NOTICE OF RULE MAKING PROCEEDINGS AND PUBLIC HEARING

NORTH CAROLINA BUILDING CODE COUNCIL

Notice of Rule-making Proceedings *is hereby given by NC Building Code Council in accordance with G.S. 150B-21.5(d).*

Citation to Existing Rule Affected by this Rule-Making: *North Carolina, Fire, Building, Mechanical, Existing Building, Residential, and Energy Codes amendments.*

Authority for Rule-making: *G.S. 143-136; 143-138.*

Reason for Proposed Action: *To incorporate changes in the NC State Building Codes as a result of rulemaking petitions filed with the NC Building Code Council and to incorporate changes proposed by the Council.*

Public Hearing: *Tuesday, March 9, 2021, 9:00AM, Albemarle Building, 325 North Salisbury Street, Raleigh, NC 27603, 2nd Floor Training Room 240. Comments on both the proposed rule and any fiscal impact will be accepted.*

Comment Procedures: *Written comments may be sent to Carl Martin, Acting Secretary, NC Building Code Council, NC Department of Insurance, 1202 Mail Service Center, Raleigh, NC 27699-1202. Comments on both the proposed rule and any fiscal impact will be accepted. Comment period expires on April 16, 2021.*

Link to Agency Notice:

https://www.ncosfm.gov/codes/building-code-council-bcc/bcc-hearing-notices

Statement of Subject Matter:

1. Request from Wayne Hamilton representing the NC Building Code Council to amend the 2018 NC Fire Code, Section 304.4.4.

~~304.4.4 Revocation. The use of doorstep refuse and recycling collection containers in apartment occupancies is revocable by the fire code official for violations of this section.~~

Motion/Second/Approved – The request was granted. The proposed effective date of this rule is June 1, 2021 (earliest through RRC), unless the BCC assigns a delayed effective date (January 1, 2022).

Reason Given – The purpose of this amendment is to remove a redundant enforcement requirement from the code as enforcement already exists in Section 109.

Fiscal Statement – This rule is anticipated to provide equivalent compliance with no net decrease/increase in cost. This rule is not expected to either have a substantial economic impact or increase local and state funds. A fiscal note has not been prepared.

2. Request by Tim Henshaw representing the NC Fire Code Revision Committee to amend the 2018 NC Fire Code, Section 510 and Chapter 80.

SECTION 510

EMERGENCY RESPONDER ~~RADIO~~ COMMUNICATION COVERAGE

510.1 Emergency responder ~~radio~~ communication coverage in new buildings. ~~All new buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage level of the public safety communications system of the jurisdiction at the exterior of the building.~~ Approved in-building 2- way emergency responder communication coverage shall be provided in all new buildings. In-building 2- way emergency responder communication coverage shall be based on the existing coverage levels of the public safety communication systems utilized by the jurisdiction, measured at the exterior of the building. This section shall not require improvement of the existing public safety communication systems.

Exceptions:

1. Where *approved* by the building official and the *fire code official*, a wired communication system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained instead of an *approved* ~~radio~~ communications coverage system.
2. Where it is determined by the *fire code official* that the ~~radio~~ communications coverage system is not needed.
3. In facilities where emergency responder ~~radio~~ communication coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the *fire code official* shall have the authority to accept an automatically activated emergency responder ~~radio~~ communication coverage system.
4. New buildings 7,500square feet or less and not more than 1 story above *grade plane.*

4.1. This exception does not apply to windowless buildings, underground buildings or buildings with a *basement.*

510.2 Emergency Responder ~~Radio~~ Communications Coverage in Existing Buildings. Deleted

510.3 Permit required. A construction permit for the installation of or modification to ~~emergency responder radio coverage systems and related equipment is required as specified in Section 105.7.5.~~ in-building 2- way emergency responder communication coverage systems and related equipment is required as specified in Section 105.7.6. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

510.4 Technical requirements. Equipment required to provide emergency responder ~~radio~~ communication coverage shall be listed in accordance with UL 2524. Systems, components and equipment required to provide the ~~emergency responder radio coverage~~ in-building 2- way emergency responder communication coverage system shall comply with Sections 510.4.1 through ~~510.4.2.5~~ 510.4.2.8.

510.4.1 ~~Radio Signal Strength~~ Emergency communication coverage system signal strength. The building shall be considered to have acceptable ~~emergency responder radio coverage~~ in-building 2- way emergency responder communication system coverage when signal strength measurements in 95 percent of all areas on each floor of the building and critical areas shall be provided with 99 percent floor area radio coverage. Critical areas are fire command centers, fire pump rooms, exit stairs, exit passageways, elevator lobbies, sprinkler rooms, riser rooms, standpipe cabinets, sprinkler sectional valve locations, and other areas deemed critical by the AHJ. The signal strength shall meet requirements in Sections 510.4.1.1 ~~and 510.4.1.2~~ through 510.4.1.3.

510.4.1.1 Minimum signal strength into the building. ~~A minimum signal strength of -95 dBm shall be received within the building.~~ The minimum inbound signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the *fire code official*. The inbound signal level shall be a minimum of -95dBm throughout the coverage area and sufficient to provide not less than a Delivered Audio Quality (DAQ) of 3.0 or an equivalent Signal-to-Interference-Plus-Noise Ratio (SINR) applicable to the technology for either analog or digital signals.

510.4.1.2 Minimum signal strength out of the building. ~~A minimum signal strength of -95 dBm shall be received by the agency's radio when transmitted within the building.~~ The minimum outbound signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the *fire code official*. The outbound signal level shall be sufficient to provide not less than a DAQ of 3.0 or an equivalent SINR applicable to the technology for either analog or digital signals.

510.4.1.3 System performance. Signal strength shall be sufficient to meet the requirements of the applications being utilized by public safety for emergency operations through the coverage area as specified by the *fire code official* in Section 510.4.2.2.

510.4.2 System design. The ~~emergency responder radio coverage~~ in-building 2- way emergency responder communication coverage system shall be designed in accordance with Sections 510.4.2.1 through ~~510.4.2.5~~ 510.4.2.8 and NFPA 1221.

510.4.2.1 Amplification systems ~~allowed~~ and components. Buildings and structures that cannot support the required level of ~~radio coverage shall be equipped with a radiating cable system, a distributed antenna system with Federal Communications Commission (FCC) certified signal boosters, or other system approved by the *fire code official* in order to achieve the required adequate radio coverage.~~ in-building 2-way emergency responder communication coverage shall be equipped with systems and components to enhance the radio signals and achieve the required level of emergency communication coverage specified in Sections 510.4.1 through 510.4.1.3. Emergency communication systems utilizing radio-frequency-emitting devices and cabling shall be approved by the *fire code official*. Prior to installation, all RF-emitting devices shall have the certification of the radio licensing authority and be suitable for public safety use.

510.4.2.2 Technical criteria. The *fire code official* shall maintain a document providing the specific technical information and requirements for the ~~emergency responder radio coverage system.~~ in-building 2-way emergency responder communication coverage system. This document shall contain, but not be limited to, the various frequencies required, the location of radio sites, the effective radiated power of radio sites, ~~and other supporting technical information.~~ the maximum propagation delay in microseconds, the applications being used and other supporting technical information necessary for system design.

510.4.2.3 Standby power. ~~Emergency responder radio~~ In-building 2- way emergency responder communication coverage systems shall be provided with ~~standby power in accordance with section 604.~~ dedicated standby batteries or provided with 2-hour standby batteries and connected to the facility generator power system in accordance with Section ~~1203~~ 604. The standby power supply shall be capable of operating the ~~emergency responder radio~~ in-building 2- way emergency responder communication coverage system ~~for a duration of not less than 24 hours.~~ at 100-percent system capacity for a duration of not less than 12 hours.

510.4.2.4 Signal booster requirements. If used, signal boosters shall meet the following requirements:

1. All signal booster components shall be contained in a National Electrical Manufacturer's Association (NEMA) 4-type waterproof cabinet.

2. Battery systems used for the emergency power source shall be contained in a NEMA ~~4 type water proof cabinet~~ 3R or higher-rated cabinet.

3. ~~The signal booster system and battery system shall be electrically supervised and monitored by a supervisor service, or when approved by the *fire code official*, shall sound an audible signal at a constantly attended location.~~ Equipment shall have FCC or other radio licensing authority certification and be suitable for public safety use prior to installation.

4. ~~Equipment shall have FCC certification prior to installation.~~ Where a donor antenna exists, isolation shall be maintained between the donor antenna and all inside antennas to not less than 20dB greater than the system gain under all operating conditions.

5. Active RF emitting devices used in in-building 2- way emergency responder communication coverage systems shall have built-in oscillation detection and control circuitry.

6. The installation of amplification systems or systems that operate on or provide the means to cause interference on any in-building 2- way emergency responder communication coverage network shall be coordinated and approved by the *fire code official*.

510.4.2.5 ~~Additional frequencies and change of frequencies.~~ System monitoring. ~~The emergency responder radio coverage system shall be capable of modification or expansion in the event frequency changes are required by the FCC or additional frequencies are made available by the FCC.~~ The in-building 2-way emergency responder communication coverage system shall be monitored by a listed *fire alarm control unit*, or where approved by the *fire code official*, shall sound an audible signal at a constantly attended on-site location. Automatic supervisory signal shall include the following:

1. Loss of normal AC power supply.
2. System battery charger(s) failure.
3. Malfunction of the donor antenna(s).
4. Failure of active RF-emitting device(s).
5. Low-battery capacity at 70-percent reduction of operating capacity.
6. Failure of critical system components.
7. The communications link between the *fire alarm system* and the in-building 2- way emergency responder communication coverage system.
8. Oscillation of active RF-emitting device(s)

510.4.2.6 Additional frequencies and change of frequencies. The in-building 2- way emergency responder communication coverage system shall be capable of modification or expansion in the event frequency changes are required by the FCC or other radio licensing authority, or additional frequencies are made available by the FCC or other radio licensing authority.

510.4.2.7 Design documents. The *fire code official* shall have the authority to require "as-built" design documents and specifications for in-building 2- way emergency responder communication coverage systems. The documents shall be in a format acceptable to the *fire code official*.

510.4.2.8 Radio communication antenna density. Systems shall be engineered to minimize the near-far effect. In-building 2- way emergency responder communication coverage system designs shall include sufficient antenna density to address reduced gain conditions.

Exception:

1. Systems where all portable devices within the same band use active power control features.

510.5 Installation requirements. The installation of the ~~public safety radio~~ in-building 2- way emergency responder communication coverage system shall be in accordance with NFPA 1221 and Sections 510.5.1 through ~~510.5.4~~ 510.5.5.

510.5.1 ~~Approval prior to installation.~~ Mounting of the donor antenna(s). ~~Amplification systems capable of operating on frequencies licensed to any public safety agency by the FCC shall not be installed without prior coordination and approval of the *fire code official*.~~ To maintain proper alignment with the system designed donor site, donor antennas shall be permanently affixed on the building or where approved, mounted on a movable sled with a clearly visible sign stating "Movement or repositioning of this antenna is prohibited without approval from the fire code official". The antenna installation shall be in accordance with the applicable requirements in the *International Building Code* for weather protection of the building envelope.

510.5.2 ~~Minimum qualifications of personnel.~~ Approval prior to installation. ~~The minimum qualifications of the system designer and lead installation personnel shall include both of the following:~~

~~1. A valid FCC issued general radio operator's license.~~

~~2. Certification of in-building system training issued by a national recognized organization, school, or a certificate issued by the manufacturer of the equipment being installed.~~

~~These qualifications shall not be required where demonstration of adequate skills and experience satisfactory to the *fire code official* is provided.~~

Amplification systems capable of operating on frequencies licensed to any public safety agency by the FCC or other radio licensing authority shall not be installed without prior coordination and approval of the *fire code official* and the frequency license holder(s).

510.5.3 ~~Acceptance test procedure.~~ Minimum qualifications of personnel. ~~Where an emergency responder radio coverage system is required, and upon completion of installation, the building *owner* shall have the radio system tested to verify that two-way coverage on each floor of the building is not less than 90 percent. The test procedure shall be conducted as follows:~~ The minimum qualifications of the system designer and lead installation personnel shall include both of the following:

~~1. Each floor of the building shall be divided into a grid of 20 approximately equal test areas.~~

1. A valid FCC-issued general radio operator's license.

~~2. 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. Certification of in-building system training issued by an approved organization or approved school, or a certificate issued by the manufacturer of the equipment being installed.

~~3. Failure of not more than two nonadjacent test areas shall not result in failure of the test.~~

~~4. In the event that three of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal areas. Failure of not more than four nonadjacent test areas shall not result in failure of the test. If the system fails the 40-area test, the system shall be altered to meet the 90 percent coverage requirement.~~

~~5. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered failure of that test area. Additional test locations shall not be permitted.~~

~~6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building *owner* so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building *owner* shall be required to rerun the acceptance test to reestablish the gain values.~~

~~7. As part of the installation, a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and at subsequent annual inspections.~~

These qualifications shall not be required where demonstration of adequate skills and experience satisfactory to the *fire code official* is provided.

510.5.4 ~~FCC compliance.~~ Acceptance test procedure. ~~The emergency responder radio coverage system installation and components shall comply with all applicable federal regulations including, but not limited to, FCC 47 CFR Part 90.219.~~ Where an in-building 2- way emergency responder communication coverage system is required, and upon completion of installation, the building *owner* shall have the radio system tested to verify that two-way coverage on each floor of the building is not less than 95 percent. The test procedure shall be conducted as follows:

1. Each floor of the building shall be divided into a grid of 20 approximately equal test areas. Where a floor exceeds 128,000 ft2 (11,900 m2), which is the floor area that can be covered by the maximum grid dimension of 80 ft. (24.4m), the floor shall be subdivided into sectors each having an area less than or equal to 128,000 ft2 (11,900 m2), and each sector be tested individually with 20 grid cells in each sector. Signal strength measurements should be taken at the center of each grid and should be performed using standardized parameters as specified by NFPA 1221.

2. 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 or equipment approved by the *fire code official.*

3. Failure of more than one test area shall result in failure of the test.

4. In the event that two of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal test areas. Failure of not more than two nonadjacent test areas shall not result in failure of the test. If the system fails the 40-area test, the system shall be altered to meet the 95-percent coverage requirement.

5. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered to be a failure of that test area. Additional test locations shall not be permitted.

6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building *owner* so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building *owner* shall be required to rerun the acceptance test to reestablish the gain values.

7. As part of the installation, a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and at subsequent annual inspections.

8. Systems shall be tested using two portable radios simultaneously conducting subjective voice quality checks. One portable radio shall be positioned not greater than 10 feet (3048 mm) from the indoor antenna. The second portable radio shall be positioned at a distance that represents the farthest distance from any indoor antenna. With both portable radios simultaneously keyed up on different frequencies within the same band, subjective audio testing shall be conducted and comply with DAQ levels as specified in Sections 510.4.1.1 and 510.4.1.2.

510.5.5 FCC compliance. The in-building 2- way emergency responder communication coverage system installation and components shall comply with all applicable federal regulations including, but not limited to, FCC 47 CFR Part 90.219.

510.6 Maintenance. The ~~emergency responder radio~~ in-building 2- way emergency responder communication coverage system shall be maintained operational at all times in accordance with Sections 510.6.1 through ~~510.6.3~~ 510.6.4.

510.6.1 Testing and proof of compliance. ~~The emergency responder radio coverage~~ The *owner* of the building or owner's authorized agent shall have the in-building 2- way emergency responder

communication coverage system shall be inspected and tested annually or where structural changes occur including additions or remodels that could materially change the original field performance tests. Testing shall consist of the following:

1. In-building coverage test as described in Section 510.5.3.

2. Signal boosters shall be tested to verify that the gain is the same as it was upon initial installation and acceptance. or set to optimize the performance of the system.

3. Backup batteries and power supplies shall be tested under load of a period of 1 hour to verify that they will properly operate during an actual power outage. If within the 1-hour test period the battery exhibits symptoms of failure, the test shall be extended for additional 1-hour periods until the integrity of the battery can be determined.

4. Other All active components shall be checked to verify operation within the manufacturer's specifications.

5. At the conclusion of the testing, a report, which shall verify compliance with Section 510.5.3, shall be submitted to the *fire code official*.

510.6.2 Additional frequencies. The building *owner* shall modify or expand the emergency responder radio the in-building 2- way emergency responder communication coverage system at his or her expense in the event frequency changes are required by the FCC or other radio licensing authority, or additional frequencies are made available by the FCC. or other radio licensing authority. Prior approval of a public safety radio an in-building 2- way emergency responder communication coverage system on previous frequencies does not exempt this section.

510.6.3 Field Testing. Nonpublic safety system. Agency personnel shall have the right to enter onto the property at any reasonable time to conduct field testing to verify the required level of radio coverage. Where other nonpublic safety amplification systems installed in buildings reduce the performance or cause interference with the in-building 2- way emergency responder communication coverage system, the nonpublic safety amplification system shall be corrected or removed.

510.6.4 Field testing. Agency personnel shall have the right to enter onto the property at any reasonable time to conduct field testing to verify the required level of radio coverage.

Chapter 80

NFPA

NFPA 1221-19 Standard for the Installation, Maintenance, and Use of Emergency Services Communications…….510.4.2, 510.5, 510.5.4.

UL

UL2524 -19 Standard for In-building 2- Way Emergency Radio Communication Enhancement Systems ……510.4.

FCC

47 CFR Part 90.219-2007 ……510.5.4, 510.5.5

Motion/Second/Approved – The request was granted. The proposed effective date of this rule is June 1, 2021 (earliest through RRC), unless the BCC assigns a delayed effective date (January 1, 2022).
Reason Given – The purpose of this amendment is to address new technology and to eliminate the requirement for one story buildings 7500sf or less where responder emergency radio coverage can be accomplished without a building emergency radio system.
Fiscal Statement – This rule is anticipated to provide equivalent compliance with no net decrease/increase in cost. This rule is not expected to either have a substantial economic impact or increase local and state funds. A fiscal note has not been prepared.

3. Request from Tim Henshaw representing NC Fire Code Revision Committee to amend the 2018 NC Building Code, Sections 403.4.5, 916, and 916.1.

403.4.5 Emergency Responder ~~Radio~~ Communication Coverage. Emergency responder ~~radio~~ communication coverage shall be provided in accordance with Section 510 of the *International Fire Code*.

916 Emergency Responder ~~Radio~~ Communication Coverage

916.1 General. Emergency responder ~~radio~~ communication coverage shall be provided in all new buildings in accordance with Section 510 of the *International Fire Code*.

Motion/Second/Approved – The request was granted. The proposed effective date of this rule is June 1, 2021 (earliest through RRC), unless the BCC assigns a delayed effective date (January 1, 2022).
Reason Given – The purpose of this amendment is to make the Building Code language consistent with the Fire Code.
Fiscal Statement – This rule is anticipated to provide equivalent compliance with no net decrease/increase in cost. This rule is not expected to either have a substantial economic impact or increase local and state funds. A fiscal note has not been prepared.

4. Request by the NC Building Code Council, Electrical Ad-Hoc Committee, to adopt the 2020 North Carolina Electrical Code.

The Base Documents for the 2020 NC Electrical Code is the 2020 National Electrical Code (NEC) and can be viewed by going to the following website:
https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=70.

The 2020 NC Building Code Council, Electrical Ad-Hoc Committee proposed amendments are posted at the following website and are replacements to the Sections printed in the Base Document:
https://www.ncosfm.gov/bcc-agenda-20201208-proposed-2020-state-electrical-code-amendments

Motion/Second/Approved – The request was granted. The proposed effective date of this rule is June 1, 2021 (earliest through RRC), unless the BCC assigns a delayed effective date (January 1, 2022).
Reason Given – The purpose of this amendment is to adopt the latest available edition of the National Electrical Code (NFPA 70) with North Carolina specific amendments that address specific NC needs.
Fiscal Statement – This rule is anticipated to provide equivalent compliance with no net decrease/increase in cost. This rule is not expected to either have a substantial economic impact or increase local and state funds. A fiscal note has been prepared and has been posted at the following website:
https://www.ncosfm.gov/bcc-agenda-20201208-2020-nec-fiscal-note-item-b7.

NOTICE:
Appeals and Interpretations *of the North Carolina State Building Codes are published online at the following link.*
https://www.ncosfm.gov/codes/codes-current-and-past

NOTICE:
Objections and Legislative Review *requests may be made to the NC Office of Administrative Hearings in accordance with G.S. 150B-21.3(b2) after Rules are adopted by the Building Code Council.*
http://www.ncoah.com/rules/