



# Yakima County Fire Marshal's Office Public Information Handout **FP-17** **Emergency Responder Radio Coverage Systems**

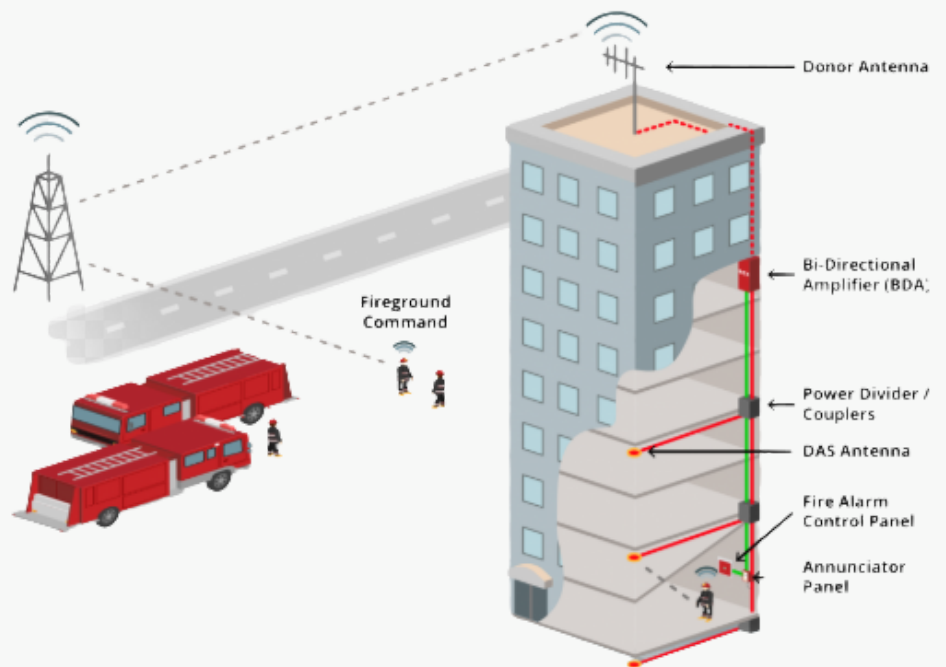


## International Fire Code 510

The International Fire Code has requirements that aid in Emergency Responders ability to communicate from within buildings that do not have adequate signal strength. These system basically are an antenna system that allows Responder radios to receive and send a radio signal.

During emergencies, firefighters and other emergency response personnel use portable radios to communicate while inside buildings or structures. Buildings and structures can interfere with emergency responders' ability to communicate effectively due to the type of construction and materials used. These features can absorb or block the radio frequency energy used to carry signals inside or outside the building, posing a significant safety hazard to emergency response personnel and building occupants.

As a safety solution, the International Fire Code (IFC) establishes requirements for certain new and existing buildings to be equipped with an emergency responder radio coverage system.



### Point of Information:

A Certificate of Occupancy will not be issued to any structure if the building fails to comply with the following provisions.

### Emergency Responder Radio Coverage

Approved radio coverage for emergency responders shall be provided in buildings that have insufficient radio signal strength. Radio coverage is based on the existing coverage levels of the public safety communication systems of the jurisdictions outside the building. This section shall not require improvement of the existing public safety communication system.

### Emergency Responder Radio Coverage in Existing Buildings

Buildings constructed prior to the implementation of this code shall not be required to comply with the emergency radio coverage provisions except as follows:

1. Whenever an existing wired communication system cannot be repaired or is being replaced.
2. Buildings undergoing substantial alteration as determined by the Fire Marshal.
3. When buildings, classes of buildings, or specific occupancies do not have the minimum radio coverage signal strength, and the Fire Marshal's Office determines a lack of minimum signal strength poses an undue risk to emergency responders that cannot be reasonably mitigated by other means.

### Additional Frequencies and Change of Frequencies

The building owner shall modify or expand the frequency range at their own expense in the event that frequency changes are required by the FCC or additional frequencies are made available by the FCC. Prior approval of a public safety radio coverage system on previous frequencies does not exempt this requirement.

### Approval Prior to Installation

No amplification system capable of operating on frequencies used by the local radio system shall be installed without prior coordination and approval of the radio system licensee, and any such system must comply with any standards adopted by all associated agencies.

### Minimum Qualifications of Personnel

The system designer, lead installation personnel, and personnel conducting radio system tests shall be qualified to perform the work. Design documents and all tests shall be documented and signed by a person in possession of a current FCC General Radiotelephone Operator License (GROL) and a certificate or certification issued by the manufacturer of the equipment being installed.

### Acceptance Test Procedure

Acceptance testing for the emergency responder radio amplification system is required upon completion of the installation. It is the building owner's responsibility to have the radio system tested by qualified personnel to ensure a minimum of 95% two-way coverage on each floor of the building.

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A report shall be submitted to the Yakima County Fire Marshal's Office at the conclusion of the acceptance testing, containing a floor plan and the signal strengths at each location tested, and other relevant information. A representative of the Yakima County Fire Marshal's Office may oversee the acceptance test. Acceptance testing is also required whenever changes occur to those buildings that would materially change the original field performance test. The test procedure shall be conducted as follows:

1. Each floor of the building shall be divided into a grid of approximately forty (40) equal areas.
2. Testing shall use a two (2) watt, portable transceiver with speaker/microphone and flexible antenna (or any calibrated device which will produce signal levels usable by the prescribed portable radio). Field strength testing instruments must have been calibrated within one (1) year of the date of the acceptance test. Field strength testing instruments must be of the frequency-selective type, incorporating a flexible antenna similar to the ones used on handheld transceivers. The Yakima County Fire Marshal may designate alternative methods of measuring the signal level that satisfy the appropriate levels of public safety coverage.
3. A maximum of two (2) non adjacent areas will be allowed to fail the test.
4. In the event that three (3) of the areas fail the test, the floor may be divided into eighty (80) equal areas in order to be more statistically accurate. In such event, a maximum of four (4) nonadjacent area will be allowed to fail the test. After eighty (80) area tests, if the system continues to fail, the building owner shall have the system altered to meet the 95% coverage requirement.
5. A spot located approximately in the center of the grid area will be selected for the test, then the radio will be keyed to verify two-way communication to and from the outside of the building through the Regional Radio System. Once the spot has been selected, prospecting for a better spot within the grid is not permitted. The gain values of all amplifiers shall be measured and the results 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.
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 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.
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 in installation and subsequent annual inspections.

**Point of Information:** While the foregoing implies manual measurement and recording, automated testing and recording is certainly permitted so long as a report can be produced documenting the signal strength (or average) in each test square.

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### FCC Compliance

The emergency responder radio coverage system installation and components shall also comply with all applicable federal regulations, including, but not limited to, FCC 47 DFR Part 90.219.



### Maintenance

The emergency responder radio coverage system shall be maintained operational at all times.

### Testing and Proof of Compliance

The emergency responder radio coverage system shall be inspected and tested annually, or whenever structural changes occur to the building that would materially change the original field performance tests, by a consultant approved by the Fire Marshal. The performance test shall include, at a minimum, a floor plan and the signal strength in various locations of the building.

### Testing shall consist of the following

1. In-building coverage tests as described in the Acceptance Test Procedure.
2. Signal boosters shall be tested to ensure that the gain is the same as it was upon initial installation and acceptance.
3. Backup batteries and power supplies shall be tested under a load for a period of one (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 other active components shall be checked to verify operation within the manufacturer's specifications.

### Identification

Buildings equipped with an Emergency Responder Radio Coverage System shall be identified by a sign located near the Fire Alarm Control Panel stating: "This building is equipped with an Emergency Responder Radio Coverage System." As a general rule, fire protection and related equipment are identified by a red sign with minimum one-inch white letters as shown below.

### 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.

If you have any questions or need further clarification, please contact Yakima County Building and Fire Safety at (509) 574-2300.