



### D65 Camera Phone Photography and AFIS Sufficiency

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After attending this presentation attendees will: (1) be introduced to the possibility of camera phones being a viable mode of photograph documentation; (2) understand the limitations and difficulties when using camera phones; and, (3) learn digital imaging standards followed by SWIGIT and the FBI.

This presentation will impact the forensic science community by adding to the knowledge of fingerprint impression evidence documentation through introducing the idea of using camera phones as a photography device.

Relevancy and validity of camera phone fingerprint impression evidence photography may be possible by testing capabilities of many different camera phones when photographing fingerprint impressions. Digital images must be proven authentic and relevant, which is why standards of operation procedures are often followed during documentation to prevent inadmissibility of evidence.<sup>1</sup> Discussing difficulties with the camera phone photography and reviewing digital imaging guidelines for AFIS sufficiency may help to further understand limitations of camera phones.

This study will add to the knowledge of forensic science and may introduce the possibility of camera phones as a method of fingerprint impression documentation at crime scenes, especially where transient evidence is present. As technology keeps progressing, modern cellular phones become more capable and are used to do things other than phone calls, such as taking good quality photographs. A few examples of cell phones with eight megapixel cameras are the iPhone 4s, Samsung Galaxy II, and the Droid X. The cameras that are in many cellular phones today are capable of high-detailed photographs, but whether or not the amount of detail is acceptable for AFIS database searches was the question of this study.

Camera phones used for the photographs were obtained through faculty, friends, and family. Camera phone megapixels ranged from 1.3Mp to 8Mp and were mounted on a pseudo tri-pod made from a ring stand and clamps. Fingerprints were made on porous, semi-porous, and non-porous surfaces, which were then dusted with black or magnetic powder for enhancement. Photographs were taken while mounted on the pseudo tri-pod and also hand held. When possible, photographs were taken flash on as well as flash off.

The photographs were then sent for AFIS review to Charles Morden, lab director of the Michigan State Police, to be assessed for AFIS sufficiency. Of 16 camera phones, 11 produced photographs that were admissible for AFIS. All the camera phones which were admissible were at least 3Mp and above. The camera phones that produced photographs that were inadmissible for AFIS were 2Mp and below.

Some difficulties or limitations that became apparent during the photography of the fingerprint impressions were camera phones that have no flash, camera phones with flash that drowned out detail, and proportion distortions from hand-held photographs. Camera phones that did not have flash in some instances had a difficult time focusing. Camera phones that did have flash often caused a reflection from the surface of the fingerprint impression to wash out the details of the photograph. The hand-held photographs had distortions that could be seen on the scale of the photograph. This is evidence that the camera was not parallel to the surface at the time the photograph was taken.

Standards for fingerprint impression digital imaging are stated in the guidelines of the National Institute of Standards and Technology as being 500 ppi (NIST 2011), but the standards from the Scientific Working Group Imaging Technology state a 1000 ppi guideline (SWGIT 2010).<sup>2,3</sup> This makes it hard to estimate a value of megapixels that would consistently produce AFIS quality photographs.

#### References:

- <sup>1</sup> Blitzer, Herbert, Karen Stein-Ferguson, and Jeffrey Huang. *Understanding Forensic Digital Imaging*. San Diego: Elsevier, 2008. 334-343. Print.
- <sup>2</sup> Wing, Brad. United States. Department of Commerce. *American National Standard for Information System - Data Format for the Interchange of Fingerprint, Facial & Other Biometric Information*. Maryland: National Institute of Standards and Technology, 2011. Web: [http://www.nist.gov/customcf/get\\_pdf.cfm?pub\\_id=910136](http://www.nist.gov/customcf/get_pdf.cfm?pub_id=910136).
- <sup>3</sup> SWGIT. Scientific Working Group Imaging Technology. Version 1.3 2010.06.11. *General Guidelines for Capturing Latent Impressions Using a Digital Camera*. 2010. Web: [http://www.theiai.org/guidelines/swgit/guidelines/section\\_8\\_v1-3.pdf](http://www.theiai.org/guidelines/swgit/guidelines/section_8_v1-3.pdf).

#### AFIS, Fingerprints, Camera Phones