



EMERGENCY RESPONDER RADIO COVERAGE GUIDELINE

Effective Date: January 2014

All buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. This section shall not require improvement of the existing public safety communication systems. The intent of this guideline is to provide the SJFD interpretation of the minimum standards necessary to meet the requirements for emergency responder radio coverage in accordance with the state code.

1.0 PERMITS

1.1. This guideline applies to all buildings within the City of San Jose.

1.1.1. Where approved the fire code official, a wired communication system in accordance with CFC 907.2.13.2 may be permitted to be installed and/or maintained in an existing building in lieu of an approved radio coverage system. Also see 2013 NFPA 72 Chapter 24.5.1.

Note: Be prepared to discuss the affects the installation of an EMERGENCY RESPONDER RADIO COVERAGE (ERRC) system will have and why it is not feasible for this building.

1.1.2. **Buildings which will achieve radio coverage without amplification are exempt.** Where it is determined by a radio signal strength and clarity study that the radio coverage system is not needed. Buildings which will achieve radio coverage without amplification are exempt.

1.1.3. In facilities where emergency responder radio coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the fire code official shall have the authority to accept an automatically activated emergency responder radio coverage system.

Note: Be prepared to discuss transmitter(s) on site and affects it (they) will have on overloading the Distributed Antenna Systems (DAS) Bi-Directional Amplifiers (BDA). Where the BDA is limited and to keep costs down a "Split DAS" solution may be proposed with separate uplink and downlink antennas to solve frequency conflicts particularly if physical separation cannot be accomplished.

1.1.4. We need to make sure that we ERRC enhancements are not impacting the communications outside the buildings they are augmenting. The common method to achieve compliance with CFC 510 is the installation of a bidirectional amplifier (BDA), an amplified distributed antenna system (DAS), or other proven signal amplification technology capable of achieving the required radio coverage. A DAS is a network of cables and antennas configured to distribute the signals from the BDA evenly throughout the building. This is usually accomplished through the use of multiple antennas or radiating cable (also known as leaky coaxial cable). When combined with a BDA, DAS is usually the best option for enabling capacity and coverage inside dense infrastructures, such as shopping malls, multi tenant commercial and residential centers, and high rise buildings. In addition to the standard coaxial cable distribution, DAS can also use a fiber-optic backbone to distribute signals. This fiber-optic option provides a lower loss solution for larger venues or more complex systems like business and residential campuses, as fiber-optics can extend out to over 10 miles before it impacts system performance. The building-by-building approach may accommodate start-up requirements, however, developing fiber optic systems that support multi building and larger applications should seriously be considered. Taking a system approach could reduce initial and life-cycle costs as well as provide improved control of the radio system.



- 1.2. A construction permit is required for installation of or modification to EMERGENCY RESPONDER RADIO COVERAGE (ERRC) systems and related equipment. To acquire an installation permit for ERRC systems, submit the following to the San Jose Fire Department's Bureau of Fire Prevention (BFP) located at 200 E. Santa Clara St., Development Services, San Jose, California:
 - 1.2.1. A completed Fire Protection and Special Systems Installation Permit – provide all required information and make sure the permit card (manila card) is legible.
 - 1.2.2. A copy of the San Jose Fire Department Plan Check Comments – this may be obtained from the architect or general contractor.
 - 1.2.3. A copy of any approved “variance” or “alternate methods” that is relevant to the ERRC system – check with the architect or general contractor if a “variance” or “alternate methods” was submitted to and approved by the City of San Jose.
 - 1.2.4. A minimum of three sets of shop quality plans and one submittal packet for the proposed ERRC system – one set of plans shall be retained by the BFP.
- 1.3. Permits are required for any of the following work:
 - 1.3.1. Installation of a new ERRC system
 - 1.3.2. Any alteration to an existing ERRC system
 - 1.3.3. Addition to an existing ERRC system.
 - 1.3.4. Demolition of a part or of a whole ERRC system.
 - 1.3.5. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.
- 1.4. Initial Permit fees based on 2 hours of plan review and inspection time plus the record retention fee will be collected when plans are approved. Fees for ERRC review and inspection are charged as additional Fire Architectural fees and charged in hours as needed to complete the process.
- 1.5. The permit applicant shall be the installing contractor. See CFC 510.5.2 and item 4.10 herein for ERRC personnel qualifications.
- 1.6. All installing contractors shall have a California Electrical (C-10 or C-7) Contractor's License; a valid worker's compensation certificate; and a San Jose business license. When the design and plans are produced by a party other than the licensed contractor, the plans shall be stamped by a Professional Engineer.
- 1.7. Installation, alteration, or demolition of a system shall not commence prior to the approval of plans and the issuance of a permit.
- 1.8. The entire permit card and a San Jose Fire Department approved set of plans shall be kept at the project site until final approval of the permit, after which they shall remain in the possession of the owner.
- 1.9. Equipment shall have FCC certification prior to installation.
- 1.10. **Operating Permit** – An emergency responder radio coverage operating permit is required. A temporary emergency responder radio coverage operating permit will be issued by the SJFD inspector at the project final. The owner/tenant shall contact Bureau of Fire Prevention at (408) 535-7687, as soon as possible after the project final, for obtaining the yearly operating permit.

2.0 PLANS

2.1 General Requirements for All ERRC Projects.

- 2.1.1 Plans and attachments shall be clearly labeled and legible.
- 2.1.2 Plans and all revisions to the plans shall be dated. If utilizing an existing drawing or portion of a drawing, the area of work shall be highlighted and clouded with an appropriate symbol (delta). Provide a revision list with a symbol, date, description, and initials.
- 2.1.3 When making alterations, additions, or deletions to an existing system, all existing devices and equipment shall be shown and properly identified on the floor plan and system riser (single-line) diagram.
- 2.1.4 Plans shall include a title sheet, an equipment list, a written standard operating procedure, a floor plan, a system riser diagram, and secondary power calculations (see paragraphs 2.2 through 2.9).
- 2.1.5 Attachments shall include the manufacturer's specification sheets for all equipment and devices such as; cables, amplifiers, ups, batteries and antenna; indicating the FCC certification. See paragraph 2.9.
Note: Failure to provide any of the information required in sections 2.1 through 2.9 will result in the plans being disapproved.

2.2. Title Sheet

2.2.1. The front sheet shall contain the following information:

- 2.2.1.1. Project name and address of the project.
 - 2.2.1.2. The designer's full name (no initials, pseudonyms, acronyms, or aliases) FCC License number and signature. The designer of record shall be responsible for the entire system being worked on.
 - 2.2.1.3. Business name, address, and California Contractor's License number and FCC issued License of the installing contractor. If the designer of the ERRC system is not the installing contractor, the following shall be clearly indicated/printed on the plans:
 - 2.2.1.3.1. **DESIGNED BY** - followed by the designer's business name, address, designer of record's full name and signature. (see CFC 510.5.2 and item 4.10 herein for qualifications)
 - 2.2.1.3.2. **INSTALLING CONTRACTOR** - followed by the installing contractor's business name, address and California Contractor's License number. (see CFC 510.5.2 and item 4.10 herein for qualifications)
 - 2.2.1.4. Type of supervising station service as per NFPA 72 (See SJFD Handout for Fire Alarm Systems).
 - 2.2.1.5. Occupancy group(s) of building or area as defined by the California Building Code.
 - 2.2.1.6. Number of basements, number of stories above basement, building height, total building area, and building construction type.
 - 2.2.1.7. Scope of work. If the scope of work is the demolition of an existing ERRC system, justification for removal shall be provided. See 1.1.2 herein.
 - 2.2.1.8. Description of transmission zone assignments.
 - 2.2.1.9. A note stating that the design and installation complies with NFPA 72 (2013 edition), the California Electrical Code (2013 edition), the California Fire Code (2013 edition), the California Building Code (2013 edition), and the San Jose Fire Department ordinances, policies, and standards.
 - 2.2.1.10. A clear site map and/or vicinity map.
 - 2.2.1.11. All other pertinent notes.
- 2.2.2. A key plan of the building and/or complex indicating the street location and the area of work within the building shall be provided.
- 2.2.3. State the required performance objective of the ERRC per CFC 510.4 and NFPA 72 24.5.2. Should the codes conflict, the most stringent shall prevail.

2.3 Equipment List

- 2.3.1 Provide the model number, manufacturer's name, description, quantity, and symbols to be used (legend) for each device, equipment, and conductors proposed to be installed (*Note: The Fire Department reserves the right to disallow any listed product due to past performance*).
- 2.3.2 The symbols used on the plans shall match the legend. Strike out any "typical" symbols that do not pertain.

2.4 Floor Plan – the following shall be clearly indicated:

- 2.4.1 Scale used and a graphical representation of the scale. The minimum scale for ERRC plans is 1/8" = 1'-0". Metric scale shall not be accepted.
- 2.4.2 Room and Room Names.
- 2.4.3 The locations of partitions, non-rated walls, and rated walls.
- 2.4.4 The location of all Emergency Responder equipment.
- 2.4.5 Power and Panel locations.
- 2.4.6 Raceway routing.
- 2.4.7 Conduit and conductor size.
- 2.4.8 Roof plan showing location(s) of antennae.
- 2.4.9 Location(s) of In Building Antennae.
- 2.4.10 Band width.

2.5 Riser Diagram – provide the following:

- 2.5.1 Single-line wiring diagram (riser diagram) that shows the interconnection of equipment of the whole system.
- 2.5.2 Type and size of wire or conductor to be used.
- 2.5.3 Schematic drawing of electrical system and backup power.

2.6 Detail Diagram – Show Supervisory points from repeater.

2.7 Calculations

- 2.7.1 Secondary power calculation – See 3.20 herein.

2.8 Signal propagation Map – Provide a color map indicating the signal strengths as designed and then as installed by As-Built.

2.9 Attachments

- 2.9.1 Manufacturer's specification sheets for all devices, equipment, and materials to be used shall be submitted, including the cables, amplifiers, ups, batteries, antenna and 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.

3.0 DESIGN AND INSTALLATION

- 3.1. ERRC systems shall be designed and installed in accordance with NFPA 72 (2013 edition), the California Electrical Code (2013 edition), the California Fire Code (2013 edition), the California Building Code (2013 edition), and the San Jose Fire Department ordinances, policies, and standards.
- 3.2. Design the ERRC to provide signal amplification on every floor of the building. During installation, install infrastructure (equipment space, electrical power and cable pathways) throughout the building. However, install amplification only on floors that fail to pass the Contractor's pre-installation and acceptance tests.
- 3.3. Components used in the installation of the ERRC system, such as repeaters, transmitters, receivers, signal boosters, cabling, and fiber-distributed antenna systems, shall be tested for compatibility with the public safety radio system.
- 3.4. ERRC shall permit the simultaneous use and interoperability of analog and digital modulation radios.
- 3.5. ERRC shall be neutral host and nonproprietary.

- 3.6. ERRC shall not infringe on or be overrun by adjacent building communication systems or cellular telephone service provider systems.
- 3.7. Permanent external filters and attachments shall not be permitted.
- 3.8. Describe if a Class A (A is channelized) 24 channels; or Class B (requires special registration with FCC and notice to the City of San Jose radio shop) is being proposed.
- 3.9. **Maximum power output:** The maximum power allowed by FCC to be generated is 4W Effective Isotropic Radiated Power (EIRP) when sending towards the Donor Site and ¼W from an Indoor Antenna. You can obtain the EIRP by simply adding the transmit output power, in dBm, to the antenna gain in dBi (if there is loss in the cable feeding the antenna you may subtract that loss). The minimum power required to carry out the desired communication shall not be exceeded. The responsibility for staying within these power limits falls on the professional installer.
- 3.10. Documentation required is presented in 2013 NFPA 72 Chapter 7.
- 3.11. Prior to installation, the developer shall meet with the Fire Department to ensure that the required radio study is prepared to assess existing and proposed signal strength and clarity. The radio study shall provide specific recommendations to the developer to achieve compliance. The radio study shall be submitted along with the applicant's formal application for permit. This document shall contain, but not be limited to, the various frequencies required, the location of radio sites, the effective radiated power of radio sites and other supporting technical information.
- 3.12. **Retroactivity:** Unlike most installation standards, ERRC is intended to be enforced retroactively on existing buildings (see CFC 510.2 and 1103.2).
- 3.13. **Emergency Communications Systems:** 2013NFPA 72 Chapter 24 – “Emergency Communication Systems” regulates the installation and use of ERRC. The CFC and CBC primarily in section 907 determines when these systems are required in a building. NFPA 72 tells you how the system should be installed when required by the fire and building codes.
- 3.14. Emergency responders include but are not limited to the following:
 - 3.14.1. City of San Jose Fire and Police Departments
 - 3.14.2. Santa Clara County Sheriff and California State Police Departments
 - 3.14.3. Ambulance
- 3.15. **Frequencies:** For current published frequencies refer to <http://www.radioreference.com/apps/db/?inputs=1&ctid=225>. Frequencies will be determined by the geographic location of the facility requiring in-building coverage.
- 3.16. **SJFD Technical criteria.** SJ Fire is VHF Hi-band (136 - 178 MHz). Our City frequencies are currently divided by Hwy 280. North uses Command 12 and South uses Command 13 with Dispatch 1 used throughout. We are currently Narrow band and we use Tactical simplex channels as well. For our primary frequencies see the chart herein. *Note: Also to be validated are the Police, Sheriff, and other Emergency Service.*
- 3.17. **Location:**
 - 3.17.1. ERRC headend including all common equipment shall be located in a room on the main floor or one floor below grade. Locate the headend equipment in the telecommunications Building Entrance (BE) room whenever possible. A sign or map identifying location of room and master power switch shall be provided as needed to assure the location is readily identifiable to emergency responders.
 - 3.17.2. Locate the EERC node equipment in Telecommunications Rooms (TRs).
 - 3.17.3. Provide the ERRC headend room and the TRs containing ERRC equipment with continuous air conditioning to alleviate heat build-up within the rooms. Connect the air conditioning system to normal building power circuits. The ERRC equipment can operate at an elevated temperature during a power outage.
 - 3.17.4. Rooms housing ERRC equipment to be separated from the remainder of the building by 2 hour rated fire barriers.

- 3.17.5. Provide pathway (circuit) survivability in accordance with NFPA 72.
- 3.17.6. Location of the main RF and donor site (site closest to the jobsite) and their power - The Lat/Long coordinates will be provided to the contractor developing the DAS system and will vary by location. At no time will the contractor be allowed access to City radio sites.
- 3.18. **Additional frequencies.** Provide ERRC expandability to permit future additions and changes to the emergency responder radio frequencies
 - 3.18.1. SJFD is part of the Silicon Valley Regional Communications System (SVRCS). A 700MHz system is in process of being deployed and this will also be a requirement for the building owner. For planning purposes, factor the data from the 800MHz tests to model the indoor 700MHz requirements. The building owner shall modify or expand the emergency responder radio coverage system at his or her expense in the event 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 section.
 - 3.18.2. ERRC shall comply with the requirements of and obtain licensee consent from the FCC as required.
 - 3.18.3. Do not combine the ERRC with other radio systems such as:
 - 3.18.3.1. Cellular telephone signal enhancement.
 - 3.18.3.2. Wi-Fi systems.
 - 3.18.3.3. Pager systems.
 - 3.18.3.4. Medical telemetry systems
- 3.19. All signal booster components shall be contained in National Electrical Manufacturer's Association (NEMA) 4-type waterproof cabinet(s) or other approved enclosure(s).
- 3.20. **Secondary power supply** - Emergency responder radio coverage systems shall be provided with an approved secondary source of power per CFC 510. 4.2.3.
 - 3.20.1. When primary power is lost, the power supply to the emergency responder radio coverage system shall automatically transfer to the secondary power supply. In accordance with SJFD requirements for alarm systems, provide standby batteries or other approved secondary power source sufficient to supply 60 hours of Standby if the Fire Alarm System does NOT have a UL certificate or 24 hours of Standby if the Fire Alarm System has a UL certificate (same as designed for the building fire alarm system; they must match). The design capacity shall be based on standby plus 100% load (means of two-way conversation) for 24 hours. CFC is more stringent than the 12 hours per 2013 NFPA 72, section 24.5.2.5.5.2 and the most stringent shall apply.
 - 3.20.2. Connect the UPS (2-hour capacity on full operational load) to a generator-backed emergency power circuit if available.
 - 3.20.3. As a Minimum:
 - 3.20.3.1. UPS shall be enclosed in a NEMA Type 4 waterproof enclosure.
Exception: Listed systems that are contained in integrated battery cabinets.
 - 3.20.3.2. UPS batteries shall be of the sealed maintenance-free type.
 - 3.20.3.3. Provide battery ventilation in accordance with code.
- 3.21. **Emergency Power Off (EPO)** - A disconnect relay connection that will disengage the Power shall be provided and be the only method of turning off a UPS system. DC Systems shall have a Battery Disconnect Switch. To turn the entire ERRC off, two actions must be completed. 1) Turn off the secondary power supply using the EPO switch and 2) Turn off the circuit breaker to cut the normal AC. The switch(es) shall be readily identifiable.

- 3.22. **Supervision** - See 2013 NFPA section 24.5.2.6 for monitoring requirements of ERRC Systems. As a Minimum, Provide supervision of the ERRC antennas, signal boosters, power supplies and UPS.
- 3.22.1. Provide supervisory and trouble signals indicating impairment. Connect the supervisory and trouble alarm contacts to the building fire alarm system.
- 3.22.1.1. As a Minimum, the following conditions shall be monitored through the Fire Alarm Panel:
- 3.22.1.1.1. Antenna Malfunction
 - 3.22.1.1.2. Signal Booster Failure
 - 3.22.1.1.3. Low Battery Capacity, sending a supervisory signal at 70% of battery capacity.
 - 3.22.1.1.4. Loss of normal AC power.
 - 3.22.1.1.5. Failure of battery charger.
- 3.22.2. Program the fire alarm system to relay ERRC supervisory and trouble signals to the appropriate supervising station. Instruct supervising station personnel to notify the San Jose Fire and Police Departments of the impairment.
- 3.23. **Dedicated Panel** - See 2013 NFPA 72, section 24.5.2.6.2 for monitoring requirements of ERRC Systems.
- 3.24. **Antennas** - If outdoor antennas are required, obtain City of San Jose Planning Department approval of antenna locations. Provide access for maintenance and code-required fall protection.
- 3.25. **Wiring.**
- 3.25.1. The wiring shall be in as required by 2013 NFPA 72 section 24.3.6 and 27.7.
 - 3.25.2. Identify all required outside plant fiber optic cables required to connect ERRC to remote antennas, other services and other buildings.
 - 3.25.3. The conduit is not required to be dedicated to radio system cable. Radio system cable may be comingled in the conduit with fiber-optic and other cable that will not impede signal transmission and complies with the California Electrical Code.
 - 3.25.4. Cable shall be in metal conduit, be metal clad or in metal sheathing. 2” minimum for vertical.
- 3.26. **Signage.** Signage shall be provided in accordance with CFC 509 as directed by the inspector. A sign shall be located above or near the building Key Box stating “This building is equipped with an Emergency Responder Radio Coverage System”.

4.0 TESTING

- 4.1 Inspection is required to demonstrate compliance to the provisions of CFC Section 510. The Owner or an authorized agent of the owner is responsible to obtain and fund special inspections services by contract with a Contractor approved by the AHJ. The Owner is responsible to provide acceptable radio coverage within the facility, access to documentation and to request inspection after a system is first installed, annually and when modifications are made to the facility. Inspection requests will identify the Testing Service who will propose a schedule and provide supporting records. The Contractor will provide as-built documentation, commissioning test data and observations of the physical installation and performance of the signal booster system as verification of proper system operation prior to placing the system on-the-air and to document indoor radio coverage of the system.
- 4.2 **Field testing.** Radio protocols will need to be coordinated with PD/Fire dispatch operations. As they will be testing on the City’s main dispatch channels, use clear regular voice communications and avoid any code or call signs.

- 4.3 SJFD Departmental interaction procedure for testing:
 - 4.3.1 Contact **Fire Communications Administration at 408-794-1280 to schedule any testing on active Fire Department frequencies. A minimum of 2 full business days lead time is required.**
 - 4.3.2 Other pertinent Contact Numbers:

Fire Control Room Supervisor	408-277-8952
Fire Communications Administration	408-794-1280
PD Non-Emergency	408-277-8900
SJPD Dispatch Supervisor	408-537-1751
SJ Radio SHOP	408-794-1260
SJ Radio Communications Manager	408-794-1262
Bruce H. Lee, County EMS Administrator	408-885-4250
http://www.emsa.ca.gov/	
Klaus Topbjerg County of Santa Clara Communications Engineer	408-977-3215
Santa Clara County Sheriff	408-299-2101
Santa Clara County Emergency Manager's Association (SCCEMA)	408-794-7055
http://www.sccema.com/	
- 4.4 Typically SJFD allows testing on its frequencies only during our slack time between 0500-0700 hours. Authorized contractors can do testing as our activity level permits. The contractors must understand that they need to monitor what is going on, and hold their traffic (especially on SJFIRE) if we start getting busy.
- 4.5 Contractors will call us at 408-277-8952 prior to starting their testing to ensure that they are OK to proceed and have agreed to finish by time (usually 0700 hours). They will provide their contact information, and we can call them to postpone their testing if needed.
- 4.6 Two-way radios for testing shall be provided by the installation contractor and the technician shall be trained in the proper use of emergency radios.
- 4.7 SJFD Frequencies may not be used for anything other than short test counts. Conversation between employees at the site shall not take place on SJFD frequencies
- 4.8 **Acceptance testing.** Upon completion of installation, the building owner shall have the radio system tested to ensure that ERRC on each floor of the building is Functional.
 - 4.8.1 **Amplifiers shall not be placed on air before they are verified.**
 - 4.8.2 The two primary considerations for the Acceptance Tests are:
 - 4.8.2.1 Equipment Validation (Again - before it is placed on the air) &
 - 4.8.2.2 Coverage Validation (to document the improved coverage)
 - 4.8.3 Any transmitter test shall document that the transmitter is set to the minimum power required to carry out the desired.
 - 4.8.4 Document that the measured peak output power (EIRP) complies with the de facto EIRP limit (+36 dBm – 4W unless otherwise noted) for all proposed antennas.
 - 4.8.4.1 Note that the output power limit was reduced in order to comply with the de facto EIRP limit if required.
 - 4.8.5 Radio Shop - Uplink level verification.
 - 4.8.5.1 With the donor EIRP known, document an accurate measurement of the downlink to identify the signal loss between the two locations. Given that the uplink path will have the same signal loss, therefore, if the uplink output power is measured the signal level at the donor site can be accurately calculated and documented.
 - 4.8.5.2 If the minimum/maximum levels into the DAS are within the automatic gain control (AGC) range of the amplifier, the output levels from the amplifier (uplink) will be relatively constant from anywhere in the building. If the minimum/maximum range is greater than what the amplifier will handle, the lowest level needs to be used in the link calculation to determine the uplink gain of the amplifier and documented.
 - 4.8.6 Maximum Output Power Testing (Uplink):
 - 4.8.6.1 Class A Amplifier:

- 4.8.6.1.1 Perform and document two measurements: a) Determine the maximum level into the amplifier by transmitting from a portable radio directly below a DAS antenna. b) Determine the minimum input into the amplifier by transmitting from the furthest point into a DAS antenna. This establishes the range of inputs. The range should not exceed the AGC range of the amplifier or the output level will be affected.
- 4.8.6.1.2 Perform and document a link calculation for the radio path between the building and the Donor Site.
- 4.8.6.1.3 Adjust the gain of the amplifier to ensure the uplink signal level received at the radio site is above -95dBm
- 4.8.6.2 Class B Amplifier
 - 4.8.6.2.1 Document all transmissions within the pass band of the filter. Calculate the composite power output based on full channel loading, including unwanted signals.
 - 4.8.6.2.2 Minimum/Maximum readings:
 - 4.8.6.2.2.1 Document the maximum level into the amplifier by transmitting from a portable radio directly below a DAS antenna.
 - 4.8.6.2.2.2 Document the minimum input into the amplifier by transmitting from the furthest point into a DAS antenna. This establishes the range of inputs. The range should not exceed the AGC range of the amplifier or the output level will be affected.
 - 4.8.6.2.3 Record the measured noise floor out of the amplifier.
 - 4.8.6.2.4 Provide a link calculation for the radio path between the building and the Donor Site.
 - 4.8.6.2.5 Document that the gain of the amplifier is adjusted to ensure the uplink signal level at the radio site is above -95dBm and the amplified noise received at the radio site is below -130dBm.
- 4.8.7 **Dummy Load:** When conducting a test, or loading up procedure, a dummy load on the "Donor" antenna connection of the amplifier shall be used or the array shall be disconnected from the donor antenna until the Equipment/System operation has been demonstrated to the Inspector. A dummy load is a large resistor capable of dissipating the radio energy from your transmitter as heat into the air. This capability is necessary during the testing and repair of radio gear. When repairing the transmitter of a radio is often required to transmit for a short time in order to diagnose the problem. But instead of transmitting an unnecessary test signal live on the air, technicians connect a dummy load to the antenna jack. This allows them to transmit a test radio signal that is absorbed in the dummy load. This forces the amplifier to be off the air until power levels, gain and antenna isolation are checked. The installer can perform all of his checks and adjustments by using a signal generator and keeping all transmissions inside the building.
- 4.8.8 After completion of Signal Level Measurements and evaluation of Audio Quality, SJFD will be asked by the contractor to schedule a Fire Crew to survey the building and verify Fire Command and Dispatch radio operation. Failure of the operational check will require that the Owner correct deficiencies and re-schedule Acceptance Testing.
- 4.9 **Annual testing and proof of compliance.** The emergency responder radio coverage system shall be inspected and tested by qualified personnel annually, or, whenever structural changes occur in or around the complex including additions or remodels that could materially change the original field performance tests. A final test report provided by the Owners Testing Agency shall be provided to SJFD.
 - 4.9.1 **Dummy Load:** When conducting a test, or loading up procedure, a dummy load on the "Donor" antenna connection of the amplifier shall be used or the array shall be disconnected from the donor antenna until the Equipment/System operation has been demonstrated to the Inspector. A dummy load is a large resistor capable of dissipating the radio energy from your transmitter as heat into the air. This capability is necessary during the testing and repair of radio gear. When repairing the transmitter of a radio is often required to transmit for a short time in order to diagnose the problem. But instead of transmitting an unnecessary test signal live on the air, technicians connect a dummy load to the antenna jack. This allows them to transmit a test radio signal that is absorbed in the dummy load. This forces the amplifier to be off the air until power levels, gain and antenna isolation are checked. The installer can perform all of his checks and adjustments by using a signal generator and keeping all transmissions inside the building.

- 4.9.2 San Jose Fire Department and other Agency personnel shall have the right to enter onto the property at any reasonable time to conduct field testing to verify the required level of radio coverage.
- 4.10 **Minimum qualifications of personnel.** Only certification of in-building training is considered demonstration of adequate skills and experience. The minimum qualifications of the system designer, lead installation personnel and personnel conducting radio system tests shall include possession of:
- 4.10.1 A valid FCC-issued general radio operators license; and**
- 4.10.2 Certification of in-building system training issued by –**
- 4.10.2.1 **Association of Public Safety Communications Officials (APCO)**
 - 4.10.2.2 **National Association of Business Education Radio (NABER)**
 - 4.10.2.3 **Personal Communications Industry Association (PCIA) or,**
 - 4.10.2.4 **The manufacturer of the equipment being installed.**

Note: All design documents and all tests shall be recorded and the data signed by a person meeting the minimum qualifications required by CFC 510.5.2 and herein.

5.0 Inspections

- 5.1 Field inspections shall be scheduled only after a permit has been issued.
- 5.2 Inspections shall be scheduled by the installing contractor only. When scheduling for inspection, request for sufficient time to complete a thorough inspection of the work performed. Travel time is included in your inspection time.
- 5.3 Inspections may be scheduled by calling (408) 535-3555. The following information is required: Permit Number. The amount of time required for inspection (including travel time) name, and number of contact person. An inspector will call to schedule the time and date of the inspection.
- 5.4 Missed inspections or inspections canceled within 48 hours shall be counted against inspection time. The installing contractor shall conduct a complete test of the system and shall complete all parts of the “Record of Completion” (Figure 10.18.2.1.1 of NFPA 72) **prior** to the San Jose Fire Department (SJFD) inspection date.
- 5.5 Necessary coordination shall be made such that representatives of other contractors whose equipment are involved in the testing are present.
- 5.6 There shall be sufficient personnel and equipment to demonstrate the installation.
- 5.7 The contractor shall schedule a SJ Station Fire Crew to survey the building and verify Fire Command and Dispatch radio operation through the Fire Prevention Bureau per 4.8.8 herein.
- 5.8 At the time of inspection, the contractor shall hand the following documentation (see 2013 NFPA 72 section 7.5) to the SJFD inspector upon his/her arrival, which includes:
- 5.8.1 Approved and stamped plans and complete permit (white, pink, hard card).
 - 5.8.2 A copy of the completed “Emergency Communications Systems Supplementary Record of Completion”.
 - 5.8.2.1 The Emergency Communications Systems Supplementary Record of Completion shall include the Names and contact information of personnel to be contacted at any time (24/7/365) if access to the equipment is needed.
 - 5.8.3 As-built plans if installation has deviations from the approved plan.
 - 5.8.4 All previous records of inspections.
- 5.9 After the successful completion of the tests/inspections, provide the following to the SJFD inspector:
- 5.9.1 For central station service systems, a copy of the listing organization’s certification that the installation complies with NFPA 72 or a copy of the placard from the listed central station certifying that the installation complies with NFPA 72. Permit shall not be “finalized” without this certificate or placard.
 - 5.9.2 The permit card (for inspector’s signature).
 - 5.9.3 Documents specified in 2013 NFPA 72 sections 7.5.

- 5.10 After final completion and acceptance of the project, the contractor shall provide the following to the owner:
- 5.10.1 Documents specified in 2013 NFPA 72 section 24.8.
 - 5.10.2 All literature and instructions provided by the manufacturers describing proper operation and maintenance of all devices and equipment,
 - 5.10.3 A copy of the approved plan and as-built plan, if applicable,
 - 5.10.4 A copy of the Certificate of Completion, and
 - 5.10.5 The signed and finalized permit card.
- 5.11 Code requires one set of ERRC technical information and documentation to be filed in the Fire Command Center (if one exists) or in the ERRC headend room. After final completion and acceptance of the project, the Owner shall maintain the following on site:
- 5.11.1 Documents specified in 2013 NFPA 72 section 24.8.
 - 5.11.2 All literature and instructions provided by the manufacturers describing proper operation and maintenance of all devices and equipment,
 - 5.11.3 A copy of the as-built plan,
 - 5.11.4 Summary drawing showing locations of ERRC headend and node equipment, and antenna sites,
 - 5.11.5 Summary of ERRC frequencies utilized,
 - 5.11.6 Table of effective radiated power at antenna sites,
 - 5.11.7 Keys to radio equipment room in key box
 - 5.11.8 Label indicating ERRC system on premises at lock box
 - 5.11.9 A copy of the Certificate of Completion, and
 - 5.11.10 The Names and contact information of personnel to be contacted at any time (24/7/365) if access to the equipment is needed.

6.0 Document Revisions

- 6.1 This document is subject to revisions. For general information and to verify that you have the most current document, please call (408) 535-7750, and request the current version date.

SJFD Requires Fire Dispatch be available throughout the city along with Command Channel 12 North of Highway 280 and Command Channel 13 being available to the South of Highway 280.

Description	Alpha Tag	Frequency Output	Frequency Input	License	Type	Tone	Mode	Tag
Fire Dispatch	San Jose FD 01	155.02500	154.01000	KMH603	RM	173.8 PL	FMN	Fire Dispatch
Fire Command 12 North of SR280	San Jose FD 12	153.98000	155.82000	KMH603	BM	151.4 PL	FMN	Fire-Talk
Fire Command 13 South of SR280	San Jose FD 13	154.11500	155.88000	KMH603	BM	136.5 PL	FMN	Fire-Talk

Emergency Services Frequencies which should be available but are not the jurisdiction SJFD have been conveyed to us on the following pages.

San Jose Police Department Frequencies							
Description	Alpha Tag	Frequency Output	License	Type	Tone	Mode	Tag
Police Ch. 1 - District R, D & V (North & Airport)	SanJosePD1	460.15000	KNNR378	RM	131.8 PL		
Police Ch. 2 - District N & F (West)	SanJosePD2	460.27500	KNNR378	RM	162.2 PL		
Police Ch. 3 - District M & W (North East)	SanJosePD3	460.20000	KMA359	RM	136.5 PL		
Police Ch. 4 - District C & P (South East)	SanJosePD4	460.42500	KMA359	RM	167.9 PL		
Police Ch. 5 - District E & K (Downtown)	SanJosePD5	460.40000	KMA359	RM	146.2 PL		
Police Ch. 6 - District L & S (Central)	SanJosePD6	460.32500	KMA359	RM	146.2 PL		
Police Ch. 7 - District A & T (South West)	SanJosePD7	460.47500	KMA359	RM	136.5 PL		
Police Ch. 8 - District X & Y (South East)	SanJosePD8	460.52500	KMA359	RM	179.9 PL		
Police Ch. 9 - Citywide Common 1	SanJosePD9	460.10000	KMA359	RM	136.5 PL		
Police Ch. 10 - CLEMARS	SanJosePD10	460.02500	KK3942	RM	156.7 PL		
Police Ch. 11 - Citywide Common 2	SanJosePD11	460.05000	WNVD228	RM	110.9 PL		
Police Ch. 12 - BAYMACS	SanJosePD12	460.02500	KK3942	M	179.9 PL		
Police Ch. 13 - Tactical/Car-to-car	SanJosePD13	460.17500	WPJP624	M	186.2 PL		
Police Ch. 14 - Tactical/Car-to-car	SanJosePD14	460.30000	WPJP624	M	203.5 PL		
Police Ch. 15 - Tactical/Car-to-car	SanJosePD15	460.37500	WPJP624	M	203.5 PL		
Police Ch. 16 - Tactical/Car-to-car	SanJosePD16	460.10000	WNVD228	M	136.5 PL		
Police Ch. 17 - Street Crimes/MERGE (Encryption Used)	SanJosePD17	453.65000	WPLZ268	RM	29A NAC		
Police Ch. 18 - Special Events	SanJosePD18	460.36250			110.9 PL		
Police Ch. 19 - Narcotics Covert Investigations (NCI)	SanJosePD19	460.25000	WPMN569	RM	141.3 PL		

Emergency Medical Services Agency Frequencies

Description	Alpha Tag	Frequency Output	License	Type	Tone	Mode	Tag
Dispatch (Med 91)	County EMS	856.43750	WNQQ764	RM	192.8 PL		
Command 92 - Hospital Ring downs	CMD 92	857.43750	WNQQ764	RM	225.7 PL		
Command 93	CMD 93	852.66250	WNQQ764	RM	192.8 PL		
Command 94	CMD 94	853.66250	WNQQ764	RM	192.8 PL		
Automatic Vehicle Location (AVL)	EMS AVL	858.43750	WNQQ764	BM			

The Sheriff system will be keying up all day long, but if you need to key it up call 408-299-2101. Ask the Sergeant or Lieutenant at Protective services.

The frequencies you might want to monitor should be:

Control 1 (analog) 156.210 MHz

Control 2 (digital) 155.700 MHz

Tac 4 (analog) 154.650 MHz