Fire Chiefs Association of Santa Cruz County
FIRE PREVENTION OFFICERS SECTION

FIRE PREVENTION STANDARDS	DATE: **3/1/2023**	NUMBER: **FP0-018**
	APPROVED:	REVISED: 7/29/24
	TITLE: **Emergency Responder Communication Enhancement System (ERCES)**	

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. Santa Cruz County fire agencies adhere to the current edition of the CA Fire Code Section 510 for permit issuance, installation, acceptance testing, and maintenance of Emergency Responder Communication Enhancement System (ERCES). Refer to the following sections of the CFC for more information: 907.2.13.2, 510.1 to 510.6.3(inclusive), NFPA 72, and NFPA-1.

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, and Santa Cruz County Information Services department. 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 and this document.
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 (ie: parking garage).
4. In any structure with structural components that are known to interfere with radio signal transmissions (i.e.: 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 functioning with the current infrastructure as well as being modified to accommodate additional frequencies and current industry technology (ie P25 Phase II).
8. When determined the construction of a new building obstructs the line of site 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 communication capabilities of the AHJ at no cost to the jurisdiction.

MINIMUM SIGNAL STRENGTH

The building shall be considered to have acceptable emergency responder communication 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 AHJ and Santa Cruz County Information Services radio shop which includes: a cover sheet, project information, signal interference study, 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 by the fire agency having jurisdiction **and** Santa Cruz County Information Services radio shop. Vendor must agree and return a signed copy of the frequency use agreement (Attachment A) to the Santa Cruz County Radio Shop prior to start of work.

CONSTRUCTION DOCUMENTS

1. A minimum of three (3) 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). The AHJ may require electronic plan submittal and it is up to the permitee to verify.
2. A minimum of three (3) 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:
   a) Size, type, and protection method of cable to be utilized;
   b) Single-line riser diagram of system of entire system, including interconnection fire alarm control panel;
   c) Design calculations for signal levels at each terminal point and initial input signal strength;
   d) Signal propagation map (color map indicating the signal strengths as designed);
   e) Battery calculations;
   f) Voltage calculations;
   g) 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:
   a. 2-hour fire-rated circuit integrity (CI) cable;
   b. 2-hour fire-rated cable system [electrical circuit protective system(s)]; 2-hour fire-rated enclosure or shaft.
   c. 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 communication coverage system shall be identified by an approved sign "Building is equipped with an Emergency Responder Communication 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. Example:

Building is Equipped with an Emergency Responder Communication Enhancement System

[Attachment A]

RADIO FREQUENCY USE AGREEMENT

BETWEEN

_ **Santa Cruz County ISD Radio Shop**, or

_ **CalFire Radio**

AND

_____

(Vendor)

Santa Cruz County Fire or CalFire RADIO SYSTEM

This agreement is executed to comply with adopted Fire Code and Santa Cruz Fire Prevention Officers Association Standard FPO-018. It provides for usage of non-government equipment and or users on a planned or scheduled basis in accordance with the following stipulations:

1. The **Vendor** will submit a signed copy of this agreement back to Santa Cruz County Radio shop, at 701 Ocean St, Santa Cruz CA, 95060 OR CalFire CZU, 6059 Highway 9, Felton, CA, 95018 for approval.
   *** Operations are not authorized until the MOU is approved ***

2. The **Vendor** may utilize not more than I Bidirectional amplifier operation on the following frequencies:

	TRANSMIT FREQUENCY	RECEIVE FREQUENCY
RED FIRE CHANNEL 1	**153.770000**	**154.325000**
YELLOW FIRE CHANNEL 2	**156.000000**	**154.190000**
CZU LOCAL	**159.28500**	**151.37000**

(3) Use of authorized frequencies is restricted to communications between **Santa Cruz County Fire Agencies and SCC 911 center, or CalFire CZU ECC** for the purpose of fire dispatching.

(Name Print) (Title) _____

(Signature) _____ (Date)_____