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Fire & Rescue Division Hazardous Materials Section

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UP-DATE INFORMATION for WIRELESS DATA TRANSMISSION (SCAN versus FAX) [For Inspection Purposes Only]

As a result of completing several team typing inspections, it has come to our attention that changes in cellular and wireless technology has affected the ability to transmit data, especially by FAX from the field.

FAX Capability:

Special Note: - It has come to our attention that with new and ever-changing frequency manipulation technology within the cellular phone industry, which includes a move toward digital and abandoning analog data transfer, the utilization of FAX capability via wireless is compromised with data loss. Therefore, effective immediately, the Inspection Team will no longer require FAX capability. In its place we recommend adopting a SCAN capability for the on-board printer. It has been recommended to FIREScope that this change be made permanent and a requirement in place of the FAX requirement, and become effective in the next revised edition of the SEL.

Creating a digital format:

Having a printer with SCAN capability will allow for the creation of a document file for the scanned item onto the hard drive. When scanned and then saved, this image is now in a very detailed digital format (i.e. jpg or pdf) with no data loss. Then, the file can be attached to an e-mail message. This DOES require the addition of an "air card" or equal technology being added to the computer, but this would have to be done anyway in order to meet SEL requirement # 7.4.6 "ACCESS to the INTERNET".

Analog VS Digital:

Analog cellular technology was benevolent to both voice and image (data packets) transmission. Analog allowed for an infinite spectrum of frequency divisions by which the "system" would package a signal, thus voice was very clear and frequency response spectrum

was relatively wide and complete. This did not impair dramatically the transmission of music or visual images to a demonstrative degree. Digital format on the other hand is different.

Digital Caters to Expansion of Customers on a Network:

Digital technology is specifically designed to cater to voice transmission. This has led to an extremely narrow range of frequency response, and then the dividing of the range of the voice into a specified number of digital packets, not an infinite number. This causes data loss in two ways. First, the voice is not reproduced within an infinite range of frequency response as with analog, and the data loss, which can be significant, is not that noticeable (it is noticeable) with regard to acceptable tolerances of the receiver. This increases speed. It also vastly increases the number of "channels" or additional customers that can be squeezed into specific frequency bands by ten or a hundred fold. This is beneficial to the cell phone provider, and detrimental to the customer. Second, files or messages containing images, photos, music do suffer significant loss in data because they are no longer available within the range of infinite number of frequency bits, but instead must be limited to a narrow frequency band (the rest of the "data" is chopped off), and then divided into a specific number of digital packets which again opens the chance of significant data loss. This is tolerable for the provider of the cellular systems for voice transmission (even though there are significant compromises). For the customer it virtually has doomed analog image transmission.

Understanding it:

When a picture or any document is scanned into the computer, or when a digital camera takes a picture, or when a video or music CD or DVD is copied, it is saved (in a number of different "formats" like tif, jpg, wpg, bmp, etc.) and the file can be transferred and imbedded onto the hard drive. The entire image has been converted into a data file that has changed all the data in the image (analog) to binary code (digital - zero's "0" and ones "1"). Binary code is digital. But this also allows for ALL of the information to be converted into digital binary code, not just some of it within specific frequency ranges. Further, when the image is to be converted back from its digital format from the hard drive, it is displayed on a monitor screen (in pixels), transmitted in an e-mail (in binary code), or printed (in so many dots per inch), all of which is within the realm of digital, not analog. And thus, what degradation there is in the data transmission is considered acceptable, and is almost negligible in most cases (there is always some even in the best of cases, but unless there are serious or repetitive "interferences" in the transmission process, the human eye cannot detect the degradation. When everything in the transmission process is running perfectly utilizing high quality equipment, the resulting image can often be nearly "pristine").