Section 1

Public Safety Radio Coverage in Buildings

1.1 Building Radio Coverage. Except as otherwise provided no personal shall maintain, own, erect, or construct, any building or structure or any part thereof, or cause the same to be done which fails to support adequate radio coverage for public safety entities, including, but not limited to, firefighters, emergency medical services and police officers. “Agency” as used in this code means the local governmental authority enacting this code.

Exceptions:
1. This section shall not apply to single family residential buildings; any building constructed of wood frame, any building twenty-five (25) feet high or less; as long as none of the aforementioned buildings make primary use of metal or concrete construction or contain below grade storage or parking areas. For purposes of this section, parking structures are included in the definitions of building, and stair shafts are included in the definition of all parts of a building, but elevators may be excluded.
2. Buildings constructed prior to the implementation of this section shall not be required to comply with public safety radio coverage provisions of this restoration, or significant modification to the original structure, exemption from the provisions of this Ordinance shall not apply.

1.2 Minimum Radio Coverage into building. A minimum voice quality of DAQ 3.4 (see TSB-88-B) (for Digital radio systems) and Circuit Merit 3 (for Analog systems) be present in all areas of the building when transmitted from the agency’s radio system. For purposes of this section, 95% building coverage is considered to all areas of the building.

1.3 Minimum Signal Strength out of building. A minimum signal strength of 20 db ± 5 db above the noise floor shall be provided to and from the agency’s radio system when transmitted or received from all areas of the building. For purposes of this section, 95% building coverage is considered to be all areas of the building.

1.4 Technical criteria maintained by the Agency. The agency shall maintain a document of technical information specific to their requirements. This document shall contain as a minimum; the frequencies required the location and effective
radiated power (ERP) of radio sites used by the in-building system, the maximum propagation delay (in microseconds) and other supporting technical information.

1.5 **Amplification Systems Allowed.** Buildings and structures which cannot support the required level of radio coverage shall be equipped with a radiating cable system and/or a distributed antenna system (DAS) with FCC certified Bi-Directional Amplifier (BDA)s (AKA: bi-directional amplifiers), or systems otherwise approved by the agency in order to achieve the required adequate radio coverage.

1.6 **Battery Systems.** The active components of the installed system or systems shall be capable of operating on an independent battery system for a period of at least twelve (4) hours without external power input. The battery system shall automatically charge in the presence of external power input.

1.7 **Bi-Directional Amplifier (BDA) requirements.** If used, Bi-Directional Amplifier (BDA)s shall meet the following requirements as well as any other requirements determined by the agency.
   a. All Bi-Directional Amplifier (BDA) components shall be contained in one NEMA4 type waterproof cabinet. Permanent external filters and attachments are not permitted.
   b. The battery system shall be contained in one NEMA4 type waterproof cabinet.
   c. The system shall be capable of providing automatic alarming of malfunctions of the Bi-Directional Amplifier (BDA) and battery system. Any resulting alarm shall be transmitted to the agency’s designated recipient by means specified by the agency, including, but not limited to, automatic standard telephone dial-up circuit, TCPAP network circuit, RS232 interface, etc.
   d. Products used in such systems must have FCC Certification prior to installation. Pending FCC certification is not acceptable.
   e. All Bi-Directional Amplifier (BDA)s must be compatible with both analog and digital communications simultaneously at the time of installation.

1.8 **Additional frequencies and change of frequencies.** The building owner will be required to modify or expand the public safety in-building system at their expense in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC. This is an advisory statement that the building owner may select equipment and distribution components that are capable of such changes. Prior approval of an in-building system on previous frequencies does not exempt this section.

1.9 **Approval for Prior to Installation.** No amplification system capable of operating on frequencies licensed to the agency by the FCC shall be installed without prior coordination and approval of the agency. This is a FCC requirement.
2.0 **Engineering and Design.** The Bi-Directional Amplifier (BDA) system(s) shall be designed by a professionally licensed Engineering Firm with a currently certified electrical engineering professional in its employ.

2.1 **Implementation.** The Bi-Directional Amplifier (BDA) system(s) shall only be implemented by professional system integrator certified and trained by the manufacturer of the Bi-Directional Amplifier (BDA).

2.2 **Documentation.** As-built drawings consisting of a system block diagram, layout drawings and data settings, shall be provided electronically in AutoCAD format on CD and in paper copies (2) to the agency.

2.3 **Testing and Proof of Compliance.** Each owner shall submit at least one in-building coverage test:
1. Acceptance testing prior to occupancy of any newly constructed building.
2. Whenever structural changes occur including additions to buildings that would materially change the original field performance test.
3. Annually.
4. When repairs or alterations are made to amplification systems, the performance test shall demonstrate that adequate radio coverage is available in all required areas of the building. At the conclusion of the testing a report shall be submitted to the agency which shall verify compliance with Section 1.2.

2.4 **Acceptance Test Procedure.** When an in building radio system is required, and upon completion of installation, it will be the building owner’s responsibility to have the radio system tested to ensure that two-way coverage on each floor of the building is a minimum of 95 percent.

2.4.1 Each floor of the building shall be divided into a grid of approximately 40 equal areas. A maximum of two nonadjacent areas will be allowed to fail the test.

2.4.2 In the event that three of the areas fail the test, in order to be more statistically accurate, the floor may be divided into 40 equal areas. A maximum of four nonadjacent areas will be allowed to fail the test. After the 40-area test, if the system continues to fail, it will be the building owner’s responsibility to have the system altered to meet the 95 percent coverage requirement.

2.4.3 The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency’s radio communications system.

2.4.4 A test location approximately in the center of each grid area will be selected for the test, then the radio will be enabled to verify two-way communications to and from the outside of the building through the agency’s radio communications system. Once the test location has been selected, prospecting for a better spot within the grid area will be permitted within 3’ in any direction of the original selected test location.
2.4.5 **Isolation Testing.** As part of the installation a spectrum analyzer or other suitable test equipment shall be utilized to insure spurious oscillations are not being generated by the subject Bi-Directional Amplifier (BDA) due to coupling (lack of sufficient isolation) between the input and output antenna systems. The test will be conducted at time of installation and subsequent annual inspections.

2.5 **System Settings.** The gain and power values of all Bi-Directional Amplifier (BDA)s shall be measured. The test measurement results shall be recorded on as-built drawings and kept on file with the building owner so that the measurements can be verified each year during the annual tests. 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.

2.6 **Annual Tests.** When an in-building radio system is required, it shall be the building owner’s responsibility to have all active components of the system, such as Bi-Directional Amplifier (BDA)s, power supplies and backup batteries test to a minimum of once every twelve (12) months. Bi-Directional Amplifier (BDA)s shall be tested to ensure that the gain and power are the same as it was upon initial installation and acceptance. Backup batteries and power supplies shall be tested under load of a period of one hour to verify that they will properly operated during an actual power outage. If within the one-hour test period, and in the opinion of the agency’s representative, the battery exhibits symptoms of failure, the test shall be extended for additional one-hour periods until the integrity of the battery can be determined. All other active components shall be checked to determine that they are operating within the manufacturers specifications for the intended purpose.

2.7 **Field Testing.** Police and Fire Personnel shall at any time have the right to enter onto the property to conduct its own field-testing to be certain that the required level of radio coverage is present.

2.8 **Minimum qualifications of personnel.** The minimum qualifications of the system engineer and integration organization shall include:

   a. A Valid Professional Engineering Certification
   b. Certification of in-building system training issued by the manufacturer of the equipment being installed.

2.9 **Other code compliance.** The in-building system installation and components shall comply with all the applicable local codes, including but not limited to, Federal Communications Rules (47CFR 90.219), NEC, NFPA, IBC, TIA/EIA etc.

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