# EMERGENCY RESPONDER COMMUNICATION ENHANCEMENT SYSTEMS (ERCES)

## PART 1 OF 3

## INTRODUCTION & CODE REQUIREMENT REVIEW

# CONTENTS

# Introduction

This e-book is the first part of a 3-part series that was written based upon 3 web-based training sessions Alliance Corporation hosted in the spring and fall of 2021 with our manufacturer partners, Comba and PCTEL.

This eBook is meant to be an excellent accompaniment to anyone who is watching our pre-recorded webinars or who is looking for an introductory training session on ERCES.

Here is a link to the recording of the webinar upon which this e-book is based.

The Safer Buildings Coalition is a non-profit organization of end users, AHJs, manufacturers, integrators, educators, consultants, anybody who has an interest in what's going on in the public safety communications arena, making and building communication safer. We encourage you to check out the website and investigate the membership criteria. We would also like to acknowledge and thank SBC for the material we have used in this guide.

AHJs can learn best practices from their peers, integrators in the business can connect with their peers and building owners can understand why this is all about. If you are serious about this business, you should join the Safer Buildings Coalition.

# ERCES – The Basics

The Safer Buildings Coalition follows 3 Pillars of Public Safety Communications:

1. Mobile 911 Calls Must Get out with Location Accuracy
2. Mobile Mass Notifications Must Get In
3. First Responder Communications Must Work

The historical approach has always been about ensuring that the first responder radios work inside the building, the 3rd point. However, how does the first responder even know there's a problem in the first place? First, the call needs to be made to 911. These days, 80% of all calls into 911 centers originate from a mobile phone.

So, if you're at a building where you got no cell coverage, right off the bat, how do you make that 911 call in the first place?

Mass Notifications are a relatively new tool for communications, with alerts sent to cell phones. For example, if the case of a school, mass mobile notifications can be sent to everyone telling them to shelter in place if there's an active shooter on campus.

Well, it's a great idea but what if you never got the notification because your cell phone didn't have a connection? So, you don't know what is going on.

These 3 elements tie together, and that's where safer buildings is focused – ensuring all three elements work in buildings.

# Key Acronyms within Public Safety

Here are some of the key acronyms used within the Public Safety space that you should know:

**ERCES**: **Emergency Responder Radio Coverage System.**

This is the more formal name being assigned to PS-DAS in spec documents.

**ERCES: Emergency Responder Communication Enhancement System**

This is the newer name being assigned to PS-DAS in spec documents (in 2023).

**AHJ: Authority Having Jurisdiction**

This person is the key resource for integrators to work with to determine frequencies, requirements, and the ATP (Acceptance Test Plan). These are also the people who determine and enforce local code requirements. The AHJ is the person who is going to tell you what they expect for an inbuilding public safety project – how they expect the system to work. The AHJ is also the person you will go to with any questions and the ones who will decide at the end of the day if your deployment pass or fails and issues the appropriate permits afterwards.

Established AHJs will share documents with you to help you understand what they are looking for. It is crucial to understand that because the AHJ is the ultimate authority to approve your system.

**Frequency Holder:** You also need to know who holds the frequency license and retransmission agreement and establish a relationship with this person.

The frequency license holder is the entity or the person that's been issued the license to operate those frequencies by the FCC. Any transmission that goes out over the air is managed in under the auspices of the FCC.

So, if you put a BDA system in, you're basically re transmitting on frequencies that are already assigned to someone else. They are the only people who can authorize you to turn the system on.

The frequency license holders may or may not be the AHJ. It could be the AHJ, the Fore Marshall or someone else. The license holder is likely going to be someone in the radio shop, and it is possibly on a shared network with multiple agencies so you might have a statewide 700, 800 MHz system and a local UHF system. In that case you have multiple frequently license holders.

**NFPA: National Fire Protection Agency**

Have different versions of release. NFPA 72 Chapter 24, 2013 or 2016 Editions are the most used today. 2016 Edition references NFPA1221-Chapter 9.6. Some AHJs use NFPA1221-2019.

### IFC: International Fire Code

Part of International Code Council (ICC), sometimes used in addition to/in lieu of NFPA standards. Reference IFC Section 510. International Fire Code ISC is an international organization.

This is where you find the rules, definitions, and the expectations for public safety system. You will see a lot of jurisdictional requirements and they will reference one of these one of these one or several of these documents.

**You cannot succeed in this business without your own copy of these documents** because these documents define what the requirements are and it's hard to be successful if you're not sure of the requirements.

### CO: Certificate of Occupancy

Required for property owners to occupy the building, also known as 'U&O' (Use and Occupancy) Permit. This is what a building owner needs to occupy their building at the end of construction.

### DAS: Distributed Antenna Systems

A distributed antenna system is a type of wireless signal boosting system that uses antennas inside a building to distribute the outside wireless signal to people within the building. A Public Safety DAS would be a system to boost the public safety signals whereas a Cellular DAS boosts the cellular signals.

### BDA – Bidirectional Amplifier

# Why Deploy a Public Safety DAS?

**Why Deploy an In-Building Public Safety System?**

1. **To enable In-Building Communications- to make sure the firefighter, paramedic or police officer can communicate using their hand-held radio when in your building**

These systems are required to enable in-building communications for public safety band networks & First Responders. The Homeland Security Act defines these safety/emergency requirements. In most cases, these systems are installed because they are required by the building code. In the United States, the requirement for a system is in virtually every building code out there, every jurisdiction, every state, every township, invokes a building code.

Post 9/11, it was determined that better communication was needed inside buildings for Public Safety officials. There continue to be additional sad outcomes due to the poor communications infrastructure inside buildings, such as during a shooting in Broward County, Florida.

2. **The system is required by code. Codes mandate First-Responder communications coverage are IFC510, NFPA-72, NFPA-1221 and soon NFPA-1225.**
   It shows up in the fire code because that's the fire codes we're building, and that's where the inspections take place.

   Well, it's for first responders, because even though the focus has been on firefighters, the reality is you're more likely to see law enforcement or paramedics in your building. You will often find that they all operate on the same radio systems, so by supporting one, we support all of them.

3. **To meet individual municipal ordinances for public safety communications.**
4. **Systems are required by AHJs to obtain a Certificate of Occupancy (CO) for the building.**

## Public Safety DAS vs Cellular DAS

Public safety deals with different radio frequencies from cellular, but functionally it's the same concept. Cellular DAS is focused on improving the cellular signal in your building. Public Safety DAS boosts the voice and radio communications systems used by firefighters, police, and paramedics – typically 700 MHz, 800 MHz, UHF, VHF.

Each system benefits a different population. Typically, when you install a system to boost the cellular signal in your building, you are thinking of the populated areas and this targeting the building occupants.

However, when it comes to Public Safety DAS requirements, we need the cellular signals in places where you don't find too many people – the stairwells, the exit corridors in malls and shopping centers, the restrooms, and anywhere that is considered a place of refuge in the event of an emergency. The signals must work in elevator shafts, in elevator cars, in parking garages and basements.

As the table shows, for approvals, a Cellular DAS needs to comply with the wireless carrier guidelines, and it doesn't need to work under extreme circumstances. Whereas a Public Safety DAS must comply with the guidelines set out by the AHJ and the NFPA/ IFC standards. A public safety DAS must also have certain "hardening" characteristics, such as fireproofing.

| Criteria | Public Safety DAS | Cellular DAS |
|---|---|---|
| Signals | Voice / radio communications (700MHz, 800MHz, UHF, VHF) | Cellular voice and data |
| Benefactors | First responders | Building occupants |
| Coverage area | Total coverage including stairwells, equipment /storage rooms, basements<br>-Typically, where people ARE NOT | Main populated / public use areas<br><br>-Typically, where people ARE |
| Compliance & approval | • Comply with AHJ guidelines and NFPA/IFC standards.<br>• Extensive hardening requirements | • Comply with carrier guidelines and approvals<br>• No hardening requirements |

**Can Cellular DAS and Public Safety DAS share the same system?** Technically, the answer is yes, from a practical point of view. However, very few AHJs to allow that because while the code says they can share, you must guarantee that there will never be any instance where the cellular network would interfere with public safety, and "never" is a very strong word. Usually, the AHJs ensure two separate systems are installed.

# Where is Public Safety DAS Used?

1. **New Construction**
   - **Highest area of growth**
   - **Often have Capex Budget for system installs**
   - **Required for CO**

By far, the most prevalent area for PS DAS deployment is new construction, because infrastructure falls under the current fire codes, and pretty much everyone's code requires this. However, not all jurisdictions are enforcing the current fire codes. We see it is more common in larger metropolitan areas.

In the case of new construction, your system will be installed as part of the Capital Expenditure (CapEx) and the Public Safety DAS is often required for the Certificate of Occupancy. Where are we most likely to say today, new construction, because the building codes typically apply to a new building.

**Existing Buildings**

- **Many localities have stipulations that will require compliance to the current standards if any building modification increases the occupancy rating certain amount.**
- **Several AHJs are requiring phased-in compliance for all buildings.**

**Government Buildings**

- **These buildings are the most likely ones to proactively test and upgrade PS coverage to established standards.**

Unfortunately, in recent years, Public Safety systems are required in schools, because of the shooting events that have taken place in some schools.

We see that on a regular basis law enforcement, or first responders are going to these incident scenes and having problems where their hand-held radio does not work. This hampers the overall response to the incident.

**Note that some jurisdictions make the building owner liable for damages and injury if proper PS coverage is not provided.**

We have seen in recent years that school boards in entire counties put out contracts for Walk Tests of their schools to ensure Public Safety radio coverage. With schools where there are issues, they have upgraded the systems to ensure the public safety radios do work.

## Public Safety Frequencies

The list below contains the frequencies for Public Safety:

1. **Very High Frequency (VHF)**
   - 152 MHz to 174 MHz – Longest range/largest coverage area
2. **Ultra-High Frequency (UHF)**
   - 450 MHz –470 MHz
3. **T-Band**
   - 480 MHz –512 MHz
4. **700 MHz**
   - Public Safety's largest spectrum band (24MHz of dedicated spectrum) –
   - Includes FirstNet spectrum
5. **800 MHz**
   - Most widely used band across the US for Public Safety

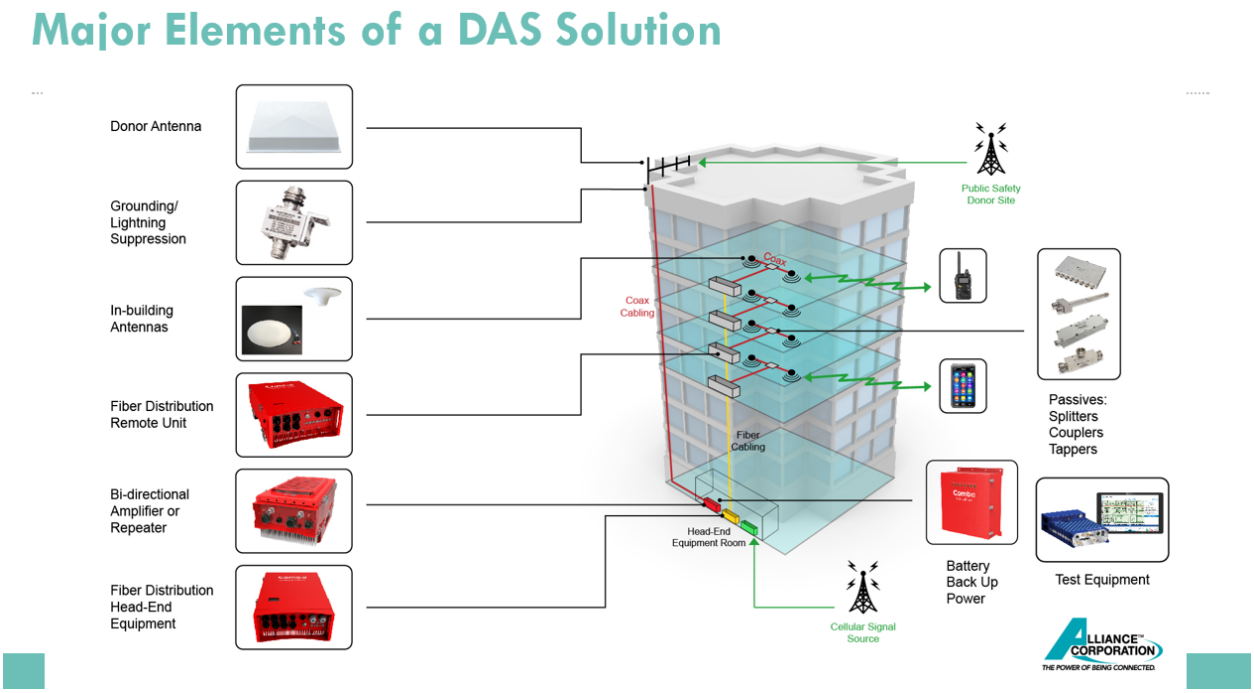
Make sure you know what the code requirements are in any given area.

The frequencies that are used make a big difference. This list contains the five basic frequency bands that fall into public safety.

Why should you care? **The lower the frequency, the higher the price of the equipment**.

The most used systems are in 700 and 800 Megahertz. These systems will have the lowest lead time and will generally cost the least.

The products for the T band, UHF or even VHF, these end up being custom because the frequency assignments were less straightforward so you will require custom solutions that also require custom filtering.




## Major Elements of a DAS Solution

The diagram above is a great tool to explain on a high level what are the components of a DAS Solution. Often you will be asked – "I need a BDA, please quote me for a BDA". The customer might think that all they need is a single bi-directional amplifier (BDA). However, the BDA is only a single piece of the puzzle.

It takes all these components you see in the diagram to complete the puzzle. Each building is treated as a uniquely designed network because each building is different.

A comparison would be to the way you would design a sprinkler system or an alarm system or even building electrical wiring. To boost the public safety signals in that building, you need to look at floor plans, to take measurements, and do tests. The ultimate design for the network will be based upon the layout of the building, and external signal levels. Rarely are two designs ever the same.

Items that will influence the overall cost include the length of cable required, the number of antennas, splitters, the type of hardening required, the frequency for the public safety system signals you need to boost and, of course, the overall size of the building.

As the diagram shows, the system takes the signal from the outside using the Donor Antenna on the roof (typical location) and brings it inside, and re transmits it inside the building, and then takes the signal from portable radios or your cell phones inside the building.

# What Causes the Poor Public Safety Signal in the Building?

The challenge we need to overcome is the reason why the signal is poor inside the building.

The problem stems from **modern day construction materials**. Modern buildings are no longer built with wood. Most commercial construction uses concrete and energy efficient, low E glass, to give structural integrity to the building and manage energy costs.

The list below shows how much attenuation or signal reduction you can expect from a variety of materials uses in construction.

| Attenuation by Material @ 900MHz | |
|---|---|
| Material | Attenuation |
| Glass 0.25" | 0.8 dB |
| Glass 0.5" | 2 dB |
| Lumber 3" | 2.8 dB |
| Brick 3.5" | 3.5 dB |
| Brick 7" | 5 dB |
| Brick 10.5" | 7 dB |
| Concrete 4" | 12 dB |
| Masonry Block 8" | 12 dB |
| Brick Faced Concrete | 14 dB |
| Masonry Block 16" | 17 dB |
| Concrete 3" | 23 dB |
| Reinforced Concrete 3.5" | 27 dB |
| Masonry Block 24" | 28 dB |
| Low E Glass | 30 dB |
| Concrete 12" | 35 dB |

DB is a measurement of signal strength. It is measured using a logarithmic scale so 30 DB of resistance will reduce the signal by 99.999% of the original signal.

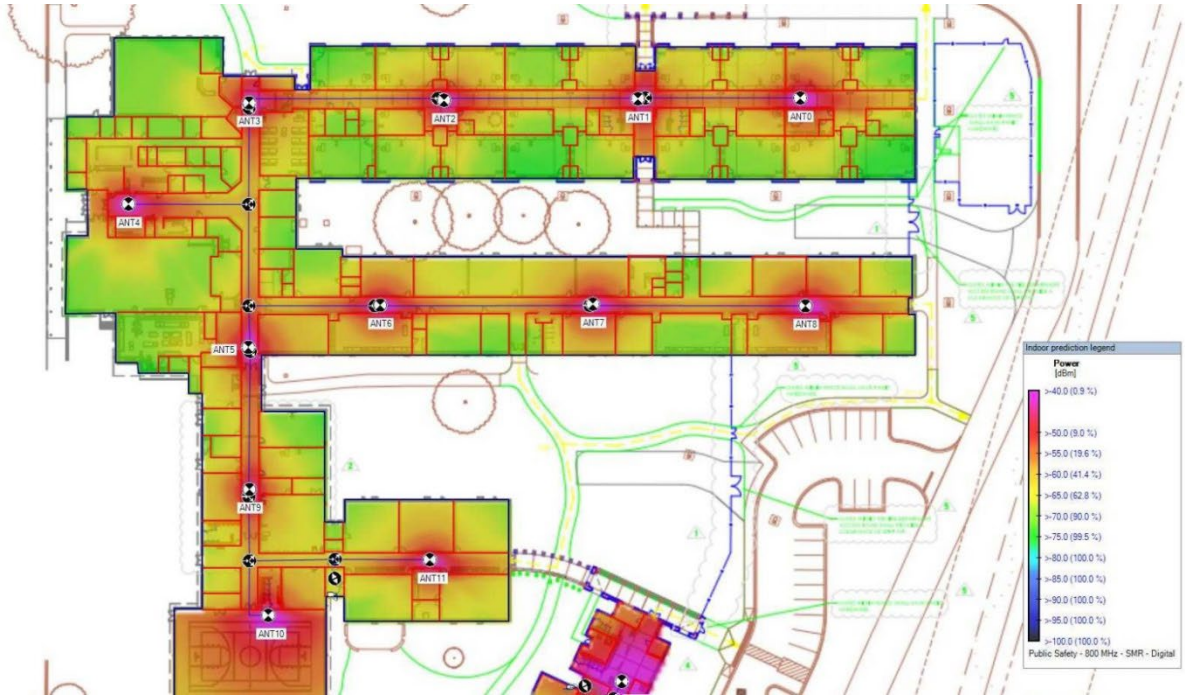
The worst material for reducing signal strength is Low E Glass – it contributes 30 DB of attenuation, which reduces the signal by almost 100%.

If you've ever been on your cell phone on a call that drops once you walk into a building, you've been affected by Low E Glass. That building you just entered doesn't have an inbuilding cellular signal boosting system. Unless you stay very close to the window, you will not get a signal.

The Low E Glass will have the same effect for first responders. So, the police officer responding to a call will not be able to reach other officers or dispatch for support using their handheld radio. The firefighter in the stairwell will not be able to call for support.

# Grid Testing - Is this system going to work once installed?

To do a proper on-site test to understand RF signal coverage inside the building, you conduct a Grid Test whereby you divide each floor up into a number of grids. You will walk the floor doing tests in each section of the grid.




*Sample Heatmap for Installed BDA System in a Building with Drywall*

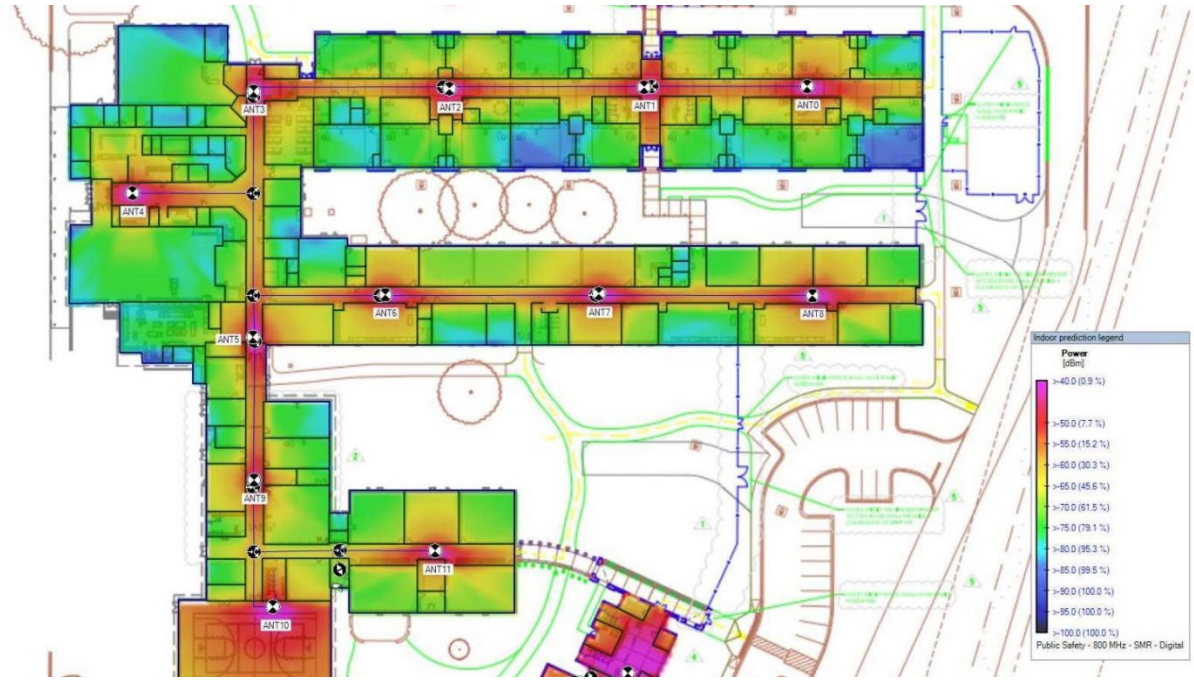
The image above shows a predictive heat map to show the signal strength for the public safety network in a building where all the interior walls are drywall.

The color chart to the right gives you the measurements for each color. The strongest signals at the top are fuchsia in color and as the signal weakens, the colors change from yellow to green, and it goes into the blues and ultimately into the black.

The installation above is indicating a good design where the signal is strong.

Light blue would be ok but no darker than that. In those cases, you need to change you design.

You can see the areas that are quite dark fuchsia colored – those circle areas are the location for the inbuilding antennas – that is where you see the strongest signals. As you move further away from the antenna, the signal drops.




*Sample Heatmap for Installed BDA System in a Building with Concrete Interior Walls*

The image above shows the footprint for the same building but instead we made the interior walls of concrete in our software tool. You might see something like this in a school or hospital and in areas along the coasts that are subject to hurricane force winds.

The image shows that now our heatmap is much bluer, despite the same inbuilding design. This is because the concrete impedes the RF signal much more than the drywall does. **So now the network designer will have to look at a different design to improve the signal strength**.

We will cover how to do this in a much more extensive fashion in Part 3 of this E-Book on Testing. If you would like to learn more right now, you can watch the recording of our webinar here.

## How do I know if I need a system if the building has not been built?

What we recommend it to start with what we do know. If you're using modern construction material, unless there's a tower in your backyard, assume you're going to need a system because the worst-case scenario is that building will be 100% dark.

The first time you can get a real indication of signal strength is once the external windows and doors have been installed. At this point, the building is sealed, and all the heavy concrete, stairwells, and elevator shafts would have been poured. If you have Low-E glass, it is installed.

Now, you can finally walk the building and see where you have signal and where you don't. You may find out that if the building is a high rise, the upper floors have a good signal.

But it's the lower floors in the concrete jungle, or if you're in the subterranean parking garage, that do not have coverage.

So, now, you can go back, and you can refine your design and your estimate and cut out the material that is not needed, because you don't need the system there.

And then, when you're done, you'll be walk test into building again, because they're going to make sure that now that you've done it, that it meets the expectations that everybody has an original design.

So, testing is critically important to, you know, before, during, and after construction.

We will cover how to do this in a much more extensive fashion in Part 3 of this E-Book on Testing. If you would like to learn more right now, you can watch the recording of our webinar here.

# What standards must be met? NFPA-72, NFPA-1221 and IFC




There are several standards that must be met for your ERCES installation. The requirement for an ERCES in these codes. As of the fall of 2021, the codes mandating First-Responder communications coverage are IFC510, NFPA-72, NFPA-1221 and soon NFPA-1225.

In most cases, these codes are invoked upon new construction. However, we are starting to see the requirement for existing structures. The code covers the requirements for coverage levels, power levels, battery backup, ratings, and survivability ratings.

The codes essentially are focused on ensuring that public safety can communicate throughout the building with the outside, using their hand-held 2-way radio systems.

**Public Safety Standards Demand More Extensive Coverage than Commercial Networks**

- 95% coverage in all areas
- 99% coverage in 'Critical Areas' as defined by the AHJ
    - stairwells, elevator shafts/cars, utility rooms, non-public areas…

Some of the codes require 95% coverage in all areas and 99% coverage in critical areas. The critical area is whatever is defined by the AHJ. The AHJ could define all areas as critical.

The most common areas defined as critical are utility rooms, stairwells, elevator shifts and non-public areas that people would be using for emergency egress.

An elevator car has 6 sides, all encased in metal, and they inhabit a concrete elevator shaft. Elevator cars are very challenging coverage design but there are ways to accomplish it.

The most important thing you can do is get an understanding of what you are looking for when you do your testing and network design. You must know what is required for a pass by the AHJ.

**The standards dictate a -95 db Minimum Signal Strength regardless of frequency**

- Ultimate test is that portable radios work in ALL critical areas
- Delivered Audio Quality (DAQ) testing becoming a criteria

Not only does the AHJ want a 95 DB or 99DB signal level on a test, but they ultimately want to make sure it works "in real life". Thus, the requirement for a Delivered Audio Quality Test or DAQ testing.

During the DAQ, a person physically does a walk through the building with their radio saying something like, "Can you hear me now?"

Each floor of the building will be divided into sections or grids and the person doing the DAQ will test each grid, taking a random place from each grid. For each grid they will ensure that the sound comes through clearly.

Together with the power level test and the DAQ, we can determine whether a system is functional or not.

We will cover how to do this in a much more extensive fashion in Part 3 of this E-Book on Testing. If you would like to learn more right now, you can watch the recording of our webinar here.

## DAQ – Delivered Audio Quality

| Category | Description |
|---|---|
| 1 | Unusable. Speech present but not understandable |
| 2 | Speech understandable with considerable effort. Requires frequent repetition due to noise or distortion |
| 3 | Speech understandable with slight effort. Requires occasional repetition due to noise or distortion |
| 3.4 | Speech understandable without repetition. Some noise or distortion present |
| 4 | Speech easily understandable. Little noise or distortion |
| 4.5 | Speech easily understandable. Rare noise or distortion |
| 5 | Perfect. No distortion or noise discernable. |

2. **Survivability**
    - Fully waterproof installation using NEMA 4/4X enclosures
    - Generator and/or battery backup for 'x' hours
    - Monitoring points/alarm notifications to assure system availability (see image below)
    - Cabling requirements – EMT conduit? 2 Hour Enclosures?

Survivability refers to physical features of the system – Can it survive a fire? Water from hoses and sprinklers? Usually, the system must be fully **waterproof in NEMA 4/ 4X enclosures**.

There must be a **primary and secondary source of power** and depending upon which version of the code your AHJ follows. You will need battery backup power for 12- 24 hours. And in some cases, you get by with less, if you have a secondary generator.

The fire alarm monitoring is also a key requirement (see image below for code reference). There are several alarm points that needs to be monitored as a supervisory alarm in the fire alarm system.

**Cabling requirements** are also specific to each jurisdiction. Cable might need to be in a conduit. If you need it to be 2-hour fire rated, you will need special cable or wrap. Cable survivability requirements can significantly increase your costs because overall, the cable could end up costing up to $80 a foot to ensure 2-hour fire rating.

Watch this recording of a webinar done with RFS on their 2-Hour rated cable to learn more about different cable options.

- **510.4.2.5 System monitoring.** 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 on-site location.

- Automatic supervisory signals shall include the following:
    1. Loss of normal AC power supply.
    2. System battery charger(s) failure.
    3. Malfunction of the donor antenna(s).
    4. Failure of active RF-emitting device(s).
    5. Low-battery capacity at 70-percent reduction of operating capacity.
    6. Failure of critical system components.
    7. The communications link between the *fire alarm system* and the emergency responder radio enhancement system.

# FCC – Devices Must Have FCC approval and the System Installation Must Have Consent

**The FCC rules require express consent. Why does this matter?**

- **Improper design and operation** of ERCES systems can interfere with operation and performance of public safety radio networks, placing the public and first responders at risk.
- **Where are the systems installed?** It is critical that the location and immediate contact information for all installed ERCES systems be available to the frequency license holder to quickly locate sources of interference and ensure correct continued operation.
- Fire Code authorizes Code Officials to require public safety radio signals be present within a building, but **FCC rules govern who can authorize turning on and off such a system.** This is the Frequency License Holder, and not the AHJ – unless the AHJ is both.
    - Ensure that the AHJ has consent of the licensee to authorize signing off on a new ERCES deployment.

Why does it matter that you get express consent from the FCC for the ERCES?

If there's something wrong with the BDA installation, you can take a public safety network down. That is something we DO NOT WANT! The entire network could go off the air – a network serving an entire city of police, fire, ambulance.

The FCC wants to ensure that the frequency holder understands RF and has done the installation correctly. Ultimately the frequency holder will have to prove that it is installed correctly and then give you permission to turn the BDA on.

# Best Practices for FCC Registration

**BEST PRACTICES:**

- The AHJ should identify the FCC License Holder (remember the AHJ might not be the license holder)
- Permission to operate any ERCES system should be provided in writing
- The FCC License Holder should develop the Technical Criteria for system design (the license holders should know this)
- RF system trained and qualified representatives of the FCC License Holder should be active participants

Records for every system should be maintained.

# FCC Part 90 Signal Booster Regulations

All Bidirectional Amplifiers (BDAs) that are used in your system must be F

We see an even split between the Class A and Class B repeaters installed. BDAs/ Repeaters more on Part 2 of this guide.

- **Class A Signal Booster**
  - Designed to transfer one or more specific channels
  - Narrow signal filters
  - No passbands exceeding 75KHz
- **Class B Signal Booster**
  - Passbands exceed 75KHz (Wide Banding)
  - Typically, less expensive than Class A

**Must be registered with the FCC prior to operation**

**In addition to using FCC approved BDAs, the system must be registered with the FCC prior to operation.**

# Elements of a Successful ERCES Deployment


A successful ERCES deployment is a **joint effort**. You need to consider not just the fire codes but also the electrical and building codes. When you are reviewing, sometimes you need to get all parties together because sometimes the code requirements conflict with each other and, unfortunately, you don't find that out until you read the actual review process.

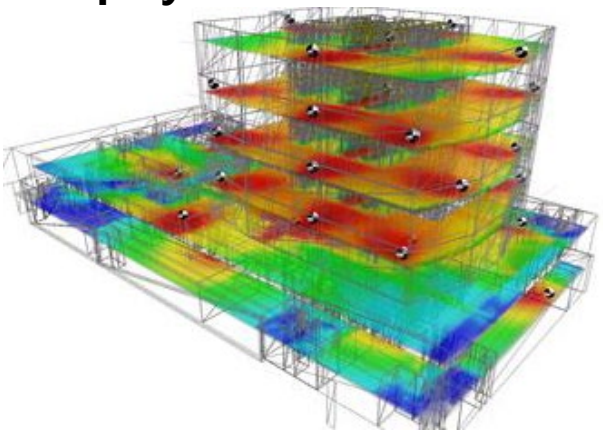
All parties, as the image above indicates, share responsibility.

- **Building Owner, Contractor, and Code Officials** are obvious
- **ONLY THE FCC LICENSE HOLDER CAN GRANT PERMISSION TO REBROADCAST THE LICENSED FREQUENCIES**
    - This includes both Land Mobile Radio (LMR) and Wireless Carrier (Cellular) frequencies)
- **FCC License Holder is frequently the State, County or Municipal Radio Operator**

They should have an inclusive role in:

- Technical Requirements, including Frequencies required and system requirements
    - RF Plan Review and RF Testing
    - Issuing initial rebroadcast license and any requirements for renewal

# Summary: Process for In-Building ERCES Deployments



In summary of the previous sections, this is a high-level overview of the process to follow for a successful In-Building ERCES Deployment:

1. Identify the AHJ and the Frequency License Holder.
    a. Determine AHJ Requirements & applicable standards. Some AHJs are advanced, and their requirements are on a website. Washington, DC, for example.
    b. Obtain Rebroadcast Agreements
2. Site Survey/Baseline Testing
    a. Initial survey of floor plans, equipment locations, impairments
3. Preliminary Design
    a. RF link budgets, initial antenna/cable layout, BOMs, etc.
4. Statement of Work – Project requirements are clearly defined
5. RF Survey/CW Testing – Perform interference and propagation measurements
6. Update Design
    a. Revise preliminary design/BOM based on results
7. Pre-Construction Survey
    a. Walk-thru to validate cable routes and equip locations
8. Final Design
    a. Revise as needed based on results of Survey
9. Order Equipment
    a. there could be a lead time, plan for that
10. Installation - cables, antennas, active equipment
11. Commissioning – Verify system performance, adjust gains as required, test system
12. System Acceptance
    a. Post install walk with AHJ to demonstrate compliance, obtain sign-off/Certificate of Occupancy

# Conclusion – Keys to a Successful Deployment

**KNOW YOUR AHJ's Requirements…**

Know the actual bands/frequencies to be enhanced

Know the areas requiring coverage

Don't enhance what doesn't need enhancing

Know the Survivability Requirements

Know the Alarming Requirements

Know the Back Up Power Requirements

Stay connected because it can all change…

Surprises can be costly…

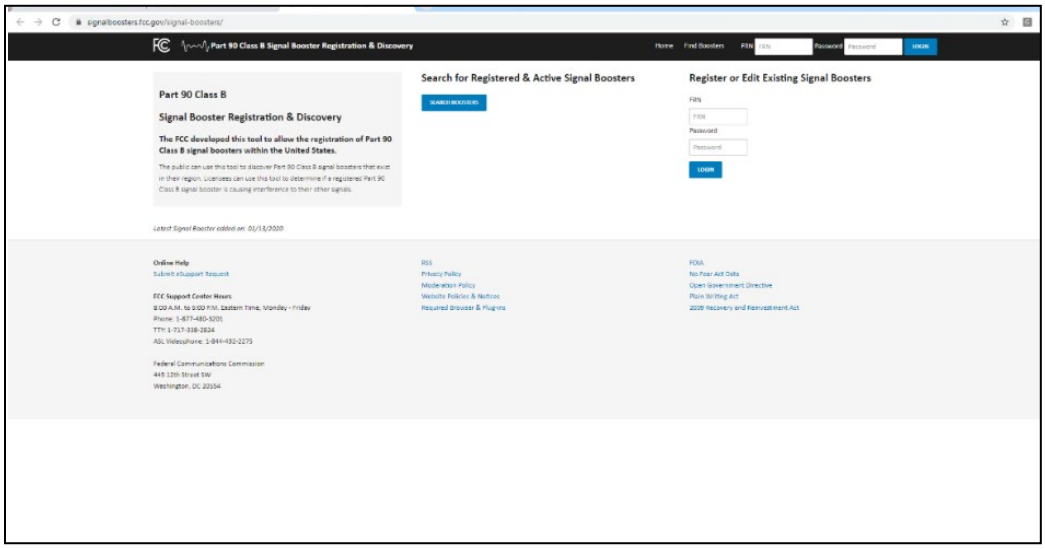
# Appendix A: FCC Class B BDA Registration Page

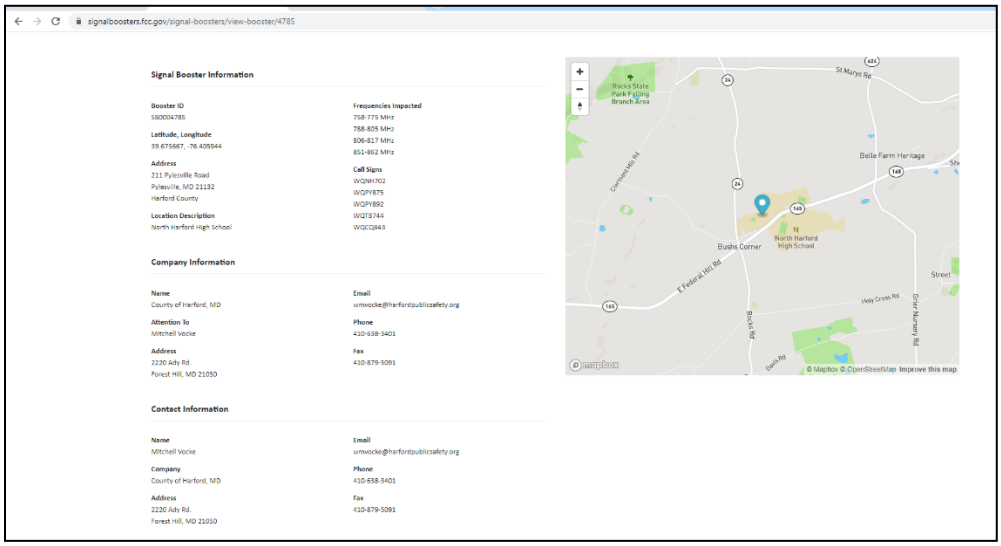
Class B BDAs must be registered with the FCC prior to operation. [Go to the FCC Class B BDA Registration page.]

This is page is maintained by the FCC and the form requires all the specific information for that BDA including contact information.

A commonly asked question is, “Why is responsible for completing the BDA registration on the RFF site?” Unless the integrator has a contract specifying their responsibility, this should be completed by the AHJ because if there is a problem with this BDA, the AHJ will get the call.

Below are examples indicating what type of information is required to complete the form.



# Appendix B: Sample Atlanta IFC 510 Compliance Acknowledgement

- ATLANTA REQUIRES General Contractor or other Owner's Representative TO ACKNOWLEDGE EXISTANCE OF IN-BUILDING RADIO FIRE CODE REQUIREMENTS AT THE KICKOFF MEETING
- BEST PRACTICE

  At the kick-off meeting for a project, Atlanta requires that the General Contractor or Owner's Representative acknowledge existence of in-building radio fire code requirements. It is part of the code process in Atlanta. In this way, everyone is aware of what is required for approval once the system is completed.
  Learn more on their website here.

**CITY OF ATLANTA**
**FIRE – RESCUE DEPARTMENT**

**KEISHA LANCE BOTTOMS**
**MAYOR**

226 Peachtree St., SW
Atlanta, GA 30303-3749
PHONE (404) 546-7000
ICHIEFS ID – ATLFDHQ

**JOEL G. BAKER**
**FIRE CHIEF**

IFC 510 Compliance Acknowledgment

Before a Fire Safety Codes Release (Certificate of Occupancy) is issued, compliance with International Fire Code Section 510 is required by means of an Emergency Responder Radio Coverage System (ERRCS) installed, tested, and accepted OR through field testing by a FCC licensed radio contractor to verify that an ERRCS is not warranted. A critical element to compliance with this standard is preliminary testing once the building is dried-in.

By signing below, I acknowledge that I have read the above statement on IFC 510:

# Appendix C: Retransmission Applications

Here's an example of a retransmission application.

In this jurisdiction the integrator completes this form to provide everything the AHJ needs to register the BDA with the FCC and keep their own files for future reference.

**Appendix C - Retransmission Application**

Radio Communication Enhancement System
Retransmission Application

City of Tampa, Florida
Technology and Innovation

| |
|---|
| COMPLETE SEPARATE APPLICATIONS FOR EACH HEADEND IN SYSTEM DESIGN. SEE INSTRUCTIONS AND CHECKLIST ON SECOND PAGE. |
| **1. SITE INFORMATION** |
| Site Name: |
| Site Address: |
| Low Voltage Permit Number (Issued by City of Tampa Construction Services Division): |
| Site Description (include type of construction, number of floors, total interior square footage): |
| Site Latitude and Longitude: |
| BDA Manufacturer and Model: \| Class: |
| BDA Headend Location (room number, etc.): |
| Number of Line Amplifiers: \| Line Amplifier Manufacturer and Model: |
| Type of System: Single carrier, County 800MHz only Multiple carrier, neutral host Other (describe below) |
| **2. OWNER CONTACT INFORMATION** |
| Owner: |
| Owner Address: |
| Point of Contact: \| Email: |

*Example From City of Tampa, FL – Application to Retransmit*

They then issue a retransmission authorization, formal document that can go to the integrator can go to the building owner and it's typically going to be left with an important documents folder.

At the BDA itself physically. This is the license to operate with a time frame during which is valid. Because you will need to go back periodically over time because things change. A lot of AHJs make you come back to do follow up testing to make sure nothing has changed over time.

**Appendix E - Retransmission Authorization**

**HILLSBOROUGH COUNTY SHERIFF'S OFFICE, FLORIDA**
**700/800 MHz RETRANSMISSION AUTHORIZATION**

Hillsborough County Sheriff's Office, Florida (HCSO) hereby grants authorization to _____ *[name of system operator]* (Operator) to operate a Two-Way Radio Communications Enhancement System (the System) on 700/800 MHz frequencies licensed to HCSO by the Federal Communications Commission (FCC) under call signs WQNM806, WQPS818, WQVH304, WQRG242, WPCW643, WPDV262, WFHE897, WPMB935, WQBY646, WQLZ361, and WQPK525 at the following location:

Site Name: _____
Site Address: _____
Latitude: _____ Longitude: _____
FCC Booster ID: _____
Site Contact: _____
Phone #: _____ Email: _____

This Authorization is subject to the following conditions:

1. The Retransmission Authorization is valid for five years from date of issuance, and will be renewed upon request, when an application for renewal and proof of successful NFPA72-2013 compliant annual testing are provided. Renewal forms and instructions can be obtained by emailing smitchel@hcso.tampa.fl.us or calling (813) 247-0080.

Sample Retransmission Authorization – Hillsborough County, FL (TAMPA Area)

# EMERGENCY RESPONDER COMMUNICATION ENHANCEMENT SYSTEMS (ERCES)

## INTRODUCTION & CODE REQUIREMENT REVIEW

ALLIANCE™ CORPORATION

*THE POWER OF BEING CONNECTED.*

# EMERGENCY RESPONDER COMMUNICATION ENHANCEMENT SYSTEMS (ERCES)

## INTRODUCTION & CODE REQUIREMENT REVIEW

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