



## Emergency Telephone System Board Of DuPage County

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**TO:** NFPA Standards Committee

**FROM:** Policy Advisory Committee

**DATE:** September 28, 2023

**SUBJECT:** NFPA1802 Standard - Request for Review

The purpose of this memorandum is to bring to the attention of the committee several safety standards from NFPA1802 which this group believes impacts the ability of a radio with these features and enhancement to be deployed safely in an operational environment.

Please permit me on behalf of the DuPage Emergency Telephone System Board of DuPage County (ETSB) Policy Advisory Committee (PAC) Fire Focus Group (Focus Group) to outline our group, provide some background, summarize our observations and concerns and offer some solutions.

### **PAC Focus Group:**

The DuPage County Fire Focus Group consists of dedicated and experienced subject matter experts consisting of fire chiefs, ETSB Policy Advisory Committee members, radio programmers, DuPage County Office of Homeland Security and Emergency Management radio unit leaders, and one member with prior NFPA committee experience. Together we represent twenty-nine (29) DuPage County Illinois Fire agencies. The DuPage ETSB 9-1-1 System serves a population of more than one million. The fire service radio fleet includes 1103 portable radios.

### **Background:**

The Focus Group is currently tasked with deploying portable radios with the latest technological and safety advances in the industry. We chose NFPA 1802 certified radios based on our desire to equip our firefighters with the safest radios available. During field testing of the APX Next XN radios, the Fire Focus Group discovered some safety related concerns that must be resolved in advance of deploying the radios into the hands of the end users.

NFPA Standard 1802, Two-way Portable RF Communications Devices for Use by Emergency Services Personnel in Hazard Zone was developed over several years and initially issued as the 2021 Edition. This Standard sets forth design and testing criteria for RF devices (portable radios) and remote speaker microphones manufactured for emergency services use in the hazard zone.

The Standard includes certification, product labeling and information, design requirements, performance requirements and test methods. There are specific performance and testing requirements (e.g., vibration resistance, water leakage, heat resistance, impact resistance, corrosion resistance and other requirements) that must be met to achieve certification. These requirements should yield a more reliable radio for emergency service personnel while operating in challenging environmental conditions within the hazard zone.

The definition of hazard zone includes areas where members might be exposed to a hazard or hazardous atmosphere. The Appendix clarifies that Hazard Zone is intended to include



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interior/exterior structural and wildland, as well as hazardous materials mitigation and technical rescue. Hazard Zone Mode is defined as a mode of operation of the device when operating in the hazard zone.

### **Problem Identification: Hazard Zone Mode:**

Chapter 6 of NFPA 1802 includes specific capabilities that are required for all RF devices. Several of these capabilities relate to the hazard zone mode of operation:

- Section 6.2.1.1. requires that all RF devices be capable of both the hazard zone mode and the non-hazard zone mode.
- Section 6.2.1.2 requires that the minimum volume of the RF device in hazard zone mode is approximately 64dB.
- Section 6.2.3 requires that when initially powered on, the RF device shall default to the hazard zone mode.
- Section 6.12.4 requires channel, talkgroup or talkgroup path announcements.
- Section 6.12.2 requires voice announcements to be active by default.
- Section 6.12.2.2.3 requires any overridden voice announcements to follow within 5 seconds of detecting the last push to talk or received audio.
- Section 6.12.5 requires that voice announcements in the hazard zone mode and when transitioning from the hazard zone mode to the non-hazard zone mode are at 82dbA.
- Section 6.2.2 requires that the RF device be capable of enabling the non-hazard zone mode via programmable switch activation, or by being programmed to a channel talkgroup or talk path.

On the surface each of the above requirements appear reasonable and in the best interest of emergency service personnel safety. However, through field testing by a group of subject matter experts we have discovered that the combined effect of these requirements makes field use of NFPA 1802 certified radios cumbersome and less safe and less effective than if there were no hazard zone requirements.

### **How do firefighters typically use a portable radio with voice announcements today?**

When firefighters arrive on the scene of an emergency, they turn on their radio with the volume control knob and listen to the voice announcement. If the volume is too high or too low, they adjust the volume to the desired level while the voice announcements are playing. Typically, they would be changing their radio to a fireground or tactical channel as designated by dispatch or incident command. If they need to change talkgroups/channels, they rotate their channel selector knob to the appropriate position (for example from dispatch position 1 to fireground position 16) and listen for the confirming voice announcement.

During the incident, they might need to adjust the volume on their radio several times due to surrounding noise conditions. For example, a truck company operating gasoline powered chain saws on a roof might need to increase their volume. An engine company driver operating a pump might need to increase volume significantly to hear over the engine noise. An incident commander monitoring a portable radio(s) might need lower volume levels depending on location and radios in use. A rescue task force might need to keep their radio volume very low to listen for victims and to avoid giving away their position. A search crew inside a building might need to lower their



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volume level to potentially hear victims or a PASS device. Multiple crew members operating in close proximity to their officer might need to lower volume levels to hear verbal commands from their officer speaking through a face mask or to prevent feedback while their officer is transmitting on the radio. If they accidentally turn the radio off while lowering the volume and then turn it back on, the radio returns to the talkgroup/channel they had previously selected unless the radio is specifically programmed to turn on to a specific channel.

### **What happens when a firefighter attempts to use an NFPA 1802 certified portable under the same conditions described above?**

Firefighters arriving on the scene of an emergency turn on their radios. The channel selectors would likely be in position 1 (dispatch) which would likely be a non-hazard zone mode channel. The radios would automatically switch to a hazard zone channel, but not necessarily their primary fireground channel, while the channel selector remains in position 1. Depending on crew size, three to six portable radios begin a series of overlapping and unsynchronized loud voice announcements of zone name, channel name and potentially other announcements.

During an active incident there is radio traffic on the fireground channel and the radio traffic receive audio has priority over the announcements as required by the standard. Once the receive audio stops the voice announcements begin to repeat. Depending on the amount of radio traffic the voice announcements can repeat numerous times until complete.

Regardless of the amount of training and familiarity with the radio, the natural tendency is to attempt to adjust the volume level down which cannot be accomplished while in hazard zone mode. From a gross motor skill, muscle memory and human factor perspective this is very difficult to overcome because the majority of the time the portable radios are operating in non-hazard zone mode and the volume adjustment is functional.

The biggest risk of not being able to minimize the volume to an acceptable level is that the user turns the volume knob too far and turns off the radio accidentally. When the radio is turned back on, the radio is required to return to a hazard zone channel, but it might not be the channel that the user was last on depending on the channel selector position and how the radio is programmed.

As identified in the previous examples, there are many radio users that need to operate on a channel that is programmed for hazard zone mode even though they might not be exposed to the physical hazard or a loud noise environment. Some users would likely be in the actual physical hazard zone (e.g., interior firefighting) and others might not be in the physical hazard zone (e.g., incident command, pump operator, EMS standby crews). However, all of their radios will remain in hazard zone mode operation until the user operates a switch to enter the non-hazard zone mode. Typically, there are only two switches available for this purpose which includes the concentric switch which can be more difficult to find and operate with gloved hands or the ABC switch which is often used for zone changes or similar functions. Specifically requiring a switch in lieu of a button or voice command reduces options for locking other buttons (e.g., zone up/down) and/or a touch screen. Not locking some of these buttons creates a greater chance for inadvertently changing channels. At best this creates a nuisance for the user to get back to the correct channel. At worst it puts the user's radio on the wrong channel with no one monitoring while in the hazard zone.



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### **Recommended Corrective Action:**

1. Eliminate Section 6.2.3 that requires the radio to default to the hazard mode when initially powered on. This requirement causes radio operation to be confusing and often unpredictable. We need to recognize that a user on a fire department providing fire and EMS services might only be using a channel that operates in the hazard zone mode a small percentage (e.g., 10-25%) of the time the radio is in use. That same user might only actually be in the hazard zone even less time (e.g., 5-10%) the radio is in use. The radio user needs to select the channel to be used out of potentially hundreds of available channels and potentially dozens of hazard zone channels. Having the radio change to a random hazard zone channel when powered on is counterproductive to the overall safety goal. It also in conflict with Section 6.1.6 that all controls shall be designed to prevent unintentional activation, deactivation, and change of operation.
2. Eliminate Section 6.2.1.1 that requires that the minimum volume of the RF device in hazard zone mode to be approximately 64dB. As described above there are many circumstances even while operating on a hazard zone channel where the user should be able to lower their volume level. The required minimum volume level of an individual radio is approaching the noise level of a vacuum cleaner. Several radios operating in close proximity is distracting, and is interfering with other verbal communication. If the committee is not willing to eliminate the minimum hazard zone volume requirement, set the requirement at a much lower level (e.g., 30-40 dB).
3. Modify Section 6.12.5 to make voice announcements in the hazard zone mode and when transitioning from the hazard zone mode to the non-hazard zone mode the same volume as item 2 above. Announcements at 82 dB are distracting, and are interfering with other verbal communication.
4. Modify Section 6.12.2.2.3 that requires any overridden voice announcements to follow within 5 seconds of detecting the last push to talk or received audio. Allow the AHJ to select the maximum number of times that the radio attempts to repeat announcements to prevent continuous attempts to repeat announcements. Continuous repeating announcements intermixed between receive audio is distracting and confusing particularly when operating in a hazard zone.
5. Modify Section 6.2.2 to allow other means to change to the non-hazard zone mode (e.g., long button press, voice command). Requiring a programmable switch activation requires one of the two available switches to be dedicated to this function. This eliminates other potential important safety related functions for these switches such as locking buttons. The alternative means to activate non-hazard zone mode require deliberate action by the user and the change is required to be announced.
6. If the above changes cannot be implemented quickly through the TIA process, then we recommend that all of the above items be temporarily eliminated from the Standard through a TIA while the committee, manufacturers and users gather field data on these requirements. This data can provide the basis for revisions that would be included in the proposed 2025 edition of the new consolidated NFPA 1930.



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We appreciate the opportunity to bring these observations forward and to be able to make operational suggestions for the safety of the fire service.

We are happy to meet with any committee members or appear at a meeting to further discussion this information.

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