



CITY OF NEWPORT BEACH

COMMUNITY DEVELOPMENT DEPARTMENT

LIFE SAFETY SERVICES

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), established the criteria to provide guidance to those properties required to provide appropriate emergency radio coverage for first responders in the City.

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.

D05.3 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 - 824 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 851 MHZ and frequencies above 869 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 twenty-four (24) 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 twenty-four (24) 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 OCSO 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 inter-connected.

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 the form of a drop ceiling, rated access panel, junction box, or other approved means shall be made available to access the horizontal branch lines extending from the vertical conduit riser to each antenna. All floors of 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 re-bandable.
 - Supported by the manufacturer for seven years after installation.
 - Equipped with an Uninterrupted Power Supply (UPS) system.
 - Equipped with an auto-dialer 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 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 with 20'x 20' signal grid layouts, for before and after, of the BDA system install for each floor.
10. Single line 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 (one must be a PDF) of Bi-Directional Amplifier/Digital Antenna System design drawings and documentation to the Orange County Sheriff's Department, Communication & Technology Division located at 840 N. Eckhoff St., Ste. 104, Orange, CA 92868-1021 or email to:
Shawn.Vadpey@comm.ocgov.com
 - Drawings must be a minimum size Architectural D sheets or similar, with supporting manufacturer documentation on 8.5" x 11" pages. Site plan, floor plan(s) and wiring diagrams must be included.
2. Once the plans are approved by OCSD Communications, the approved plans shall be submitted to the Newport Beach Community Development Division.

D.05.9 TESTING AND SYSTEM DESIGN PROCEDURE

Acceptance Tests:

1. 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 to this Standard, including:
 - Acceptance testing shall be performed by an FCC licensed third party technician and shall not be performed by the installation contractor or technician that initially installed the system. The third party testing agency shall use the attached testing and certification form on page 8 of this Standard.
 - The FCC licensed technician shall contact OCSD Communications (Shawn.Vadpey@comm.ocgov.com) to obtain any protocols related to the BDA system before final testing. OCSD Communications 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.

- The developer or property owner is responsible to retain the FCC-licensed third party technician to test all areas of the building or structure in accordance with the requirements of the Newport Beach Fire Code and OCSD Communications.
2. Upon successfully satisfying all testing criteria, the FCC licensed third party technician shall provide to the City and OCSD Communications a copy of the completed test report, the certification form, and as-built amplification plans, if applicable, per the requirements below.
 - 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, their respective companies, and the results, i.e. passing or failing of the performance requirements (DAQ), and signal strength requirements.
 - b) Floor plans of the building with testing grids and measurements for performance (DAQ) and signal strength.

Note: In cases where the decision to provide an amplification system was made after the building permit was issued, as-built amplification plans shall be provided that include complete single line drawings showing system circuits, equipment specifications, and equipment locations.

3. OCSD Communications is the custodian of the 800 MHz CCCS FCC frequencies, and filings. OCSD Communications will file the required FCC BDA registration for all the deployed BDA systems in the City of Newport Beach.

Annual Tests:

1. 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 an FCC licensed technician hired by the building or property owner. The testing agency shall use the attached testing and certification form on page 8 of this Standard for all testing and certification. Such testing shall be in compliance with the requirements of the Newport Beach Fire Code Section 510 and these Standards, including:
2. Signal boosters shall be tested to ensure that the gain is the same as it was upon initial installation and acceptance. In-building system components shall be tested to determine general function operability. If noncompliance is found, the FCC licensed

technician will assess improvements necessary and provide such information to OCSD Communications and Newport Beach Life Safety Services.

3. Backup batteries and power supplies shall be tested under load for a period of 1-hour to verify that they will properly operate during an actual power outage. If within the 1-hour test period the battery exhibits symptoms of failure, the test shall be extended for additional 1-hour periods until the integrity of the battery can be determined.
4. All other active components shall be checked to verify operation within the manufacturer's specifications.
5. At the conclusion of the testing, the certification report, which shall verify compliance with Section 510.5.3 of the Newport Beach Fire Code, shall be submitted to OCSD Communications and Newport Beach Life Safety Services.

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.

Record Retention:

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 Life Safety Services 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



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IN-BUILDING BI-DIRECTIONAL AMPLIFIER (BDA) CERTIFICATION TEST AND ANNUAL INSPECTION

*****NOTE: THIRD PARTY TESTING IS REQUIRED FOR ALL NEW INSTALLATIONS*****

Building Address:	BDA Insp. Date:
BDA Location:	BDA Model #:
Building Contact:	BDA Serial #:
Contact Email:	
Contact Tel. #:	
Contractor Name:	Contr. Tel. #:
Contractor Email:	Tech. FCC Lic. #:
Technician Name:	Tech. Tel. #:

Did you or your company originally install the BDA system?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
OPERATIONAL TEST: Is the BDA system functional?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
COVERAGE TEST: Does the 800MHz coverage test meet the City Standards? <i>NOTE: Test shall be conducted utilizing 800MHz portable radios or service monitor Test for both countywide talk groups, as well as primary cell site for the area.</i>	<input type="checkbox"/> YES	<input type="checkbox"/> NO
AUTO-DIALER TEST: Does the auto-dialer function properly? <i>NOTE: Test shall be done to OCSD/Communications paging system. Call DSU Group Duty Tech @ 714-704-7999 or System Watch @ 714-628-7021 to confirm BDA goes through</i>	<input type="checkbox"/> YES	<input type="checkbox"/> NO
BACK-UP POWER TEST: Is the UPS still functional? Did you perform battery 1-hour drop test? Do the UPS batteries need to be replaced?	<input type="checkbox"/> YES <input type="checkbox"/> YES <input type="checkbox"/> YES	<input type="checkbox"/> NO <input type="checkbox"/> NO <input type="checkbox"/> NO
ANTENNA SYSTEM: Is the condition of the Donor (outside) antenna satisfactory? Is the donor antenna clear from obstructions? Is the condition of the inside antenna system(s) ok?	<input type="checkbox"/> YES <input type="checkbox"/> YES <input type="checkbox"/> YES	<input type="checkbox"/> NO <input type="checkbox"/> NO <input type="checkbox"/> NO

CERTIFICATION

<i>I certify that the installation/test of the BDA system identified on this certificate is installed per all applicable codes and standards:</i>		

FCC Certified Technician Name

Signature

Date