SWGDE Practical Considerations for Submission and Presentation of Multimedia Evidence in Court

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Table of Contents

1. Purpose

Multimedia evidence is commonly presented in court and is increasingly becoming a prolific form of evidence in judicial proceedings. Multimedia evidence can have a profound impact on a proceeding by providing clarity to the trier of fact. This document provides guidance and practical considerations for participants in court proceedings to ensure that multimedia evidence is submitted and presented in an optimal manner. For the purposes of this document, multimedia evidence refers to audio, video, images, and associated metadata, which may be in digital or analog format.

2. Scope

For the purposes of this document, personnel retrieving and/or examining the multimedia evidence will be referred to as "practitioners." This document's audience also includes attorneys who introduce multimedia evidence provided by practitioners either as a demonstrative or evidentiary exhibit, witnesses, judges, and any other participants who will be presenting in a courtroom setting. This document does not address multimedia that consists of a witness-prepared digital model, presentation, reenactment, or demonstrative exhibit.

Determining optimal playback of multimedia in court is an often-overlooked component of the trial process. This document addresses the importance of testing multimedia playback with existing equipment in the courtroom prior to use at trial and in consultation with court staff and attorneys. The goal is to optimize playback of multimedia for maximum effectiveness in court proceedings. As with other forms of evidence, multimedia evidence must comply with any applicable local, state, or federal laws and policies governing admission.

3. Limitations

This document is not intended to constitute legal advice or replace an organization's Standard Operating Procedures (SOPs). Evidence rules in this document refer to the Federal Rules of Evidence (F.R.E.) and may differ from State Rules. The guidance from this document should be implemented after consultation with legal personnel versed in the laws and rules applicable to the practitioner's particular jurisdiction.

Variations on the principles outlined in this document may be appropriate based upon continuing changes in technology.

4. Retrieval, Storage of Evidence, and Chain of Custody

Multimedia can originate from many sources, including the following:

- Multimedia generated or recorded by an agency (e.g., interviews, security and surveillance footage, in-car video, body-worn cameras, crime scene video); or
- Multimedia retrieved or provided to an agency from a third party (e.g., social media sources, digital video recorder system footage, mobile devices, drone cameras, commercial cameras, Internet of Things [IoT] devices).

The documentation of acquisition, retrieval, and receipt of multimedia evidence is the first step in multimedia examination (e.g., validate date and time, format, device manufacturer, media, the hash value of original files, etc.). This should also include documentation of any persons contacted in relation to the evidence who provided input on the examination. Practitioners should store evidence in a manner consistent with the organization's SOPs, ensuring that the chain of custody is maintained. Practitioners should refer to SWGDE documents referenced in Section 8 for guidance on these procedures.

5. Considerations for Submission of Multimedia Evidence

When providing copies of multimedia evidence for legal purposes, practitioners should consider taking steps to demonstrate the file integrity (e.g., hash values) to the recipient to enable future integrity verification. Recipients should verify the integrity of multimedia evidence prior to use. For additional information on hash algorithms refer to *SWGDE Position on the Use of MD5 and SHA1 Hash Algorithms in Digital and Multimedia Forensics*.

During the discovery process, multimedia evidence may be distributed through cloud-based technology; however, any multimedia shared through the cloud should be downloaded and submitted on physical media (e.g., write-once optical media, USB flash drive or portable hard drive) for admission into evidence. The physical media should be maintained after the completion of court proceedings in the event that it needs to be reviewed (e.g., in appellate or post-conviction proceedings). The multimedia should generally be displayed from the physical media on which it is contained. However, if playback performance from that physical media is an anticipated issue, consider asking permission of the court and opposing counsel to play the video from a temporary location, so long as that location contains a fair and accurate duplicate of the physical media (e.g., from a file stored locally on a computer rather than from optical media). To minimize playback errors, consideration should be given to optimize playback and avoid dropout.

It is recommended that the practitioners and other witnesses should meet with the attorney or individual who will be utilizing the multimedia evidence in court prior to the commencement of the proceedings. The attorney must understand the steps the practitioner took to retrieve the multimedia, the chain of custody, and also have the ability to address legal challenges based on technical aspects of multimedia retrieval, playback, storage, and admission. If the multimedia is going to be submitted in court in a medium that differs from its original format, the contents should be reviewed by the witness and attorney in order to address possible authentication objections. This ensures the attorney is prepared to conduct a direct-examination of the practitioner, make objections, address any issues within cross-examination, and effectively communicate the process and its reliability to the judge, jury, or other trier of fact. A lack of understanding of the technology and its attributes can result in the unintended suppression or misuse of evidence. Likewise, technically deficient evidence may be admitted through a lack of understanding. If the practitioner should have to meet with opposing counsel, representative counsel should be present. For a more detailed discussion on the proper recovery of evidence and

chain of custody, refer to the documents referenced in Section 8 specific to the type of multimedia being introduced.

5.1 Admission of Evidence

Admission of evidence is determined by the court consistent with Federal Rules of Evidence (F.R.E.) 104 and other applicable rules and generally requires satisfaction of the following legal prerequisites:

- Is the proffered evidence relevant? F.R.E. 401, 402.
- Has the proffered evidence been properly authenticated? F.R.E. 901, 902.
- Does the proffered evidence constitute hearsay? F.R.E. 801. If so, is it admissible under a hearsay exception? F.R.E. 803, 804, 807.
- Is the proffered evidence an original or an accurate reproduction of the original? F.R.E. 1002, 1003.
- Is the probative value of the proffered evidence substantially outweighed by the danger of unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence? F.R.E. 403.
- Are any redactions required?

Although the attorney will need to establish that the relevant factors and foundation have been met prior to the admission of multimedia evidence, the practitioner acquiring the multimedia evidence may be required to testify to establish authentication of the multimedia evidence and to establish that it is the "best" evidence. If multimedia evidence cannot be properly authenticated, it may not be admitted, even if it is otherwise probative and valuable to the trier of fact.

F.R.E. 901(a), and most state counterparts, indicates that "the requirement of authenticating or identifying an item of evidence" is satisfied when the proponent of the evidence produces "evidence sufficient to support a finding that the item is what the proponent claims it is." This may be accomplished through the testimony of the practitioner who retrieved or processed the multimedia evidence, perhaps in combination with the testimony of other witnesses. To meet this standard, the practitioner should be able to identify the procedures followed for retrieving the multimedia and any associated documentation.

Authentication testimony may include:

- The retrieval method.
- The condition of the original recording device and the accuracy of the resultant multimedia.
- Time offsets and other observations noted during the retrieval.
- Agency evidence and storage protocols.
- Chain of custody documentation.

Pursuant to F.R.E. 902, some digital evidence is self-authenticating and will "require no extrinsic evidence of authenticity in order to be admitted." F.R.E. 902(13) describes a process for

authenticating records "generated by an electronic process or system," which can include a printout from a webpage, or a document retrieved from files stored in a personal computer. F.R.E. 902(14) provides a similar procedure for authenticating data copies from electronic sources through a certification.

5.2 Common Challenges/Objections to the Admission of Multimedia Evidence

Multimedia evidence admissibility is often challenged when the file type offered into court has changed from how it was originally recorded on the source device.

Generally, F.R.E. 1002 requires the production of the original "writing, recording, or photograph in order to prove its content unless" the rules provide otherwise. However, pursuant to F.R.E. 1001(d), for electronically stored information, an original includes "any printout - or other output readable by sight - if it accurately reflects the information." Additionally, a "duplicate" which is "a counterpart produced by a mechanical, photographic, chemical, electronic, or other equivalent process or technique that accurately reproduces the original" is admissible pursuant to F.R.E. 1001(e). Finally, F.R.E. 1003 authorizes admission of a duplicate "to the same extent as the original unless a genuine question is raised about the original's authenticity or the circumstances make it unfair to admit the duplicate."

While the Federal Rules of Evidence state that an original piece of evidence is preferred over duplicates, they also provide for the introduction of a duplicate when the original is no longer available or impractical for introduction in court (e.g., playback of the original is unavailable). This is referred to as the "best evidence" rule. In the context of multimedia evidence, a copy of original recordings is often the first acquired data. Steps should be taken to ensure that the duplicates are an accurate representation of the original.

Even if not played from its original source or format, multimedia evidence can be admitted. Therefore, the practitioner acquiring the multimedia evidence may be called to testify that the multimedia contains information consistent with the original file. This may include explaining all processing steps taken to demonstrate the processed copy is being used in court without data alteration, edit, or deletion (e.g., transcoding, conversions, etc.). Additionally, if the multimedia has been changed in any way to optimize playback, the practitioner should be able to explain how this does not materially alter the evidence from the original.

Another common challenge/objection to preclude admission of multimedia evidence is that the exhibit being presented in the court contains only a portion or portions of the information/data that was actually acquired or received.

F.R.E. 1006 allows the use of "a summary, chart, or calculation to prove the content of voluminous writings, recordings, or photographs that cannot be conveniently examined in court." In this situation the "originals or duplicates [must be made] available for examination or copying, or both" or produced in court if so ordered.

In some situations, there are challenges to the admission of multimedia, or portions thereof, mid-trial and the attorney will need to address them.

The attorney and practitioner should be prepared to deal with the need to conduct redactions and/or change the format of the multimedia to be consistent with court rulings if required. The practitioner should ensure the attorney is aware of what limitations may exist in redacting the recording, as well as its effect on the quality or effectiveness of the video, other information/data, or audio. This additional analysis or redaction should not be performed while testifying. For additional information on redaction, see *SWGDE Video and Audio Redaction Guidelines*.

Note: Care should be given to multimedia exhibits offered to the jury for consideration as they may contain information not intended to be seen or heard by the jury (e.g., file names, titles, dates, or other identifying prejudicial information).

6. Optimizing Playback of Image or Video

Once an image or video is deemed admissible, efforts should be made to ensure that all required equipment and software is available, properly installed, in functioning order, and properly configured (e.g., aspect ratio, resolution). Any audio should be tested to ensure that it is audible and intelligible. See ***Section 7 Optimizing Playback of Audio***.

Practitioners should ensure that the attorney admitting the evidence is aware of how these factors can affect the presentation detail of the image or video, and work with the attorney to address these issues prior to use in court.

The image or video should be reviewed utilizing the specific equipment that will be used in court, as well as tested in the courtroom where it will be displayed. If possible, this should be completed with sufficient time prior to the trial or court proceeding to address any technical issues, or to allow for the procurement of additional equipment. During this process, parties should ensure that the playback of the video is optimal to serve its purpose and is clearly visible to the judge and/or jurors. For example, if there is minute detail that is essential to the proceeding, effort should be made to optimize settings to minimize loss of detail during playback. In making this determination, various factors can be considered, including but not limited to:

- Playback system configuration
- Image quality (e.g., format, resolution, frame rate)
- Audio fidelity (see Section 7)
- Size and quality of display screens
- Projector quality (e.g., amount of lumens, type of signal ports)
- Projector configuration (e.g., color space, white balance, gamma curve, etc.)
- Appropriate audio and video cables, adapters or signal convertors (e.g., HDMI cable, Thunderbolt to HDMI video convertor, etc.)
- Room lighting
- Distance from and angle of screens to viewers

Upon identifying any deficiencies or limitations caused by either the multimedia evidence itself or the equipment being utilized, consideration should be given to the following possibilities:

- Changing the settings
- Finding more suitable equipment
- Moving the jurors or judge to provide them with a better view of the video
- Relocating equipment in the courtroom
- Modifying settings within the multimedia itself to optimize playback

Costs for larger projectors and associated projection screens may be prohibitive for some jurisdictions. Where cost or storage of monitors is an issue, use of multiple smaller high definition video monitors (e.g., a computer tablet) may be a more practical alternative to effectively display video evidence. When employing multiple monitors, consideration should be given to their display settings and location so as to not impede or obstruct the presentation of other evidence or the view of the jurors. Additionally, the visual color display of monitors may vary. When color is of importance (e.g., vehicle color, clothing color), consider color calibration of monitors. In lieu of purchasing Audio/Video (AV) equipment, equipment rental is an option.

When using a projector or single large display, refer to Figure 1 below for recommended general viewing distances based upon monitor size and image resolution.

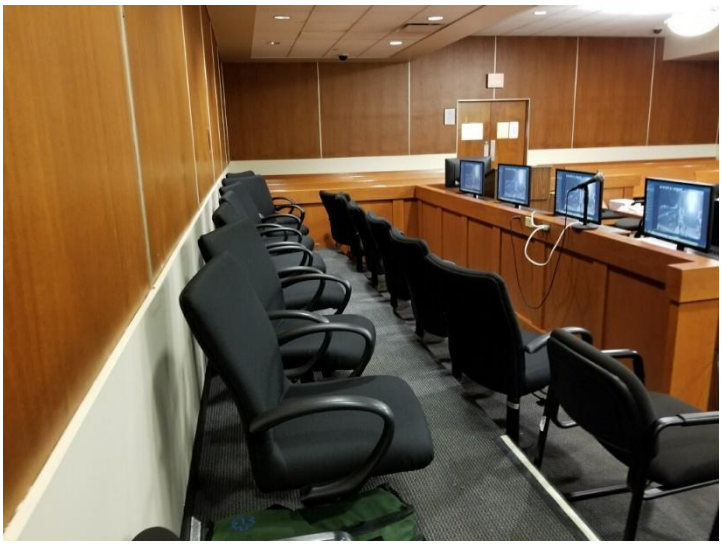
Figure 1. Recommended maximum viewing distances[1]

Recommended Maximum Viewing Distance based on Screen Size and Resolution				
	Vertical Resolution			
Diagonal Size (inches)	480	720	1080	
32	11.5	6.2	4.2	Maximum Viewing Distance (feet)
40	14.3	7.8	5.2	
42	15	8.2	5.5	
46	16.5	9	6	
50	17.9	9.8	6.5	
52	18.6	10	6.8	
55	19.7	10.7	7.2	
58	20.8	11.3	7.5	
60	21.5	11.7	7.8	
63	22.6	12.3	8.2	
65	23.3	12.7	8.5	

[1] Chart produced by SWGDE with information derived from various sources.

The following photographs show various examples of monitors or projectors that can be utilized for optimal viewing.

Example of a courtroom with multiple large monitors



Example of a courtroom with portable smaller monitors

7. Optimizing Playback of Audio

Audio evidence can play a significant role in judicial proceedings and may include conversational speech or important background sounds. Examples of audio evidence include wiretap recordings, recorded phone calls, surveillance recordings, and interviews of suspects in custody. The ability of a jury and other participants to hear audio may be compromised by the playback system and acoustic environment in a courtroom.

Those responsible for the playback of audio in a courtroom should strive to achieve the best playback possible. Playback equipment should be selected to support the format of the audio evidence. If the courtroom lacks the necessary equipment, the attorney should consult with the practitioner to find an appropriate solution. Ideally, this would include high-quality headphones for all members of the jury, the judge, and courtroom personnel. If headphones are not available, high-quality speakers in close proximity to the intended listeners should be used. This often requires the use of equipment that is in addition to what is typically employed in most courtrooms. Playback from low-quality equipment such as computer speakers, television speakers, and "boom boxes" should be avoided. As discussed in section 6, pre-trial testing should be conducted to minimize any playback challenges.

Courtroom construction (materials and design) often are not conducive to proper presentation of audio evidence. Hard surfaces and parallel walls are examples of features which compromise acoustics for speech intelligibility. If possible, consider designing or modifying an environment adequate for audio presentation.

Limitations of low-quality systems can result in a loss of intelligibility, audio signal quality, and may also affect translation and transcription services. Attorneys and courtroom technicians should seek out information on these topics through consultation with acousticians, audio engineers, *SWGDE Best Practices for Forensic Audio*, and the references in this document.

8. SWGDE Framework and Guidance Documents

Additional documents from SWGDE can provide the framework and understanding for courtroom personnel. It is highly recommended that courtroom personnel be familiar with the documents listed below, in addition to other national and international forensic standards organizations.

- SWGDE Best Practices for Data Acquisition from Digital Video Recorders
- SWGDE Best Practices for Digital & Multimedia Evidence Video Acquisition from Cloud Storage
- SWGDE Collection of Digital and Multimedia Evidence Myths vs Facts
- SWGDE Best Practices for the Acquisition of Data from Novel Digital Devices
- SWGDE Best Practices for Computer Forensic Acquisitions
- SWGDE Best Practices for Forensic Audio
- SWGDE Core Competencies for Forensic Audio
- SWGDE Technical Overview of Digital Video Files

- SWGDE Best Practices for Mobile Phone Forensics
- SWGDE Core Competencies for Mobile Phone Forensics
- SWGDE Best Practices for Digital Forensic Video Analysis
- SWGDE Requirements for Report Writing in Digital and Multimedia Forensics

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