EMERGENCY RESPONDER
RADIO COVERAGE
Emergency responder radio coverage (ERRC) was first introduced in the 2009 International Building Code.

The ERRC requirement was established to address the performance of emergency responders’ portable radios inside buildings because building construction, building size, construction features, and other elements can absorb or block radio communications.
Concrete or metal construction, larger buildings, and underground structures, will have a negative impact on the in-building signal strength required for reliable communications.
Buildings that use low-E glass windows will attenuate the signal from public safety radio systems.
During an incident, lack of communication can result in dire consequences.

Communications affected include radio transmissions from responders inside buildings to an incident commander outside or to a dispatch center.
The 8th Edition of the Massachusetts Building Code (adopted in 2011), first required to provide emergency responder radio coverage in all new buildings (780 CMR 915.0).

There was a major revision to 780 CMR 915.0 on April 11, 2014.
If a building does not meet the required signal strength (-95dBm) the only effective solution is the installation of a signal booster (BDA).

Other methods such as two-way radio repeaters, or fire phones will not improve communications on the fireground.
Many design professionals are not aware of the ERRC requirements.

If ERRC is not referenced on a building submittal, the fire official should immediately notify the building official and design professional, in writing, that the ERRC must be evaluated; and if the existing radio coverage has not been maintained, then ERRC must be provided.
Every new building does not need a BDA!

However....... All buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building.

(780CMR 915.2 April 11, 2014)
Every radio adds to the noise floor. We do not want any unnecessary amplifiers.
Simply calling back and forth between dispatch and fire department personnel inside a building to see if the radio transmissions are clear is not a proper evaluation method.
RF Survey

- Will determine if ERRC is required.

- Responsibility of the building owner.

- Accomplished by measuring the Downlink/Uplink signal strengths in decibels-milliwatts (dBm) by special measuring devices.
RF Survey

- Typically performed by specialized third-party communication companies and some fire department radio personnel.

- Results submitted to AHJ to determine if a BDA is required or if a waiver is appropriate.
RF Survey

- DOWNLINK signal strength from the donor system cannot be accurately determined until all doors, walls, and windows have been installed.

- UPLINK signal strength to the donor system is usually estimated by adding –11dbm of loss to the DOWNLINK reading. (-84dbm required)
RF Survey

It is difficult for design professionals to design and project total costs when the testing must be done on the completed structure.

In many cases it may be cost effective to plan on a BDA and at least install basic wiring.
RF Survey

The building can be prewired assuming that a signal booster will be required.

The DAS (distributed antenna system) can also be used to support in-house radio systems (housekeeping, engineering) or to extend cellular coverage.
ERRC is specifically required for the protection of responders during an emergency.

Only the local Fire Official can waive the ERRC if it is not needed, but considerable thought should be given before doing so.
The threshold requirements, design, testing and monitoring of the ERRC must be in accordance with the 2010 NFPA 72: Chapter 24.
The Signal Booster is required to indicate an alarm due to:

- Power Failure
- Charger Failure
- Antenna Failure
- Battery Failure
- Amplifier Failure

A dedicated alarm panel must be located in the fire command center.

The alarms must also be monitored by the building’s fire alarm system.
Title 47: Telecommunication
PART 90—PRIVATE LAND MOBILE RADIO SERVICES
Subpart I—General Technical Standards
§90.219 Use of signal boosters.

(1) PLMRS licensees may also consent to operation of signal boosters by non-licensees (such as a building owner or a signal booster installation contractor) within their service contour and across their applicable frequencies, but....... 

**must maintain a reasonable level of control over these operations**

.............in order to resolve interference problems.
Emergency Responder Radio Coverage in Buildings

Requirements for the Installation of a Fire Fighter Communication System

The Boston Fire Department has developed these requirements in conjunction with the requirements of the Massachusetts Building Code as amended on April 11, 2014.

The installation and operation of radio based fire fighter communication systems must comply with this document.

The voluntary installation of a radio based fire fighter communication system must comply with all of the requirements of this document.

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.

Joseph F. Brooks
Radio Supervisor
Boston Fire Department

Revision: 17
Effective Date: October 17, 2016
BOSTON FIRE COMMUNICATIONS

CITY OF BOSTON FIRE DEPARTMENT
Permit to Install and Maintain a Signal Booster

Installation Address: ____________________________ Zip: ______
Name of Bldg (if applicable): _______________________

Property Owner
Name: _________________________________________
Address: _______________________________________

Property Manager
Name: _________________________________________
Address: _______________________________________

Note: Not to be signed by contractors

Description of Work:
Name: _________________________________________ Electrician’s License #: _____________
Address: _______________________________________
Email: _________________________________________ Phone: ___________________________

Radio System Installer
Name: _________________________________________ FCC License #: _____________
Address: _______________________________________
Email: _________________________________________ Phone: ___________________________

I certify that the property owner understands and has agreed to comply with the current Boston Fire Department Signal Booster Specification. If a conflict should result with any of these specifications, it will be my responsibility to resolve it.

The property owner has also acknowledged that upon final system acceptance, permission will be granted to operate a signal booster on frequencies licensed to the Boston Fire Department, by the Federal Communications Commission (FCC) and that failure to maintain compliance with the Boston Fire Department Signal Booster specifications will result in the withdrawal of this permission.

Radio Service Provider
Name: _________________________________________ Phone: ___________________________
Address: _______________________________________
Email: _________________________________________ Phone: ___________________________

BFD Permit Number: ____________________________ FCC Signal Booster Registration #: _____________
Issued by: ____________________________ Signal Booster Specification Version: ____________

ID# 2014
CITY OF BOSTON
FIRE DEPARTMENT

Fire Fighter Communication System Compliance Certification

Installation Address

Address: ____________________________
Name of Building (if applicable): ____________________________
Zip Code: ____________
Permit #: ____________________________

Floors

Above Grade: ____________________________
Below Grade: ____________________________

Certification Type

☐ New Installation
☐ Contract Update
☐ 3-Year Renewal (survey required)

Radio Technician Certification

Name: ____________________________
FCC License #: ____________________________
Employee #: ____________________________
Expiration Date: ____________________________
Date: ____________________________
Signature: ____________________________

I hereby certify that the Fire Fighter Communication System at the above address was installed and tested in accordance with the requirements of the current BFD In-Building Radio Specification and is in compliance with same.

Maintenance Contract Certification

Service Provider: ____________________________
Name: ____________________________
Title: ____________________________
Contract Expiration Date: ____________________________
Emergency Contact #: ____________________________
Date: ____________________________
Signature: ____________________________

I hereby certify that a maintenance contract is in place for the Fire Fighter Communication System at the above address. This agreement provides 24 hour by 7 day emergency response within two (2) hours after notification. The BFD Radio Supervisor will be notified within 24 hours if this contract is cancelled. Such notice shall contain the date and time such cancellation is to take effect.

Fire tests are only

Radio Survey
Monitoring System
Cabinet Label
Equipment specifications
Radio system drawings
Sample test

Acceptable: ____________
Comments: ____________

Uplink Gain: ____________
Downlink Gain: ____________

The Sample Testing indicates an acceptable level of radio signal to provide effective firefighter communications.

Signature: ____________________________
Date: ____________________________
Title: ____________________________

3/5/2011

BOSTON FIRE DEPARTMENT

Compliance Certification
Violation Notice

BOSTON FIRE COMMUNICATIONS

NOTICE OF VIOLATION

Date: Sep 19, 2016

DIVISION 1
DISTRICT 6

Responsible Party: LLC

Mailing Address: AVENUE BOSTON MA 02111

Inspection of the premises located at: Avenue Boston MA 02210

Violation Address: AVENUE BOSTON MA 02111

Boston Fire Prevention Code: 12.16

M.G.L. Chapter 148 Section:
Comm. of. Mass. Regs.: 527 CMR 1.00 Chapter: 1.123, 1.125; 1.154

You are hereby ordered to correct the condition(s) enumerated below as directed ☒ FORTHWITH ☐ WITHIN 15 DAYS

1. Contract with a service company and provide an inspection report for the bi-directional amplifier (BDA)

2. You must also maintain a service company that will respond within 2 hours 24x7 (365) in the event of a failure of the BDA. Submit the executed contract for service.

The Boston Fire Department's building radio specifications require annual and 5 year inspections. It is imperative for the safety of the occupants and the fire fighters that this equipment is brought into compliance.

CONTACT: Radio Supervisor Joseph Brooks at 617-343-2875 or joseph.brooks@boston.gov

Failure to Comply will Result in Court Action

This Notice Served: ☒ IN HAND ☐ VIA MAIL

Per Order:

[Signature]

Boston Fire Department Official use only.

[Signature]

Inspector James Martinez

[Signature]

Assistant Chief

Fire Prevention

Legal Unit:

[Signature]

[Signature]

[Signature]
Commonwealth of Massachusetts
Housing Court Department
Boston Housing Court
Edward W. Brooke Courthouse 3rd Floor
24 New Chardon Street
Boston, MA 02114
(617)788-8485

Clerk
Robert L. Lewis

First Justice
Hon. Jeffrey M. Wink

Date: June 17, 2016

Re: Inspectional Services Department
Vs: Street Condominium Assn.
No:

Notice of Probable Cause Hearing

A request for criminal complaint naming you as the defendant has been filed in this Court, and a copy of the proposed complaint is enclosed.

Before any criminal process issues, the Clerk of the Court will hold a show cause hearing to determine if there is sufficient evidence to require that you be charged with the offense alleged.

A clerk's hearing to determine whether criminal proceedings will be commenced against you will be held at:

Date: 09/28/2016
Time: 10:00 AM

Courtroom: Show Cause Session
Session/Location: Clerk's Office, 3rd Floor
Edward W. Brooke Courthouse
24 New Chardon Street
Boston, MA 02114

At the hearing you may present your side of the matter, bring witnesses, and be represented by an attorney, if you so choose.

______________________________
Robert L. Lewis
Clerk - Magistrate

Street Condominium Assn.
Street
Boston, MA 02116
BDAs must be registered with FCC
BDAs must be registered with FCC

- Only Class B BDAs must be registered

Class A – Channelized (expensive)
Class B – Pass Band (lower cost)

- BFD registers BDA when permit is issued
Mobile Mark

Mobile Mark’s patent-pending disguised distributed antenna system (DAS) looks similar to a ceiling mount sprinkler head. The antenna offers wideband coverage across cellular and Long Term Evolution (LTE) bands from 680 MHz to 1 GHz and 1.63 – 2.2 GHz with a 4 dBi gain on both bands. The antenna meets carrier passive intermodulation (PIM) requirements and measures 1.9 by 3.5 inches. The easy-to-install product mounts directly to standard ceiling tiles. A metal backing plate mounts to the back side of the ceiling tile to provide the ground plane.

www.mobilemark.com
- Requirements
- Permit
- Certifications
Frequently Asked Questions

1. Clarify the NFPA requirements for annunciator at FACP or is FACP monitoring adequate?

- A dedicated alarm panel must be located in the fire command center.

- The alarms must also be monitored by the building’s fire alarm system.
Frequently Asked Questions

2. Does the Building Code require BDAs for Police and Fire Departments?

- The Code requires coverage.

- The AHJ will determine which Agencies will need coverage.
Frequently Asked Questions

2A. *Who determines what public safety agencies are to be supported under the provisions for “Emergency Responder Radio Coverage”?*

The Fire Official
Frequently Asked Questions

2B. How does a system designer or system engineer determine what frequencies are to be supported?

The AHJ is required to maintain a document of technical information specific to its requirements.
Frequently Asked Questions

3. *Where multiple agencies are required to be supported, is each agency responsible for accepting or approving their respective system, or is that the sole responsibility of the Fire Official?*

Each FCC Licensee must approve any BDA operating on their frequencies.
Frequently Asked Questions

4. What skill set, education or experience must a technician have to install, commission, and service a BDA system?

Boston requires:
- FCC GROL or approved equivalent.
- Manufacturer certification
Frequently Asked Questions

5. How does one determine whether existing Radio coverage is adequate, or justify whether an Enhancement System is warranted?

An RF Survey must be performed
Frequently Asked Questions

6. What is the long term standard on the bandwidth and FCC license for this equipment going forward?
Frequently Asked Questions

6. What is the long term standard on the bandwidth and FCC license for this equipment going forward?

- Tax Relief Act of 2012.
- Migration to 6kHz channels (from 12kHz)
Frequently Asked Questions

7. Can multiple raw channel radio frequencies be deployed for Fire, Police and MET responders and can digital data using BI-Phase Manchester techniques or equivalent be utilized for transport of digital data on the same wireless system?

- The DAS may be shared, not the Amp
- Check with the AHJ first.