

## EMERGENCY RESPONDER RADIO COVERAGE BDA SYSTEMS

**Royse City Fire Department - Fire Marshal's Office**  
305 N Arch St. • Royse City, TX 75189 • Phone: 972.524.4819  
Website: <http://www.roysecity.com/departments/fire/>  
Email: [rcfd@roysecity.com](mailto:rcfd@roysecity.com)

These guidelines are to be followed when a building, or facility, within the City of Royse City, does not meet the radio signal level requirements and is required to have an approved Emergency Responder Radio Coverage System. All Emergency Responder Radio Coverage Systems for the purposes of this guideline and any other guidelines or requirements of the Fire Marshal's Office shall conform to 2022 NFPA 72, 2019 NFPA 1221, 2018 International Fire Code, and FCC 47 CFR Part 90.219.

### General Requirements

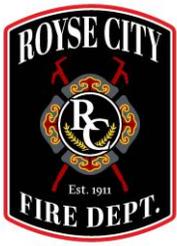
- ❖ All new and existing buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication system in the City of Royse City at the exterior of the building.
- ❖ Buildings that cannot support the required level of radio coverage shall be equipped with a distributed antenna system and FCC certified and listed signal booster or systems otherwise approved to achieve the required adequate radio levels coverage.
- ❖ A permit for the installation of or modification to emergency responder radio coverage systems and related equipment is required through the Fire Marshal's Office. Maintenance performed in accordance with the International Fire Code is not considered a modification and does not require a permit.
- ❖ Survivability from attack by fire, of installed components, shall meet 2022 NFPA 72.

The following notes must be added to the **architectural drawings** for buildings required to meet the requirements for emergency responder radio coverage:

- ❖ This project is required to meet the requirements in the 2018 International Fire Code Section 510 for Emergency Responder Radio Coverage.
- ❖ If this building does not meet the signal strength requirement of -95 dB into and out of the building in 95% of all areas on each floor of the building, a radiating cable system, a distributed antenna system with FCC certified signal boosters, or other system approved by the Fire Marshal's Office will be provided to achieve the required coverage.

### Submittal Requirements

- ❖ Prior to obtaining a permit, a complete design package shall be submitted for review and approval from one of The City of Royse City's 3rd Party Plan Review Firms (See Third Party Plan Review Guidelines). All related expenses are the responsibility of the contractor, owner, or designated agent. As a minimum, the submittal package for review shall consist of the following:
  - Drawings shall contain the original BDA signal strength heat map, riser diagram, cable paths, antenna location, equipment locations, code and standard editions, cable survivability level, system performance narrative, and general notes describing the minimum Scope of Work
  - Equipment technical specifications
  - Product certifications (FCC ID, UL Listing, and File Number)
  - Battery Calculations



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- Plans signed by a person holding a valid FCC GROL License
- Contact information and license number of the installing contractor(s)

### **Design Criteria**

#### ❖ Radio Signal Strength

- The building is considered to have acceptable emergency responder radio coverage when the signal strength measurements in 95 % of all areas, on each floor of the building meets the requirement of receiving a minimum signal strength of -95 dB into and out (downlink / uplink) of the building.
- Minimum signal strength into and out of the building shall be sufficient to provide usable voice communications throughout the coverage area as specified by the fire code official. The inbound and outbound signal level shall be 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.

#### ❖ Frequency Information

##### Rockwall County Interoperable Radio Network Frequency Allocation for P25 Phase II System

Channel 1	800.01875 TX 770.01875 RX	Channel 2	801.06875 TX 771.06875 RX
Channel 3	802.06875 TX 772.06875 RX	Channel 4	802.76875 TX 772.76875 RX
Channel 5	803.24375 TX 773.24375 RX	Channel 6	804.43125 TX 774.43125 RX

- ❖ Standby Power – An approved secondary source of power must be provided for radio coverage systems. The standby power supply shall be capable of operating the radio coverage system for at least 12 hours. The standby power supply shall be either a battery system, UPS or an emergency generator. All batteries must be contained within a National Electrical Manufacturer's Association (NEMA) 4-type waterproof cabinet.
- ❖ Signal Booster – If used, signal boosters must be contained within a NEMA 4-type waterproof case. The signal booster and battery system must be electronically supervised and monitored by a supervisory service (tied into fire alarm system as a supervisor trouble signal).



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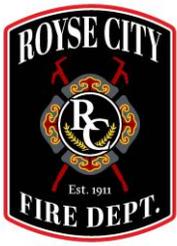
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### **System Monitoring**

- ❖ The emergency responder radio enhancement system shall include automatic supervisory signals for malfunctions described below and annunciated by the fire alarm system. The building owner shall immediately report all indications to the signal booster provider.
  - Loss of normal AC power supply
  - System battery charger(s) failure
  - Malfunction of the donor antenna(s)
  - Failure of active RF-emitting device(s)
  - Low battery capacity at 70% reduction of operating capacity
  - Failure of critical system components
  - The communications link between the fire alarm system and the emergency responder radio enhancement system
- ❖ A sign will be located at the dedicated monitoring panel with the service provider's name and telephone number.

### **Acceptance Test**

- ❖ Upon completion of the installation, the system is required to be tested after construction is complete in order to ensure that the two-way coverage on each floor of the building is a minimum of 95%. Critical areas such as an emergency command center, fire pump room, exit stairs, exit passageways, standpipe cabinets, sprinkler sectional, valve locations, elevator lobbies, and similar critical areas shall be provided with 99% floor area radio coverage per NFPA 1221 Section 9.6.7.3. The test procedure shall be as follows per 2018 IFC Section 510:
  - Each floor of the building must, at a minimum, be divided into a grid of 20 approximately equal test areas.
  - The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency of jurisdiction talking through the agency's radio communications system in both receive and transmit modes.
  - Failure in more than one test area shall result in failure of the test.
  - In the event that two of the test areas fail the test, 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 must be altered to meet the 95% coverage requirement.
  - 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 radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location is considered a failure of that test area. Additional test locations are not permitted.
  - The gain values of all amplifiers shall be measured and the test measurement results shall be kept



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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 is required to rerun the acceptance test to reestablish the gain values.

- 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.
  - Systems incorporating Class B signal-booster devices or Class B broadband fiber remote devices shall be tested using two portable radios simultaneously conducting subjective voice quality checks. One portable radio shall be positioned not greater than 10 feet 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 2018 IFC Sections 510.4.1.1 and 510.4.1.2.
- ❖ Installed Class B systems must be registered with the FCC. <https://signalboosters.fcc.gov/signal-boosters/> Proof of registration must be provided to the Royse City Fire Marshal's Office.
  - ❖ Royse City Fire Marshal's Office shall witness the final acceptance test. Email [rcfd@roysecity.com](mailto:rcfd@roysecity.com) or call 972.524.4819 to schedule.

### **Final Report**

Prior to issuance of a certificate of occupancy, a final acceptance report shall be submitted to the Fire Marshal's Office via email at [rcfd@roysecity.com](mailto:rcfd@roysecity.com) containing a floor plan and the signal strengths at each location tested and other relevant information stamped and signed by the FCC Certified Technician or Engineer with a statement specifying that the building complies with all of the requirements of the 2018 IFC section 510.

### **Annual Testing**

- ❖ The owner of the building or owner's authorized agent shall have the emergency responder radio coverage system be inspected and tested annually or where structural changes occur including additions or remodels that could materially change the original performance test. Testing shall comply with the 2018 IFC Section 510.6.
- ❖ At the conclusion of the testing, a report, which shall verify compliance with 2018 IFC Section 510.5.3, shall be submitted to the Fire Marshal's Office via email at [rcfd@roysecity.com](mailto:rcfd@roysecity.com)