In-Building Communications BDA/DAS Public Safety


Below is a list of seven things you should know about in-building Public Safety code and how these requirements may impact your next BDA/DAS project.

1. **System Coverage**: NFPA systems require 99% coverage in critical areas as designated by the local fire department and 90% coverage in general-use areas. The IFC requires 95% coverage of all areas. Think about it, your typical DAS design provides coverage in areas that are most likely occupied during a normal business day (offices, conference rooms, public, and common areas); however, first responders often find themselves in stairwells, elevators, equipment rooms, parking structures, and basements. Adding the first responder requirement to your project adds another layer of effort, including a more comprehensive initial RF survey that impacts your final design and bill of materials. In addition, you need to incorporate the radio frequencies used by local Public Safety personnel (UHF/VHF 700 MHz and 800 MHz) as well as assess the building's construction and layout to make sure you have acceptable coverage.

2. **NEMA 4 Enclosures**: In the event of a fire, there are usually a great deal of hoses aimed on a building, resulting in water on your sensitive radio gear and the potential for lost communications. The NEMA specification reads: "Watertight and weatherproof. Must exclude at least 65 GPM of water from a one-inch nozzle delivered from a distance not less than 10 feet for five minutes." Get the picture? Both IFC and NFPA require all equipment, such as radios and power systems, supporting the Public Safety network, to be housed in NEMA 4 compliant enclosures. While NEMA 4 enclosures are not new, there is an added expense in material cost in addition to the added installation effort required in proper mounting and conduit installation.

3. **System Monitoring Alarms**: Essentially these alarms provide real-time monitoring of the system's readiness. The code covers alarm requirements for power/battery failures, antenna malfunctions, and battery capacity (alarm generated at 70% remaining power). This will certainly impact your solution design, as well as the networking or the backhaul of this information to a centralized monitoring point. Both the IFC and NFPA require some level of alarming, but they do differ - your local jurisdiction will have the final say on the requirement.

4. **-95 db Minimum Signal Strength**: The minimum signal strength within the coverage area for both the IFC and NFPA is -95 db regardless of the frequency. Your analysis and design must reflect both coverage area and signal strength. Also, you need to consider the frequencies to be used - 700 MHz and 800 MHz frequency will not have the same signal strength as legacy VHF and may need a greater antenna density to achieve coverage, at a minimum of -95 db.

5. **Battery Backup**: In the event of a building emergency there's often a power failure or power is cut off to prevent further danger to first responders. The code requires the equipment supporting the Public Safety radio system to remain operational on a battery backup for no less than 24 hours. There are several ways to meet this requirement; however, selecting the proper solution for your design will take some time and research. Remember to think holistically when selecting components because your power requirements can vary from AC to 12 volts or -48 volts DC.

6. **Future Frequency Changes**: Systems supporting the Public Safety emergency responder radio coverage need to support future frequency requirements. Current platforms need to support UHF, VHF, 700 MHz, and 800 MHz according to the IFC and NFPA. Future-proofing your DAS deployment to cover the adoption of new frequencies should be a design consideration.

7. **Antenna Isolation**: While the IFC does not specify a requirement, the NFPA does stipulate an antenna isolation requirement of 15 db higher than the gain of the amplifier. While your DAS design will probably incorporate a 15 db separation, your Public Safety coverage may require more antennas as you factor coverage and signal strength for a Public Safety solution. To ensure proper isolation, a directional antenna rather than an omnidirectional antenna may be required for proper coverage, signal strength, and antenna isolation.

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