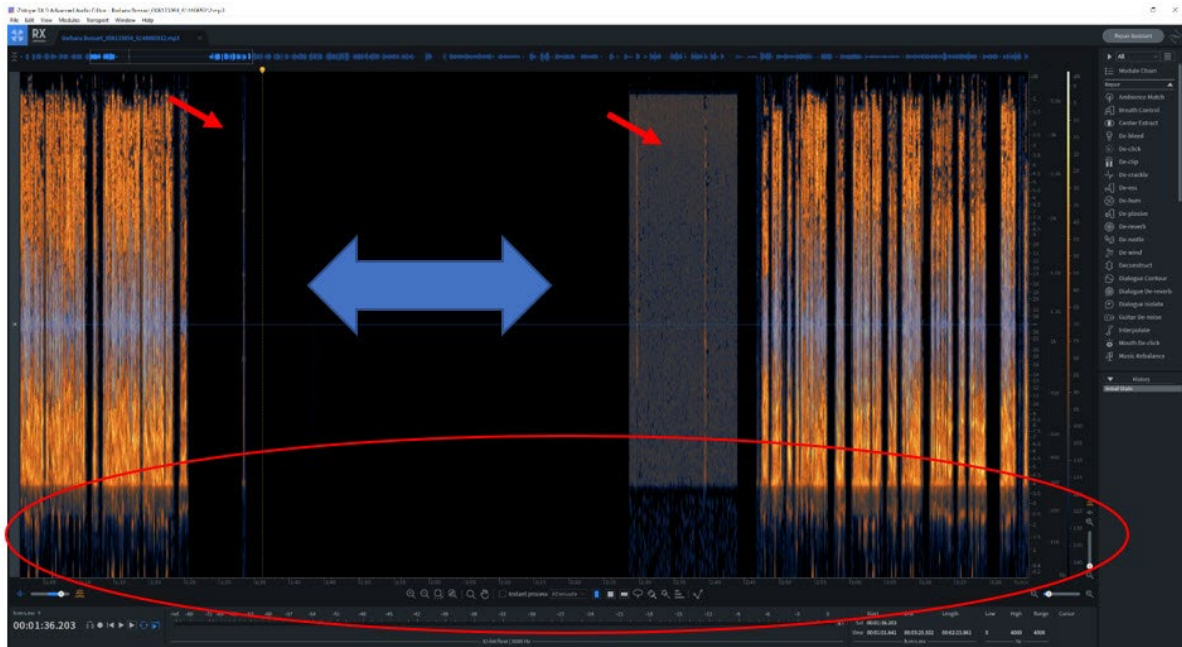


Call 22

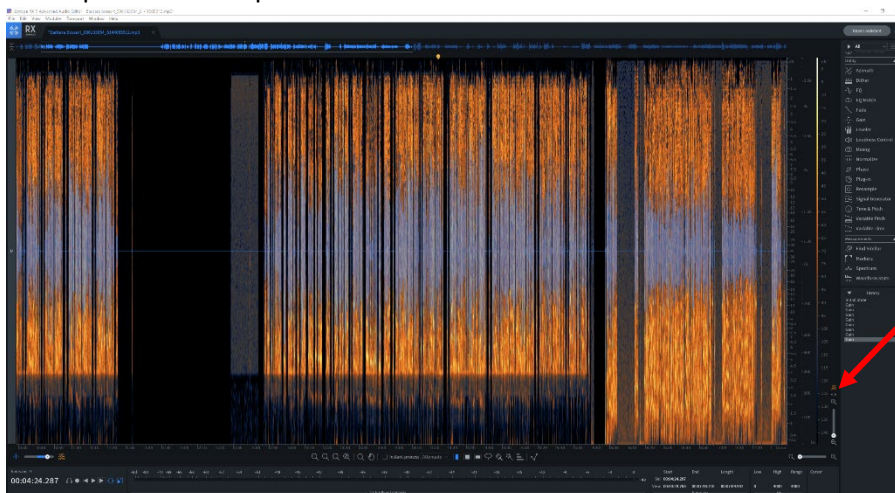
This recording was completely automated and here is the visual representation between speech which means it was actively recording during the whole phone call.



Media Information: Barbara Bossart 006133054 6144065912.



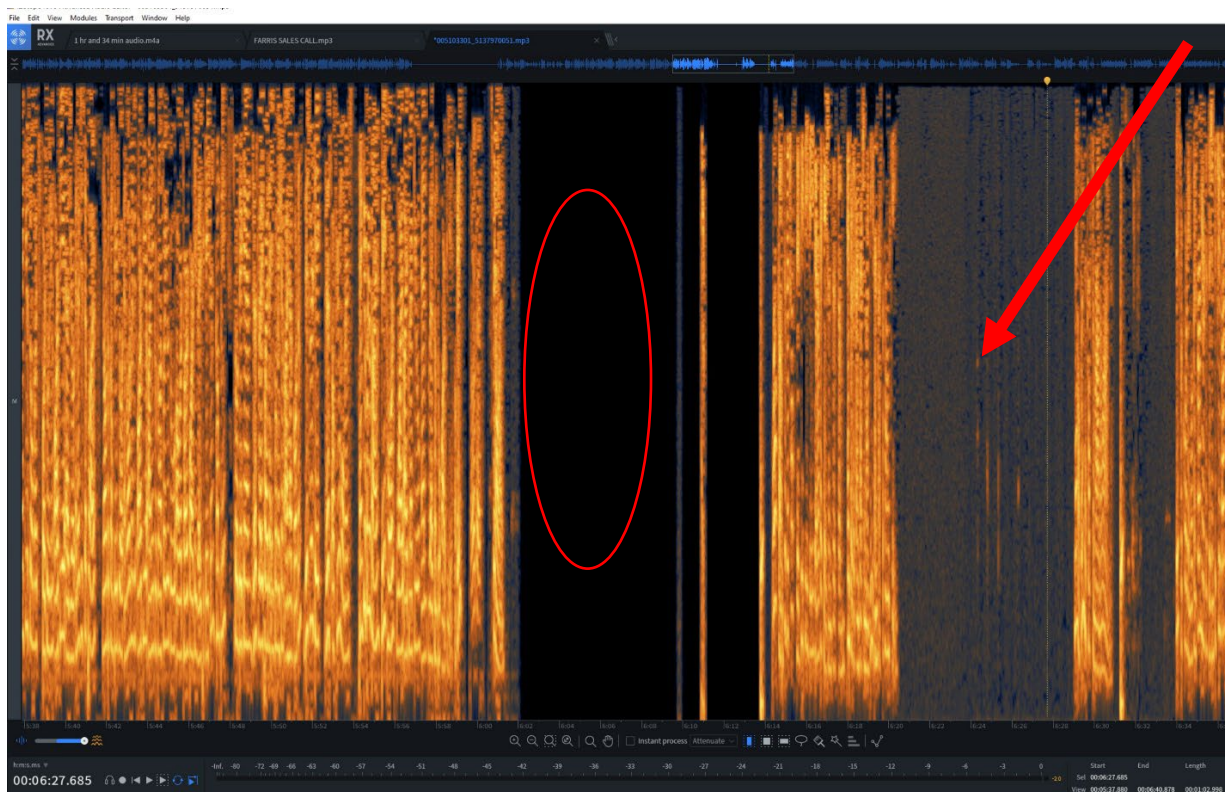
1. Both small red arrows are pointing to a place in the recording wherein between complete audio dropouts (no audio is recording) then a small portion indicates sound then complete absence of sound.
2. The space illustrated with the blue arrow is no audio present.
3. The circle highlights the lower frequencies of this recording, but it appears visually that there are possible modifications made to the lower frequencies in this part of the recording and differences in the digital compression. The snapshot below demonstrates the frequencies during a later portion of the phone call.



Findings:

Looking at the waveform of the Farris recording, the arrow designates a section where the client was put on “hold” and their remained to have “floor noise and an audio signal that was present, even if it was one-sided. In several sections, that I labelled as acoustic anomalies (and is shown by the red circle), there was complete lack of audio present. This is a picture of the Farris phone recording. The red circle indicates there was no “audio” from about 5:15 to 5:26 in the recording. This is a visual representation of what the audio “looks like” when different settings occur on the user end. Different functions (hold, mute, stop record etc.) leave different “signatures” on the waveform during a recording. This is one of many reasons it is imperative to know make, model and the complete audit trail of that file and its recorder to help authenticate and verify the integrity of the audio recording.

All files show digital compression.



Critical Listening Summary of Farris phone call:

Owen Forensic Services listened to all the recordings to observe any discontinuities in the conversation. It is also imperative to note any answers or questions that are not “normal” or seem out of place in the context of the conversation. For example, a Sales representative asks at two minutes and four seconds in the Farris Call “does that sound good to you?” and the customer responds “yes, it is”. This is an odd response to that question; it does not mean a modification, but it does warrant being noted.

Summary:

It is extremely problematic for this Forensic examiner to reach a definitive position on whether modifications, alterations, additions, and deletions occurred in the recording if the opposing party withholds information that can help identify the acoustic anomalies as such.

Conclusion:

I have reached this conclusion with professional certainty. As the investigation continues, I reserve the right to amend my report. I am ready, willing, and able to testify to the foregoing conclusions.

Respectfully Submitted,

A handwritten signature in black ink that reads "Jennifer E. Owen". The script is cursive and fluid, with the first letters of each word being capitalized and prominent.

Jennifer E. Owen

Appendix:

SWGDE Best Practices for Digital Audio Authentication.
(Click link to view)



SWGDE-Best-Practice
s-for-Digital-Audio-Au

**This foregoing document was electronically filed with the Public Utilities
Commission of Ohio Docketing Information System on**

9/30/2022 3:51:52 PM

in

Case No(s). 22-0441-GE-COI

Summary: Testimony Expert Testimony of Jennifer E. Owen electronically filed by
Mrs. Kimberly M. Naeder on behalf of PUCO