



## Emergency Responder Communications Coverage Systems

Technical Criteria for Designers and Installers of  
In-Building Radio Coverage System

**January 2024**

**HENDERSON COUNTY FIRE MARSHAL'S OFFICE**

2529 Asheville Hwy.  
HENDERSONVILLE, NC 28791  
828-697-4728

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## 1. GENERAL

Henderson County requires that the Henderson County Public Safety Radio Systems be fully operable in the interior of all new building construction. The North Carolina Fire Code Section 510 (amended September 13, 2022) is the source of this requirement. New buildings 7,500 square feet or less and not more than 1 story above grade plane are exempt from this requirement. This exception does not apply to windowless buildings, underground buildings, or buildings with a basement. Building owners are required to either prove that existing radio coverage in the building meets the required signal levels or an Emergency Responder Communication Coverage System (ERCCS) must be installed to bring the radio signals up to the level required by the code. This document serves as the source of "Technical Criteria maintained on the Henderson County Public Safety Radio Systems".

We encourage contractors, vendors, designers, and installers of ERCCS to meet with the Fire Marshal's Office (HCFMO) as early as possible in their survey and design process in order to ensure that existing radio coverage meets the existing requirement or that any installed ERCCS will meet the code requirements.

## 2. LOCAL PUBLIC SAFETY RADIO SYSTEMS

**Two different Public Safety Radio Systems covering the Hendersonville Area are included in the scope of the requirement. These systems are an analog and digital MHz systems. Both systems are trunked VHF systems.**

The systems are both multi-site simulcast networks with generally strong outdoor coverage in Henderson County. Certain construction designs or materials may, however, limit penetration of these radio signals into the interior of some buildings. Installers of ERCCS should generally find a strong signal for a donor antenna at roof top level regardless of the precise pointing azimuth of the donor antenna. In general, it should not be difficult to find a compromise azimuth that will provide adequate donor signal for both systems.

## 3. EXEMPT PROPERTIES

Existing buildings are exempt from the requirement for interior radio coverage. If the owner of a non-exempt building wishes to provide an ERCCS it will need to follow the guidelines of a new ERCCS.

#### **4. SIGNAL SURVEYS AND AMPLIFIER INSTALLATIONS**

Signal surveys conducted for the purpose of demonstrating the existing radio coverage meets the required signal level shall be conducted by personnel meeting the minimum standards of Section 510.5.3 of the 2018 NCFC. Such surveys will be based on the 20-grid, 95% coverage procedure outlined in Section 510.4.1 through 510.4.1.2. Signal level measurements will be required on the active control channel for both the city and county public safety radio systems. Minimum signal required in -95dBm for both systems. Received signal levels will be measured with a suitable spectrum analyzer that has been calibrated within the last 12 months.

Documentation required to prove sufficient existing signal coverage will include the signal level measurements taken from the center of all 20 grids on each floor as well as spectrum analyzer screen shots captured for all 20 grids per floor, including subgrade levels and parking decks. In addition, one set of signal measurements should also be taken outside the building at the main entrance to the building as well as the roof top level. Documentation must be submitted in electronic form such as thumb drives. The Henderson County Fire Marshal's Office (HCHCFMO) personnel may do a spot check to verify the survey results.

In the case where a survey has sampled enough data to conclude that 95% interior coverage at -95dBm does not exist and that the owner will need to install and ERCCS, the survey can be suspended at the owner's option without submitting the survey documentation to the HCFMO. If the survey results or the HCFMO determines that an ERCCS is required, it is recommended that the designer of the system submit the design plan to the HCFMO prior to implementation. Design and installation of the ERCCS should be in accordance with NFPA 1225-22 Section 18.3 and the appropriate sections of the 2018 NCFC. Installation of all ERCCS, to include rooftop antenna components and all required bonding, grounding, and lightning protection will be in compliance with all building and fire codes and will be subject to the permitting and inspection process.

Design plans should include all of the appropriate items listed in Appendix E( NFPA 1225-22 Section 20.3.10).

(1)

All alarm functions capable of being monitored of the ERCCS will be wired into the main building fire alarm panel. Also, in installations where the ERCCS amplifier is not co-located with the alarm panel, a Knox Lock will be installed at the alarm panel that can remotely shut down the ERCCS amplifier if needed. A sign should be prominently affixed near the Knox Lock that identifies it as a kill switch for the ERCCS amplifier. HCFMO assistance will be required to procure a Knox Lock keyed for the respective Henderson County Fire Department.

## **5. PERMIT PROCESS**

As specified in Section 105.7.5 of the 2018 NCFC, an Emergency Responder Radio Coverage System permit will be required for any installation or modification of an ERCCS. The permit application will be thru SmartGov and reviewed by the the Henderson County Fire Marshal's office. The application will have two tracking paths: one for Fire Plan review and inspections and a second path for approval by the frequency license holder. The ERCCS permit will be an amendment to the main building permit for the premises. The General Contractor for the project is responsible for having all plans and permits on the job site. The ERCCS installation contractor and electrical contractor can then request the respective inspections for the final ERCCS approval.

## **6. FCC AUTHORIZATIONS**

The FCC requires a Letter of Authorization for Retransmission that allows the building owner to retransmit on frequencies that are licensed to Henderson County. The HCFMO will supply the appropriate letters for any ERCCS operating on Henderson County frequencies. Those letters must be stored or displayed prominently on or near the ERCCS amplifier enclosure. The Authorization Letters are valid for one year and must be reissued for each annual re-inspection (see Section 10). In addition, all ERCCS amplifiers operating in Class B mode are required to be registered with the FCC. The HCFMO will be responsible for registering Class B ERCCS in the FCC database.

## **7. MINIMUM QUALIFICATIONS OF PERSONNEL**

Minimum qualifications for personnel involved in the testing, design, installation, and maintenance of ERCCS is covered in Section 510.5.3 of the 2018 NCFC and is listed here:

- (1) A valid FCC-issued general radio operator's license.
- (2) Certification of in-building system training issued by an approved organization or 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.

## **8. VENDORS**

Henderson County does not endorse specific vendors or restrict the list of firms that can conduct surveys on installing ERCCS.

## 9. ACCEPTANCE TESTING

Acceptance testing for installed ERCCS shall be conducted in accordance with Section 510.5.4 of the 2018 NCFC. Where an in-building 2-way emergency responder communications 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: Each floor of the building shall be divided into a grid of 20 approximately equal test areas. Where floor exceeds 128,000 ft<sup>2</sup> (11,900 m<sup>2</sup>) which is the floor area that can be covered by the maximum grid dimension of 80 ft (24.4 m), the floor shall be subdivided into sectors each having an area less than or equal to 128,000 ft<sup>2</sup> (11,90 m<sup>2</sup>), and each sector to be tested individually with 20 grid cells per sector. Signal strength measurements should be taken at the center of each grid and should be performed using standardized parameters as specified in NFPA 1225-22:

- (1) 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*.
- (2) Failure of more than one test area shall result in failure of the test.
- (3) 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.
- (4) 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 communication to and from the outside of the building through the public agency's radio communication 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 that area. Additional test locations shall not be permitted.
- (5) 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 the 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.

- (6) 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.
- (7) 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 of the NCFC.

## **10. ANNUAL RE-INSPECTION**

Annual re-inspection and re-testing of all ERCCS is required in accordance with Section 510.6.1 of the 2018 NCFC. Results of the annual re-inspection and test shall be submitted directly to the HCFMO ([HCFMO@hendersoncountync.gov](mailto:HCFMO@hendersoncountync.gov)). Letters of Authorization to retransmit on Henderson County frequencies will be re-issued for one additional year and for each annual re-inspection.

## **11. APPENDIX A – EMERGENCY WIRELESS COMMUNICATIONS**

- (A) *Purpose* The purpose of this section is to ensure that buildings and structures shall not interfere with the Henderson County’s communication network. Developments shall be modified to accommodate the needs of the county’s communications network, to eliminate any interference a development would create or otherwise accommodate the needs of the county’s communication network within the development proposal. Adequate provisions shall be made for a radio signal booster system which will correct for a reduction in the radio signal to a level below that required to assure the 95 percent area coverage reliability needed for public safety communications.
- (B) *Radio signal booster system required* Except as otherwise provided no person 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 law enforcement officers. The following structures are exempt from these requirements”

- a. One- and two-family residential buildings.
- b. Buildings constructed prior to the effective date of this section (January 1, 2019) shall be required to comply with public safety radio coverage provisions of this section.

(C) *Easements* The county may require an easement to utilize the roof for communications infrastructure components to support current and future public safety communication needs. This includes, but not limited to a 12 feet x 25 feet rooftop area for antennas, base stations, UPS power supplies, and microwave dish antennas. The building owners shall provide a secure climate-controlled environment, no less than 10 feet x 20 feet x 10 feet, suitable for sensitive equipment. This room shall be located within the top floor of roof area to allow for less than 100-foot cable runs to the antenna locations. Power for the equipment in the room shall be fed from the building emergency generator.

Additional construction specifications will be made available as required.

(D) *Specifications* All emergency wireless communications shall be constructed in accordance with the standards set forth in the Henderson County Standards and Specifications Manual.

(E) *Alternative standards* Based on sound telecommunication engineering practices, the information technology director or his designer may approve alternative standards that are equal to or better than those set forth in this chapter and in the Henderson County Standards and Specifications Manual.

## **12. APPENDIX B- SECTION 510 FROM THE 2018 NORTH CAROLINA FIRE CODE**

**510.1 Emergency responder radio communications coverage in new buildings.** *Approved* in-building 2-way emergency responder communication coverage shall be provided in all new buildings, in-building 2-way emergency responder communications 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* communications coverage system.
2. Where it is determined by the *fire code official* that the communications coverage system is not needed.
  3. In facilities where emergency responder communication coverage is required and such systems, components or equipment required could have a negative impact on the normal operation of that facility, the *fire code official* shall have the authority to accept an automatically activated emergency responder communications coverage system.
  4. New buildings 7,500 square feet or less and not more than 1 story above *grade plane*.
  5. This exception does not apply to windowless buildings, underground buildings, or buildings with a *basement*.

## **510.2 Emergency Responder Communications Coverage in Existing Buildings. Deleted**

**510.3 Permit required.** A construction permit for the installation of or modification to in-building 2-way emergency responder communication coverage systems and related equipment is required as specified in section 105.7.5. 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 communication coverage shall be listed in accordance with UL 2524. Systems, components, and equipment required to provide the in-building 2-way emergency responder communication coverage system shall comply with sections 510.4.1 through 510.4.2.8.

**510.4.1 Emergency communication coverage system signal strength.** The building shall be considered to have acceptable 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 through 510.4.1.3.

**510.4.1.1 Minimum signal strength into 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 and 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.** 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 in-building 2-way emergency responder communications coverage system shall be designed in accordance with Sections 510.4.2.1 through 510.4.2.8

and NFPA 12225-22

**510.4.2.1 Amplification systems and components.** Buildings and structures that cannot support the required level of 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 in-building 2-way emergency responder communication coverage system. This document shall, but not be limited to, the various frequencies required, the location of radio sites, the effective radiated power of radio sites, the maximum propagation delay in microseconds, the applications be used and other supporting technical information necessary for system design.

**510.4.2.3 Standby power.** In-building 2-way emergency responder communication coverage systems shall be provided with dedicated standby power or provided with 2-hour standby batteries and connected to the facility generator power system in accordance with Section 604. The standby power shall be capable of operating the in-building 2-way emergency responder communication coverage system 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 3R or higher-rated cabinet.
3. Equipment shall be FCC or other radio licensing authority certification and be suitable for public safety use prior to installation.
4. 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 System monitoring.** 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 shall include sufficient antenna density to address reduced gain conditions.

**Exceptions:**

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

**510.5 Installation requirements.** The installation of the in-building 2-way emergency responder communication coverage system shall be in accordance with NFPA 1225-22 and Sections 510.5.1 through 510.5.5.

**510.5.1 Mounting of the donor antennas.** 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 Approval prior to installation.** 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 Minimum qualifications of personnel.** The minimum qualifications of the system designer and lead installation personnel shall include both of the following:

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

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

**510.5.4 Acceptance test procedure.** Where an in-building 2-way emergency responder communications 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 ft<sup>2</sup> (11,900 m<sup>2</sup>), 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 ft<sup>2</sup> (11,900 m<sup>2</sup>), 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 NPPA 1225.
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 a subsequent annual inspection.
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 in-building 2-way emergency responder communication coverage system shall be maintained operational at all times in accordance with Sections 510.6.1 through 510.6.4.

**510.6.1 Testing and proof of compliance.** The *owner* of the building or owner's authorized agent shall have the in-building 2-way emergency responder communication coverage system 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 system.
3. Backup batteries and power supplies shall be tested under load for 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. 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 *owners* shall modify or expand the in-building 2-

way emergency responder communication coverage system at his or her expense in the event of 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 an in-building 2-way emergency responder communication coverage system on previous frequencies does not exempt this section.

**510.6.3 Nonpublic safety system.** Where other nonpublic safety amplification systems installed in building reduce the performance or cause interference with the in-building 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.

### 13. APPENDIX C - HENDERSON COUNTY RADIO SYSTEM TECHNICAL INFORMATION

The Henderson County VHF trunked radio system transmits from six tower sites around the county. The system utilizes different frequencies at each tower. Each channel has a bandwidth of 6.25 kHz.

Bearwallow Mountain	35.461382 N	-82.357620 W
Corbin Mountain	35.168065 N	-82.434557 W
Edneyville	35.384930 N	-82.299880 W
Forge Mountain	35.363353 N	-82.624108 W
Courthouse	35.314551 N	-82.460322 W
Pinnacle Mountain	35.229938 N	-82.539751 W

The system utilizes the following frequencies for each site. The installer may coordinate with Henderson County to determine which site would be best suited for the **ERCCS**. Frequencies are listed on the next two pages.

SITE	DOWNLINK TO SUBSCRIBERS	UPLINK TO REPEATERS
BEARWALLOW	150.85250	158.19000
BEARWALLOW	150.94250	159.93000
BEARWALLOW	150.97250	159.96000
BEARWALLOW	153.23750	159.86250
BEARWALLOW	153.43250	160.16250
BEARWALLOW	154.24250	159.08250
BEARWALLOW	154.25750	158.94750
BEARWALLOW	154.33250	159.02250
CORBIN	150.86750	158.89500
CORBIN	150.95000	158.22750
CORBIN	151.52750	159.63000
CORBIN	151.60250	159.96750
CORBIN	152.86250	159.66750
CORBIN	153.02750	159.07500
CORBIN	153.10250	159.84750
CORBIN	153.73250	159.62250

<b>SITE</b>	<b>DOWNLINK TO SUBSCRIBERS</b>	<b>UPLINK TO REPEATERS</b>
COURTHOUSE	150.93500	157.48500
COURTHOUSE	151.16750	158.84250
COURTHOUSE	151.39250	159.11250
COURTHOUSE	151.45250	155.87250
COURTHOUSE	151.97000	158.16000
COURTHOUSE	153.37250	158.18250
COURTHOUSE	153.58250	158.19750
COURTHOUSE	153.61250	159.78750
EDNEYVILLE	151.97750	157.47750
EDNEYVILLE	153.46250	159.75750
EDNEYVILLE	153.49250	159.80250
EDNEYVILLE	153.68750	160.02750
EDNEYVILLE	154.19750	159.60000
EDNEYVILLE	154.37750	159.71250
EDNEYVILLE	154.61000	160.19250
EDNEYVILLE	155.93250	159.10500
FORGE	150.88250	159.68250
FORGE	152.26250	159.81750
FORGE	153.44750	160.13250
FORGE	153.52250	160.01250
FORGE	154.39250	155.68500
FORGE	154.42250	159.16500
FORGE	154.55500	159.92250
FORGE	155.30250	155.04750
PINNACLE	150.95750	158.15250
PINNACLE	153.16250	159.72000
PINNACLE	153.20750	158.27250
PINNACLE	153.22250	158.33250
PINNACLE	153.28250	159.77250
PINNACLE	153.32750	159.74250
PINNACLE	153.50750	159.98250
PINNACLE	153.59750	160.08000



## 14. APPENDIX D - ERCCS CHECKLIST FOR PLAN REVIEW

The design submitted for approval should consist of the following, as appropriate for the design.

- (1) DAQ signal source level measurements in a format acceptable to the AHJ [e.g. DAQ bit error rate (BER), signal to interference noise ratio (SINR)]
- (2) Building site plan, building floor plans, and elevation plans
- (3) Donor RF link path profiles, link budgets, azimuths, and distances
- (4) Donor antenna mounting details and donor antenna cable installation details
- (5) Grounding and surge suppression details
- (6) Backbone and distribution antenna cable diagrams
- (7) Device locations on floor plans
- (8) Pathway survivability design as applicable
- (9) Primary and backup power distribution design and wiring
- (10) Backup power calculations
- (11) Monitoring system design including fire alarm control unit (FACU) interfaces and annunciators
- (12) Donor/DAS antenna isolation calculations
- (13) Pre-installation predictive DAQ or signal coverage maps on floor plans
- (14) Designer qualifications
- (15) Installer qualifications
- (16) Test grids on floor plans, or walk plan if approved by the AHJ
- (17) Manufacturers' specification sheets (i.e. cut sheets) for all equipment and cable



# APPENDIX E: RETRANSMISSION AUTHORIZATION

Henderson County Emergency Services  
2529 Asheville Highway  
Hendersonville, North Carolina 28791

## RETRANSMISSION AUTHORIZATION

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### SECTION 1: Requesting Party Information

I hereby request retransmit authorization via BDA for in-building public safety radio system coverage, according to the information below:

Requestor Name:

Requestor Email:

Phone Number:

Submittal Date:

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### SECTION 2: Information to be provided by Building Owner or Designee

1. Building Owner name:
2. Building Owner phone:
3. Name of Building:
4. Building Address:
5. Building Contact Name:
6. Contact Phone:
7. Contact Email:
8. Emergency Contact Name:  
(Bldg Contact, NOT contractor contact)
9. Emergency Contact Phone (24h):  
(Bldg Contact NOT contractor contact)
10. Location of equipment in building (floor and room):
11. Designed By:
12. Installed By:
13. Tested By:
14. BDA mfg/model:
15. Antenna type/mfgr/model:
16. Antenna gain (dBd):
17. ERP to donor site (dBm):
18. Antenna coordinates (NAD83):
19. Antenna height above ground (feet):
20. Antenna Height Above Mean Sea Level (amsl):
21. Projected signal level at donor site (-dBm):
22. Date to be commissioned (first turned on):

PE or GROL  
Number:  
(required)

**SECTION 2: Information to be provided by Building Owner or Designee(Continued)**

23. Broadband Channelized

24. How many channels:

25. Antenna azimuth (degrees true):

26. Licensed call letters to be rebroadcast:

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**SECTION 3: Request for Authorization Process**

1. Completed form can be emailed to HCFMO@hendersoncountync.gov
2. The HCFM Office will review the request and either approve or disapprove the BDA request.
3. The HCFM then sends an approved and executed Retransmission Authorization form back to the applicant. If disapproved a reason will also be provided.
4. Upon completion, Class B BDAs will be registered with the FCC and the registration number maintained by the HCFM.

**NOTE REGARDING INITIAL ACTIVATION OF BDS SYSTEMS**

Coordination with the HCFM is required before a new BDA system is turned on for the first time. Vendors or BDA owners are asked to contact the HCFM Office at 828-697-4728 at least 2 weeks prior to initial system activation to coordinate this activity. The HCFM must be notified prior to testing the BDA. All testing will be performed on the channel assigned by the HCFM Office.

**If at any time during or after installation, the BDA system negatively impacts the HCPS network, the building owner will be required to immediately turn off the malfunctioning BDA system until correct functioning is restored. For all BDA's that are connected to HCPSRS, Fire Code Officials are not permitted to waive the hardening requirements and the battery backup requirements of the standard.**

**SECTION 4: Signatures**

A copy of this signed authorization will be kept on file at the Henderson County Fire Marshal's Office at 2529 Asheville Highway, Hendersonville, North Carolina 28791.

The parties have signed below as evidence of their agreement with the terms of this authorization:

Requester Name: Requester Title:

Requester Signature: Date:

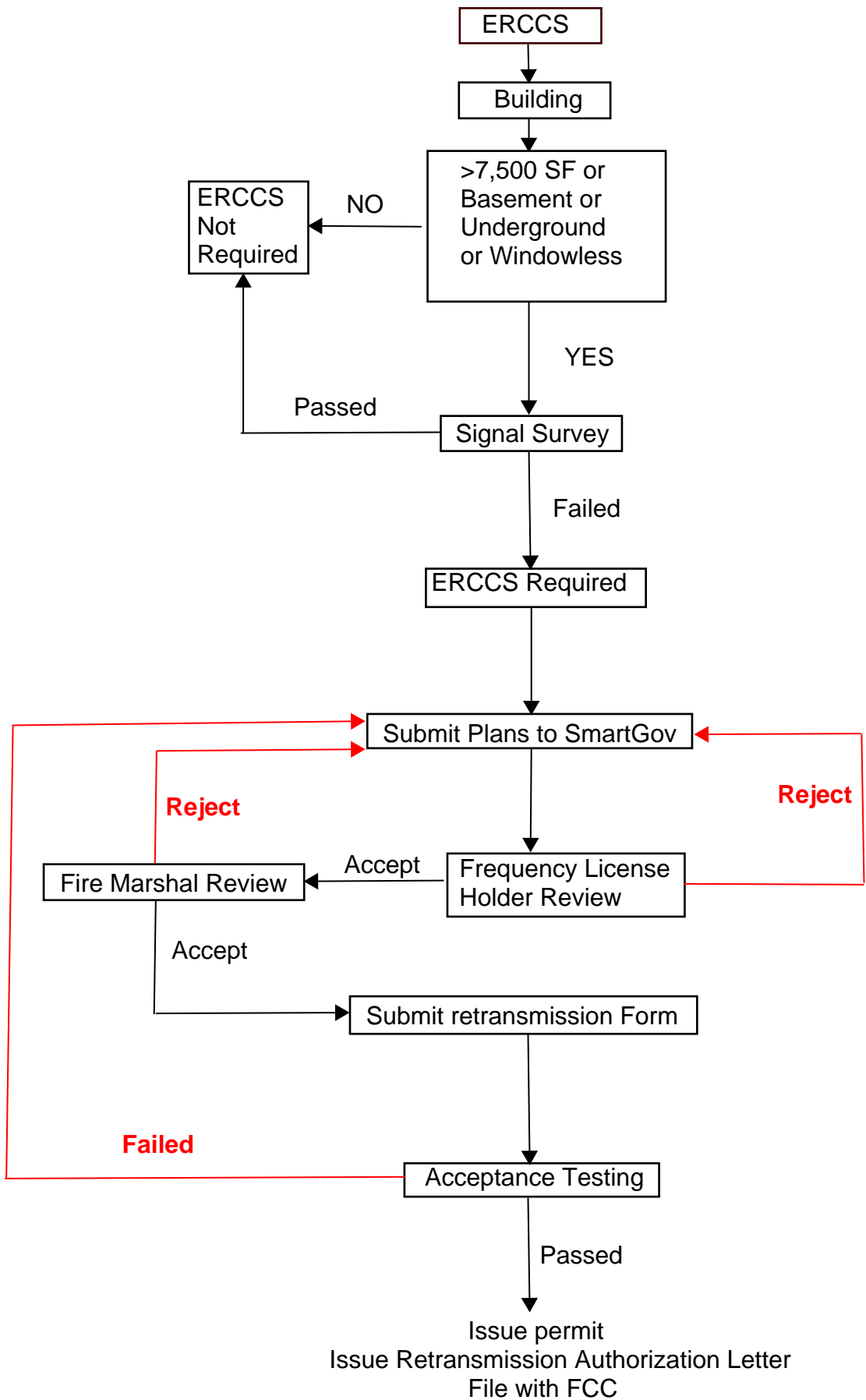
**HCFM Office Use Only**

Approving Authority Name: Approving Authority Title:

Approving Authority Signature: Date:

FCC Signal Booster Registration:

APPENDIX F - ERCCS WORKFLOW



## 15. References

200FCC47CFR90.219-2007	Private Land Mobile Radio Services – Use of Signal Boosters
NCFC-18	2018 North Carolina Fire Code with Amendments
NFPA 72-13	National Fire Alarm and Signaling Code
NFPA 1225-22	Standard for Emergency Services Communications