



## **Communications terminology used for Signal booster guidelines and Forms**

This cover page has acronyms the reader may encounter during the review of this document. Please review before moving forward.

AHJ: Authority Having Jurisdiction

MHz: Megahertz

FCC: Federal Communications Commission

CFR: Code of Federal Regulations

NFPA: National Fire Protection Association

DAS: Distributed Antenna System

DAQ: Delivered Audio Quality

BDA: Bi-Directional Amplifier

RF: Radio Frequency

dB: Decibel

### **1<sup>st</sup> Step- Apply for Fire Permit and Qualifications**

The contractor shall apply for the appropriate fire permit with the County or City.

Contractor qualifications:

- 1 - The contractor must possess a PCTEL Public Safety Network monitoring system with grid-map capability or an equivalent system.
- 2 - The contractor must have a technical certification from the manufacturer of the BDA being installed.
- 3 - The contractor must present these qualifications during a plan review process to the Fire Rescue division representative.

### **2<sup>nd</sup> Step - Initial assessment (Grid Test)**

**The contractor shall provide the AHJ with:**

1. Building address.
2. Point of contact.
3. Floor plans with overlay grid. (Grid overlay to be within the footprint of building and grid sizes identified for estimating coverage area.)
4. Grid testing shall be done using PCTEL test equipment or equivalent. Grid tests done with a portable radio will not be accepted.

Subdivide the floor into

Floor>128,000sq.ft.

NO

Indicate Grid dimensions within each grid

Grids to be within the footprint of the building (Outermost walls)

**Flagler County Innovation Technology Public Safety Systems will provide to the AHJ:**

1. Flagler County Innovation Technology Public Safety Systems will review the test report identifying those areas without sufficient 800 MHz radio signal level. A DAQ test will be performed in marginal areas. (readings less than -100dBm) A DAQ reading of 3.4 or better will be required to pass marginal areas.
2. A recommendation to the AHJ based on the test results and frequency propagation of the radio system. (NFPA 1221 guidelines 99% critical areas: Section: 9.6.7.4 and 90% general areas: Section: 9.6.7.5).

## **Flagler County Public Safety Bi-Directional Amplifier Installation process:**

If a BDA is deemed necessary by AHJ, the contractor must review the Flagler County Public Safety Bi-Directional Amplifier Documentation (see table 1-5 at the end of this document) for system information and locations.

DAS systems installed into buildings that are primarily used for housing or temporary living quarters should have their indoor antennas limited to common areas of the building.

### **3<sup>rd</sup> Step – BDA Design review**

#### **The following documentation should be submitted to the AHJ:**

1. A single line diagram and floor plans showing the location of equipment, antennas, and connections, **signed and** sealed by a Professional Engineer in the State of Florida and acceptable to the County.
2. Equipment list with specifications. A Class A BDA is required.
3. Signal Booster FCC ID number. ([FCC ID Search](https://www.fcc.gov/oet/ea/fccid))  
(<https://www.fcc.gov/oet/ea/fccid>)
4. In Building Propagation coverage map showing expected RF levels.
5. Diagram of primary power source, secondary power source, and fire alarm monitor panel connectivity to Bi-Directional Amplifier.

**After a successful review of the proposed install and equipment list, the AHJ will give the approval to move forward with the installation phase of work.**

### **4<sup>th</sup> Step – Acceptance Test**

A final test must be scheduled with the AHJ, via e-mail. ([please include the Email address here](#))

The contractor should include in the e-mail the following information:

1. Building address.
2. Point of contact.
3. Signal booster commissioning test results showing in-building coverage.
4. The signal booster FCC Registration number ([Signal BoosterRegistration](https://signalboosters.fcc.gov/signal-boosters))  
(<https://signalboosters.fcc.gov/signal-boosters>)

#### **Flagler County I.T. Radio Services will provide for the AHJ:**

1. The final acceptance verification form (see page 7 of this document.)
2. An authorization memo, as required by the FCC, to the managers/owners of buildings to operate signal boosters for the Flagler County 800 MHz Public Safety Radio System.

#### **Coverage Requirements: NFPA 1221-Section: 9.6.7**

- Adherence to Florida State Statute 633.202 is required for all new construction of buildings greater

than 10,000 square feet and all new High-rise buildings greater than ~~75 ft~~75# in height.

- Existing High-rise buildings and buildings greater than 10,000 square ~~feet that~~feet, ~~that~~ are not in compliance with Florida Statute 633.202 should have applied for a permit by December 31, 2019, and must be compliant by January 1, 2022. Existing apartment buildings must apply for a permit for the required communications installation by December 31, 2022, and be compliant by January 1, 2025. Apartment buildings are buildings or a portion of a building containing three (3) or more dwelling units with independent cooking and bathroom facilities.

99% Critical area coverage - Section: 9.6.7.4

90% General area coverage - Section: 9.6.7.5

DAQ (Delivered Audio Quality) – Annex: A.11.3.9

Minimum Antenna isolation of 20 dB – Section: 9.6.9

Bi-Directional Amplifier Components – Section: 9.6.11 (FCC Certified booster only)

In-Building Grid layout requirements – Annex: A.11.3.9

Inbound signal level – a minimum signal strength of -102 dBm. Section: 9.6.8.1

Outbound will be checked during the final. The contractor may make the necessary adjustments.

#### **Power Supply Requirements: NFPA 1221 Section 9.6.12**

##### **Primary power source requirements: Section 9.6.12.1**

1. Must be a dedicated branch circuit and comply with NFPA 72

##### **Secondary power source requirements: Section 9.6.12.2**

###### **One of the following designs:**

1. A storage battery dedicated to the system with at least 12 hours of 100% system operation capacity
2. An alternative power source of 12 hours at 100% system operation capacity as approved by the AHJ.

#### **System Monitoring Requirements: NFPA 1221 Section 9.6.13**

##### **Required Supervisory alarms to fire alarm panel: Section 9.6.13.1**

1. Antenna failure
2. Signal booster failure
3. Low battery capacity
4. Loss of normal ac power
5. Failure of battery charger

**Monitoring for the integrity of the system shall comply with NFPA 72 Chapter 10**

#### **Annual Test Requirement**

Annual checks are the responsibility of the managers/owners. (NFPA 1221 Annex: A.14.4.10.6)

**Call sign: WREP611**

**Public Safety Radio System:** Motorola P25 Phase 2 Simulcast System

**Frequencies:**

**County Wide Trunked Channels Simulcast**

Channel	Mobile Receive Frequency	Mobile Transmit Frequency
1	853.8625	808.8625
2	853.6125	808.6125
3	853.3625	808.3625
4	853.2375	808.2375
5	853.1125	808.1125
6	852.8625	807.8625
7	852.6125	807.6125
8	852.3625	807.3625
9	852.3125	807.3125
10	885.0625	807.0625

Table 1

**Simulcast Towers**

Site Name	Address	Latitude and Longitude
305	245 County Road 305 Bunnell, FL 32110	29° 28' 45.5" North 081° 22' 06.8" West
304	7570 County Road 304 Bunnell, FL 32110	29° 20' 42.6" North 081° 18' 25.6" West
Jail Admin	1001 Justice Lane Bunnell, FL 32110	29° 27' 12.5" North 081° 15' 20.6" West
Matanzas	2355 Matanzas Woods Parkway Bunnell, FL 32110	29° 36' 04.2" North 081° 14' 42.9" West
Plantation Bay	1250 S Old Dixie Highway Bunnell, FL 32110	29° 24' 11.0" North 081° 10' 39.0" West

It is not clear whether the author requires that all frequencies list on these pages are required to be repeated by the

BDA Systems

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Table 2 It is not clear where 8TAC93 and 94 are located?

### County Wide Conventional Channels Simulcast

Channel	Mobile Receive Frequency	Mobile Transmit Frequency
8TAC94	853.0125	808.0125
8TAC93	852.5125	807.5125

The channels below can be assumed to be located at the sites named in their channel names.

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Table 3

### Conventional Channels Single Site

Channel	Mobile Receive Frequency	Mobile Transmit Frequency
Jail Admin (MA-FLA)	854.6375	809.6375

Table 4

### P25 Phase 1 Channels Single Site

Channel	Mobile Receive	Mobile Transmit Frequency
305 (P25)	851.2750	806.2750
Matanzas (P25)	851.8250	807.5125
Plantation Bay (P25)	851.5750	806.5750

Table 5

## Flagler County Radio System Final Acceptance Test

AHJ: Date: FCC Registration Number: SB

Customer:

Site Location:

Point of Contact:

Checks to be performed to verify signal booster operating in accordance with NFPA-72

**guidelines. "Check box if passed"**

Checks Visual Inspection: All equipment and cabling are neatly installed.

Isolation Test: 20 dB greater than the maximum gain of signal booster.

Required Labels: FCC warning label, Company installing/servicing the unit.

Grounding: Equipment grounded to good building ground.

Surge Protection: Lightning protection on donor antenna.

~~Downlink "In-Building Coverage: Level -102 dBm or greater in 90% common and 99% critical area. In-~~

~~Building Coverage: Levels between -65 dB and -102 dB. 90% common and 99% critical area~~

coverage. Uplink Levels to 800 MHz System: Levels between -65 dB and -102 dB. Adjusted at final check.

**Customer Representative**

**FCIT PSS Representative**

Signature Signature

Printed Name Printed Name

Date Date