



# Emergency Responder/Public Safety Radio Amplification

May 2020

Emergency responders need reliable communications wherever they work, including inside buildings. Section 510 of the International Fire Code requires that certain buildings be provided with radio amplification 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/or location. These radio coverage amplification systems are also referred to as BDA (bi-directional amplifier) and DAS (distributed antenna systems). In this Information Sheet, they are collectively referred to as BDA/DAS systems.

## **Section 1: Buildings Required to Have an Emergency Responder Radio Coverage System**

All new high-rise buildings require installation of an emergency responder radio coverage system, unless the responsible party can demonstrate that the building meets minimum coverage standards for the King County Radio System. Where these buildings will pass radio signals through part of the building, emergency responder radio coverage need only be provided for those areas within the building that do not pass radio signals.

In addition, all new buildings that have total building area of 50,000 square feet or more; or the total basement area is 10,000 square feet or more; or there are floors used for human occupancy more than 30 feet below the finished floor of the lowest level of exit discharge, must have an emergency responder radio coverage system, unless the responsible party can demonstrate that the building meets minimum coverage standards for the King County Radio System. Where these buildings pass radio signals through part of the building, emergency responder radio coverage need only be provided for those areas within the building that do not pass radio signals.

New buildings that are smaller than those described in item 2 above are exempt from the requirements of IFC Section 510, unless the Fire or Police Chief determines that in-building radio coverage is critical because of its unique design, location, use or occupancy.

For information on how to document that a new or existing building meets radio coverage requirements without BDA/DAS, please use the Radio Coverage Assessment Form stored here: [BellevueWA.gov/sites/default/files/media/pdf\\_document/2020/Assessment%20of%20Coverage%20Without%20BDA-DAS.pdf](https://BellevueWA.gov/sites/default/files/media/pdf_document/2020/Assessment%20of%20Coverage%20Without%20BDA-DAS.pdf)

## **Section 2: Working with the Bellevue Fire Department including our contract cities (Beaux Arts Village, Clyde Hill, Hunts Point, Medina, Newcastle and Yarrow Point)**

During the design and installation of a BDA/DAS system, customers can expect to work with the Bellevue Development Services (electrical permits – City of Bellevue), Washington State Department of Labor & Industries (electrical permits – contract cities), and the Bellevue Fire Department (BFD).

### **Eastside Public Safety Communication Agency (EPSCA) Requirements**

EPSCA owns and manages Bellevue's portion of the public safety radio system, commonly referred to as the King County Regional 800 MHz System. To ensure that BDA/DAS systems do not cause any harmful interference to the public safety radio system, building owners or their designees will be required to provide specific information about their BDA/DAS system and to coordinate system turn-up with EPSCA. Building owners or their designees can request authorization using the "Request for Authorization: BDA/DAS Installation for In-Building Public Safety Radio System Coverage" form, which is available on the EPSCA website: [EPSCA.com/bdaauthorizationletter.html](https://EPSCA.com/bdaauthorizationletter.html).

### Important note

The current radio system will be replaced in 2022 and in order for BDA/DAS systems to be forward compatible, they will need to comply with the new radio system operator's (PSERN) requirements which are located here: [PSERN.org/requirements/](https://psern.org/requirements/). Among other requirements, DAS/BDA must be (FCC) Class A bi-directional FCC Class A channelized BDA capable of supporting up to 28 channels.

After the BDA/DAS system design firm, installing contractor, or other responsible party has completed installation of the BDA/DAS system, the building owner or designee must notify EPSCA prior to turning on or activating the BDA/DAS system. Notification should be sent to EPSCA by email at least five business days prior to the BDA/DAS system being activated for coverage testing. "Request for Authorization: BDA/DAS Installation" forms, notifications and other communication with EPSCA related to BDA/DAS systems should be directed to [dshatfield@redmond.gov](mailto:dshatfield@redmond.gov).

Coordination with EPSCA is required before a new BDA/DAS system is turned on for the first time. A technician will typically monitor inbound radio system noise and signal levels at the donor radio site during this process. Customers should call Scott Hatfield/EPSCA at 425-556-2516 not less than one week prior to initial system activation in order to coordinate this activity.

Bellevue Fire has two radios for post-installation testing. These are loaned out to qualified entities for one to two days of system testing prior to final BFD inspection. Requests to use these radios is done online by completing the [Radio Checkout Form](#), alternatively radios may be available via EPSCA's contractor (Day Wireless).

### Bellevue Development Services Fire and Electrical Permits

BDA/DAS systems and associated battery or other backup power systems are required to be designed and installed under a Development Services construction permit (FE). In addition, an electrical permit for work to install branch circuits is required. In our contract cities the construction permit is obtained from Bellevue Fire (FO) and the electrical permit is obtained from Washington State Department of Labor & Industries.

Fire and Electrical permits can only be obtained online via [MyBuildingPermit.com](https://mybuildingpermit.com) (Bellevue). Electrical permits in our contract cities can be made online via Washington State Department of Labor & Industries, in person or via mail.

### Bellevue Fire Department Requirements

After acceptance testing is successfully conducted by the building owner and after electrical sign-off BFD inspectors will conduct talk-back testing for selected areas of the building using BFD radios for verification of radio function.

Inspections can be scheduled via [MyBuildingPermit.com](https://mybuildingpermit.com) or IVR 425-452-6875. Prior to scheduling Bellevue Fire Department functional verification testing:

- The building owner or designee shall submit a "Request for Authorization: BDA/DAS Installation" [form](#) to [EPSCA](mailto:EPSCA) (mail to: [dshatfield@redmond.gov](mailto:dshatfield@redmond.gov)) with a copy to [Bellevue Fire](mailto:Bellevue Fire) (mail to: [firereview@bellevuewa.gov](mailto:firereview@bellevuewa.gov)).
- EPSCA shall provide frequency and other information to the building owner or designee. The BDA/DAS installation contractor or other responsible party shall perform and certify results of acceptance testing to verify proper performance of the system.
- The electrical permit shall be signed off.

- Customers should ensure the following information is available on site for use by the BFD inspector:
  - A copy of the “Request for Authorization: BDA/DAS Installation” form submitted to EPSCA and Bellevue Fire.
  - Locations of the BDA/DAS system control equipment, amplifiers, signal boosters, backup battery systems, and any outdoor antennas.
  - Diagram for each floor where coverage is provided, divided into a grid of 20 approximately equal test areas, and include pre-test received signal strengths and frequencies for each test area. Indicate all critical areas where 99% coverage is required.
  - Copies of manufacturer specification sheets for all BDA/DAS systems components, including amplifiers, signal boosters, antennas, coax, couplers, splitters, combiners, filters, or any other passive components proposed. Include data sheets for the backup battery and charging system (if utilized) and include calculations to ensure the backup power requirements are met.
  - A certification letter stating that the BDA/DAS system has been installed and tested per code and that the system is complete and fully functional.

The above information shall be present at the subject property when the BFD inspector arrives and shall be maintained at the subject property for the life of the system.

It is the responsibility of the contractor to perform all acceptance tests and provide the necessary equipment for the tests. The exception is that public safety portable radios are available at no charge to the testers. Please complete this [online form](#) at least one week in advance. Alternatively, you can request test radios from EPSCA’s Contractor (Day Wireless).

Acceptance testing and certification requirements are enumerated in IFC Section 510.5.3.

**BDA/DAS system** installations, acceptance testing, and annual inspection and testing are required to be performed or supervised by personnel meeting the minimum qualifications outlined in the IFC as amended by the City of Bellevue.

The minimum qualifications of the system designer and lead acceptance test personnel shall include:

- A valid FCC-issued general radio operators license; and
- Certification of in-building system training issued by a nationally recognized organization, school or a certificate issued by the manufacturer of the equipment being installed.

### Section 3: Recurring Testing and Maintenance

BDA/DAS systems are required to be inspected and tested annually or whenever structural changes occur including additions or remodels that could materially change the original field performance tests in accordance with IFC Section 510.6.

Note: A construction permit is required for any system changes outside of routine maintenance. You can apply for permits online through [MyBuildingPermit.com](http://MyBuildingPermit.com).

Technicians for annual testing are required to have specific qualifications (see Section 510.6.4 of the International Fire Code).

Annual test reports are required to be provided to the Bellevue Fire Department via our vendor’s website [TheComplianceEngine.com](http://TheComplianceEngine.com), using the standard system test report form. Reporting forms are incorporated in the vendor’s website and available for review on the Bellevue Fire Department website at [BellevueWA.gov/city-government/departments/fire/fire-prevention/information/application-forms](http://BellevueWA.gov/city-government/departments/fire/fire-prevention/information/application-forms) complete this [online form](#) at least one week in advance. Alternatively,

you can request test radios from EPSCA's Contractor (Day Wireless). Contact EPSCA to set up an appointment for signal level strength measurement.

Test reports must be uploaded by the testing company within 5 business days of the annual test. Reports of red tagged or impaired systems must be submitted by the end of the day of the test.

#### **Section 4: Impairment Reporting**

The occurrence of any fault in an emergency responder radio coverage system where the system function is decreased shall result in the transmission of a supervisory signal to a supervisory service. Systems that are out-of-service for more than eight hours require notification to the fire code official. To report an out-of-service system, visit: [BellevueWA.gov/sites/default/files/media/pdf\\_document/Report\\_of\\_Impaired\\_System.pdf](http://BellevueWA.gov/sites/default/files/media/pdf_document/Report_of_Impaired_System.pdf).

#### **Federal Communications Commission (FCC) Registration Requirement**

BDA/DAS system owners are required by the FCC to register their BDA/DAS system (which the FCC identifies as 'signal boosters') with the FCC. This applies to those systems already placed in operation, in permitting or under construction. The FCC Rule requiring registration is CFR 47, FCC Part 90.219(d) (5). Additional information may be found at: [Wireless.FCC.gov/signal-boosters/part-90-boosters/index.html](http://Wireless.FCC.gov/signal-boosters/part-90-boosters/index.html).

#### **Section 5: Planning for Technological Development**

Federal and regional initiatives could lead to future technological change in the King County public radio system infrastructure. Building owners may wish to evaluate design options such that newly installed radio enhancement systems are forward-compatible and/or capable of being modified to accommodate technological development in the King County radio system, in order to allow maintenance of the minimum system design criteria. Ref: International Fire Code Section 510.6.2

#### **Nationwide "Rebanding" Effort**

##### ***Puget Sound Region timing: Q1 2016 Followed by Retuning***

The federal government initiated a "rebanding" effort that reassigned spectrum to eliminate current interference issues between cellular carriers and public safety agencies in the 800 MHz band. This effort modified the frequencies assigned to local jurisdictions for their public safety radio systems. In the Puget Sound region, the transition occurred in early 2016.

BDA/DAS installed prior to the transition in February 2016 require retuning in order to continue meeting requirements for public safety communications in structures. If your BDA/DAS has not been retuned, you must contact your radio system service technician to schedule the required maintenance. This service may be combined with your annual required maintenance to save money on service calls.

#### **Replacement of Aging Analog Infrastructure with P25 Digital Infrastructure**

##### ***Estimated timing: 2022***

The public safety radio system in King County will be replaced by a new digital system that will extend through the Puget Sound region. The new Puget Sound Emergency Radio Network (PSERN) is being funded by a levy approved by voters in 2015. The new system is required because the current system is reaching the end of its service life.

Channelized BDA/DAS systems installed in buildings in King County will require retuning to continue to interoperate with the new radio system.

## Development of new nationwide wireless network for first responders

*Estimated timing: 2018-2028*

In 2012, Congress passed legislation to start developing a nationwide, interoperable broadband cellular network for public safety. Congress set aside spectrum in the 700 MHz band for this broadband cellular network. The initiative is referred to nationally as FirstNet and in Washington State is called WashingtonOneNet. If the network is built, first responder communications could evolve significantly over the next 10 to 15 years.

The exact timing and implications for the PSERN system have not yet been defined, however at a minimum BDA/DAS systems will need to also transmit on the 700 MHz spectrum. For information, visit: [Firstnet.gov/](http://Firstnet.gov/).

## Section 6: Cable Installation

BFD, along with many cities in King County, has included clarifications in a new Section 510.5.6 of the upcoming 2018 Fire Code regarding cable installation. This new section is based on NFPA 1221, 2019 Edition, Section 9.6 for cable installation. The new requirements are:

1. The backbone, antenna distribution, radiating, or any fiber-optic cables shall be rated as plenum cables.
2. The backbone cables shall be connected to the antenna distribution, radiating, or copper cables using hybrid coupler devices of a value determined by the overall design.
3. Backbone cables shall be routed through an enclosure that matches the building's fire-resistance rating for shafts or interior exit stairways, and passage of the antenna distribution cable in and out of the enclosure shall be protected as a penetration per the International Building Code. Contact the project architect to determine the fire resistance rating of the enclosures.

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 For alternate formats, interpreters, or reasonable accommodation requests please phone at least 48 hours in advance 425-452-6168 (voice) or email [kcarlson@bellevuewa.gov](mailto:kcarlson@bellevuewa.gov). For complaints regarding accommodations, contact City of Bellevue ADA/Title VI Administrator at 425-452-6168 (voice) or email [ADATitleVI@bellevuewa.gov](mailto:ADATitleVI@bellevuewa.gov). If you are deaf or hard of hearing dial 711. All meetings are wheelchair accessible.