City of Troy

Fire Department
500 West Big Beaver Road
Troy, Michigan 48084
Phone: 248-524-3419
Fax: 248-689-7520

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Mr. Bob Martell, Assistant VP
FM Approvals
FM Global
1151 Boston-Providence Turnpike
PO Box 9102
Norwood, MA, 02062

Dear Mr. Martell:

I am the chairman of the Communications Committee of the International Association of Fire Chiefs (IAFC). The IAFC has been in existence since 1873, and represents chief fire officers from around the world, including career, combination, and volunteer fire departments, as well as military and government fire chiefs, and industrial fire brigades that protect gas and petroleum and similar installations.

The new Factory Mutual 2012 standard for Intrinsically Safe (IS) ratings for electronic equipment is expected to cause significant economic and logistical problems for America's fire service. Our foremost concern is with land mobile radios (LMR), specifically portable radios, which are ubiquitous in the fire service. Additionally, this new IS standard will have an impact on other ratings including the requirements of NFPA 1800 for electronic equipment used in the fire service, and NFPA 1982. These NFPA standards cover many devices including PASS alarms, thermal imaging cameras, and SCBA electronics. Even flashlights used by the fire service are IS rated. Currently many fire departments and industrial fire brigades utilize portable radios that are certified as Class 1, Division 1, which means that gases, vapors, or liquids may be present continuously (if there has been a spill or burst pipe or tank) or intermittently.

The new IS standard will have considerable financial and operational impact on fire departments and fire brigades in the U.S. and in other areas of the world that depend on

the FM IS approval rating. We understand that these proposed changes are coming about in order to 'harmonize" FM IS standards with those in the rest of the world. However, it is our understanding that there has never been an instance of an explosion or other dangerous situation being caused by using electronic devices certified under the current standard.

In dialogue with vendors of LMR equipment, we have learned that:

1) These changes will impact the radio housings because of the need to have conductivity to dissipate static charges. This will mean different materials will have to be used and tested for mechanical and thermal stability, and this may increase radio size. Most firefighters would prefer a smaller, not a larger radio.
2) New thermal requirements for copper traces and components mean that circuit boards must be completely redone, necessitating design and manufacturing changes, which may increase radio size.
3) Increased current and voltage safety factors will impact batteries, meaning that battery capacity, and hence shift life, may decrease as much as 25%. Many departments today are looking for longer shift life from the radios, not less.
4) Reduced inductance and capacitance of the device overall will likely impact the RF specifications, including possibly reducing transmitter output power below levels currently used in North America (6 watts at VHF, 4 watts at UHF, 3 watts at 700/800 MHz). Reduced transmitter RF levels will impact fire operations in the following ways:
    a) Radio-to-radio direct simplex mode of operations will experience reduced range. For many fire departments, even those using trunked radio systems, direct mode is used on the fireground and in buildings. Most departments know approximately what range they can expect in the buildings in their jurisdictions based on experience or testing. Using radios with reduced RF power levels will necessitate new testing, at a time of reduced staffing and budgets, and operational procedures may have to be altered. Further, in some areas the reduced range will be unacceptable, leading to the need to spend additional scarce monies on portable or vehicular repeaters, in building repeaters (BDAs), or similar devices.
    b) Systems that currently provide in-building coverage from fixed LMR sites or premise specific bidirectional amplifiers (BDA) will have to have those systems checked for coverage with portables with lower RF power. This will be time consuming and costly to test. If problems are noted, the solutions to returning the coverage to where it was may be costly; new fixed sites or voting repeaters may be necessary.
    c) Outdoor coverage will also be impacted, and again if reduced such as to be operationally unacceptable, additional fixed sites may have to be added. Every

time a new fixed site is added, the site has to be acquired or leased or permission granted from the owner, zoning permissions granted for the tower/antenna, the site built out as needed including access roads, a tower or support mast and antenna installed, a grounding system installed, a cabinet or shelter erected and physically secured, AC power and backup power provided, and backhaul of the baseband signals via microwave links or leased lines provided. Leased lines add a recurring cost to operational budgets.

d) Some departments use vehicular repeaters to boost range on the fireground or at wildland fires or other such incidents. Reduced portable radio RF power will again reduce the range to the vehicular repeater by some amount which will need to be tested and operational guidelines adjusted accordingly

If the 2012 IS guidelines are implemented, the following will be the likely results to fire departments:

- The vendor community will design new LMR portable radios to meet the new 2012 requirements. These will be completely new and different radios, with unique designs just for those users needing IS. For most LMR vendors IS radios represent 20% or less of their total sales volume of portable radios, so that these new radios will be significantly more expensive than current versions. The lead time to design, test, and make ready for delivery of a new model radio is 18 to 30 months for most vendors.
- Fire departments and fire brigades will have to begin buying the new 2012 IS rated radios, with fewer radios purchased per budget dollar. This will slow down adoption of new radios as old radios reach their end of operational life, and may mean that older radios begin to fail while in use. (An unintended consequence may be that some departments will abandon buying IS radios because of the cost; meaning that firefighters and civilians will be less safe than if IS radios were purchased.)
- The new IS radios will possibly be larger, and have less shift life or larger batteries for the same shift life.
- If portable radio transmitter RF power levels are reduced to meet the IS standard, fire operational procedures will have to be changed, and fire fighter safety may be impacted negatively until (and if) the coverage can be restored.
- Current LMR systems, including in-building BDA systems, will have to have their radio coverage retested, and additional sites and equipment may be necessary in order to restore coverage.

At the current time, the fire service is heavily stressed by reduced budgets, reduced staffing for both career and volunteer departments (for different reasons), increased training and standards requirements, and demands of the public to become 'all hazards' responders. In the communications area, many departments are still trying to determine how they can afford to meet the FCC mandate to narrowband their existing VHF and UHF radio systems by January, 2013 and for those with systems at 800 MHz, FCC mandated rebanding is still not totally completed.

From our perspective, this IS standard change could not have come at a worse time. More importantly, it would appear to have no significant improvement in fire fighter safety, but come at a huge cost of time, money, and operational adjustments.

We respectfully suggest that members of our committee meet with your organization to examine this issue, and look at ways that these issues can be addressed. I understand that you will available the afternoon of November 16th in Washington, DC. I Look forward to an initial discussion with you at that time.

Sincerely,

William Nelson, CFO
Chief, Troy Michigan Fire Department
Chair, IAFC Communications Committee