



EMERGENCY RESPONDER RADIO COVERAGE SYSTEM SUBMITTAL

These guidelines are to be followed when a business, facility or organization proposes to install or modify emergency responder radio coverage systems within the Lake Cities Fire Department Jurisdiction. This document shall assist in the preparation of a submittal for permit. These guidelines are not to be interpreted as containing all data required for proper design, installation, or approval.

All emergency responder radio coverage systems for the purposes of this guideline and the requirements of the Fire Department shall conform to the current adopted International Fire Code, and amendments by Hickory Creek, Shady Shores, Lake Dallas, and Corinth.

This guide does not replace, nor supersede any codes and/or ordinances adopted by Hickory Creek, Shady Shores, Lake Dallas, Corinth.

INCOMPLETE PERMIT APPLICATIONS WILL NOT BE REVIEWED.

Three (3) set of plans and specifications will be submitted for review with the following information:

These guidelines are to be followed when a building, or facility, within the Lake Cities Fire Department, does not meet the signal level requirement and is required to have an approved Two-Way Radio Communications Enhancement System. All Two-Way Radio Communications Enhancement Systems for the purposes of this guideline and any other guidelines or requirements of the Fire Department shall conform to the current NFPA 70, NFPA 72, NFPA 1221, International Fire Code, and FCC 47 CFR Part 90.219.

APPLICABILITY

All new and existing buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the Lake Cities Public Safety Communications System at the exterior of the building if the following minimum conditions fail to meet compliance of the current IFC, Section 510.4.1.1 and 510.4.1.2, NFPA 72, Section 24.5.2.2.1 and 24.5.2.2.2 than an enhancement system is needed:

1. A minimum signal strength of -95dBm shall be provided in
 - a. Critical areas, such as fire command center(s), fire pump room(s), exit stairs, exit passageways, elevator lobbies, storm shelters, and other areas deemed critical shall be provided with 99 percent floor area radio coverage.
 - b. General areas shall be provided with 90 percent floor area radio coverage.

See pages 6 & 7 for technical information related to radio frequencies, radio system and antenna site locations.

TWO-WAY RADIO COMMUNICATIONS ENHANCEMENT SYSTEM PROJECT REQUIREMENTS

2. Permit is required before every project, and a submittal package is required with the following information:
 - a. Submittal document must include the material list, data sheets of the materials, snapshots of the overall design plan and floor plans.
 - b. Overall design plan, Floor plans with the design, prediction propagation heat maps on PDF format with proper labeling for each component on a 24"x36" scale. Design plan will also include projected emission limits to reduce the

interference potential that would cause adverse effects of increased noise floor at the donor site.

- c. Benchmark test is required for each floor to make sure the amount of coverage is needed (whole floor, partial floor or none needed). The results of this test must include the make/model and calibration certificate of the measurement device used.
3. Plenum cable and connectors required for all interior horizontal and vertical runs.
 4. Outdoor rated coax cable and connectors required for exterior runs.
 5. Passive components and antennas must be easily purchasable/replaceable.
 6. All active components must be in a NEMA 4/NEMA 4X enclosure. This includes Repeater, Remote Units, and DAS Head End Units.
 7. Active components shall be located in an approved accessible conditioned space or room, such as an IT closet, or fire rated room.
 8. There must be sufficient isolation between the donor and service antennas, the minimum isolation required is 15dB greater than the repeater gain.
 9. Battery backup must be provided in a NEMA 4/NEMA 4X Enclosure and a calculated runtime of the 24-hour battery backup must be provided.
 10. All interior vertical runs must be protected in a 2-hour Fire rated raceway or enclosure. If the interior vertical runs are in a stacked 2-hour rated room and the sealed with proper fire caulking, this meets the requirement.
 11. The Two-Way Radio Communications Enhancement System installation and components shall also comply with all applicable federal regulations including but not limited to, FCC 47 CFR Part 90.219.
 12. Installations must be registered in the FCC signal booster database that can be accessed at <https://signalboosters.fcc.gov/signal-boosters/>.

ORGANIZATIONAL AND EQUIPMENT REQUIREMENTS

13. The minimum qualifications of the system designer and lead installation personnel shall include the following:
14. A valid FCC-issued General Radio Operators License.

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

16. System design software with prediction tools are to be used in the design plan to give an accurate display of the overall design and RF propagation. Design process shall include site surveys to collect pre and post installation data to validate predictions and ensure proper loss, gain, and power levels.

17. A PCTel test will be used to validate pre and post installation signal levels in dBm. Validations and loss, gain, power levels will be included in the completed As-Built documentation.

18. A calibrated coax cable sweep test device will be used to capture accurate losses to validate design loss predictions and ensure proper installation of connectors. All measured cable losses will be included in the completed As-Built documentation.

ACCEPTANCE TEST REQUIREMENT

19. Each floor must be divided into a minimum of 20 grids and one sample must be taken from the center of each grid. A PCTel test will be used to ensure a signal level of -95dBm or greater is recorded in each grid. Critical areas will have 99 percent coverage and General areas will have 90 percent coverage. Critical areas must have their own grid in addition to 20 grids. (Elevator lobby, staircase, mechanical rooms). Test will be deemed failed if two or more adjacent grids do not meet the required signal level.

20. Additionally, Delivered Audio Quality (DAQ) testing will be performed with the same model/manufactures radio as used by the Lake Cities Public Safety. A DAQ of 3.4, speech understandable with repetition only rarely required, will be required in the same critical and general test grid locations.

21. As-Built Design documents, cable sweep test documentation, and acceptance test results will be kept onsite for reference.

MONITORING AND MAINTENANCE

22. The Two-Way Radio Communications Enhancement System shall include automatic supervisory and trouble signals for malfunctions of the signal booster(s) and power supply(ies) that are annunciated by the fire alarm system and comply with the following:

23. System and signal booster supervisory signals shall include the following:

- a. Antenna malfunction
- b. Signal booster failure

24. Power supply/Battery backup signals shall include the following for each signal booster:

- a. Loss of normal ac power
- b. Failure of battery charger
- c. Low-battery capacity indication

25. The Two-Way Radio Communications Enhancement 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:

26. In-building coverage test.

27. Signal boosters shall be tested to verify that the output power is the same as it was upon initial installation and acceptance.

28. 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.

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

30. At the conclusion of the testing, a report, which shall verify compliance will be submitted to the Lake Cities Fire Marshal's Office.

NOTE:

31. Re-inspection fee – If it does not meet the requirements or fails to operate, there may be a re-inspection fee.

REQUIRMENTS FOR BDA INSTALLATION IN DENTON COUNTY

32. Radio System Frequencies

P25 Ch	Rprt TX	Rprt RX	Description
1	859.2875	814.2875	Primary Control Channel
2	773.65625	803.65625	Alternate Control Channel
3	858.2875	813.2875	Alternate Control Channel
4	772.60625	802.60625	Alternate Control Channel
5	857.2875	812.2875	Primary Talk Path
6	771.85625	801.85625	Primary Talk Path
7	856.2875	811.2875	Primary Talk Path
8	771.15625	801.15625	Primary Talk Path
9	854.6125	809.6125	BSI WNJJ690
10	770.53125	800.53125	Primary Talk Path
11	770.10625	800.10625	BSI WQVV340

33. FCC Radio Tower Locations

- Location #1: 127 N Woodrow Ln, Denton
GPS Coord: 33 12 48.3 N, 97 06 49.9 W
- Location #2: 403 Demoye, Aubrey
GPS Coord: 33 18 18.0 N, 96 58 57.0 W
- Location #3: 4101 Fairway Dr., Grapevine
GPS Coord: 32 59 02.9 N, 97 03 55.4 W
- Location #4 8400 Thompson Rd, Argyle
GPS Coord: 33 06 17.2 N, 97 14 27.5 W

34. Required Notifications

- a. For all signal boosters: send specifications/location/Turn up date of install to sheriff.tech@dentoncounty.gov, DCSO Radio Shop phone number, 940-349-1501.
- b. The FCC requires that all Class B signal boosters be registered Per FCC Part 90. The link to the registration site is as follows:

<https://signalboosters.fcc.gov/signal-boosters/>

See screenshot of example FCC Registration form on next page.

- c. All class A signal boosters must be licensed with the FCC.

The issuance of a Fire Department Construction Permit from the Lake Cities Fire Department does not relieve the applicant of any permits required by the Cities of Hickory Creek, Shady Shores, Lake Dallas, or Corinth Building Department.

Submit Plans To

Lake Cities Fire Department

3501 FM 2181 Suite B Corinth, TX 76210

Phone: 940-279-4590 Fax: 940-497-3455