Collier County
Administrative Services Department
Information Technology Division

Collier County P25 Radio System Guidelines for Deployment of In-Building Radio Coverage Systems

Version Date February 2020

Network Operator Administrative Contacts

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Collier County owns and operates an 800 MHz P25 Phase 2 Trunked system licensed call under call signs WNLK955, WNSK615, WQMB408, WQMD549, and WQPW733. The system consists of 14 tower sites, 4 of which are single-site base stations, and 10 tower sites form a simulcast cluster.

Below are the requirements for installation of in-building radio coverage systems building owners must follow in order to receive authorization from Collier County to retransmit the frequencies licensed to Collier County. This document also includes a radio system map, a draft version of the retransmission acknowledge letter, and an FCC public notice regarding signal boosters.

1. Systems shall be installed, operated and maintained in accordance with Federal Communications Commission Part 90 rules, NFPA 1221 Standards, manufacturer's instructions, and other Federal, State or Local codes as determined by the AHJ (Authority Having Jurisdiction).
2. Signal boosters must be FCC type accepted.
3. No Harm- The System shall not cause interference to licensed radio systems or equipment operated by Collier County or other government entities in Collier County
4. System owner shall promptly resolve any interference that occurs up to and including deactivation of the system, if necessary, until such time that the interference is corrected.
5. System owner shall provide access to the system for inspection upon request by the AHJ, Collier County Telecommunications, or the FCC.
6. Prior to operation of an in-building system the owner shall request a Retransmission Authorization letter from the Collier County.
    a. The letter must be posted conspicuously with the headend equipment (location of Bi-directional amplifier and associated alarm panel)
    b. In-building systems comprised of multiple signal boosters shall require a separate retransmission authorization letter for each signal booster.
7. System owner must notify and coordinate with Collier County radio system group prior to testing, optimizing, and comissioning the in-building system.
8. Testing, acceptance, and approval of an in-building system for commercial service is at the sole discretion of the AHJ.
9. The AHJ reserves the right to inspect or re-inspect the in-building system at any time.

Key Technical Requirements

1. Selection of signal boosters
    a. The use of Class A or narrow band signal booster (designed to retransmit signals on specific RF channels) is preferred. Class A signal boosters do not require registration with the FCC.
    b. If Class B or wide band signal booster (designed to retransmit any channel within a wide frequency band) is used:
        i. Class B signal boosters must be registered in the FCC signal booster database: www.fcc.gov/signal-boosters/registration
        ii. The Class B signal booster must be equipped with "uplink squelch" feature, where the uplink RF signal amplifier (i.e. mobile radio to Tower site) of the signal booster is inactive during idle periods where there are no mobile radios transmitting within the area covered by the in-building system.
2. The trunking system control channel is randomly assigned among all the licensed RF channels (see Table of Licensed Frequencies below).
3. The maximum radio signal propagation delay introduced by the ERRCS shall not exceed 15 µs.

P25 800 MHz Tower Site Technical Data

Site Name	Site Category	Latitude	Longitude	Antenna Center-Line (ft.)	Effective Radiated Power (dBm)
Loop Road	Single-site	25-45-45.4	80-56-09.2	236	55.3
Carnestown	Single-site	25-54-36.4	81-21-49.3	275	54.7
Miles City	Single-site	26-09-42.1	81-20-56.9	190	55.3
I-75 East- DOT	Single-site	26-10-08.3	81-04-57.3	200	55.2
Immokalee	Simulcast	26-23-42.2	81-24-46.2	280	54.6
NCH-Baker	Simulcast	26-09-03.50	81-47-55.2	145	57.6
Corkscrew	Simulcast	26-16-36.0	81-36-04.0	200	57.3
North Naples	Simulcast	26-13-33.3	81-46-45.3	250	54.9
Old 41	Simulcast	26-19-03.3	81-47-13.7	210	55.2
Gulf Coast HS	Simulcast	26-16-12.9	81-42-22.4	155	55.6
County Barn	Simulcast	26-07-34.5	81-43-40.0	245	54.9
Marco Island	Simulcast	25-55-28.2	81-43-42.1	130	55.8
Krehling	Simulcast	26-01-51.0	81-38-32.0	200	55.2
WAVV	Simulcast	26-10-59.0	81-34-29.0	295	54.5

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Table of Licensed Frequencies

COLLIER P25 SIMULCAST SYSTEM		
Channel	**Tx Frequency**	**Rx Frequency**
1	854.3625	809.3625
2	856.4375	811.4375
3	856.4875	811.4875
4	856.9375	811.9375
5	856.9625	811.9625
6	857.4875	812.4875
7	857.9625	812.9625
8	858.9375	813.9375
9	858.9625	813.9625
10	859.4875	814.4875
11	860.4375	815.4375
12	860.7625	815.7625
Expansion 13	860.4875	815.4875
Expansion 14	860.9625	815.9625

MUTUAL AID CHANNELS		
Channel	**Tx Frequency**	**Rx Frequency**
8CALL90	851.0125	806.0125
8TAC91	851.5125	806.5125
8TAC92	852.0125	807.0125
8TAC93	852.5125	807.5125
8TAC94	853.0125	808.0125

CARNESTOWN SINGLE SITE SYSTEM		
Channel	**Tx Frequency**	**Rx Frequency**
1	854.4375	809.4375
2	855.4875	810.4875
3	859.2625	814.2625
4	859.9375	814.9375
5	860.9375	815.9375

I75 EAST DOT SINGLE SITE SYSTEM		
Channel	**Tx Frequency**	**Rx Frequency**
1	856.7625	811.7625
2	857.7625	812.7625
3	858.7625	813.7625

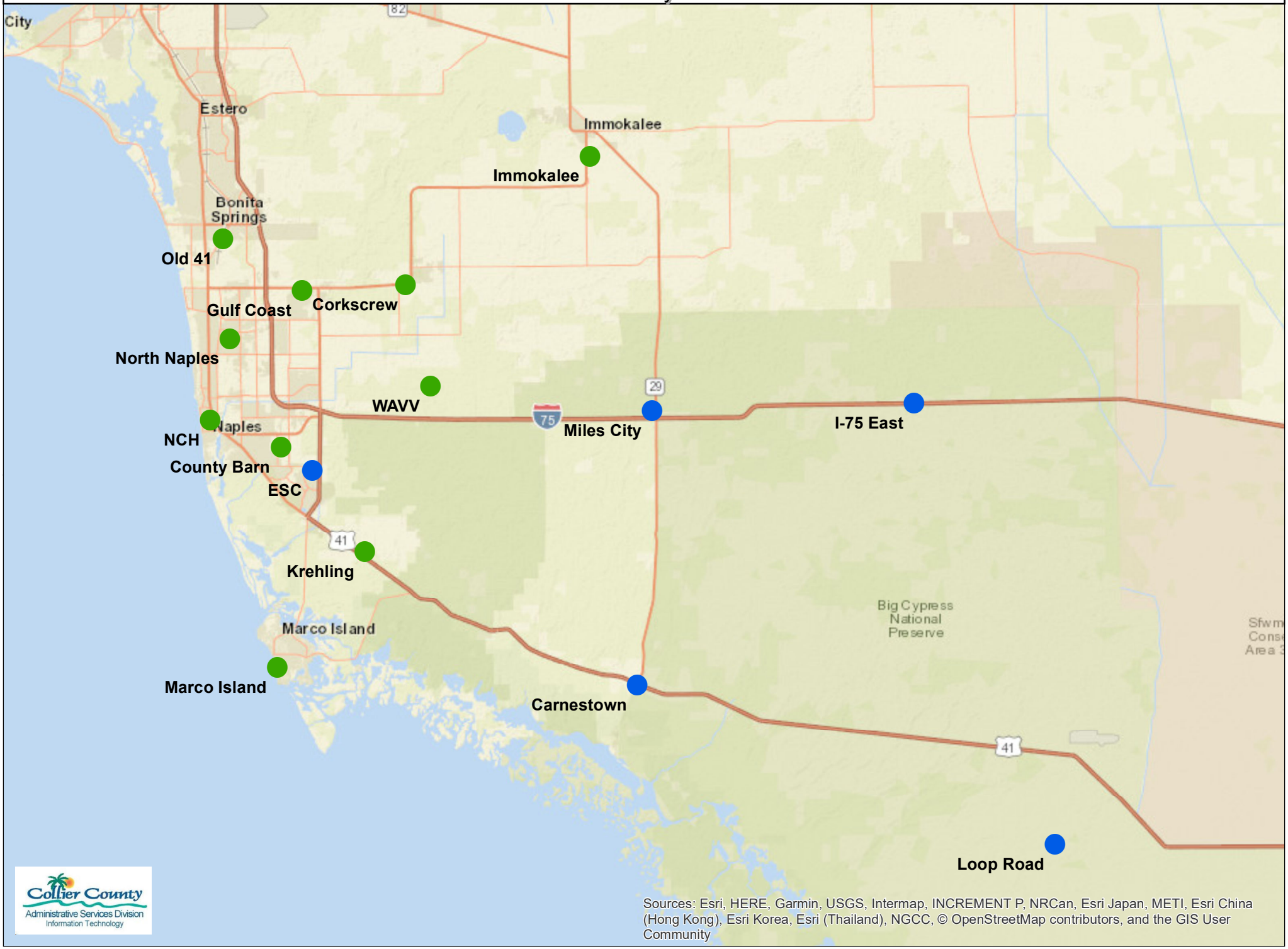
LOOP ROAD SINGLE SITE SYSTEM		
Channel	**Tx Frequency**	**Rx Frequency**
1	856.2625	811.2625
2	857.2125	812.2125
3	857.9375	812.9375

MILES CITY SINGLE SITE SYSTEM		
Channel	**Tx Frequency**	**Rx Frequency**
1	851.0875	806.0875
2	852.0875	807.0875
3	852.6500	807.6500
4	853.5625	808.5625

Multi-Site Simulcast

800 MHz Public Safety Radio Network

Updated 12/2018



800 MHz Retransmission Acknowledgement

Collier County Information Technology, 800 MHz Radio Network Operator, acknowledges the intent of ***[name of system operator]*** to design, install, and operate a two-way radio communications enhancement system on 800 MHz frequencies licensed to Collier County by the Federal Communications Commission (FCC) at the following location:

System Name	
System Address	
Latitude/Longitude	
Building Owner	
FCC Signal Booster ID (if Class B)	To be provided to AHJ & Collier County at acceptance
Technical Design Contact	
Contact phone #	
Contact email address	

1. Call signs, system frequencies and site locations are included in Collier County's Communications Enhancement System Guidelines document.
2. The System shall be operated and maintained in accordance with manufacturer's instructions, FCC Part 90 FCC rules and regulations, and requirements of NFPA 1221 Standard.
3. No Harm- The System shall not cause interference to radio systems or equipment operated by Collier County or other government entities in Collier County
4. Operator shall promptly resolve any interference that occurs to radio systems or equipment operated by government entities, up to and including deactivation of the System, if necessary, until such time that the interference is corrected.
5. Operator shall provide access to the System for inspection upon request by the AHJ (Authority Having Jurisdiction), Collier County Telecommunications, or the FCC.
6. This retransmission acknowledgement shall be posted at the headend equipment location (Bi-directional amplifier and associated alarm panel).
7. System testing, final, acceptance, and approval of the system for commercial service is at the sole discretion of the AHJ

Regards,

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DRAFT

PUBLIC NOTICE

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REMINDER OF THE OBLIGATIONS OF NON-LICENSEES THAT OPERATE PART 90 PRIVATE LAND MOBILE RADIO SIGNAL BOOSTERS

WT Docket No. 10-4

The Public Safety and Homeland Security Bureau and the Wireless Telecommunications Bureau issue this notice to remind building owners and other non-licensee operators of Part 90 Private Land Mobile Radio (PLMR) signal boosters that they may not operate these boosters until they: (a) obtain the express written consent of the licensee(s) whose signals they would re-transmit and (b) register Class B signal boosters[1] with the Federal Communications Commission (Commission) at the website: www.fcc.gov/signal-boosters/registration.[2] **Failure to do so risks harmful interference to first responders and others and may subject you to enforcement action.**

(a) PART 90 SIGNAL BOOSTERS

Part 90 PLMR signal boosters include a wide variety of devices that serve multiple users simultaneously and are designed to improve, for example, public safety agency radio coverage in large but confined areas such as stadiums, airports, office buildings, hospitals, tunnels, and educational campuses.[3] Booster technology such as distributed antenna systems (DAS) plays a crucial role in allowing users to communicate in areas where their radio signals would otherwise be blocked.[4]

The Bureaus recognize that many building owners install Part 90 signal boosters to comply with building codes that require the building owner to ensure that users, typically first responders, have seamless indoor radio coverage when they respond to an incident. But improperly installed or operated signal boosters can interfere with the very communications they are designed to re-transmit. It therefore is essential that the licensees whose signals are re-transmitted (e.g., public safety agencies) and the Commission have accurate information on such boosters. Without such information, the licensees and the Commission cannot promptly act to identify and eliminate interference that can seriously impair first responders' ability to respond and provide aid. Consequently, as detailed below, Part 90 signal booster

[1] See definition of Class A and B boosters under Section (c) below (Registration Requirement for Class B Signal Boosters).

[2] This Public Notice focuses only on Part 90 PLMR signal boosters and does not address other types of signal boosters, including those consumer and industrial signal boosters that are intended to retransmit signals of commercial wireless carriers. For more information regarding signal boosters that operate on wireless carrier frequencies, *see* Section 20.21 of the Commission's rules.

[3] *Amendment of Parts 1, 2, 22, 24, 27, 90 and 95 of the Commission's Rules to Improve Wireless Coverage Through the Use of Signal Boosters*, WT Docket No. 10-4, Report and Order, 28 FCC Rcd 1663, 1665, para. 5 (2013) (*Signal Booster R&O*).

[4] *Id.* at 1717, para. 151.

operators must obtain consent from the licensees whose signals are re-transmitted and register Class B devices.

(b) CONSENT REQUIREMENT

Although building codes or other regulations may require installation of Part 90 signal boosters, they do not authorize non-licensee building owners or others to operate them. Commission rules prohibit Part 90 booster operation unless the proposed operator has obtained the express written consent of the licensee(s) whose signals are to be re-transmitted. The Part 90 booster operator must retain that written consent and provide it to the Commission or a licensee representative on request.[5] Boosters should be installed and maintained only by qualified installers.[6]

You may search the Commission's Universal Licensing System (ULS) for PLMR licensees operating in your area in order to determine whose consent is required. The ULS search engine can be found at: https://wireless2.fcc.gov/UlsApp/UlsSearch/searchLicense.jsp.[7]

Part 90 boosters, on occasion, may incidentally and intermittently re-transmit signals of licensees other than the licensee(s) that have provided express written consent for retransmission of their signals. Such incidental retransmission does not require the express written consent of the incidentally re-transmitted licensee.

All booster operators should be mindful that boosters are authorized strictly on a non-interference basis – they must not cause interference to other users and must accept interference they may receive from other users. If a booster causes interference, you must adjust it so that it does not cause interference or immediately discontinue operation.[8]

(c) REGISTRATION REQUIREMENT FOR CLASS B SIGNAL BOOSTERS

The Commission recognizes two types of Part 90 PLMR signal boosters: A **Class A device** is a signal booster designed to retransmit signals *on one or more specific channels* and does not require registration with the Commission. A **Class B device** is a signal booster designed to retransmit *any signal within a wide frequency band* and must be registered with the Commission.[9] Class B Signal booster operators, e.g., building owners, must register their Class B devices with the Commission at www.fcc.gov/signal-boosters/registration prior to beginning operation of a signal booster.

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[5] 47 CFR § 90.219(b)(1)(i).

[6] *Signal Booster R&O*, 28 FCC Rcd at 1665, para. 5. Although the Commission has not adopted standards for qualified installers, several state and local jurisdictions have done so. Parties intending to install boosters should check state and local codes for installer qualifications.

[7] A booster operator, installer, or the operator's counsel can use the Commission's ULS database to identify the location and ownership of Part 90 stations in the booster's area. The database allows searching by frequency, frequency range, county, state or radius around a center point. The ULS database may be accessed at https://wireless2.fcc.gov/UlsApp/UlsSearch/searchLicense.jsp and selecting Advanced License Search. Assistance in use of the database may be obtained at https://wireless2.fcc.gov/helpfiles/licenseSearch/helpAdvanced.html or by calling 1-877-480-3201.

[8] 47 CFR § 90.219(c).

[9] *Id.* § 90.219(a).

Registration of Class B signal boosters allows parties to identify the source interference when it occurs and arrange for shut down of the booster until interference is resolved.[10] Registration must include, at a minimum:

- the call sign and frequency of the station to be re-transmitted;
- the operating range of the Class B signal booster;
- the physical location (address, city and state) of the signal booster; and
- contact information for the individual(s) responsible for the signal booster's operation.

The signal booster database is searchable by state, county, frequency range, and location of the device.

(d) ENFORCEMENT ACTION

If Part 90 booster operators do not obtain express written consent from the re-transmitted licensee or fail to register their Class B boosters with the Commission, their violation of Commission rules can subject them to enforcement action, including fines and the seizure of equipment. Causing interference that hampers first responders' ability to render aid could result in harm to persons or property.

Booster installers should carefully note the strict technical requirements specified in Section 90.219(d) of the Commission's rules when deploying Part 90 PLMR signal boosters.[11]

(e) FACT SHEET

Attached is a fact sheet summarizing the obligations and requirements for non-licensees who operate Part 90 PLMR signal boosters.

For further information regarding this matter contact Brian Marenco, Electronics Engineer, Policy and Licensing Division, Public Safety and Homeland Security Bureau, at (202) 418-0838 or Brian.Marenco@fcc.gov, or Jaclyn Rosen, Mobility Division, Wireless Telecommunications Bureau, at (202) 418-0154 or Jaclyn.Rosen@fcc.gov.

- FCC -

[10] *Signal Booster R&O*, 28 FCC Rcd at 1722, para. 162. Registration of Class A devices is not required.

[11] 47 CFR § 90.219(d).

Attachment A
Fact Sheet on Non-Licensee Operation of Part 90 Private Land Mobile Radio (PLMR) Signal Boosters

Question 1: *What is a Part 90 PLMR signal booster and what is it intended to do?*

Answer 1: A Part 90 PLMR signal booster is a device designed to re-transmit radio signals from PLMR licensees to improve radio coverage in weak signal areas. A common type of Part 90 PLMR signal booster is a distributed antenna systems (DAS). DAS are typically deployed in large areas such as stadiums, airports, office buildings, hospitals, tunnels, and educational campuses. Part 90 PLMR signal boosters play a crucial role in allowing public safety-first responder agencies to communicate in buildings, tunnels, and other areas where their radio signals would normally be blocked.

Question 2: *May I operate a Part 90 PLMR signal booster without a license from the FCC?*

Answer 2: Yes. An entity such as a building owner may operate a Part 90 PLMR signal booster without a license from the Commission provided that the operator first obtains the express written consent of the licensee(s) of the frequencies for which the device is intended to amplify. Consent must be maintained in a recordable format that can be presented to a Commission representative or other relevant licensee if interference occurs. Part 90 PLMR signal boosters may only be installed by "qualified installers."

Question 3: *Why is it necessary for me to obtain consent from the licensee(s) whose signals will be retransmitted by my Part 90 PLMR signal booster?*

Answer 3: It is necessary to obtain consent because improperly installed or operated signal boosters can interfere with radio communications of, for example, first responders who the boosters are intended to assist. Therefore, coordinating with the appropriate licensees ahead of time and obtaining their consent may avoid interference before it occurs.

Question 4: *How can I find out which PLMR licensees operate in my area on the frequencies or frequency range re-transmitted by my Part 90 PLMR signal booster?*

Answer 4: You may search the Commission's Universal Licensing System (ULS) for PLMR licensees operating in your area. By choosing the "Advanced Search Options" you can search the ULS database for licensees based on individual frequencies or a frequency range and you may limit your search to a geographic area such as a state, county, or a radius around a center point. The ULS search engine can be found at: https://wireless2.fcc.gov/UlsApp/UlsSearch/searchLicense.jsp. Your installer should be able to inform you what frequencies or frequency range your device is designed to retransmit.

Question 5: *Are there limitations to how I may deploy a Part 90 PLMR signal booster?*

Answer 5: Part 90 PLMR signal boosters should be deployed by qualified installers. Furthermore, the signal booster may only be used to improve coverage in weak signal areas. It may not be deployed to extend the coverage of PLMR licensees' radio systems. Finally, the signal booster must be deployed and adjusted so the effective radiated power (ERP) is limited to 5 Watts on both the forward link and return link of the booster.

Question 6: *What if my Part 90 PLMR signal booster retransmits signals from third party licensees?*

Answer 6: Consent is not required from third party (unintended) licensees whose signals are incidentally retransmitted.

Question 7: *What is the difference between a Class A and Class B Part 90 PLMR signal booster?*

Answer 7: A **Class A device** is a signal booster designed to retransmit signals *on one or more specific channels* while a **Class B device** is signal booster designed to retransmit *any signal within a wide frequency band*. A signal booster is deemed to be a Class A signal booster if none of its passbands exceed 75 kHz; it is deemed to be a Class B signal booster if any of its passbands exceed 75 kHz.

Question 8: *Do I need to register my Part 90 PLMR signal booster?*

Answer 8: Maybe. If you install a Class B signal booster you must register the device with the Commission at: www.fcc.gov/signal-boosters/registration. Required information includes: (1) the operating range of the Class B signal booster; (2) the physical location of the Class B signal booster; and (3) contact information for the individual(s) responsible for the Class B signal booster's operation. You may want to ask your installer to register your Class B signal booster device for you or to assist you with registration. Class A devices are not required to be registered.

Question 9: *Why is registration necessary?*

Answer 9: Registration of Class B signal boosters is a valuable tool to help PLMR licensees or the Commission locate and identify devices causing interference.

Question 10: *How can I tell if my Part 90 PLMR signal booster is a Class A or Class B device?*

Answer 10: Commission rules require manufacturers to label their signal boosters to indicate whether the unit is a Class A or a Class B device. You should check with your installer if you are uncertain which type of device is being deployed at your facility.

Question 11: *What should I do if I'm told my Part 90 PLMR signal booster is causing interference?*

Answer 11: Operation of a Part 90 PLMR signal booster is on a non-interference basis. If a signal booster causes interference, the operator is required by Commission rules to either cease operation or alter the operating parameters of the device to eliminate the interference.

Question 12: *What is the penalty for operating a Part 90 PLMR signal booster out of compliance with Commission rules?*

Answer 12: Unauthorized or improper operation of a Part 90 PLMR signal booster may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.

Question 13: Is a building code requirement a suitable substitute for express written consent of the licensee(s) of the frequencies for which the device is intended to amplify?

Answer 13: No. Express written consent must come directly from retransmitted Part 90 Licensee(s).

Question 14: Can a vendor register with the Commission as the operator of a booster?

Answer 14: Yes, but only if the vendor will accept full responsibility for ensuring the ongoing proper operation of the booster and, therefore, be responsible for any violation of the FCC's rules. If the vendor does not assume that responsibility, the individual or company registered as the booster owner (typically the building owner) will be responsible for complying with the FCC's rules and liable for any penalties assessed for improper operation of the booster.