Section 1. Chapter 198 of the Smithfield Code of Ordinances entitled " Fire Prevention" is hereby amended by adding thereto the following section " Part 8 , Article XXIII , Two-Way Radio Communication Enhancement Systems "

PART 8 , ARTICLE XXIII, TWO –WAY RADIO COMMUNICATION EHANCEMENT SYSTEMS

198-176 . PURPOSE .

The Town of Smithfield Fire Department requires two-way radio in-building coverage sufficient to meet the performance of Two-Way Radio Communication Enhancement Systems as required by the Rhode Island adopted National Fire Protection Association (NFPA) 1 Fire Code.

198-177APPLICABILITY

1) All new buildings constructed in the Town of Smithfield shall comply with this ordinance.
    a. Buildings shall have approved radio coverage for Fire Fighters within the building based upon the existing coverage levels of the Smithfield Fire Radio System at the exterior of the building. This shall not require improvement of the existing Smithfield Fire Radio System.

    B. Exemptions

        1. All single family and two family residential dwellings shall be exempt from the provisions of this ordinance.

        2. All commercial buildings that have sufficient levels of radio coverage as determined by the Smithfield Fire Department shall be exempt from the provisions of this ordinance.

2) Existing buildings undergoing substantial renovation, a change of occupancy, or the installation of a new fire alarm system are required to provide radio coverage for fire fighters as outlined in this ordinance.

3) Buildings and structures that cannot support the required level of radio coverage shall comply with the requirements of this ordinance.

198- 178 WAIVER OF RADIO COVERAGE SYSTEM

1) Buildings that have sufficient levels of radio coverage to satisfy the requirements may request a waiver from the Smithfield Fire Department. The request for a waiver shall include an RF survey showing sufficient levels of radio coverage. Coverage may be verified by an independent radio technician.

2) Waivers are valid for a period of five years and must be renewed.

3) At any time it is determined by the Smithfield Fire Department that radio coverage is not adequate, the waiver will be withdrawn and the property owner is then required to provide radio coverage as per this ordinance.

198-179. FEES

1) All new commercial construction in the Town of Smithfield shall be charged one-time user fee to cover Fire Department expenses to provide an alternative to an installed Two-Way Radio Communication Enhancement System . All fees shall be paid to the Smithfield Fire Department Radio Communications Fund.
2) All fees paid into the Smithfield Fire Department Communications Fund shall be used to cover the purchase of updated radio equipment, maintenance of the apparatus repeater system, maintenance of the VHF simulcast radio system, maintenance of facilities housing the components of the VHF simulcast radio system, construction of facilities to support radio communications, construction of tower sites to support radio communications, purchase of any equipment/supplies to support radio communications, support enhancement of the Smithfield Police Department's communications equipment and other expenses deemed necessary by the Town of Smithfield to support radio communications to enhance public safety within the Town of Smithfield.
3) The Smithfield Fire Department Radio Communications Fund fee schedule is as follows:
   a) Commercial Buildings between 2,500 square feet -10,000 square feet $.30/square foot
   b) Commercial Buildings between 10,001square feet to 75,000 square feet $.60/square foot
   c) Commercial Buildings over 75,000 square feet $.75/square foot

198-180 ALTERNATIVE TO ONE-TIME FEE:

1..As an alternative to a one-time fee paid to the Smithfield Fire Department Radio Communications Fund, this ordinance may be satisfied by installing a two-way radio communication enhancement system, also referred to as a bi-directional amplifier or BDA.

If a BDA is chosen, the following requirements are applicable.

1) Approval and Permit
   a. Prior to the installation of a two-way radio communication enhancement system, a meeting shall take place with the Smithfield Fire Prevention Bureau.
   b. Any permit application shall include:
      i. Detailed drawings showing the location of the amplification equipment and associated antenna systems which includes a view showing building access to the equipment.
      ii. Schematic drawings of the electrical system, backup power, antenna system and any other associated equipment relative to the amplification equipment including panel locations and labeling.
      iii. Manufacturer's data sheets on all equipment to be installed. Note: Additional permits and approval may be needed from the Smithfield electrical inspector.
   c. Upon approval, a permit for the installation of a signal booster will be issued.
      i. Any field changes that occur during construction shall be incorporated into new As-Built plans, including any manufacturer's data sheets for any equipment changes not submitted in the original submittal. As-Built plans, if required due to system changes, shall be submitted for approval.

d. The Smithfield Fire Department assumes the responsibility of registering approved signal boosters with the FCC.
e. Property owners who maintain compliance with this document are granted permission to operate a signal booster on frequencies licensed to the Smithfield Fire Department by the Federal Communications Commission. The failure to maintain compliance with this specification will result in the automatic withdrawal of said permissions.

2) Radio Coverage
   a. General building areas shall be provided with 90 percent floor area radio coverage.
   b. Critical areas, including fire command centers, fire pump rooms, exit stairs, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations, and other areas deemed critical, shall be provided with 99 percent floor area radio coverage.

3) System Design
   a. The distributed antenna system may be a radiating cable, fixed antennas or a combination of both.
   b. The system must comply with all applicable sections of FCC Rules.
   c. Permanent external filters or attachments shall not be permitted.
   d. Assembly/installation of all components shall comply with the National Electrical Code.
   e. Survivability from attack by fire shall comply with NFPA 72.
   f. All system components shall be installed, tested, inspected, and maintained in accordance with the manufacturers' published instructions.
   g. The system design, and installation, shall not exceed the FCC's OET 65 standards.
   h. The system shall be normally powered on and continuously provide passing of required frequencies.
   i. The system shall be compatible with both analog and digital communications, simultaneously at the time of installation.
   j. BDA systems shall have lightning protection that complies with NFPA 780.
   k. Maximum propagation delay is 15us (microseconds).

4) Signal Strength
   a. A minimum inbound (downlink) signal strength of -95 dBm shall be provided throughout the coverage area. The inbound signal level shall be sufficient to provide a minimum of DAQ 3.0 for either analog or digital signals.
   b. A minimum outbound (uplink) strength of -95 dBm shall be provided at the Smithfield Fire and Police Department receivers. The outbound signal level shall be sufficient to provide a minimum of DAQ 3.0 for either analog or digital signals.

5) Isolation
   a. Antenna isolation shall be maintained between the donor antenna and all inside antennas to a minimum of 20dB under all operating conditions.

6) Pathway Survivability
   a. Levels shall be as described in Section 5.10. (International Fire Code, 2009)
   b. Shall have a pathway survivability of Level 1, Level 2, or Level 3.
   c. Radiating cable shall not be required to be installed in metal raceway.
   d. Feeder and riser coaxial cables shall be rated as plenum cables.
      i. Feeder coaxial cables shall be connected to the riser coaxial cable using hybrid coupler devices of a value determined by the overall design.

ii. Riser coaxial cables shall be rated as riser cables and routed through a 2-hour–rated enclosure.

e. The connection between the riser and feeder coaxial cables shall be made within the 2-hour–rated enclosure, and passage of the feeder cable in and out of the 2-hour–rated enclosure shall be fire-stopped to 2-hour ratings.

7) Non-Interference and Non-Public Safety System Degradation
   a. No amplification system capable of operating on frequencies or causing interference on frequencies assigned to the Smithfield Fire & Police Departments by the FCC shall be installed without prior coordination and approval of the Smithfield Fire Department.
   b. The property owner shall suspend and correct equipment installations that degrade the performance of the Smithfield Fire & Police radio system or the BDA.
   c. BDA Systems that share infrastructure with non-public safety services shall ensure that the coverage and performance of the public safety communications channels are not degraded below the required level of performance, regardless of the amount of traffic carried by the nonpublic safety services.
   d. Secondary users must furnish a complete list of transmit and receive frequencies along with an intermodulation (IM) study that will accompany the permit application. The IM Study will consist of the following calculations: IM= Q*F, IM=F1+F2+F3, IM=F1+F2-F3, IM=Q1*F1+Q2*F2, and IM=Q1*F1-Q2*F2 for all frequencies up-link and down-link. These calculations will be done to the 5th order.

8) System Radio Frequencies
   a. The BDA shall be capable of transmitting all radio frequencies, assigned to the Smithfield Fire & Police Departments, and be capable of using any modulation technology in current use by the Smithfield Fire & Police Departments.
   b. Assigned Frequencies
      i. Fire Department: VHF Fire 1; VHF Fire 2; UHF Fireground
      ii. Police Department: RISCON 800mhz
      iii. Note: Specific frequency assignments to be assigned at time of BDA proposal.
   c. Class B Amplifier Pass Band – to be determined during system design based upon frequency allocations.

9) Frequency Changes
   a. The BDA system shall be upgradeable to allow for changes or additions to system frequencies to maintain radio system coverage as it was originally designed.

10) Radio Survey
   a. The building owner shall have the in-building radio system tested to insure that two-way radio coverage on each floor of the building meets or exceeds the required signal strength.
   b. Each floor of the building shall be divided into a grid of approximately twenty (20) equal areas. A maximum of two (2) areas will be allowed to fail the test per floor. A spot located approximately in the center of a grid area will be selected for the test. Once the spot has been selected, prospecting for a better spot within the grid area will not be permitted. Field strength testing instruments are to be calibrated annually and of the frequency selective type incorporating a flexible antenna similar to the ones used on Smithfield Fire Department hand held transceivers.
   c. RF plots indicating the initial assessment of radio coverage and the enhanced coverage shall be submitted at the time of acceptance testing.

d. All compliance testing to be done with 50 ohm loads in place of the donor antenna to avoid interference to the Smithfield Fire Department radio system.
e. Unattended testing of the operation of the BDA is not permitted until the completion of acceptance testing.

11) Power Supplies
a. At least two independent and reliable power supplies shall be provided for all RF emitting devices and any other components of the system.
b. The Primary Power Source Shall be supplied from a dedicated branch circuit and comply with NFPA 72.
c. The Secondary Power Source Shall consist of a storage battery dedicated to the system with 12 hours of 100% system operation capacity.

12) Component Enclosures
a. All BDA components, RF filters, and battery system components shall be contained in a NEMA4- or NEMA4X-type enclosure(s).
b. The cabinet shall be large enough to dissipate internal heat without venting the inside of the cabinet to the outside atmosphere. External or exposed RF filters are unacceptable.
c. Dedicated battery cabinets may be vented.
d. The cabinet shall be painted red and equipped with a locking mechanism.
e. The cabinet shall be labeled in bright yellow.

13) System Monitoring
a. A sign will be located at the dedicated monitoring panel with the name and telephone number of the radio service provider indicating that they shall be notified of any alarm.
b. Trouble signals must be immediately reported to the radio service provider.
c. The Smithfield Fire Department must be notified of any failures that extend past a four (4) hour time limit.
d. The building's Fire Alarm system shall include automatic supervisory signals for malfunctions of the BDA system that are annunciated by the fire alarm system in accordance with NFPA 72, and shall comply with the following:
    i. Monitoring for integrity of the system shall comply with NFPA 72, Chapter 10.
    ii. System supervisory signals shall include the following:
        1. Donor antenna malfunction
        2. Active RF emitting device failure
        3. Low-battery when 70% of the 12-hour operating capacity has been depleted
        4. System component failure
    iii. Power supply supervisory signals shall include the following for each RF emitting device and system component:
        1. Loss of normal ac power
        2. Failure of battery charger
    iv. The communications link between the fire alarm system and the BDA must be monitored for integrity.
    v. A dedicated monitoring panel shall be provided within the fire command center to annunciate the status of all RF emitting devices and system component locations. The monitoring panel shall provide visual and labeled indications of the following for each system component and RF emitting device:
        1. Normal ac power
        2. Low battery capacity (to 70 percent depletion)

3. Loss of normal ac power
4. Donor antenna malfunction
5. Battery charger failure
6. Active RF emitting device malfunction
7. System component malfunction

vi. The communications link between the dedicated monitoring panel and the two-way radio communications enhancement system must be monitored for integrity.

14) Acceptance Testing

a. Delivered audio quality (DAQ) testing will be conducted by Smithfield Fire Department radio personnel to ensure that two way radio coverage, on each floor of the building, meets the minimum coverage requirements. At least five (5) business days notice is required prior to the test being conducted.
b. At the time of this test, the following are also required:
    i. The approved radio technician shall certify that the in-building radio system was installed and tested in accordance with the requirements of the current Smithfield Fire Department In-Building Radio Specification.
    ii. An approved radio service company shall certify that a maintenance contract is in effect that provides 24-hour by 7-day response within 4 hours of notification of a problem. This contract must be for a period of at least 1 year.
    iii. RF Survey results, gain values of all amplifiers, small scale drawings (11" x 17" maximum) of the structure shall be provided by the owner/contractor. The plans shall show each floor divided into the grids. Each grid shall be labeled to indicate the DAQ result from the RF Survey.
    iv. As built drawings (if needed)
    v. BDA Manufacturer, Model #, Serial #, FCC Certification

15) Testing Procedures:

a. For testing system signal strength and quality, the testing shall be based on the DAQ system. A DAQ level below 3.0 shall be considered a failed test for a given grid cell.
b. Delivered Audio Quality Definitions:
    i. DAQ 1: Unusable, speech present but unreadable.
    ii. DAQ 2: Understandable with considerable effort. Frequent repetition due to noise / distortion.
    iii. DAQ 3: Understandable with slight effort. Occasional repetition required due to noise/distortion.
c. A number of cells per floor shall be selected at random. Signal strength measurements shall be taken at the center of each cell.
d. A maximum of two grid cells per floor will be allowed to fail the test. In the event that three of the areas fail the test, in order to be more statistically accurate, the testing grid resolution maybe doubled. If the number of grid cells is adjusted, the number of failed cells permitted shall be adjusted accordingly to meet the 90% coverage requirement.
e. Failures shall not be allowed in critical areas, including but not limited to the Fire Command Center, Fire Pump Room, Emergency Generator Room, Stairwells with a standpipe, Elevator Lobbies serving the Emergency Elevator, and other areas as identified by the Fire Department.
f. Both inbound and outbound signals shall be measured on each and every floor above and below ground including stairwells, basements, penthouse facilities and parking areas of the structure.

g. Measurements shall be made with the antenna held in a vertical position at three (3) to four (4) feet above the floor. (portable radio worn on the belt or turnout coat pocket).

16) Annual Test
   a. All active components of the in-building radio system, including but not limited to amplifier, power supplies, and back-up batteries, shall be inspected a minimum of once every twelve (12) months.
   b. Annual tests will be conducted by an authorized company.
   c. Amplifiers shall be tested to insure that the gain is the same as it was upon initial installation and acceptance. The original gain shall be noted and any change in gain shall be documented.
   d. Back-up batteries and power supplies shall be tested under load for a period of one (1) hour to verify that they will operate during an actual power outage.
   e. Active components shall be tested to verify they are operating as designed by the manufacturer.
   f. If communications appear to have degraded or if the tests fail to demonstrate adequate system performance, the owner of the building or structure is required to remedy the problem and restore the system in a manner consistent with the original approval criteria.
   g. The re-testing will be done at no expense to the Town as required in the original testing procedures.

17) Five Year RF Survey
   a. An RF Survey be conducted a minimum of once every five (5) years to insure that the radio system continues to provide the required level of radio coverage.
   b. The procedure set forth in Section 15 shall apply to such tests.

18) Maintenance & Servicing:
   a. At final acceptance, the building owner shall supply a letter to the Fire Department accepting the property owner's responsibilities. These responsibilities are as follows:
      i. Upgrades to system as directed by the Somerville Fire Department;
      ii. Maintenance contract in place with name of authorized company, who will provide a 24 hour by 7-day emergency response within four (4) hours after notification. The system shall be maintained in accordance with FCC requirements.
      iii. Maintain a list of contact personnel with phone numbers at the BDA cabinet. The contact personnel shall have knowledge of the building and the BDA system and be available to respond to the building in the case of an emergency.
      iv. Annual Inspections.
      v. 5-year RF surveys.
      vi. This letter is to be on company letterhead signed by the property owner or a legal representative.

19) Modifications
   a. Modification of an existing BDA System requires prior approval from the Smithfield Fire Department.
   b. A permit application shall be submitted which includes a description of the work to be performed and drawings showing intended modification.
   c. Modification work must not degrade radio coverage at any time.
   d. An RF Survey must be completed and submitted after any modification to an existing antenna system.

20) Radio Service Provider

a. An approved Radio Service Provider is a company that employs individual(s) that are qualified by the equipment manufacturer (in writing) to work on the bi-directional amplifier system and holds a valid FCC license or equivalent.
b. Design, Installation and Testing shall be conducted, documented, and signed by a technician qualified by the equipment manufacturer to work on the bi-directional amplifier system and who is also in possession of one of the following:
    1. FCC General Radiotelephone Operator License
    ii. APCO Radio Technician Certification
    111. Certification from an industry organization acceptable to the Smithfield Fire Department.
c. Reports of annual inspections and 5-year RF Surveys must be submitted to the Smithfield Fire Department.
d. The Smithfield Fire Department shall be notified in writing at least thirty (30) days prior to cancellation of a maintenance contract. Such notice shall contain the date and time such cancellation is to take effect, BDA location, and BOA Permit#.
e. The Smithfield Fire Prevention Bureau shall be notified in writing upon the procurement of contractual agreements relating to in-building radios covered by this specification.

21) Fire Department Inspections

a. Fire Department Radio personnel, after providing reasonable notice to the owner or their representative, shall have the right to enter onto the property to conduct field testing to be certain that the required level of radio coverage is present.

Section 2. This ordinance shall take effect thirty (30) days after its adoption.

Approved:

Lyn Antonuccio, Acting Town Clerk

Suzanna Alba, Town Council President

Approved as to form and legality:

Anthony M. Gallone, Town Solicitor