The Boston Fire Department, Superintendent of Fire Alarms and the Fire Marshall have mandated that the "Fire Department communication system requirement" under **780 CMR, 403.6 Sec. 1 (State Building Code),** shall be complied with by the installation of a radio based communication system.

The installation and operation of a radio based fire department communication system will be governed by this specification, which has been adopted by the Boston Fire Department.

Applicants shall forward the In-Building Radio Application to the Superintendent of Fire Alarm, 59 Fenway, Boston, MA 02115. Radio system drawings with technical parameters and equipment specifications shall accompany this application.

An approved permit is required prior to construction of the system. Unattended operation of the radio system is not permitted until final acceptance by the Boston Fire Department.

Voluntary adoption of this specification for buildings not covered by 780 CMR, 403.6 (state building code), must comply with all requirements of this specification.

Revision: 14.3

Effective Date: August 24, 2009

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1. Signal Strength

1.1 The in-building radio system is an integral component of the life safety equipment of a building or structure. The primary function is to provide reliable firefighter communications at the required signal strength within the specified areas. The system is required to provide coverage at the specified level within 95% of a building's floor area and also 95% of the stairwells.

1.2 In-building radiation systems required by this ordinance must provide a signal strength that includes all of the following:

1.2.1 A minimum signal strength of -95 dBm available in 95% of the area of each floor when transmitted from the Boston Fire Department.

1.2.2 A minimum signal strength of -95 dBm received at the FIRE DEPARTMENT SYSTEM from 95% of the area of each floor of the building.

2. Permissible In-Building Radiation Systems

2.1 Buildings and structures shall be equipped with an FCC Certificated Class B Bi-Directional UHF Amplifier(s) as needed**.**

2.2 The distribution system may utilize a radiating cable system or an internal multiple antenna system.

2.3 The downlink (from BFD) pass band of the BDA shall have a center frequency of 483.2 +/- 75Khz. The uplink (to BFD) pass band of the BDA shall have a center frequency of 486.2 +/- 75Khz.

2.4 There shall be no connectivity between the in-building radiation system and the fire alarm system.

2.5 The system as installed must comply with all applicable sections of FCC Rules Part 22, Part 90 and Part 101.

3. Backup Power

3.1 The system shall be capable of operating on an independent battery for at least 12 hours.

3.2 Buildings equipped with an emergency generator shall provide emergency power to the BDA system as needed.

3.3 The battery system shall automatically charge in the presence of external power input.

4. Compliance Testing

4.1 Compliance testing for an in-building radiation system is required, upon completion of installation.

4.2 The building owner shall have the in-building radiation system tested to insure that two-way coverage on each floor of the building meets or exceeds the required 95%.

4.3 Each floor of the building shall be divided into a grid of approximately twenty (20) equal areas. A maximum of one (1) area 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 recently calibrated (1 year) and of the frequency selective type incorporating a flexible antenna similar to the ones used on the hand held transceivers.

4.4 All compliance testing to be done with 50 ohm loads in place of the donor antenna to avoid interference to Fire Alarm. The BFD Communications Section is to be notified prior to any testing. (617-343-2875)

4.5 Delivered audio quality (DAQ) testing will be conducted by BFD radio personnel during sample testing of the accuracy of the BDA Compliance Test Report**.** All test results and as built drawings are to be submitted when the sample test date is requested. At least five (5) business days notice is required prior to the test being conducted.

4.6 The gain values of all amplifiers shall be measured and the results kept on file with the building owner so that the measurements can be verified each year during the annual tests.

4.7 In the event that the measurement results become lost, the building owner will be required to rerun the acceptance test to reestablish the gain values.

4.8 A Link Budget for the installation will be provided to the Boston Fire Communications Section when requesting the site visit for sample testing.

5. Annual Tests

5.1 When an in-building radio system is installed, the building owner shall test all active components of the system, including but not limited to amplifier, power supplies, and back-up batteries, a minimum of once every twelve (12) months.

5.2 Amplifiers shall be tested to insure that the gain is the same as it was upon initial installation and acceptance.

5.3 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.

5.4 Active components shall be checked to determine that they are operating within the manufacturer's specifications for their intended purpose.

5.5 Documentation of the test shall be maintained on site and a copy forwarded to the Boston Fire Department Radio Supervisor.

6. Five Year Test

6.1 In addition to the annual test, the building owner shall perform a radio coverage test a minimum of once every five (5) years to insure that the radio system continues to meet the requirements of this ordinance. The procedure set forth in Section 4 shall apply to such tests.

7. Qualifications of Testing Personnel

7.1 All tests shall be conducted, documented, and signed by a person in possession of a current FCC General Radiotelephone Operator License, or a technician certification issued by the Association of Public-Safety Communications Officials International (APCO) or the Personal Communications Industry Association (PCIA).

8. Fire Department Inspections

8.1 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.

9. Property Owner Responsibilities

9.1 Upgrades to system as directed by the Boston Fire Department.

9.2 Maintenance contract maintained with a qualified radio service contractor, who will provide a 24 hour by 7 day emergency response within two (2) hours after notification

9.3 At final acceptance, proof of a maintenance contract must be provided, listing contact personnel with phone numbers

10. Required Forms

10.1 All required forms can be obtained from the Boston Fire Radio Shop, 59 Fenway, Boston, MA 02115, (617) 343-2875.

10.2 BDA Application and Permit

10.3 BDA Compliance Certification

12. Cabinet

12.1 The bi-directional amplifier will be installed in a NEMA 4 painted steel cabinet. The color will be FIRE ENGINE RED and bear the lettering as follows: BOSTON FIRE DEPT. RADIO in bright yellow.

12.2 The maintenance vendor and telephone number will be marked on the cabinet The cabinet will have a locking mechanism to keep the unit secure.

13. Primary Power

13.1 Connection to primary power can be done in two (2) manners. The first, a cord set with twist lock plug and receptacle or with metallic conduit.

13.2 Each bi-directional amplifier shall be powered by its own twenty (20) ampere circuit.

14. System Monitoring

14.1 Each amplifier unit will have a monitoring system that monitors amplifier operation and primary power. A failure will activate an audible device and white strobe light. The audible signal may be silenced but the strobe light must remain illuminated until the fault has been corrected.

14.2 The strobe light will be located in a public space authorized by the BFD Radio Supervisor. A sign will be located at the strobe light with the name and telephone number of the equipment maintenance contractor. The Boston Fire Department must be notified of any failures that extend past the two (2) hour time limit.

14.3 An in-house building maintenance alarm system, monitored 24/7/365, is acceptable in place of the audible/strobe requirement.

15. Component Installation

15.1 Assembly and installation of all components of the BDA System shall comply with all applicable sections of the National Electrical Code.

15.2 Survivability from attack by fire shall meet NFPA 72, National Fire Alarm Code, Section 6.9.4.3, 2002 edition.

16. Antenna Distribution Network

16.1 A secondary user of the antenna distribution network must comply with all requirements of the Boston Fire Department so as not to degrade the operational standards of the system. Notice will be made to the Boston Fire Department as part of the permit application if the in-building radiation system will have non-fire department frequencies included.

16.2 Secondary users must furnish a complete list of transmit and receive frequencies along with an inter-modulation (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.

17. Modifications

17.1 Any modification of an existing BDA System will require a written request to the BFD Radio Supervisor. This request will include; frequency list (transmit and receive), full IM study, and drawing showing intended modification. Upon written approval of the BFD Radio Supervisor, the modification can begin with the stipulation that during the construction period the BFD System will always be operational at the required specifications or better.

17.2 After completion of any modification to a BDA a full acceptance test as required in this specification will be conducted and submitted for review.

18. Cancellation of Service Contract

18.1 The Superintendent of Fire Alarm 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.

18.2 It shall be the responsibility of the radio service provider to notify the Superintendent of Fire Alarm regarding cancellations and/or procurements of contractual agreements relating to radio service covered by this specification.

19. Radio Call Signs

19.1 Contractors will be issued call signs for communicating with Boston Fire Department personnel on the Boston Fire Radio System. These call signs are to be used only by properly licensed individuals.

20. Disclaimer

20.1 The Boston Fire Department does not endorse, recommend or specify any product, service provider or configuration as the means to comply with this specification.