

Seattle Permits

—part of a multi-departmental series on City services & permitting

Emergency Responder/ Public Safety Radio Amplification Systems Using PSERN

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Emergency responders need reliable communications wherever they work, including inside buildings. Section 510 of the Seattle Fire Code requires that certain buildings be provided with radio amplification systems designed to provide radio coverage in areas of the buildings if 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 Client Assistance Memorandum, they are collectively referred to as BDA/DAS systems.

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

1. 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 Puget Sound Emergency Responder Network (PSERN). 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.
2. 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.

3. New buildings that are smaller than those described in item 2 above are exempt from the requirements of SFC Section 510.
4. Existing high-rise buildings that do not have a wired communication system or approved radio coverage for emergency responders within the building shall be retrofitted with such system or coverage; however, a wired fire department communication system in accordance with SFC Section 907.2.13.2 and SFC Section 1103.2 may be provided in lieu of an approved radio coverage system.

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: <http://www.seattle.gov/Documents/Departments/Fire/Business/Assessment%20of%20Coverage%20Without%20BDA-DAS.pdf>

For information on wired fire department communication systems, see SFD Client Assistance Memo #5122 at: www.seattle.gov/fire/firecode.

Section 2: Working with City of Seattle and PSERN

During the design and installation of a BDA/DAS system, customers can expect to work with PSERN as well as the Seattle Department of Construction and Inspections (SDCI), and the Seattle Fire Department (SFD).

Seattle Department of Construction and Inspections (SDCI) Electrical Permits

BDA/DAS systems and associated battery or other backup power systems are required to be installed under an SDCI over the counter (OTC) electrical permit.



Use the subcategory “Communications” when filling out the online permit application. For information on SDCI electrical permits, visit: [http://www.seattle.gov/sdci/permits/permits-we-issue-\(a-z\)/electrical-permit](http://www.seattle.gov/sdci/permits/permits-we-issue-(a-z)/electrical-permit)

SDCI electrical inspectors also review the wiring including hanging of wiring and any conduit requirements, see: [SDCI Electrical Inspections](#).

PSERN Requirements

Contractors should notify PSERN of the intent to install a new DAS in Seattle. During testing for the new system as part of the construction process, contractors can contact PSERN to borrow test radios. Once installation and testing is complete, and once SDCI has signed off on the electrical permit, contractors will again work with PSERN to complete uplink validation, verifying that the new DAS does not interfere with the PSERN radio signal quality. A technician will typically monitor inbound radio system noise and signal levels at the donor radio site during this process. Customers should contact PSERN at least one week prior to initial system activation in order to coordinate uplink validation: DAS-PSERN@kingcounty.gov

To comply with FCC regulations, PSERN will require building owners or their designees to sign a rebroadcast agreement. Please visit <https://psern.org/das-in-building-coverage/> for more information about the rebroadcast agreement.

Seattle Fire Department Requirements

After the SDCI permit has been signed off and the PSERN rebroadcast agreement and uplink verification has been completed, you will commence work with SFD. SFD inspectors will conduct talk-back testing for selected areas of the building using SFD radios for verification of radio function.

To schedule an inspection, please submit an online request form to us—see https://forms.office.com/Pages/ResponsePage.aspx?id=RR7meOtrCUCPmTWdi1T0G7BaEA_9gT5FsdnrHrrmzsRUN09DTEVINKISQkdURVZZRIQ4SUZSMINYUC4u

Inspections need to be scheduled at least five working days in advance, however more notice is generally advisable given the high volume of construction inspection requests. SFD inspectors will also confirm functionality for the Seattle Police Department (SPD) radio channels, so there is no need for the customer to request separate testing from SPD.

Prior to scheduling SFD functional verification testing:

1. The BDA/DAS installation contractor or other responsible party shall perform and certify results of acceptance testing to verify proper performance of the system. System information and acceptance test results as described below, along with the certification letter, should be made available on site for SFD and SDCI and uploaded to SFD (see item #4 below).
2. The electrical permit shall be signed off by SDCI.
3. The rebroadcast agreement and uplink verification shall have been completed with PSERN. PSERN will notify SFD when these items are completed.
4. Commissioning test results for new and replacement systems shall be entered by the BDA/DAS contractor into SFD’s website thecomplianceengine.com at least 24 hours prior to the SFD inspection. As part of this requirement, two sets of documentation must also be uploaded: (a) the grid square diagram and test results, and (b) the diagram showing location of BDA/DAS control equipment, amplifiers signal boosters, backup battery systems, and any outdoor antennas, and a wiring schematic must be uploaded by the contractor. For more information please see: <https://www.seattle.gov/fire/business-services/systems-testing#bdadasemergencyradiocommunications>

Customers should ensure the following information is available on site for use by the SFD inspector and will be stored on site in the DAS cabinet or enclosure:

1. A copy of the SDCI electrical permit.
2. Document showing locations of the BDA/DAS system control equipment, amplifiers, signal boosters, backup battery systems, and any outdoor antennas.
3. 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.
4. 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.

5. A system 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 when the SFD inspector arrives and shall be maintained in the DAS enclosure or cabinet for the life of the system.

It is the responsibility of the contractor to perform all commissioning or “acceptance testing” and provide the necessary equipment for the tests. The exception is that public safety portable radios are provided by the PSERN Operator. Please arrange loaners when scheduling your uplink appointment by emailing DAS-PSERN@kingcounty.gov.

Acceptance testing and certification requirements are enumerated in SFC Section 510.5.4.

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

1. A valid FCC-issued general radio operators license; and
2. 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 SFC Section 510.6.

Technicians for annual testing are required to have specific qualifications (see Section 510.6.4 of the Seattle Fire Code) and a Seattle Fire Marshal’s Office certification is not required.

Annual test reports are required to be provided to the Seattle Fire Department via our vendor’s website www.thecomplianceengine.com, using the Seattle-

standard system test report form. Reporting forms are incorporated in the vendor’s website and available for review on the Seattle Fire Department website at <http://www.seattle.gov/fire/business-services/systems-testing>. PSERN is not involved in annual testing.

Test reports must be uploaded by the testing company within 7 calendar 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: <http://www.seattle.gov/Documents/Departments/Fire/Business/ReportofImpairedSystemForm.pdf>. Fire watch is not required for impaired BDA/DAS systems.

Section 5: Cable Installation

SFD, along with many cities in King County, has included clarifications in a new Section 510.5.6 of the 2018 Fire Code regarding cable installation. This new section is based on NFPA 1221, 2019 Edition, Section 9.6 for cable installation. NFPA 1221 has eliminated the need for pathway survivability for antenna cables in these systems. 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. SDCI electrical inspectors also review the wiring including hanging of wiring and any conduit requirements, see: [SDCI Electrical Inspections](#).

Section 6: Additional Resources

Please see the SFD PSERN information sheet here: <http://www.seattle.gov/fire/business-services/systems-testing#bdadasemergencyradiocommunications>.