NGEN Operations Board

NGEN Operations Board Action Item 24-009

Date: November 7, 2024

Presented by: Thomas Montoya **On behalf of**: County of Monterey ITD

Request:

Approve and recommend the NGEN Executive Board approve the NGEN Emergency Responder Radio Coverage System (ERRCS) Policy.

Funding Source: N/A;

Summary/Discussion:

First responders need reliable communications wherever they work, including inside buildings. The California Fire Code and Building Codes require that certain buildings be provided with radio enhancement systems designed to provide radio coverage in areas of the buildings where signal strength does not meet minimum criteria due to building construction features and location. These radio coverage enhancement systems are referred to as emergency responder radio coverage systems (ERRCS). The purpose of this policy is to establish a procedure for tracking and managing the ERRCS installations throughout the Monterey County operational area to minimize the potential for interference with the NGEN System. The policy will assist jurisdictions having authority, engineers, and contractors in the ERRCS process from initiation, through design / permitting, into construction, and finally maintenance thereafter.

Staff Recommendation:

Recommend the NGEN Operations Board approve the NGEN ERRCS Guideline.

Fiscal Impact:

None.

Effect(s) of Failure to Approve Request and/or caveats:

Implementation of this guideline introduces structure to the ERRCS project lifecycle process. Failure to approve this request will continue to make tracking of installations difficult potentially allowing the installation of an ERRCS that could cause harmful interference to the NGEN System operations.

NGEN Operations Board Action

Modification to requested action: Yes _X_ No __

The last sentence of this section was deleted:

1.1 Existing Buildings

Existing buildings undergoing alterations or renovations which were constructed before the current adopted code shall be provided with approved radio coverage for emergency responders as required in CFC Construction Requirements For Existing Buildings Chapter. ~~All existing ERRCS shall be upgraded to provide coverage enhancement required for the NGEN system at the building owner's expense.~~

Vote Date 11/07/2024

Motion by Doug McCoun 2nd Sam Klemek Approved: Yeas _X_ Nays__

Signed by:
Keith Boyd, Undersheriff
FDC2E8CCCA134AE...
Keith Boyd, Chair

Yeas: 9 Nays: 0

NGEN Emergency Responder Radio Coverage Systems (ERRCS) Policy

November 7, 2024

Table of Contents

Purpose

The purpose of this policy is to establish a procedure for tracking and managing in-building Emergency Responder Radio Coverage Systems (ERRCS) installations throughout the Monterey County operational area to minimize the potential for interference with the NGEN System. The policy will assist jurisdictions having authority, engineers, and contractors in the ERRCS process from initiation, through design / permitting, into construction, and finally maintenance thereafter.

Definitions

Agency: A public agency, or other authorized user organization, including, but not limited to, a general government agency (local, state, or federal), its authorized employees and personnel (paid or volunteer), participating in and using the NGEN system under the NGEN Services and Governance Agreement.

Alternate Method of Compliance: An approved method of compliance that, in the opinion of the Fire Department, meets the intent of the provisions of the California Fire Code.

BDA: Bi-directional amplifier system, is a signal-boosting solution designed to enhance in-building radio frequency signal coverage. It usually comes with two amplifiers to enhance signals between the radio repeater, building, subscriber unit device and radio network. These amplifiers send radio signals back and forth simultaneously.

CBC: California Building Code.

CEC: California Electrical Code.

CFC: California Fire Code, California Code of Regulations, Title 24 Part 9.

DAS: Distributed antenna system, is a signal-boosting solution designed to enhance in-building radio frequency signal coverage. It has a network of spatially separated antenna nodes connected to a common source via a transport medium that provides wireless service within a geographic area or structure.

ERRCS: Emergency responder radio coverage systems. This can typically be implemented by using a BDA or a DAS system.

Fire Code Official: Officers and their duly authorized representatives who have as part of their regular duties the performance of fire code inspections, or the resolution of conflicts relative to application of the fire code.

Fire Department: A local fire department that has jurisdiction over the location where an ERRCS system is required.

Monterey County Radio Shop: A team within the Monterey County IT department that provides, maintains, and operates radio communication technology services including but not limited to the NGEN system. Monterey County Radio Shop assists NGEN agencies with in-building coverage verification prior to ERRCS installation, plan review which includes ERRCS design review, optimization alignment and post-installation acceptance test.

NFPA: National Fire Protection Association

NFPA 72: National Fire Protection Association Standard 72 – National Fire Alarm and Signaling Code.

NFPA 1221: National Fire Protection Association Standard 1221 – Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems.

NGEN: Next Generation Radio System, comprised of land mobile radio technology that provides county-wide radio coverage using supplemental and overlapping P25 digital trunked and analog conventional systems.

Project 25 (P25): standards for interoperable land mobile radio (LMR) systems so emergency responders can exchange critical communications across agencies and jurisdictions.

1. Where is ERRCS Required

First responders need reliable communications wherever they work, including inside buildings. The California Fire Code (CFC) and California Building Code (CBC) require that certain buildings be provided with radio enhancement systems designed to provide radio coverage in areas of the buildings where signal strength does not meet minimum criteria due to building construction features and location. These radio coverage enhancement systems are typically referred to as emergency responder radio coverage systems (ERRCS).

1.1 New Buildings

Approved radio coverage for emergency responders shall be provided in accordance with CFC Emergency Responder Communication Coverage Section within all new buildings.

1.2 Existing Buildings

Existing buildings undergoing alterations or renovations which were constructed before the current adopted code shall be provided with approved radio coverage for emergency responders as required in CFC Construction Requirements For Existing Buildings Chapter.

2 Submission for Building Permits

2.1 Permit Required

A construction permit for the installation of or modification to emergency responder radio coverage systems and related equipment is required as specified in CFC Emergency Responder Communication Coverage Section. The local Fire Code Official of the jurisdiction having authority will evaluate the scope of work as part of the permitting process to determine if it classifies as a new or modification / alterations project. The Fire Code Official, at its discretion, may also approve alternate methods of compliance on a case-by-case basis.

Maintenance performed in accordance with this guideline is not considered a modification and does not require a permit. A frequency change made to an existing system is considered to be new construction and will require a construction permit.

Buildings with existing emergency responder radio coverage that did not perform optimization test in accordance with the CFC Emergency Responder Communication Coverage Section shall be optimized. During the annual maintenance testing, the building owner's emergency responder radio coverage system maintenance contractor shall contact the Monterey County Radio Shop to perform the optimization test described in the CFC Emergency Responder Communication Coverage Section.

2.2 Monterey County NGEN ERRCS Application & Registration

Prior to issuance of a construction permit, systems must be registered with the Monterey County Radio Shop and proof of registration shall be submitted to the Fire Code Official upon plan submittal. Systems can be registered by filling out and submitting **Attachment 1** Monterey County NGEN ERRCS registration form, specifically Section 1, to the Monterey County Radio Shop along with other information requested. After the ERRCS system installation and final optimization is complete, Section 2 of the Monterey County NGEN ERRCS registration form (**Attachment 1**) must be completed with post installation data and submitted to the Fire Code Official prior to final acceptance.

2.3 Plans Required

2.3.1 General requirements for all ERRCS projects

2.3.1.1 Plans and attachments shall be clearly labeled and legible.

2.3.1.2 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.

2.3.1.3 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.

2.3.1.4 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 Title Sheets section herein.

2.3.1.5 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 Attachments section herein.

Note: Failure to provide any of the information required will result in plans being disapproved.

2.3.2 Title Sheet

2.3.2.1. The front sheet shall contain the following information:

2.3.2.1.1 Project name and address of the project.

2.3.2.1.2 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 proposed.

2.3.2.1.3 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:

DESIGNED BY – followed by the designer's business name, address, designer of record's full name and signature. See CFC Emergency Responder Communication Coverage Section for qualifications.

LEAD TECHNICIAN - followed by the lead technician name, address and FCC license. See CFC Emergency Responder Communication Coverage Section for qualifications.

INSTALLING CONTRACTOR – followed by the installing contractor's business name, address and California Contractor's License number. See CFC Emergency Responder Communication Coverage Section for qualifications.

2.3.2.1.4 Name and type of supervising station service monitoring system as per NFPA 1221.

2.3.2.1.5 Occupancy group(s) of building or area as defined by the California Building Code.

2.3.2.1.6 Number of basements, number of stories above basement, building height, total building area, and building construction type.

2.3.2.1.7 Scope of work. If the scope of work is the demolition of an existing ERRC system, justification for removal shall be provided.

2.3.2.1.8 Description of transmission zone assignments such as complex name, address, or campus and designation.

2.3.2.1.9 A note stating that the design and installation complies with the CFC, NFPA 72 & 1221, the California Electrical Code, the California Building Code, and the current local Fire Department ordinances, policies, and standards. Specify year release/edition. Verify with jurisdiction having authority prior to initiating design.

2.3.2.1.10 A clear site map and/or vicinity map.

2.3.2.1.11 All other pertinent notes.

2.3.2.2 A key plan of the building and/or complex indicating the street location and the ERRC System Controls within the building shall be provided.

2.3.2.3 State the required performance objective of the ERRC System per CFC and NFPA 1221. Should the codes conflict, the most stringent shall prevail.

2.3.3 Equipment List

2.3.3.1 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.

2.3.3.2 The symbols used on the plans shall match the legend. Strike out any "typical" symbols that do not apply.

2.3.4 Floor Plan

The following shall be clearly identified:

2.3.4.1 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.

2.3.4.2 Room and room names.

2.3.4.3 The locations of partitions, non-rated walls, and rated walls.

2.3.4.4 The location of all Emergency Responder equipment.

2.3.4.5 Power and Panel locations

2.3.4.6 Raceway outing.

2.3.4.7 Conduit and conductor size.

2.3.4.8 Roof plan showing location(s) of antennae.

2.3.4.9 Location(s) of in building antennae.

2.3.4.10 Band width.

2.3.5 Riser Diagram

The following shall be provided:

2.3.5.1 Single line wiring diagram (riser diagram) that shows the interconnection of equipment of the whole system.

2.3.5.2 Location and fire protection rating of pathways.

2.3.5.3 Details and location of penetrations on fire rated horizontal and vertical assemblies.

2.3.5.4 Type and size of wire or conductor to be used.

2.3.5.5 Schematic drawing of electrical system and backup power.

2.3.6 Detail Diagram

Show Supervisory points from repeater and the operational matrix.

2.3.7 Calculations

The System Design-Calculations shall identify:

2.3.7.1 Downlink Signal Levels on all floors. (The Benchmark Test Data should include this information.)

2.3.7.2 Outdoor Signal Levels and Clutter Loss (CLlow) to the Donor Site. (The Benchmark Test Data should include these levels on all exterior and immediately inside of the same exterior side of the building in question).

2.3.7.3 Building loss – Ground floor (The benchmark test data should include these levels.)

2.3.7.4 RSL at the roof-top antenna location and clutter loss (CLhigh) to the donor site. (The uplink path calculations should include these levels based on the selected donor antenna location.) Design will also include the calculated noise level received at the donor site receiver antenna: not to exceed -150dBm in band noise.

2.3.7.5 Antenna density identifying the Max. and Min. uplink input levels from the ERRCS.

2.3.7.6 Downlink and uplink gain settings for the amplifier (These levels subject to change as adjusted at the time of system optimization).

2.3.7.7 Uplink path calculations for Max. and Min. signal levels, including predicted in-band noise received at the donor site receivers.

2.3.7.8 Coverage estimate showing downlink coverage and signal levels.

2.3.7.9 Engineered/calculated in-band noise level received by the donor site receive antenna showing noise levels do not exceed -150 dBm.

2.3.7.10 Secondary power calculation - Secondary power supply – Emergency responder radio coverage systems shall be provided with an approved secondary source of power per CFC Emergency Responder Communication Coverage Section and NFPA 1221.

2.3.8 Signal Propagation Map

Provide a map indicating the signal strengths as designed and then as installed by As-Built record. These maps are commonly printed in color; however, they are scanned in black and white. The map(s) must be graphically distinguishable when scanned to black and white copy.

2.3.9 Attachments

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 Technical Requirements

Systems, components, and equipment required to provide emergency responder radio coverage systems shall comply with CFC Emergency Responder Communication Coverage Section.

3.1 Radio Signal Strength

The ERRCS coverage system signal strength shall be in accordance with CFC Emergency Responder Communication Coverage Section.

3.1.1 Signal strength differential

The system shall be designed such that the ERRCS signal strength, immediately inside building exterior walls, is at least 15 dB less than the exterior (macro system) signal strength. The signal strength differential shall apply whether the building has an open area or subdivided floor plan.

3.1.2 Noise Floor

ERRCS systems shall not exceed -150 dBm of in-band noise to macro receiver antenna systems. Measurements will be validated against FCC 47 CFR 90.219.

3.2 Building conduit and pathway survivability

Pathways shall be designated based on the performance characteristics defined in NFPA 72 Chapter 12. All new buildings requiring emergency responder radio coverage shall be constructed with ERRCS backbone cable raceways and enclosures, which extend from the head-end equipment location to the lowest level/floor or subterranean floors and to the roof. Cable pathways shall be included in the architectural design of the building and shown on building permit construction documents. All radio cable (riser and feeder) is required to be plenum-rated. Cable other than radio cable is allowed to comingle with the radio cable in the conduit provided it is listed, shielded cable that will not interfere with the radio cable. Ready access shall be provided to riser conduit and feeder cables for installation, service, and inspection. Provide access by way of removable ceiling tiles or minimum 20”x30” access panels along hallways and partitions/walls. Fire rated access panels shall be used where access is through

fire rated assemblies. All floors of the subterranean parking garages shall meet access, conduit installation, and rating requirements.

3.3 System Design

The emergency responder radio coverage system shall be designed in accordance with CFC Emergency Responder Communication Coverage Section.

3.4 Monterey County Radio Shop

Monterey County Radio Shop assists NGEN agencies with in-building coverage verification prior to ERRCS installation, plan review which includes ERRCS design review, optimization alignment and post-installation acceptance test. Monterey County Radio Shop can provide the various frequencies required, the location of radio sites, effective radiated power of radio sites, and other supporting technical information upon request by the building owner or owner's representative. To ensure ERRCS design is compatible with the NGEN system, vendor can contact the Monterey County Radio Shop:

Phone: (831) 796-1333

Email: support@countyofmonterey.gov

Monday through Friday from 8am to 5pm

4 Installation, Testing and System Certification

4.1 Installation Requirements

4.1.1 Approval of design is required prior to installation. Amplification systems capable of operating on frequencies licensed to any public safety agency by the FCC shall not be installed without prior coordination and approval of the Fire Code Official and the Monterey County Radio Shop.

4.1.2 The installation and testing of the in-building, two-way ERRCS shall be in accordance with NFPA 1221 and CFC Emergency Responder Communication Coverage Section.

4.2 Acceptance Test Procedure and System Certifications

4.2.1 Coordination with the local Fire Code Official and the Monterey County Radio Shop is required before a new ERRCS system is turned on for the first time.

4.2.2 Upon completion of installation, the building owner shall have the radio system tested to verify that two-way coverage on each floor of the building is in accordance with the CFC Emergency Responder Communication Coverage Section. To the extent possible, system optimization/alignment shall be conducted concurrently with system testing below by working with Monterey County Radio Shop.

4.2.3 Prior to issuance of the building Certificate of Occupancy, a system Certification Letter including an acceptance test report and the optimization/alignment pass through documents must be obtained by working with Monterey County Radio Shop. These documents will be forwarded to the Fire Code Official and the ERRCS vendor and be made available to the Fire Department upon request. The report shall verify compliance with the CFC Emergency Responder Communication Coverage Section and include: the emergency responder radio coverage system equipment data sheets, as-built construction documents, diagrams showing device locations and wiring schematic, and a copy of the electrical permit and the system certification letter. The Fire Code Official will not

approve ERRCS operation for building occupancy unless these pass-through documents are completed and received by Fire Code Official.

4.2.4 For requisite analog channels in the ERRCS, testing must be coordinated with the Monterey County Radio Shop and primary dispatch center for those channels.

4.3 Location of Equipment

For buildings without a fire command center, the communications control equipment shall be located inside the building near the fire alarm control panel or other approved location. For buildings with a fire command center, the communications control equipment shall be located within the command center in a location approved by the Fire Code Official. The approved location shall be separated from the rest of the building by not less than 2-hour rated fire barriers. and/or horizontal assemblies. Reference CFC for further details.

Exception: In sprinklered buildings, not containing 2-hour-rated vertical enclosures, the control equipment maybe separated by a 1-hour fire-rated assembly.

4.4 Signage

Buildings equipped with an emergency responder radio coverage system shall be identified by an approved sign located above or near the building key box stating “Radio System Installed” as illustrated in **Figure 1**.

5 Maintenance

The emergency responder radio coverage system shall be always maintained, operational, tested, and shall have proof of compliance in accordance with the CFC Emergency Responder Communication Coverage Section.

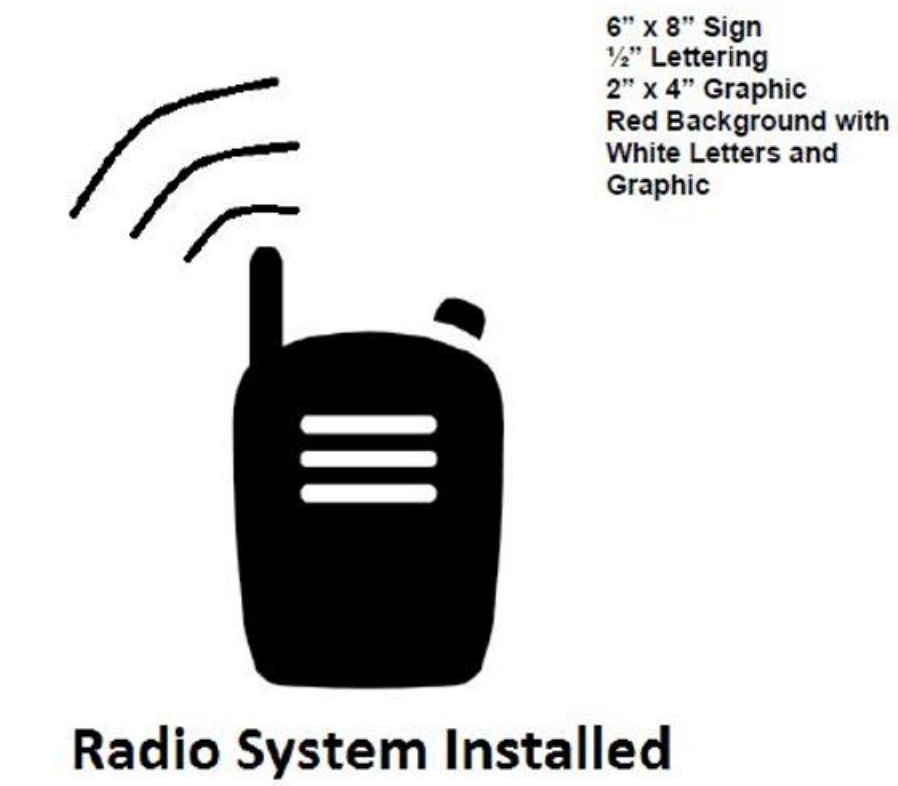

Figure 1. Required ERRCS Signage

Attachment 1: Monterey County NGEN ERRCS Registration Form

In accordance with local and state fire regulations, certain entities are required to perform annual ERRC testing on their property. The legal requirements for this test are not provided on this page but can be found on various government websites such as those of the State of California Fire Marshall and the local County and City Fire Departments' sites. Refer to code requirements in the CFC Emergency Responder Communication Coverage Section.

You must coordinate testing with the Monterey County Radio Shop. This will ensure the correct channels are tested and the correct certificates are issued, as required by the Federal Communications Commission and the local Fire Department having jurisdiction.

Complete the form below with all the information requested as incomplete submissions will not be processed. You are advised to lodge your request at least 45 days in advance.

REGISTRATION NUMBER: _____

(Monterey County Issued)

SECTION 1: APPLICATION INFORMATION

SITE PARTICULARS

Name of Site / Building / Complex: _____

Site's Building Address: _____

City:_____ State:_____ Zip:_____

PROPERTY / SITE OWNER'S PARTICULARS

Full Name of Property Owner: _____

Property Owner Contact (Technical):_____

Contact Phone (24hr/7day):_____ Contact E-Mail (24hr/7day):_____

Owner's Address: _____

City:_____ State:_____ Zip:_____

INSPECTING COMPANY PARTICULARS

Inspecting Company Name: _____

Company Contact Full Name:_____

Contact Phone:_____ Contact E-Mail:_____

Company Address: _____

City:_____ State:_____ Zip:_____

ADDITIONAL INFORMATION

Is this an initial or renewal test at this site? _____

Fire Permit Number (if applicable): _____ Fire Department Jurisdiction: _____

If a Monterey County ERRC Certificate was previously issued, enter Registration Number: _____

Attach hard and digital copies (on thumb drive) of architectural / system drawings of the building(s) to be tested. Files **MUST** include all grids to be tested **AND** all critical test points. Incomplete submissions will result in delays. YOU MUST INCLUDE ALL INFORMATION AS REQUESTED.

SECTION 2: POST INSTALLATION DATA & AS-BUILT REGISTRATION INFORMATION

(applicable where ERRCS installation is required)

ERRCS Equipment Make/Model/Serial Number: _____

Complete list of Receiver/Transmit Frequencies: _____

_____

Attach hard and digital copies (on thumb drive) of **AS-BUILT** architectural / system drawings including the building(s) test results. Files **MUST** include all grids tested **AND** all critical test points. Incomplete submissions will result in delays. YOU MUST INCLUDE ALL INFORMATION AS REQUESTED.

ERRC Testing Conditions and Guidelines

1. It is the testing contractor's responsibility to ensure they arrive at the test site early enough in order to begin testing at the scheduled time.
2. If the testing contractor is unable to begin testing at the scheduled time, the test(s) may be cancelled for the day.
3. It is the testing contractor's responsibility to ensure they have the authority and ability to physically access the buildings or structures being tested.
4. It is the testing contractor's responsibility to ensure that any staff who are performing the test(s) are trained and qualified to do so.
5. Monterey County staff are unable to provide any testing advice or equipment including cables, antennas, etc.
6. Monterey County staff are unable to assist with operating any test equipment or providing support for any equipment.
7. Monterey County staff will be present only to facilitate testing by providing uplink signal strength readings and ensuring channels being tested are transmitting for downlink testing.
8. Testing shall comply with the local Fire Marshal's regulations and CFC Emergency Responder Communication Coverage Section.