



# **The Evidential Value of Audio Files and Its Acceptability in Court: A Review of the Legal and Technical Considerations**

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## **ABSTRACT**

This paper reviews the legal and technical considerations regarding the evidential value and admissibility of audio files in court. The use of audio recordings as evidence has become increasingly prevalent in legal proceedings, particularly in criminal cases, where they can provide crucial information and context to help determine the facts of a case. However, the admissibility of audio evidence is subject to strict rules of evidence, and there are technical challenges that must be addressed to ensure its reliability and authenticity. This paper explores the context of the admissibility of audio evidence and the technical considerations that must be taken into account, such as the recording quality, the chain of custody, and the methods used for analysing the recording. The paper concludes with a discussion of the current challenges and future directions for the use of audio recordings as evidence in court.

Keywords: Audio files, Court admissibility, Legal & Technical consideration, Party consent, evidential value.

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## **1. Introduction**

The use of audio files as evidence in legal proceedings has become increasingly common in recent years. The use of audio files presents several advantages over other forms of evidence, such as written documents or witness testimony. Audio recordings can capture conversations and other events with greater accuracy and reliability than human memory. Additionally, they provide an objective record of events that can be used to corroborate witness testimony. [1] When using audio files as evidence in court, there are several key legal considerations to keep in mind. Firstly, the recording should be authentic and correct; there should be no changes, additions, or deletions made to the recording. Secondly, the recording must have been preserved in a manner that can be shown to the court. Thirdly, the speakers must be identified. Additionally, it is important to be aware of the consent laws in your state, as some states follow a "two-party consent" law for audio recordings. Audio records obtained without consent are generally not admissible in court as evidence. Finally, if an audio recording is admissible, the court will deploy a jury to look at it, but only if it meets certain requirements and is not just an isolated portion of the recording. [2] The evidential value of audio files and their acceptability in court is a topic that requires consideration of both legal and technical aspects. This review paper aims to provide an overview of the legal and technical considerations surrounding the use of audio files as evidence in court. The paper draws on existing literature to discuss the probative value of evidence, the admissibility of audio files in court, and the technical considerations that affect the reliability of audio files. The review also highlights the challenges that arise in the use of audio files as evidence, such as the need for proper authentication and the potential for manipulation. Overall, this review paper provides a comprehensive analysis of the evidential value of audio files and their acceptability in court and highlights the importance of considering both legal and technical aspects in the use of audio files as evidence. [3] Audio evidence can often be one of the most important pieces of evidence in a case, so it should always be given a great deal of attention. The most common way people create digital audio evidence is by using digital audio recorders. Law enforcement will often use them for interrogations and confessions, and sometimes even out in the field as a backup for their dashcam or bodycam. People outside of law enforcement use them for creating audio evidence as well. Concealed audio recordings are not always legal. Federal law states that creating an audio recording only requires one person's consent, but some states follow a 'two-party consent' law. This law means that all parties who are on the recording must give permission to the person recording in order for it to be used as evidence in court. I highly suggest looking into your own state's laws regarding concealed audio recordings before making one.

### **1.1 Legal considerations**

The rules of evidence apply to the admissibility of audio files as evidence in court. These rules vary depending on the jurisdiction but generally require that the evidence be relevant, reliable, and authentic. Additionally, the evidence must not be unfairly prejudicial or misleading. One of the challenges of using audio files as evidence is establishing their authenticity. The court must be satisfied that the recording is a true and accurate representation of the events that occurred. This requires establishing the chain of custody of the recording and ensuring that it has not been tampered with or altered in any

way [5]. Another challenge is ensuring that the recording is not unfairly prejudicial or misleading. This requires careful consideration of the context in which the recording was made and the events that led up to it. For example, a recording of a heated argument may be admissible as evidence, but it may be misleading if it does not provide the full context of the conversation.

- ***Two-party consent***

India is a two-party consent nation, according to which both parties should give legal consent to the audio being recorded and used. Consent after the fact is not sufficient. Consent must be granted before the recording takes place. Article 21 of the Constitution of India quotes, "It is illegal for any person, business entity, or state or local government to conduct private communications or conversations between two or more individuals without getting the prior consent of all the parties to the communication or conversation. The ban on recording or intercepting private communications applies to communications transmitted by telephone, radio, telegraph, or any other device" [6].

- ***Exceptions to two-party consent***

There are several exceptions to the general rule that requires the prior consent of all parties to the conversation or communication. These exceptions include:

- a. The conversations and communications reporting an emergency, like a disaster, fire, disaster, or medical crisis
- b. The communications and conversations include unlawful requests or demands, such as threats of bodily harm, extortion, blackmail, etc.
- c. Anonymous or highly inconvenient harassing conversations or communications
- d. Communications by a barricaded person or someone who is holding someone hostage.
- e. Also, different rules apply to the media and to people who have announced to all the participants in the conversation or communication that the event will be recorded.

## ***1.2 Technical considerations***

In addition to the legal considerations, there are also technical considerations that must be taken into account when using audio files as evidence. One of the main technical considerations is the quality of the recording. The recording must be clear and of sufficient quality to allow for accurate transcription and analysis [7]. Another consideration is the equipment used to make the recording. The court may require evidence of the type of equipment used and whether it was properly maintained and calibrated. This is particularly important if the recording was made in a noisy environment or if there are other factors that could affect the accuracy of the recording. Finally, the method used to transcribe the recording must also be taken into account. Transcription errors can lead to inaccuracies in the evidence, so it is important to use a reliable and accurate transcription method. When creating a digital audio recording that is going to be used in court, there are many things one should be aware of before making the actual recording. When preparing to make an audio recording, regardless of whether it is a concealed recording or an interrogation recording, the user should always look at the settings of the digital audio recorder [8-9]. Two major settings determine the quality of a digital audio recording: sample rate and bit depth. Together, these settings also determine the bit rate of a recording. Changing these settings will affect both the quality of the audio recording and the amount of space used on the digital recorder. When creating digital audio evidence, it is necessary to balance these two in order to get a high-quality recording while optimising the amount of space on the digital recorder. Thankfully, many digital audio recorders will record in lossy compressed formats like MP3 files, which take up much less space and don't sacrifice a lot of quality. When recording digital audio in MP3 file format, the two key settings to pay attention to are the sample rate and the bit rate. The sample rate will ultimately determine the range of frequencies the recorder picks up. At least two samples are needed to record any frequency, which means the sample rate must be twice as high as the highest frequency you need to record. The range of human hearing is roughly between 20 Hz and 20 kHz. Typical audio recordings are done at 44.1 kHz to capture the full range of human hearing. While this is standard for music and other professional recordings, it is not always necessary for audio evidence. The most fundamental frequencies of the voice are between 100 and 500 Hz, with some of the most important harmonic content between 1 kHz and 4 kHz. This means that a sample rate as low as 8 kHz can sometimes be adequate for recording a conversation, which will also save a large amount of space on the digital recorder.

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## **2. Methods used in recording samples**

Voice recording plays a crucial role in forensic analysis, aiding in the identification, analysis, and interpretation of audio evidence. Over the years, both conventional and modern methods have been used to record voice samples for forensic purposes. Let's explore the characteristics and techniques associated with each method.

### ***2.1 Conventional Methods***

Conventional methods were widely used in the past but have largely been superseded by modern digital recording methods due to advancements in technology and audio quality. Conventional methods for recording a voice sample for forensic analysis refer to the traditional techniques and technologies that were commonly used in the past. These methods involved analog recording technologies, such as tape recorders and cassette. It's worth noting that

while these conventional methods were widely used in the past, they have largely been surpassed by modern digital recording methods. The advancements in digital technology, such as digital audio recorders and smartphone apps, have provided higher fidelity, greater convenience, and more advanced analysis capabilities for voice recordings in forensic analysis.

- **Analog Tape Recorders:** In the past, analog tape recorders were commonly used for voice recording in forensic investigations. These devices captured sound waves onto magnetic tapes. However, analog recordings were prone to degradation and noise interference, leading to reduced audio quality over time. Analog tape recorders use magnetic tapes to capture voice recordings. The sound waves are converted into electrical signals and magnetically imprinted onto the tape.

*Advantages:* Portable, widely available, and relatively simple to use.

*Disadvantages:* Susceptible to degradation over time, vulnerable to noise interference, limited audio fidelity.

*Example:* Reel-to-reel tape recorders

- **Cassette Recorders:** Cassette recorders became popular in the mid-20th century. These portable devices used compact cassettes to record audio. While they offered convenience, cassette recordings suffered from limited frequency response and inherent tape hiss, which affected the accuracy of forensic analysis. Cassette recorders employ compact cassette tapes to record audio. The tapes contain a thin magnetic strip that stores the sound waves.

*Advantages:* Portable, easy to handle, and widespread during their era.

*Disadvantages:* Limited frequency response, inherent tape hiss, reduced audio quality.

*Example:* Cassette tape recorders like the Sony Walkman.

- **Mini-Disc Recorders:** Introduced in the 1990s, mini-disc recorders utilized a magneto-optical disc to store digital audio data. They offered improved audio quality compared to analog tape and cassette recorders. However, mini-discs had limited popularity and have largely been replaced by more advanced digital recording methods. Mini-disc recorders use magneto-optical discs to store digital audio data. The audio is recorded and read by a laser onto a small optical disc.

*Advantages:* Improved audio quality compared to analog recordings, smaller form factor.

*Disadvantages:* Limited popularity, proprietary format, the decline in usage due to advancements in digital recording.

*Example:* Sony Minidisc recorders.

## 2.2 Modern Methods

**Digital Audio Recorders:** Digital audio recorders have revolutionized voice recording in forensic analysis. These devices use built-in microphones to capture audio signals and convert them into digital data. Digital recordings offer higher fidelity, clarity, and the ability to store vast amounts of audio in various formats. They also provide metadata, such as time stamps, which aids in investigation and analysis. Modern methods for recording voice samples for forensic analysis involve the use of advanced technology and techniques to capture high-quality and reliable voice recordings. These recordings play a crucial role in various forensic applications, including speaker identification, voice comparison, audio authentication, and transcription analysis. Here are some of the key components and methods used in recording voice samples for forensic analysis:

- a. **Smartphones and Mobile Apps:** With the widespread adoption of smartphones, they have become valuable tools for voice recording in forensic applications. Numerous mobile apps offer high-quality audio recording capabilities, often leveraging the device's built-in microphones. Smartphone recordings are easily accessible, shareable, and can be quickly integrated into forensic analysis workflows.
- b. **Forensic Audio Workstations:** Forensic audio workstations are specialized software applications designed for voice analysis and enhancement. They allow forensic experts to manipulate, filter, and enhance audio recordings to extract valuable information, reduce background noise, and improve intelligibility. These workstations often include advanced tools for speaker identification, voice comparison, and transcription.
- c. **Acoustic Forensic Techniques:** In addition to direct voice recording, acoustic forensic techniques are used to capture and analyze audio evidence indirectly. These methods involve techniques like gunshot analysis, room impulse response measurement, or audio surveillance systems. They enable experts to reconstruct audio events, determine the location of the sound source, and enhance the overall understanding of the forensic context.
- d. **Acoustic Authenticity Analysis:** Modern methods also involve analyzing the authenticity and integrity of voice recordings. Forensic experts employ techniques such as voice spectrography, voice biometrics, and voice watermarking to verify the genuineness of audio evidence and detect potential tampering or manipulation.

It's important to note that regardless of the recording method used, proper documentation of the recording process, including the equipment used, the recording environment, and any potential limitations or issues, is crucial in maintaining the integrity and admissibility of audio evidence in legal proceedings.

### 2.3 Advancements in analysing voice

- **Audio Equipment:** Forensic audio recordings require high-quality audio equipment to capture accurate and clear voice samples. This includes professional-grade microphones, audio interfaces, and recording devices. Condenser microphones are often preferred for their sensitivity and ability to capture a wide frequency range.
- **Controlled Recording Environment:** To minimize background noise and interference, voice samples are typically recorded in controlled environments, such as soundproof rooms or anechoic chambers. These environments help ensure that the recorded voice is the primary sound source, making it easier to extract relevant information during forensic analysis.
- **Multi-Channel Recording:** Modern recording techniques involve the use of multiple microphones placed strategically to capture audio from different angles. Multi-channel recording provides additional information for analysis, such as capturing spatial characteristics of the voice, which can be useful in forensic investigations.
- **Digital Recording:** Analog recording methods have largely been replaced by digital recording techniques, which offer several advantages. Digital recordings provide higher fidelity, better signal-to-noise ratio, and allow for more precise analysis and manipulation of the audio data.
- **Sampling Rate and Bit Depth:** The sampling rate and bit depth of the recording affect the quality and accuracy of the captured voice samples. Higher sampling rates (e.g., 44.1 kHz or 48 kHz) and bit depths (e.g., 16-bit or 24-bit) are commonly used in forensic audio recordings to ensure accurate representation of the original voice.
- **Chain of Custody:** Maintaining a proper chain of custody is essential in forensic analysis. This involves documenting and securely storing the voice recordings, ensuring their integrity and preventing tampering. It includes details about the time, date, location, and individuals involved in the recording process to establish the authenticity of the evidence.
- **Non-Invasive Techniques:** In certain situations, it may be necessary to obtain voice samples from individuals without their consent or knowledge. Non-invasive techniques include recording conversations using concealed microphones or employing remote surveillance techniques. However, the legal and ethical aspects of such techniques vary depending on the jurisdiction.
- **Forensic Transcription:** Once the voice samples are recorded, forensic transcription may be performed to convert the audio data into written form. This involves using specialized software and trained professionals to transcribe and document the spoken content accurately. Forensic transcription is essential for further analysis and documentation purposes.
- **Audio Enhancement:** In some cases, audio enhancement techniques may be applied to improve the quality and intelligibility of the voice recordings. These techniques involve the use of specialized software tools to reduce background noise, filter out unwanted frequencies, and amplify specific parts of the audio signal while maintaining its integrity.

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### 3. Evidential value

- According to Section 65B of the Indian Evidence Act 1872, any information contained in an electronic record that is printed on paper, stored, recorded, or copied on optical or magnetic media produced by a computer shall be deemed a document and be accepted in court as digital evidence.
- Despite the challenges associated with using audio files as evidence, they can provide significant evidentiary value in court. Audio recordings can capture conversations and events with greater accuracy and reliability than human memory. Additionally, they can provide an objective record of events that can be used to corroborate witness testimony. [10]
- However, the evidential value of audio files is dependent on several factors, including the quality of the recording, the authenticity of the recording, and the context in which the recording was made. It is important to carefully consider these factors when using audio files as evidence in court.
- The evidential value of audio files has become increasingly significant in legal proceedings, especially in criminal cases. Audio recordings can provide crucial evidence, including confessions, witness statements, and other conversations that can help establish the facts of a case. However, the use of audio recordings as evidence requires careful consideration of both legal and technical issues.
- From a legal standpoint, the admissibility of audio recordings as evidence depends on several factors, including chain of custody, authentication, and quality control. The chain of custody refers to the documentation of who has handled the recording and when, which is essential to establishing its authenticity and reliability. Authentication involves proving that the recording is what it purports to be and that it has not been tampered with. Quality control ensures that the recording is of sufficient quality to be admissible and that it accurately reflects what was recorded.

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#### 4. Discussion with case study

The use of audio files as evidence in court presents several advantages over other forms of evidence. However, the use of audio files is not without its challenges. Legal and technical considerations must be taken into account when using audio files as evidence, including the authenticity of the recording, the quality of the recording, and the context in which it was made. When used appropriately, audio files can provide significant evidential value in court and help to ensure a fair and just legal process. In conclusion, the evidential value of audio files and their acceptability in court require consideration of both legal and technical aspects. Audio recordings must meet certain legal requirements to be admissible in court, including being authentic and correct, having no changes, additions, or deletions, being preserved in a manner that can be shown to the court, and having the speakers identified. Additionally, the consent laws in your state must be followed, and it is important to know the law before making an audio recording. The admissibility of sound recordings of conversations can be authenticated in four different ways, and a proper foundation must be laid. The court must be satisfied that the recording is accurate, authentic, and generally trustworthy. Finally, it is recommended to make a transcript of the recording or get someone else to do it, as it can be helpful for the court to be able to read what was said in the recording. Overall, it is important to consider both legal and technical aspects in the use of audio files as evidence in court. The evidential value of audio files and their acceptability in court is an important topic that requires both legal and technical considerations. While audio recordings can provide valuable evidence in legal proceedings, their reliability and authenticity must be established through proper handling, storage, and analysis. Various legal and technical issues can impact the admissibility of audio recordings as evidence in court, such as chain of custody, authentication, and quality control. It is essential for legal practitioners, technical experts, and law enforcement officials to work together to ensure that audio recordings are collected and processed in a manner that adheres to established standards and procedures. With the increasing use of audio recording technology in everyday life, the importance of understanding the evidential value of audio files and their acceptability in court is becoming more critical. As such, it is imperative for legal professionals and technical experts to stay up-to-date with the latest legal and technological advancements in the field to ensure that audio recordings are used effectively and ethically as evidence in court. In addition to legal issues, technical considerations are also important in determining the evidential value of audio files. The quality of the recording, the equipment used to make the recording, and the methods used to store and process the recording can all affect its admissibility as evidence. For example, if the recording is of poor quality or the equipment used to make the recording was not properly calibrated, the recording may not be reliable enough to be admissible. One challenge to using audio recordings as evidence is the potential for manipulation or fabrication. Digital technology has made it easier to alter or fake audio recordings, which can undermine their credibility in court. As a result, forensic experts may need to analyse the recording to determine whether it has been tampered with or manipulated. Overall, the evidential value of audio files and their acceptability in court require careful consideration of both legal and technical issues. Legal professionals and technical experts must work together to ensure that audio recordings are collected, stored, and analysed in a manner that adheres to established standards and procedures. By doing so, they can help ensure that audio recordings are used effectively and ethically as evidence in court.

##### *The Watergate Scandal of 1970 (case study):*

In the mid-1970s, the Watergate scandal had several legal ramifications. In 1973, with the help of White House aide Andrew Butterfield, US President Richard M. Nixon installed an audio recording system inside the White House and elsewhere. As a result of the executive office building, US District Judge John J. Sirica ordered that the recording be handed over to the District Court of the District of Columbia for transcription. During the subsequent investigation in 1974, it was discovered that there was a recording of a conversation between President Nixon and his chief of staff at the White House from 1972, which included the participation of a registered staff member, H.R. Haldeman, in a segment of approximately 1812 minutes that was completely garbled by a buzzing noise, possibly due to a tape malfunction or deliberate erasure of that portion of the recorded conversation. The question before the court was whether the gap was due to a malfunction or a deliberate action taken after the recording.

The Chief Justice Sirika appointed a group of technical experts to include a special on the White House tape advisor panel to prepare and implement a complete physical analysis of the tape, including the production of magnetic signals on the tape, magnetic signals generated by tape playback, acoustic signals, and the quality of recording devices used to produce magnetic signals on the tape. The magnetic signals were used to produce patterns on the tape. After a set of tests and examinations, the panel concluded that the 18-minute gap was caused by an overlapping tape with a specific model of magnetic erase head passing over the tape that was different from the recording device used to make the original recording. The panel's tests clearly demonstrated the magnetic pattern on the tape's specificity, recording devices available for recording, and erase heads. The work done by the White House tape advisor panel was highly effective in the field of audio forensics. The panel's methodology is now widely accepted. [12]

Procedures followed in analysing this case:

- Observe the entire length of the tape (or other data storage medium).
- The integrity of the storage medium should be recorded to enhance its integrity.
- The recording should be continuous with no unexplained stop/start sequences or erasures, and verify it.
- perform critical listening of the entire tape.
- non-destructive methods to be applied to save the original evidence.

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