

Emergency Responder Radio Signal Amplification Systems Fremont Fire Standard

The intent of CFC 510 is to provide emergency first responders the same level of radio coverage in the interior of a new building as they would receive on the exterior of that same building. Fremont Fire Department adheres to the current edition of the CA Fire Code Section 510 for permit issuance, installation, acceptance, and maintenance of Emergency Responder Radio Coverage (ERRC). Please refer to the following sections of the CFC for more information: **CFC 510.1 to 510.6.4 (inclusive), CFC 907.2.12.2; NFPA 72, NFPA-1, Annex O; and NFPA 5000-Annex F.**

It is highly recommended that a building's architect should engage a RES (Radio Enhancement System) designer to estimate the needs for enhanced coverage and to plan for the installation of an RES. The building's owner is ultimately responsible for the initial testing, design, permitting, purchasing, and maintenance of devices to meet the requirements of CFC 510.

The list below includes some, but not all, of the buildings where an RES may be required:

- 1.) Where radio coverage signal strength is most likely not consistent with minimal signal strength outlined in the CFC.
- 2.) When a building is 3 or more stories above grade
- 3.) Any portion of a building below grade with an area of 5,000 square feet or more (parking garage)
- 4.) In any structure with structural components that are known to interfere with radio signal transmissions (concrete, masonry, all-steel construction, e-glass, "wrapped buildings").
- 5.) Photovoltaic system installed on a roof
- 6.) Buildings where transmissions from an interior space are deliberately impeded (Faraday cage).
- 7.) The system must be capable of being modified to accommodate additional frequencies.

MINIMUM SIGNAL STRENGTH

Coverage the building shall be considered to have acceptable emergency responder radio coverage when signal strength measurements of 95% in all areas, on each floor, of the building meet the signal strength below:

- 1.) Minimum signal strength into the building of -95 dBm shall be receivable.
- 2.) Minimum signal strength out of the building should be -95 dBm shall be received.

INITIAL TEST REPORT

Initial testing is the responsibility of the owner. Test reports should be submitted to the Fremont Fire Department which includes: a cover sheet, project information, building information, address and tenant info, square footage, project scope of work; color signal strength/quality measurement scheme (“red” [fail] and “green” [pass]).

WORK PERMITS

Construction permits for all work on RES are required.

CONSTRUCTION DOCUMENTS

- 1.) A minimum of two (2) copies of the plan, wet-signed by the architect or engineer of record shall be submitted. The minimum plan size for this type of submittal is 24-inches by 36-inches (1/8” scale minimum).
- 2.) A minimum of two (2) material data packages (in separate binders) shall accompany the plans, and include all designer and installer documentation. Material data packages shall include all manufacturers’ specification sheets for all devices, equipment, and materials to be used shall be submitted, including the transponder to the supervising station. Highlight on the cut sheet which device or equipment is being used, the listing information, and the application per listing, as well as, manufacturer’s installation instructions.
- 3.) **Shop drawings** shall be of sufficient clarity and detail to fully describe the proposed installation and equipment. Shop drawings shall include, but are not limited to the following:
 - Size, type, and protection method of cable to be utilized;
 - Single-line riser diagram of system of entire system, including interconnection fire alarm control panel;
 - Design calculations for signal levels at each terminal point and initial input signal strength;
 - Signal propagation map (color map indicating the signal strengths as designed);
 - Battery calculations;
 - Voltage calculations;
 - Overcurrent protection devices and equipment (NEC 110.9 and 110.10).
- 4.) **Pathway survivability:** Pathway survivability shall consist of cable installed in metal raceway, or approved metal sheathing.

Exception: High-Rise Buildings and Buildings with Voice Evacuation Systems pathway survivability shall consist of one or more of the following:

- 2-hour fire-rated circuit integrity (CI) cable;
- 2-hour fire-rated cable system [electrical circuit protective system(s)];
- 2-hour fire-rated enclosure or shaft;
- 2-hour performance alternatives as approved.

5.) **Supervision/Monitoring: System(s)** shall be electronically monitored by the buildings fire alarm control panel. At a minimum the following five points shall be monitored:

- a.) Loss of normal AC power
- b.) Signal booster failure
- c.) Antenna malfunction
- d.) Failure of UPS
- e.) Low-battery capacity

6.) **Signage:** Buildings equipped with an emergency responder radio coverage system shall be identified by an approved sign “Building is equipped with an Emergency Responder Radio Coverage System” located adjacent to the fire alarm control panel remote annunciator, or at the fire alarm control panel if no remote annunciator is installed. Sign shall consist of a red background with minimum ½” white lettering.

**Building is Equipped with an Emergency
Responder Radio Coverage System**

Building is Equipped with an Emergency Responder Radio Coverage System

OBSTRUCTION BY NEW BUILDINGS

1. When determined that the construction of a new building obstructs line of sight emergency radio communications to existing buildings or other locations, the developer of the new building shall correct the degraded radio coverage as necessary to restore communications capabilities of the Fremont Department at no cost to the jurisdiction.



Fremont Frequencies

Fremont FD
Fremont, CA 94538
Phone: (510) 494-4200

EMERGENCY RESPONDER RADIO SYSTEM FREQUENCY REQUIREMENT

RFSS	Site	Name	County	Freqs							
1 (1)	001 (1)	<u>ALCO Southwest Simulcast</u>	<u>Alameda</u>	769.29375	769.58125	769.86875	770.33125	770.76875	771.04375	771.34375	
				771.64375	771.94375a	772.24375a	772.54375c	772.84375c			
1 (1)	002 (2)	<u>ALCO East Simulcast</u>	<u>Alameda</u>	769.33125	769.83125	770.36875	771.11875	771.56875	772.01875	772.76875a	
				773.66875a	774.14375c	774.89375c					
1 (1)	003 (3)	<u>CCCO West Simulcast</u>	<u>Contra Costa</u>	851.35000	851.36250	852.60000	852.61250	852.92500	852.93750	853.28750a	
				853.30000a	853.73750a	853.75000c					
1 (1)	004 (4)	<u>ALCO Northwest Simulcast</u>	<u>Alameda</u>	769.09375	769.76875	770.29375	770.56875	770.84375	771.19375	771.49375	
				771.79375	772.09375	772.39375	772.69375	772.99375	773.46875a	773.74375c	
				774.21875c	774.49375c						
1 (1)	005 (5)	<u>CCCO Central Simulcast</u>	<u>Contra Costa</u>	770.53125	771.08125	771.75625	772.05625	772.35625	772.65625	772.88125	
				773.15625	773.90625a	774.18125a	774.45625c	774.73125c			
1 (1)	006 (6)	<u>CCCO East Simulcast</u>	<u>Contra Costa</u>	770.05625	770.60625	771.30625	771.60625a	771.90625a	772.50625a	772.80625c	
1 (1)	007 (7)	<u>ALCO Crane Ridge (East)</u>	<u>Alameda</u>	851.33750	852.45000	852.62500	852.95000a	853.56250c	853.95000		
1 (1)	008 (8)	<u>CCCO Marsh Creek (East)</u>	<u>Contra Costa</u>	852.43750	852.77500	853.13750	853.58750a	853.93750c			
V											

System Wide Talk Groups

DEC	HEX	Mod e	Alpha Tag	Description	Tag
1001	3e9	D	EBRCS Call 1	Calling	Interop
1002	3ea	D	EBRCS IO 1	Interop 1	Interop
1003	3eb	D	EBRCS IO 2	Interop 2	Interop
1004	3ec	D	EBRCS IO 3	Interop 3	Interop
1005	3ed	D	EBRCS IO 4	Interop 4	Interop
1006	3ee	D	EBRCS IO 5	Interop 5	Interop
1015	3f7	D	EBRCS Law 1	Law Interop 1	Interop
1016	3f8	D	EBRCS Law 2	Law Interop 2	Interop
1017	3f9	D	EBRCS Law 3	Law Interop 3	Interop
1010	3f2	E	EBRCS Law 4	Law Interop 4	Interop
1027	403	D	EBRCS Fire 1	Fire Interop 1	Interop
1036	40c	D	EBRCS Fire 2	Fire Interop 2	Interop
1039	40f	D	EBRCS EMS 1	EMS Interop 1	Interop
1038	40e	D	EBRCS EMS 2	EMS Interop 2	Interop
1032	408	D	BART	Bay Area Rapid Transit	Interop