Purpose: Procedure for Examination of Documents Produced with Liquid Ink Jet Technology

This procedure provides guidance be used by forensic document examiners the for examination of documents produced with liquid inkjet technology and related procedures. These procedures are applicable whether the examination is of a Questioned and Known item(s) or of exclusively Questioned item(s). These procedures include evaluation of the sufficiency of the material available for examination.
The particular methods employed in a given case will depend upon the nature and sufficiency of the material available for examination. These methods are applicable to examinations involving copiers, printers, facsimile devices, and multifunction devices using ink jet technology.

By following these procedures, a forensic document examiner can reliably reach an opinion concerning whether two or more documents produced with ink jet technology are from the same device, whether a particular device created the document, or the determination of the make or model of a device.

Items submitted for examination may have inherent limitations that can interfere with these procedures. Limitations should be noted and recorded on the QR DOC-2 or the case notes. Limitations can be due to the generation of the document(s), limited quantity or comparability, or condition of the items submitted for examination.

The results of improper prior storage, handling, testing, or chemical processing (for example, for latent prints) may interfere with the ability of the examiner to see certain characteristics. The effects can include, but are not limited to, partial destruction of the substrate, stains, and deterioration of the ink. Whenever possible, document examinations should be conducted prior to any chemical processing. Items should be handled appropriately to avoid compromising subsequent examinations.

Consideration should be given to the possibility that various forms of manipulation and duplication of ink jet-produced items can be generated by computer, scanner, digital camera, graphic pad or other means.

Additionally, it should be noted that commercially some ink supply units are interchangeable between different brands or models of machines. Due to the trend to become more recycle friendly, some ink units are refillable and ink from suppliers other than the original manufacturer may be used.

Some multi-function devices utilizing toner technology can operate in either printing or copying mode, at different resolutions and can produce both multi-color (for example, CYMK) black or monochrome (for example, one color black). These various outputs from one machine have many significant differences among them.

Responsibility:

Forensic Science Examiners assigned to the Questioned Documents Unit or performing casework in the Unit.

Equipment:

1. Lighting (natural, fluorescent) and alternate light sources
   Lighting may include the use of transmitted, side or vertical lighting to improve the ability to view fine details.
2. Stereomicroscopes with fiber-optic lighting
3. Scanners
4. Cameras
5. Rulers in metric, U.S. customary units, printers' measure, and desktop publishing units.
6. VSC

Procedure:

The Questioned Document Unit will usually be the first Unit to receive document-type evidence for analysis. In the event that another Unit examined this evidence first, it should be understood that there may be analysis methods that may limit the examination of these documents. Prior handling, testing, or chemical processing (for example, for latent prints) or swabbing of a document may interfere with the ability of the examiner to see certain characteristics.

1. Beginning of examination: Refer to QD SOP-3 for guidance on transferring, LIMS documentation and evidence identification.

2. All examination steps, relevant observations, and results shall be documented on QR-DOC-2 and/or case notes. If the examiner notes that the submitted evidence is of limited quality or quantity, the examiner or Case Management Unit may need to contact the submitting agency to acquire more evidence. If it is noted that the evidence received has been handled or chemically treated that limits or prevents the examination, the submitting agency may be contacted to communicate this information. (see GL20)

3. During the examination procedure, the examiner may use different types of lighting and magnification (such as stereomicroscopes) to examine the documents and the writing present on

the documents. The documents may be scanned or photographed to preserve the writing and for incorporation into the case notes.

4. At various points in these procedures, a determination that a particular feature is not present or that an item is lacking in quality or comparability may indicate that the examiner should discontinue or limit the procedure(s). It is at the discretion of the examiner to discontinue the procedure at that point and report accordingly or to continue with the applicable procedures to the extent possible. The reasons for such a decision shall be documented in QR DOC-2 or the case notes.
5. Determine whether the submitted Questioned document(s) was produced with liquid ink jet technology. If not, discontinue examination and report accordingly.
6. Determine whether the examination is comparison of a Questioned document(s) to a Known document(s), a comparison of exclusively Questioned documents, or is another type of examination of a Questioned item(s) (e.g., to determine date limitations or class of machine).
7. Determine whether the Questioned document(s) is suitable for examination, or comparison, or both. If it is not suitable, discontinue the procedure and report accordingly. Factors that affect the suitability include clarity, detail, or condition of the document.
8. If a Known document(s) is submitted, determine whether the Known document(s) is suitable for examination, or comparison, or both. If it is not suitable, discontinue the procedure and report accordingly. Factors that affect the suitability include clarity, detail, or condition of the document.
9. If the original is not submitted, evaluate the quality of the best available reproduction to determine whether significant details have been reproduced with sufficient clarity for comparison purposes and proceed to the extent possible. If the reproduction is not of sufficient clarity for comparison purposes, discontinue these procedures and report accordingly.
10. If a device is examined, its condition should be noted. Note damage to easily accessible internal components of the device such as the print head or paper transport mechanism. If possible, the submitting agency should try to obtain the service records and pertinent other information noted and recorded. Note the capabilities, features, and settings of any variable features on each device examined. If the device has internal memory, retain or recover any stored information.

    If the device has an internal storage/memory, the examiner should contact the supervisor of the Computer Crimes and Electronic Evidence Unit to discuss the best course of action to take regarding the examination.

11. Prepare appropriate exemplars with the submitted device, taking into consideration the features of the device and possible chemical ink examinations.

    The examiner should take into consideration that visible external components of the device such as the platen, slit glass, collators, and cover/automatic document feeder that may contain physical evidence, obstructions, debris, correction fluid, marks, or scratches. Before taking exemplars, consideration must be given to the possible destruction or loss of physical evidence within the device (for example, fragments torn from the Questioned document).

12. If none of the exemplars produced by the submitted device are suitable for comparison and no others are obtained, discontinue these procedures and report accordingly.

13. Examine the Questioned item(s), or the Questioned and Known items. The type of substrate used in an ink jet printer may affect the appearance of the ink such as banding, circularity, feathering, bleed, mottling, offset, spatter or satellite droplets.

14. Examination(s) for indentations (QD SOP-10) may be performed for the purpose of visualizing indented writing or physical characteristics such as marks from the paper transport mechanism.

15. Various illumination techniques (color filtering, infrared, or ultraviolet) may be used to provide additional information such as security features or stains.

16. Examination(s) for alterations (QD SOP-9) may be performed.

17. Identification of the typestyle(s) may provide useful information (for example, dating information).

    Compare class characteristics (for example, paper supply system, ink type, marks caused by mechanics, color capability). If significant unexplainable differences exist, discontinue and report accordingly.

18. If possible, classify the device used to produce a Questioned document(s). When identifying a manufacturer of a Questioned item(s), refer to published industry resources. If necessary, contact the device manufacturer or distributor for further information.

19. Compare individualizing characteristics such as wear and damage defects, misalignments, reproducible marks, banding, voids, and improper or extraneous ink transfer. Perform and note measurements as needed.

Successive copying on the same machine will make marks slightly out of register. Doubling or tripling of a pattern of dots or marks indicates, respectively, two or three generations of copies on the same machine. Copying on more than one device may bear the distinctive marks of all machines.

Care must be taken in the evaluation of characteristics as some may be caused by factors external to the print device (for example, artifacts from or manipulation of the source computer file) or characteristics common to a particular model of machine.

20. Evaluate similarities, differences, and limitations. Determine their significance individually and in combination. Conclusion(s), opinion(s), or findings resulting from these may be reached once sufficient examinations and information has been gathered.

21. Once examinations and evaluations have been completed, reports may include the following types of conclusion(s), opinion(s), or finding(s):
    1) ***Identification***—When the examination reveals no significant differences between two or more items and there is agreement in significant individualizing characteristics, an identification is appropriate. There may be limitations.
    2) ***Elimination***—If significant differences between two or more items are found at any level of the analyses, an elimination may be appropriate. There may be limitations. There may be similarities.
    3) ***Qualified Opinions***—When there are limiting factors and the examination reveals similarities or differences of limited significance between two or more items, the use of qualified opinions can be appropriate. This opinion requires explanation of the limiting factors.
    4) ***No Conclusion/Inconclusive***—When there are significant limiting factors, a report that no conclusion can be reached is appropriate. This opinion requires explanation of the limiting factors.

Sources of Error: Not applicable

References:

SWGDOC Standard for Examination of Documents Produced with Liquid Ink Jet Technology ver. 2013-1