
SOUTH CAROLINA PUBLIC SAFETY SIGNAL BOOSTERS



RECOMMENDATIONS & REQUIREMENTS

February 1, 2020
Version

Record of Change

[illegible]

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Date: June 7, 2019

To: Public Safety & Building Codes Officials

From: George Crouch

Subject: Public Safety Signal Boosters

The use of public safety signal boosters is a growing consideration for fire marshals and building codes officials across South Carolina. Signal boosters are also referred to as a Bi-Directional Amplifier (BDA) systems. A jurisdiction's decision to require a building owner to install a public safety signal booster is a public safety decision for the jurisdiction and an operational cost to building owner. The regulations for the engineering and installation of a signal booster go beyond the International Fire Code (IFC). The Federal Communications Commission (FCC) has very specific regulations on public safety signal boosters and enforces those regulations with potentially significant fines. Public safety signal boosters are signal boosters that ONLY amplify the public safety frequencies or bands utilized by first responders, law enforcement, EMS and fire, at a specific location. The FCC prohibits these public safety signal boosters from amplifying cellular spectrum bands (cellular requires different equipment and has different regulations).

The purpose of this document is to help educate, provide guidance and support the proper installation, registration and consent form requirements needed when a jurisdiction requires a building owner to install a public safety signal booster. If there are public safety signal boosters already installed in your jurisdiction that are not in compliance with the FCC regulations contact us and we will be glad to help you.

An in-building public safety signal booster is an extension of the public safety radio system utilized by the jurisdiction. Signal boosters utilize a fixed transmitter and receiver on the public safety radio system and the FCC requires the signal booster to be registered and the Licensee(s) of the radio system must provide written consent for the signal booster to operate on the public safety radio system. If a signal booster malfunctions or begins to isolate (audio begins to echo itself) it can disrupt your public safety communications.

The guidance in these signal booster documents was developed by the Palmetto 800 Advisory Committee's BDA subcommittee to help coordinate statewide guidance for public safety signal booster use and educate users on FCC regulations for public safety signal boosters. The committee included fire marshals, communications officials, LLR, Palmetto 800 users, local governments and other interested public safety officials from around the state. The information attached represents key elements that fire officials, building codes officials and building owners need to be aware of when installing or engineering a signal booster to support public safety first responders.

Please do not hesitate to contact our staff if you have any questions palmetto800@admin.sc.gov.

Respectfully,

George Crouch

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South Carolina Public Safety Signal Boosters Recommendations & Requirements for the Palmetto 800 Radio Network

Disclaimer: This document does **NOT** address or represent all National Fire Protection Association (NFPA) 72, NFPA 1221, International Fire Code (IFC), Federal Communications Commission (FCC) regulations and areas of compliance for Public Safety Signal Booster requirements. This document only highlights selected sections for Signal Booster compliance within NFPA 72, NFPA 1221, IFC and FCC regulations. Signal Booster design engineers, vendors, contractors, qualified installers and building owner(s) are responsible for full compliance of all Federal, State and Local code requirements.

Palmetto 800 Radio Network. The South Carolina Palmetto 800 Network is a statewide radio network that provides primary public safety radio communications for hundreds of jurisdictions across South Carolina. The network is made up of FCC Licensees from numerous authorities having jurisdiction (AHJ). As the administrator and primary Licensee for the Palmetto 800 Network, the SC Public Safety Communications Section is providing coordination between the Licensees and jurisdictions to simplify the process for building owners, signal booster vendors and users of the Palmetto 800 Network.

What Is A Signal Booster? A device or system that automatically receives, amplifies, and retransmits signals from wireless stations into and out of building interiors, tunnels, shielded outdoor areas and other locations where these signals would otherwise be too weak for reliable communications. Sometimes referred too as a bi-directional amplifier (BDA) system. Signal booster systems may contain both Class A and Class B signal boosters as components.

What Buildings May Be Subject To Signal Booster Requirements? The SC Fire Code requires signal boosters in any building, new or existing, when the emergency responder radio coverage is compromised due to the construction materials of the building. For new construction, the SC Office of State Fire Marshal recommends that all buildings required to be designed by a licensed design professional be evaluated during the design phase for the potential need for signal boosters. This would apply to all buildings that are:

- (1) Not a one or two family dwelling or farm structure.
- (2) Larger than 5000 square feet.
- (3) Three stories or more in height.
- (4) Except that **All** Assembly, Educational, Institutional and Hazardous occupancies require design professionals regardless of height or area and should consider the need for signal boosters for emergency responder communications.

Note: Always check with the local jurisdiction(s) as signal booster requirements may vary.

Distributed Antenna System (DAS). A network of spatially separated antenna nodes connected to a common source via a transport medium that provides wireless service within a structure.

FCC Required Certification. All repeaters, transmitters, receivers, and signal boosters shall be installed and operated in a manner consistent with Title 47, CFR Within these regulations is a mandatory requirement that repeaters, transmitters, and signal boosters have Federal Communications Commission (FCC) "certification." FCC certification verification can be obtained from any FCC office or online <https://www.fcc.gov/oet/ea/fccid>.



South Carolina Public Safety Signal Boosters Recommendations & Requirements for the Palmetto 800 Radio Network

Signal Booster Types.

Class A signal booster. A signal booster designed to retransmit signals on one or more specific channels. A signal booster is deemed to be a Class A signal booster if none of its passbands exceed 75 kHz.

Class B signal booster. A signal booster designed to retransmit any signals within a wide frequency band. A signal booster is deemed to be a Class B signal booster if it has a passband that exceeds 75 kHz.

What is a Passband. A passband is the range of frequencies or wavelengths that can pass through a filter. For example, a radio receiver contains a bandpass filter to select the frequency of the desired radio signal out of all the radio waves picked up by its antenna. The passband of a receiver is the range of frequencies it can receive.

Signal Booster Design & Engineering: Where an engineering design is needed or required, a signal booster design software such as IB-Wave shall be used by engineers for signal predication in new or existing construction and design layout.

Public Safety Signal Boosters. FCC (47 §CFR 90.219(7)) Signal booster passbands are limited to the service band or bands for which the operator (Licensee) is authorized (Licensed). In general, signal boosters should utilize the minimum passband that is sufficient to accomplish the Public Safety purpose. Except for distributed antenna systems (DAS) installed in buildings, the passband of a Class B signal booster should **not** encompass both commercial services (such as Enhanced Specialized Mobile Radio (ESMR) and Cellular systems) and part §90 Land Mobile and Public Safety Services.

Deployment. FCC (47 §90.203(a)(2) and part 2, subpart J) Deployment of public safety signal boosters must be carried out in accordance with the rules in this paragraph.

- (1) Signal boosters may be used to improve coverage in weak signal areas only.
- (2) Signal boosters must not be used to extend Private Land Mobile Radio Service(s) (PLMRS) stations' normal operating range.
- (3) Except as set forth in paragraph (d)(3)(ii) of this section, signal boosters must be deployed such that the radiated power of each retransmitted channel, on the forward link and on the reverse link, does not exceed 5 Watts effective radiated power (ERP).

FCC Minimum qualifications of personnel. The minimum qualifications of the system designer and lead installation personnel shall include both of the following (2018 IFC 510.5.2):

- (1) A valid FCC-issued general radio operators license.
- (2) Certification of inbuilding system training issued by a nationally recognized organization, school or a certificate issued by the manufacturer of the equipment being installed.



South Carolina Public Safety Signal Boosters Recommendations & Requirements for the Palmetto 800 Radio Network

Authority to Operate A Signal Booster Requirements. Signal boosters (Class A & Class B) must be in compliance with all NFPA 72, NFPA 1221, IFC and FCC regulations and installed by a qualified installer. Non-licensees (such as a building owner or a signal booster installation contractor(s)) seeking to operate signal boosters must obtain the express consent of the licensee(s) for the frequencies which the device or system is intended to amplify. The consent must be maintained in a recordable format that can be presented to an FCC representative or other relevant licensee(s) investigating interference. All Class B signal boosters (as defined in 47 §CFR 90.219) must be registered online at www.fcc.gov/signal-boosters/registration prior to activation and testing of the signal booster.

Authority Having Jurisdiction (AHJ). All signal booster's installations must also be in compliance with the authority having jurisdiction (AHJ) building codes and fire codes. Local jurisdictions may require a permit and have additional requirements or policies from those listed in this document.

Non-Licensee Requirements. All non-licensees installing Signal Boosters (Class A or B) amplifying public safety spectrum must receive written consent from the FCC licensee(s). Jurisdictions using the Palmetto 800 radio network FCC licenses, should e-mail Palmetto800@admin.sc.gov for frequency, site and Consent of Licensee Application information.

FCC Required Registration for Class B Signal Booster(s). To register a Class B signal booster(s), you will first need a FCC Registration Number (FRN). The signal booster installer, building owner or licensee must register the booster. If you do not already have a (FRN) you can register for a (FRN) at <https://www.fcc.gov/wireless/support/universal-licensing-system-uls-resources/getting-fcc-registration-number-frn> go to the FCC Commission's Registration Systems (CORES). Once you have an FRN you can proceed to www.fcc.gov/signal-boosters/registration to register your signal booster(s). If multiple signal boosters are required, each must be registered separately. You will need the Licensee's frequency license number(s) to complete the registration.

Signal Strength.

Inbound. A minimum inbound signal strength of -95 dBm, or other signal strength as required by the authority having jurisdiction (AHJ), shall be provided throughout the coverage area.

Outbound. A minimum outbound signal strength of -95 dBm at the donor site, or other signal strength as required by the authority having jurisdiction (AHJ), shall be provided from the coverage area.

Component Enclosures. NFPA-72-2013 (24.5.2.5.2) All repeater, transmitter, receiver, signal booster components, filters and battery system components shall be contained in a water tight NEMA4- or 4X-type enclosure(s). All penetrations into the NEMA4- or 4X-type enclosure(s) must be sealed to maintain the compliance of the enclosure(s). (24.5.2.5.3) External Filters. Permanent external filters and attachments shall not be permitted.



South Carolina Public Safety Signal Boosters Recommendations & Requirements for the Palmetto 800 Radio Network

Coaxial Cables. NFPA-1221-2016 (9.6.2.1.1.1 and 9.6.2.1.4) The feeder and riser cables shall be rated as plenum cables that match the buildings fire rating and pathway survivability The connection between the riser and feeder coaxial cables shall be made within an enclosure matching the building's fire rating and pathway survivability, and passage of the feeder cable in and out of the enclosure shall be fire-stopped to the building's fire rating and pathway survivability. Effective Date: December 26, 2017.

Antenna Isolation. If a donor antenna exists, isolation shall be maintained between the donor antenna and all inside antennas and shall be a minimum of 15 dB above the signal booster gain under all operating conditions.

Oscillation Suppression. Signal boosters utilized to enhance Public Safety radio coverage shall utilize oscillation prevention circuitry (2018 IFC 510.4.2.4(5)) in the design of the signal booster to reduce public safety radio interference. Public safety radio signal boosters and distributed antenna systems (DAS) should only be deployed in areas where signal enhancement is required to prevent transmitter oscillation. Signal booster systems that begin oscillating should immediately notify the authorities having jurisdiction (AHJs), alarm company or vendor servicing the signal booster. Continued signal booster(s) oscillation will directly interfere with public safety radio operations.

Power Supplies. NFPA-72-2013 (24.5.2.5.5) At least two (2) independent and reliable power supplies shall be provided for all repeater, transmitter, receiver, and signal booster components, one primary and one secondary.

Primary Power Source. The primary power source shall be supplied from a dedicated branch circuit and comply with NFPA-72-2013 (10.6.5.1).

Secondary Power Source. The secondary power source shall consist of one of the following:

- (1) A storage battery dedicated to the system with at least 12 hours of 100 percent system operation capacity and arranged in accordance with NFPA-72-2013 (10.6.10) if the building is not equipped with an automatic-starting, engine-driven generator.
- (2) An automatic-starting, engine-driven generator serving the dedicated branch circuit or the system with at least 12 hours of 100 percent system operation capacity and storage batteries dedicated to the system with at least 2 hours of 100 percent system operation capacity and arranged in accordance with NFPA-72-2013 (10.6.11.3).

System Monitoring: IFC 2018 (510.4.2.5) The emergency responder radio enhancement system shall be monitored by a listed fire alarm control unit, or where approved by the fire code official, shall sound an audible signal at a constantly attended (7x24) on-site location.



South Carolina Public Safety Signal Boosters Recommendations & Requirements for the Palmetto 800 Radio Network

Fire Alarm System. NFPA-72-2013 (24.5.2.6.1) & IFC 2018 (510.4.2.5) The public safety radio communications enhancement system shall include automatic supervisory and trouble signals for malfunctions of the signal booster(s) and power supply(ies) that are annunciated by the fire alarm system and comply with the following:

- (1) The integrity of the circuit monitoring signal booster(s)
- (2) Power supply(ies) shall comply with NFPA-72-2013 (10.6.9 and Section 12.6).
- (3) System and signal booster supervisory signals shall include the following:
 - (a) Antenna malfunction
 - (b) Signal booster failure
- (4) Low-battery capacity indication when 70 percent of the operating capacity has been depleted.
- (5) Power supply signals shall include the following for each signal booster:
 - (a) Loss of normal ac power
 - (b) Failure of battery charger

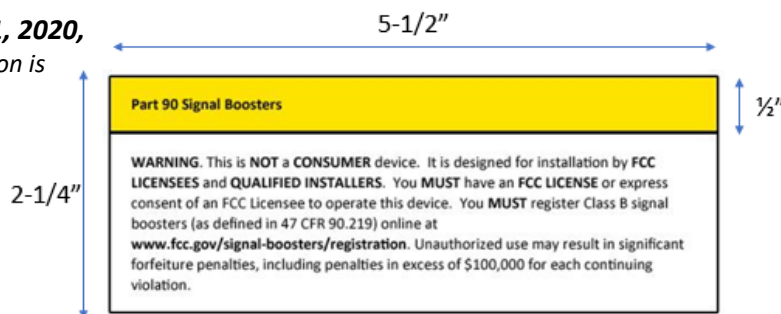
Dedicated Signal Booster Panel. NFPA-72-2013 (24.5.2.6.2*) A dedicated monitoring panel shall be provided within the fire command center to annunciate the status of all signal booster locations. The monitoring panel shall provide visual and labeled indication of the following for each signal booster:

- (1) Normal AC power
- (2) Signal booster trouble
- (3) Loss of normal ac power
- (4) Failure of battery charger
- (5) Low-battery capacity

Additional Frequencies and Change of Frequencies. 2018 IFC (510.4.2.6) The signal booster system shall be capable of modification or expansion in the event frequencies changes are required by the FCC, the radio licensing authority or additional frequencies are may available by the FCC.

FCC Required Device Labeling. Signal booster(s) must be labeled to indicate whether it's a Class A or Class B and must include on marketing materials, instruction manuals, packaging and on the **FRONT** of the device, the following advisory; "WARNING. This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. You MUST register Class B signal boosters (as defined in 47 CFR §90.219) online at www.fcc.gov/signal-boosters/registration . The consent must be maintained in a recordable format that can be presented to an FCC representative or other relevant licensee investigating interference. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation."

Effective January 1, 2020,
this label configuration is
required!



The minimum label size shall be 5-1/2 inches by 2-1/4 inches with a 1/2" yellow banner. The warning label must be clearly distinguishable, include the same wording listed above and utilize a #10 font or larger.



South Carolina Public Safety Signal Boosters Recommendations & Requirements for the Palmetto 800 Radio Network

FCC Required Certification. Use of repeaters, transmitters, or signal boosters that do not have an existing FCC-issued certification is a violation of federal law, and users are subject to fine and/or imprisonment. A label displaying the exact FCC certification number must be placed in a visible place on the equipment itself.

Underwriters Laboratories (UL) 2524. It is suggested that Signal Boosters have a UL-2524 In-building Two-Way Emergency Radio Communications Enhancement Systems listing. This is a new October 2018 Standard and many vendors are still in the certification process.

System Design and Deployment Questions. For radio frequency channels, repeater site locations and radio system questions please contact palmetto800@admin.sc.gov to request a Consent of Licensee Application. All other questions should be directed to the authority having jurisdiction (AHJ). Please provide the following information in your request;

- (1) Address or Longitude/Latitude
- (2) Type and height of structure
- (3) Your contact information
- (4) The contact information for the (AHJ)
- (5) Signal booster type (Class A or B)
- (6) Brand, Model of the signal booster if known
- (7) Local jurisdiction where the Signal Booster will be installed
- (8) Fire jurisdiction where the Signal Booster will be installed

How Can I Check To See if A Class B Signal Booster Has Been Registered? Go to the FCC Signal Booster registration link www.fcc.gov/signal-boosters/registration at the top of the page, on the right side click on Find Boosters. This will allow you numerous search options.

FCC Required Consent of Licensee Application. For obtaining a Palmetto 800 network Signal Booster Consent of Licensee Application, see the consent of licensee application on page 12.

Contact Information:

South Carolina Department of Administration, Division of Technology Operations,
Public Safety Communications & Emergency Operations Section
4430 Broad River Road, Columbia, SC 29210
palmetto800@admin.sc.gov or 803-896-0300



South Carolina

Public Safety Signal Booster Approval Process

The South Carolina Division of Technology Operations, Public Safety Communications section administers the statewide Palmetto 800 radio network. As the largest public safety radio system in the state, we are helping to facilitate the coordination of public safety signal booster use and installation across the state. All buildings larger than 5000 square feet, more than three (3) stories in height, and buildings for assembly, education, institutional and hazardous occupancies should consider the need for signal boosters for emergency responder communications.

If your request is for a public safety radio system other than the Palmetto 800 network, we will forward your request to the proper public safety agency.

1. Buildings and occupancies described above should have a signal booster design and engineering study to determine if all or portions of the building require a public safety signal booster. Consult with the local authority having jurisdiction (AHJ).
2. Submit a Signal Booster Consent of Licensee Application (July 1, 2019 version) to palmetto800@admin.sc.gov to receive the public safety radio system information needed to complete the signal booster design and engineering study.
3. The public safety licensee will send you the frequency and tower location information needed to complete the signal booster design and engineering study.
4. Notify the public safety licensee who provided you with their frequency and tower location information, that you will be installing a public safety signal booster. Please indicate the donor site that your signal booster antenna will be pointed towards and request a Retransmission Consent Authorization. If you have any questions or problems do not hesitate to e-mail palmetto800@admin.sc.gov.
5. The public safety licensee will send you a completed Retransmission Consent Authorization letter for your records. The consent authorization must be maintained by the building owner in a recordable format that can be presented to an FCC representative or other relevant licensee investigating interference.
6. Notify the public safety licensee when the signal booster installation is complete.
7. You MUST register Class B signal boosters (as defined in 47 CFR §90.219) online at www.fcc.gov/signal-boosters/registration. Coordinate with the public safety licensee to determine the best way to have your device registered.

NOTE: Unauthorized use of a signal booster may result in significant FCC forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.



Signal Booster Consent of Licensee Application Palmetto 800 Radio Network

Please Complete the Following Information		
SITE INFORMATION		
Site Name:		
Site Street Address:		
City:	State:	Zip Code:
City or County Jurisdiction:		Fire Jurisdiction:
<u>Site Description (construction, number of floors & square footage)</u>		
Site Latitude and Longitude:		
Signal Booster Manufacturer:	Model:	Class:
Frequency Ranges of the Booster:		
OWNER INFORMATION		
Owner/Rep Name:		
Owner Address:		
City:	State:	Zip Code:
Point of Contact:		
Work Phone:	E-mail:	
SYSTEM INTEGRATOR/INSTALLER/MAINTAINER		
Company Name:		
Company Address:		
City:	State:	Zip Code:
Point of Contact:		
Work Phone:	Cell Phone:	
E-mail:		
PREPARER SIGNATURE AND DATE		
Signature:		Date:
Print Name and Title		

E-mail the completed form to palmetto800@admin.sc.gov

Palmetto 800 Retransmission Consent Authorization

The South Carolina Department of Administration, Division of Technology of Operations, Public Safety Communications and Emergency Operations Section (State) hereby grants authorization to _____ (Operator), to operate a two-way public safety radio communications signal booster (System) on 700/800 MHz public safety frequencies licensed to the South Carolina Division of Technology Operations (Licensee) by the Federal Communications Commission (FCC) under call sign(s) _____, _____ and _____ at the following location:

Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Latitude: _____ Longitude: _____

Signal Booster Brand/Model: _____ Class: _____

Contact: _____

Phone: _____ E-mail: _____

This Authorization is subject to the following conditions:

1. The signal booster shall be operated, maintained and tested annually in accordance with manufacturer's instructions, the International Fire Code (IFC), FCC rules and regulations and National Fire Protection Association (NFPA) 72 National Fire Alarm and Signaling Code, 2013 edition.
2. The signal booster shall not cause interference to radio systems or equipment operated by the State or any other FCC licensee.
3. Signal booster passbands are limited to the service band or bands for which the public safety Licensee is authorized. In general, signal boosters should utilize the minimum passband that is sufficient to accomplish the purpose. Except for distributed antenna systems (DAS) installed in buildings, the passband of a Class B booster should not encompass both commercial services (such as ESMR and Cellular Radiotelephone) and part 90 Land Mobile and Public Safety Services

Palmetto 800 Retransmission Authorization

4. The Operator shall promptly resolve any interference that occurs to radio systems, equipment of the State or any FCC licensee, up to and including deactivation of the signal booster, if necessary, until such time the interference is corrected.
5. In the event of an outage of the signal booster, the Operator shall notify the authority having jurisdiction (AHJ) in accordance with the regulations, policies, and procedures for reporting any fire alarm/fire safety system outage.
6. The Operator shall provide access to the signal booster for inspection upon request by the State, AHJ or the FCC.
7. A separate retransmission authorization shall be obtained for each headend location used in the system design and posted conspicuously with the headend equipment.
8. The signal booster must be labeled in accordance with FCC requirements to indicate whether it's a Class A or Class B and must include the following advisory:

“WARNING. This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. You MUST register Class B signal boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. The consent must be maintained in a recordable format that can be presented to an FCC representative or other relevant licensee investigating interference. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.”
9. Class B signal boosters must be registered with the FCC (as defined in 47 CFR 90.219) at www.fcc.gov/signal-boosters/registration prior to testing and utilization.
10. The State, as FCC licensee of the frequencies, reserves the right to terminate this consent authorization at its discretion.

If you have questions, please e-mail palmetto800@admin.sc.gov or call (803) 896-0300.

SC Division of Technology Operations
Public Safety Communications & Emergency Operations Section

cc: Local Fire Marshal



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Part 90 Signal Boosters

Part 90 Signal Boosters are a type of Industrial Signal Booster. Part 90 Signal Boosters sold and marketed starting on March 1, 2014 must meet new FCC requirements. In addition, Class B Signal Boosters must be registered directly with the FCC before being used.

[Register Your Part-90 Class B Signal Booster \(https://signalboosters.fcc.gov/signal-boosters/\)](https://signalboosters.fcc.gov/signal-boosters/)

On February 20, 2013, the FCC released a Report and Order that included the following actions related to Part 90 Signal Boosters:

- Clarification of FCC rules to make it clear that non-licensees who seek to operate signal boosters must obtain the consent of the licensee[s] whose signals they intend to amplify;
- Adoption of a registration requirement for existing and future Class B signal booster installations;
- Permit Part 90 licensees to deploy Class A (narrowband) signal boosters in both fixed and mobile environments provided that they do not cause interference to other licensed services in the band. Prohibit mobile deployment of Class B (wideband) signal boosters, but allow fixed deployment of Class B signal boosters;
- Require system integrators and installers to consider the potential adverse effects of the increased noise floor on PLMR systems and establish additional emission limits to reduce the interference potential of signal boosters;
- Update the FCC equipment authorization process to differentiate between Class A and Class B signal boosters and testing procedures;
- Establish labeling requirements to promote compliance with FCC rules; and
- Clarify certain definitions and power requirements.

Several of these changes are highlighted below with additional information.

Part 90 Signal Booster Classifications

Class A signal booster. A signal booster designed to retransmit signals on one or more specific channels. A signal booster is deemed to be a Class A signal booster if none of its passbands exceed 75 kHz.

Class B signal booster. A signal booster designed to retransmit any signals within a wide frequency band. A signal booster is deemed to be a Class B signal booster if it has a passband that exceeds 75 kHz.

Registration System for Class B Signal Boosters

On February 20, 2013, the FCC released a Report and Order that included a requirement for new and existing Class B signal boosters to be registered with the FCC. By creating a permanent record of all Class B signal booster installations in a searchable database, licensees will be able to search online for signal booster installations if they experience interference or other degradations to their system. This will allow licensees to identify and shut down signal boosters causing harmful interference as necessary.

Licensees and signal booster operators were required to register existing Class B signal booster installations with the FCC by November 1, 2014. After November 1, 2014, operation of an existing, unregistered Class B signal booster is unauthorized and subject to enforcement action. Any new Class B signal booster installed after November 1, 2014 must be registered prior to operation. To encourage compliance with this new requirement, registration will be free of cost to the operator and/or licensee.

Manufacturers and Labeling Requirements

As of February 20, 2013, the FCC will no longer accept applications for equipment certification for Part 90 Signal Boosters that do not comply with the FCC's new rules. In addition, the FCC will cease certification of devices which do not comply with the new rules. As of March 1, 2014, all Industrial Signal Boosters sold and marketed in the United States must meet the FCC's new rules.

Transition Process

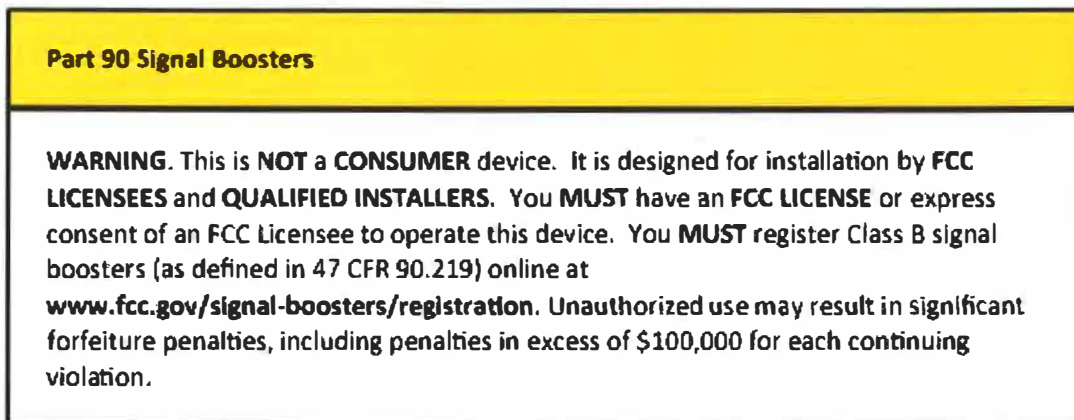
The FCC established a two-step transition process for equipment certification for Part 90 Signal Boosters sold and marketed in the United States.

Labeling Requirements

Part 90 Signal Boosters must include a label with the following information:

1. As of February 20, 2013, the FCC will no longer accept applications for equipment certification for Part 90 Signal Boosters that do not comply with the FCC's new rules. In addition, the FCC will cease certification of devices which do not comply with the new rules.
2. As of March 1, 2014, all Industrial Signal Boosters sold and marketed in the United States must meet the FCC's new rules.

It is possible that the warning label looks different than the sample label below. However, the warning label must include the same information.



Bureau/Office:

[Wireless Telecommunications \(https://www.fcc.gov/wireless-telecommunications\)](https://www.fcc.gov/wireless-telecommunications)

Tags:

[Signal Boosters \(/tags/signal-boosters\)](/tags/signal-boosters) - [Wireless Services \(/tags/wireless-services\)](/tags/wireless-services)

ELECTRONIC CODE OF FEDERAL REGULATIONS

e-CFR data is current as of November 1, 2019

Title 47 → Chapter I → Subchapter D → Part 90 → Subpart I → §90.219

Title 47: Telecommunication

PART 90—PRIVATE LAND MOBILE RADIO SERVICES

Subpart I—General Technical Standards

§90.219 Use of signal boosters.

This section contains technical and operational rules allowing the use of signal boosters in the Private Land Mobile Radio Services (PLMRS). Rules for signal booster operation in the Commercial Mobile Radio Services under part 90 are found in §20.21 of this chapter.

(a) *Definitions.* The definitions in this paragraph apply only to the rules in this section.

Class A signal booster. A signal booster designed to retransmit signals on one or more specific channels. A signal booster is deemed to be a Class A signal booster if none of its passbands exceed 75 kHz.

Class B signal booster. A signal booster designed to retransmit any signals within a wide frequency band. A signal booster is deemed to be a Class B signal booster if it has a passband that exceeds 75 kHz.

Coverage area of a PLMRS station. All locations within the normal reliable operating range (service contour) of a PLMRS station.

Deploy a signal booster. Install and/or initially adjust a signal booster.

Distributed Antenna System (DAS). 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.

Operate a signal booster. Maintain operational control over, and responsibility for the proper functioning of, a signal booster.

Signal booster. A device or system that automatically receives, amplifies, and retransmits signals from wireless stations into and out of building interiors, tunnels, shielded outdoor areas and other locations where these signals would otherwise be too weak for reliable communications. Signal booster systems may contain both Class A and Class B signal boosters as components.

(b) *Authority to operate.* PLMRS licensees for stations operating on assigned channels higher than 150 MHz may operate signal boosters, limited to the service band for which they are authorized, as needed anywhere within the PLMRS stations' service contour, but may not extend the stations' service contour.

(1) PLMRS licensees may also consent to operation of signal boosters by non-licensees (such as a building owner or a signal booster installation contractor) within their service contour and across their applicable frequencies, but must maintain a reasonable level of control over these operations in order to resolve interference problems.

(i) Non-licensees seeking to operate signal boosters must obtain the express consent of the licensee(s) of the frequencies for which the device or system is intended to amplify. The consent must be maintained in a recordable format that can be presented to an FCC representative or other relevant licensee investigating interference.

(ii) Consent is not required from third party (unintended) licensees whose signals are incidentally retransmitted. However, signal booster operation is on a non-interference basis and operations may be required to cease or alter the operating parameters due to a request from an FCC representative or a licensee's request to resolve interference.

(2) [Reserved]

(c) *Licensee responsibility; interference.* PLMRS licensees that operate signal boosters are responsible for their proper operation, and are responsible for correcting any harmful interference that signal booster operation may cause to other licensed communications services. Normal co-channel transmissions are not considered to be harmful interference. Licensees are required to resolve interference problems pursuant to §90.173(b). Licensees shall act in good faith regarding the operation of signal boosters and in the resolution of interference due to signal booster operation. Licensees who are unable to determine the location or cause of signal booster interference may seek assistance from the FCC to resolve such problems.

(d) *Deployment rules.* Deployment of signal boosters must be carried out in accordance with the rules in this paragraph.

(1) Signal boosters may be used to improve coverage in weak signal areas only.

(2) Signal boosters must not be used to extend PLMRs stations' normal operating range.

(3)(i) Except as set forth in paragraph (d)(3)(ii) of this section, signal boosters must be deployed such that the radiated power of each retransmitted channel, on the forward link and on the reverse link, does not exceed 5 Watts effective radiated power (ERP).

(ii) Railroad licensees may operate Class A signal boosters transmitting on a single channel with up to 30 Watts ERP on frequencies 452/457.9000 to 452/457.96875 MHz in areas where communication between the front and rear of trains is unsatisfactory due to distance or intervening terrain barriers.

(4) Class B signal boosters may be deployed only at fixed locations; mobile operation of Class B signal boosters is prohibited after November 1, 2014.

(5) Class B signal booster installations must be registered in the FCC signal booster database that can be accessed at the following URL: www.fcc.gov/signal-boosters/registration.

(6) Good engineering practice must be used in regard to the radiation of intermodulation products and noise, such that interference to licensed communications systems is avoided. In the event of harmful interference caused by any given deployment, the FCC may require additional attenuation or filtering of the emissions and/or noise from signal boosters or signal booster systems, as necessary to eliminate the interference.

(i) In general, the ERP of intermodulation products should not exceed -30 dBm in 10 kHz measurement bandwidth.

(ii) In general, the ERP of noise within the passband should not exceed -43 dBm in 10 kHz measurement bandwidth.

(iii) In general, the ERP of noise on spectrum more than 1 MHz outside of the passband should not exceed -70 dBm in a 10 kHz measurement bandwidth.

(7) Signal booster passbands are limited to the service band or bands for which the operator is authorized. In general, signal boosters should utilize the minimum passband that is sufficient to accomplish the purpose. Except for distributed antenna systems (DAS) installed in buildings, the passband of a Class B booster should not encompass both commercial services (such as ESMR and Cellular Radiotelephone) and part 90 Land Mobile and Public Safety Services.

(e) *Device Specifications.* In addition to the general rules for equipment certification in §90.203(a)(2) and part 2, subpart J of this chapter, a signal booster must also meet the rules in this paragraph.

(1) The output power capability of a signal booster must be designed for deployments providing a radiated power not exceeding 5 Watts ERP for each retransmitted channel.

(2) The noise figure of a signal booster must not exceed 9 dB in either direction.

(3) Spurious emissions from a signal booster must not exceed -13 dBm within any 100 kHz measurement bandwidth.

(4) A signal booster must be designed such that all signals that it retransmits meet the following requirements:

(i) The signals are retransmitted on the same channels as received. Minor departures from the exact provider or reference frequencies of the input signals are allowed, *provided that* the retransmitted signals meet the requirements of §90.213.

(ii) There is no change in the occupied bandwidth of the retransmitted signals.

(iii) The retransmitted signals continue to meet the unwanted emissions limits of §90.210 applicable to the corresponding received signals (assuming that these received signals meet the applicable unwanted emissions limits by a reasonable margin).

(5) On or after March 1, 2014, a signal booster must be labeled to indicate whether it is a Class A or Class B device, and the label must include the following advisory

(1) In on-line point-of-sale marketing materials,

(2) In any print or on-line owner's manual and installation instructions,

(3) On the outside packaging of the device, and

(4) On a label affixed to the device:

"WARNING. This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC Licensee to operate this device. You MUST register Class B signal boosters (as defined in 47 CFR 90.219) online at www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation."