



CITY OF NEWPORT BEACH

Fire Department

Fire Prevention Division

GUIDELINES AND STANDARDS

GUIDELINE D.05 – Emergency Responder Radio Coverage System

D.05.1 PURPOSE

The City of Newport Beach, in conjunction with the Orange County Sheriff's Department Communications and Technology Division (OCSD Communications, OCC), established the criteria to provide guidance to those properties required to provide appropriate emergency radio coverage for first responders in the City.

D.05.1.1 RECOMMENDATION: It is strongly recommended by the Newport Beach Fire Prevention Division to begin designing the Emergency Responder Radio Coverage System at the start of a new project. The process requires submittals to various Authorities Having Jurisdiction (AHJ) and can extend the length of a project. Certificate of Occupancy **WILL NOT** be given until all requirements are met and the Emergency Responder Radio Coverage System is signed off by all AHJs involved. A flowchart is provided at the bottom of this document.

D.05.2 AUTHORITY

The regulatory authorities for the provisions contained within this standard are found in the California Fire & Building Codes. The City has adopted a separate ordinance governing in-building emergency radio coverage which shall take precedence over the California Fire Code. Additional Federal and State requirements may apply, as OCSD Communications and the City of Newport Beach have a joint responsibility in the installation, use, and maintenance of emergency responder radio systems.

D.05.3 SCOPE

This standard shall not apply to the following:

1. Where it is determined by the fire code official that the radio coverage system is not required.
2. One and two family dwellings.
3. Elevators.

4. Structures that are three stories or less without subterranean storage or parking and that do not exceed 50,000 square feet on any single story.
5. Wood-constructed residential structures four stories or less without subterranean storage or parking which are not built integral to an above ground multi-story parking structure.

For structures that are three stories or less, which do not exceed 50,000 square feet on any single story, but includes subterranean parking or storage, this standard shall apply only to the subterranean areas.

Existing buildings undergoing extensive remodel and/or expansion shall be coordinated with the Building Department to determine if the installation of an in-building radio system is needed. If so, staff will, as early in the construction approval process as practical, notify the developer/property owner.

NOTE: The owner of any building or structure to which this standard applies shall be responsible for all costs associated with the installation, maintenance, and compliance with the City of Newport Beach emergency responder radio coverage system specifications.

D.05.4 DEFINITIONS

Bi-Directional Amplification System (BDA): An in-building public safety radio amplification system composed of FCC-certified bi-directional 800 MHZ amplifier(s), associated distribution system, and subcomponents.

Countywide Coordinated Communication System (CCCS): The radio system used by local law enforcement, fire, lifeguard and public works departments within the County of Orange for emergency and non-emergency radio communication on the 800 MHZ radio band.

FCC Licensed Technician: An individual with a General Radiotelephone Operator License (GROL/PG), or equivalent, qualified to review design plans and perform installations in affected structures to ensure compliance with the specifications set forth in this standard.

Third Party Testing: Testing performed by an FCC licensed technician not affiliated with the installation contractor or installing technician, who is hired by the building or property owner to perform BDA system acceptance tests.

D.05.5 SPECIFICATIONS

A. Coverage

The following levels of coverage are required for public safety radio communication on the Countywide Coordinated Communication System:

1. A delivered audio quality (DAQ) of level 3 on each floor of the building or structure, which constitutes audio quality that makes speech understandable with slight effort with occasional repetition required due to noise or distortion.

DAQ Delivered Audio	Subjective Performance Description
1	Unusable, speech present but unreadable.
2	Understandable with considerable effort. Frequent repetition due to noise/distortion.
3	Speech understandable with slight effort. Occasional repetition required due to noise/distortion.
3.5	Speech understandable with repetition only rarely required. Some noise/distortion.
4	Speech easily understood. Occasional noise/distortion.
4.5	Speech easily understood. Infrequent noise/distortion.
5	Speech easily understood.

2. A minimum signal strength of -95dBm in 90% of the area of each floor of the building or structure from both the Countywide Coordinated Communication System and from within the building or structure.
3. A frequency range supported from the Countywide Coordinated Communication System of 851 - 869 MHZ (base transmitter frequencies), and a frequency range supported to the Countywide Coordinated Communication System of 806 - 816 MHZ (radio field transmit frequencies) on each floor of the building or structure.

If the building or structure is unable to naturally achieve compliance with the required level of coverage above, the property owner must install an amplification system.

B. Amplification System Specifications.

1. The amplification system shall include filters to reject frequencies below 861 MHZ by a minimum of 35 dB.
2. All amplification system components must be 100% compatible with analog and digital modulations after installation without additional adjustments or modifications. The system must be capable of encompassing the frequencies stated above and capable of future modifications to a frequency range subsequently established by the City of Newport Beach and OCSD Communications. If the system is not capable of modification to future frequencies, then a new system must be installed to accommodate the new frequency band.

3. All electrical components must be equipped with standby power to function at full capacity for at least twelve hours (12) hours. Battery systems shall be replaced per manufacturer's specifications at least every two (2) years.
4. The amplification system shall be designed and installed by an FCC licensed technician.

C. Active Device Specifications.

1. Active devices shall have a minimum of -50dB 3rd order intermodulation protection.
2. All active devices shall be FCC Part 90 Type Certified.
3. All electrical components must be equipped with standby power to function at full capacity for at least twelve hours (12) hours. Battery systems shall be replaced per manufacturer's specifications at least every two (2) years.
4. Active devices shall be alarmed, with a phone line that will provide dial tone to an alarm device. The alarm device will be programmed to activate a pager on the County of Orange's 900 MHZ paging system. Access to the active device is required twenty-four (24) hours a day by the OCSD Communications technicians/engineers. The minimum alarms will indicate AC electrical failure and operational failure. The device shall also have modem access to allow remote monitoring.

NOTE: When the radio monitoring/alarm functions can be performed as described above via the building's sprinkler monitoring or fire alarm system without interfering with either system's operation, the systems shall be permitted to be interconnected.

5. All AC operated power supplies shall have a UL listing.

D. Conduit and Cabinets.

1. All new building construction shall have a conduit installed between the first and bottom subterranean floor, the conduit shall extend along the center of the building to the roof. At each floor and the roof, an opening shall be made to afford ready access to the conduit from the ceiling or wall. Access in the form of a drop ceiling, rated access panel, junction box, or other approved means shall be made available where necessary to access cable in the conduit. Access in either the form of drop ceiling or conduit shall be made available along hallways and through firewalls. Access in either the form of a drop ceiling or conduit shall be made to access the horizontal branch lines extending from the vertical conduit riser to each antenna.

All floors of the subterranean parking garages shall have a similar conduit installation.

2. The radio system, extending from the amplifier to the distributed antennas, shall not be combined with other distributed antenna systems installed in the building. Cable, other than radio cable, is allowed to co-mingle in the conduit, provided it will not interfere with the emergency responder radio system operation.
3. Where fiber optic distribution systems or other methods are used to extend the radio system throughout the building or to other buildings, the line shall be enclosed in conduit meeting the requirements, or otherwise protected, as specified above.
4. NEMA Type 4 waterproof cabinets shall be used for all equipment and batteries.

D.05.6 DESIGN DOCUMENTATION REQUIREMENTS

1. The FCC licensed contractor is fully responsible for the 800 MHz BDA system design and compliance with all applicable code and ordinance requirements.
2. The amplification system shall be:
 - Fully Rebandable.
 - Supported by the manufacturer for seven years after installation.
 - Equipped with an Uninterrupted Power Supply (UPS) system.
 - Equipped with auto-dialer system that is programmed to report the assigned BDA ID to the county 900 MHz paging system
3. Indoor antennas shall be 700/800 MHz compliant, at a minimum.
4. Indoor tri-band antennas for BDA/DAS and cell phone coverage are optional based upon the building owner needs or requirements.
5. BDA system design shall utilize 1/10 couplers, rather than splitters.
6. Drawings shall detail the model numbers for all the proposed equipment (i.e. BDA system, Indoor antennas, Donor antenna, UPS, etc.)
7. Rack layout documentation.
8. Fiber optics layout, and interconnect (if applicable).

9. Provide floor plan showing 20'x 20' signal grid layouts of the BDA system install for each floor.
10. Single page diagram showing the signal levels from the BDA system and indoor antennas.
 - Drawings shall show indoor antenna layouts and signal levels, splitter/hybrid layouts, and donor antenna.

D.05.7 APPLICATION FOR A PERMIT

1. Retain an FCC licensed technician who will prepare and/or review construction plans in order to ensure that such plans meet the radio communication criteria specified in the City's Municipal Code (CBC, CFC, Planning, etc.) and this Standard.
2. All recommended in-building solution system components, subcomponents, devices, and equipment shall be clearly shown in the building, electrical, and fire alarm plans where applicable. The FCC licensed technician shall certify such plans with the technician's FCC license number noted on the plans prior to their submittal to OCSD Communications and the City of Newport Beach.

D.05.8 PROCEDURE FOR SUBMITTAL

1. The FCC licensed contractor shall submit three sets (two hardcopy sets and one electronic copy in PDF format) of Bi-Directional Amplifier/Digital Antenna System design drawings and documentation to the Orange County Sheriff's Department, Communication & Technology Division at: 840 N. Eckhoff, Ste. 104, Orange, CA or bcobb@ocsd.org.
 - a. Drawings must be a minimum size Architectural D (24x36") sheets or similar, with supporting manufacturer documentation on 8.5" x 11" pages. Site plan, floor plan(s) and wiring diagrams must be included.
 - b. After design review, OCSD will assign a BDA system identification number and provide instructions to the contractor for programming the auto-dialer to dial into the county paging system.
2. Once the plans are approved by the OCSD Communications & Technology Division, plans will be submitted to the City's Building Official (and Police Department if applicable) and the Newport Beach Fire Prevention Division.
 - a. The submittal to NBFD shall include a photocopy of the approved OCSD plans and documentation.
 - b. The submittal to the Building Official shall include a photocopy of the approved OCSD plans and documentation as well as any information required for approval of the electrical systems/tie-ins, details for penetrations through rated construction assemblies, and/or other

information as determined by the Building Official.

D.05.9 TESTING AND SYSTEM DESIGN PROCEDURE

Acceptance Tests:

1) Initial Tests.

(a) Prior to the issuance of a certificate of occupancy for any building or structure to which these specifications apply, the system shall be tested in accordance with the CFC §510.

1. Newport Beach Fire Prevention Division no longer performs BDA testing. The BDA installing contractor needs to contact a 3rd party FCC licensed BDA contractor (e.g., RF Signalman, RedRock, Leaf Comm, Das Simplified, HCI) to perform the following:

- a. Grid test measurement report, and design certification
- b. Auto dialer test
- c. Isolation test report

b) Upon successfully satisfying all testing criteria, the FCC certified technician shall provide a copy of the completed test report, and where applicable, as-built amplification plans*to Newport Beach Fire Prevention Division.

(1) Test report shall be a bound or stapled document of 8 ½ x 11 sheets (fold out sheets of 8 ½ x 17 may be used for floor plan diagrams). Content shall include:

(a) A summary signed by the party responsible for the testing which includes testing procedures followed, the dates, names of the parties involved in the testing and their respective companies, and the results, i.e. passing or failing of the performance requirements (DAQ), and signal strength requirements.

2) Floor plans of the building with testing grids and measurements for performance (DAQ) and signal strength.

a) An electronic copy of the information listed above in PDF format

**Note: In cases where the amplification system was designed after the building permit was issued, as-built amplification plans shall be provided that include complete line drawings showing system circuits, equipment specifications, and equipment locations. When required by the Building Official, as-built amplification plans or revisions to approved architectural, mechanical, and electrical plans may be required.*

3) Annual Tests.

a) Systems shall be inspected and tested annually or whenever structural changes occur including additions or remodels that could materially change the original field performance tests. Tests shall be completed by the FCC certified technician

hired by the building or property owner. Such testing shall be in compliance with CFC requirements.

**Note: Any first responder may conduct periodic field tests on each floor of each building or structure to which these specifications apply to verify the required level of radio coverage. This test is not intended to replace any required maintenance and testing that is the responsibility of the property owner.*

4) Record Retention.

- a) The owner of any building or structure to which these specifications apply shall retain all records of initial and annual tests performed pursuant to this section and shall submit copies to the Newport Beach Building Official, The Police Department and the Newport Beach Fire Prevention Division within thirty (30) days of completion of such tests.

Applicable Codes:

- California Building and Fire Code (California Code of Regulations, Title 24, Part 2 and Part 9)
- Newport Beach Municipal Code 9.04.190 Emergency Responder Radio Coverage

D.05.10 Submittal Flowchart

