BROWARD COUNTY
BOARD OF RULES AND APPEALS

1 N. University Drive, Suite 3500B
Plantation, FL 33324

Phone: 954-765-4500
Fax: 954-765-4504
broward.org/CodeAppeals

To: Members of the Committee to Address Uniform Procedures for Installation of Bi-Directional Amplifiers (BDA)

D. Rice, P.E.	B. Bowers	J. Bryan	C. Clinton
J. de Zayas	R. Dinello	J. Franklin	K. Grams
L. Hastings	B. Higdon	H. Melamed	J. Preston
M. Sheehan	L. Sullivan	R. Taylor	A. Zackria

From: Bryan Parks, Chief Fire Code Compliance Officer
Ken Castronovo, Chief Electrical Code Compliance Officer

Date: March 29, 2021

Subj: BDA Committee to Discuss Agenda Items

The Chairman of the BDA Committee, Mr. Dave Rice, P.E., called for a meeting of the BDA Committee on March 29, 2021 from 1:30PM – 3:30PM via Zoom. The latest issues concerning Bi-Directional Amplifiers will be discussed.

AGENDA

Chairman Welcoming Remarks

New Member(s): **Mr. Jon-Paul Bryan**, City of Miramar Fire Rescue
Mr. Chris Clinton, City of Hollywood Fire Rescue
Mr. Larry Sullivan, City of Deerfield Beach

Roll Call

Acceptance of February 24, 2021 Meeting Minutes

Regular Meeting

Discussion

Schedule Next Meeting

Adjournment

Sunshine Law Reminder: *Advisory Board members cannot communicate with each other on a possible committee or Board topic outside of a public meeting, per State statute.*

BROWARD COUNTY
BOARD OF RULES AND APPEALS

1 N. University Drive, Suite 3500B, Plantation, FL 33324
P: 954-765-4500 | F: 954-765-4504 | broward.org/CodeAppeals

MEETING OF THE COMMITTEE TO ADDRESS UNIFORM PROCEDURES FOR INSTALLATION OF BI-DIRECTIONAL AMPLIFIERS

Minutes
FEBRUARY 24, 2020

DRAFT

Call to order:

Chair David Rice, P.E. called a published meeting of the Broward County Board of Rules and Appeals Committee to Address Uniform Procedures for Installation of Bi-Directional Amplifiers to order at 1:32pm.

The roll was called, and the following members were present:

Present:

Bruce Bowers	Jonathan Franklin	John Preston
Mickey Bray	Kevin Grams	David Rice, P.E.
Jorge Castano	Lori Hastings	Mike Sheehan
Robert "Bob" Dinello	William "Bill" Keys, CFPE	Abbas Zackria

Staff: Bryan Parks, Chief Fire Code Compliance Officer
Kenneth Castronovo, Chief Electrical Code Compliance Officer

Chair David Rice, P.E. explained that the purpose of this particular BDA Committee meeting was to pass the Broward County Board of Rules and Appeals Two-Way Radio Communications Enhancement Systems (BORA RCES) Guidelines; which would allow the document to be passed on to the Broward County Board of Rules and Appeals for the Board's approval. He went on to thank the committee members, BORA staff and members of the public who helped him craft and refine the guidelines.

Chair Rice added that since there was a lot of information to share with a limited amount of time, he explained that he would go through the PowerPoint presentation about the BORA RCES Guidelines without input from the audience. After the presentation was finished, the public would be welcomed to share questions and comments with the BDA committee members.

Chair Rice introduced Ms. Lori Hastings, Assistant District Chief, BSO Department of Fire Rescue and Emergency Services and Mr. Jorge Castano, Deputy Fire Marshal & Fire Code Official, City of Hollywood Fire Rescue, as the newest members of the Committee to Address Uniform Procedures for Installation of Bi-Directional Amplifiers.

A MOTION WAS MADE BY MR. FRANKLIN AND SECONDED BY MR. ZACKRIA TO APPROVE THE SEPTEMBER 17, 2019 COMMITTEE TO ADDRESS UNIFORM PROCEDURES FOR INSTALLATION OF BI-DIRECTIONAL AMPLIFIERS MEETING MINUTES. THE MOTION PASSED BY UNANIMOUS VOTE.

Item 1: Send Guidelines to the Broward County Board of Rules and Appeals for approval

Chair Rice presented a PowerPoint about the Broward County Board of Rules and Appeals Two-Way Radio Communications Enhancement Systems (BORA RCES) Guidelines document. Highlighting the changes that were made since the last draft that was presented at the September 17, 2020 BDA Committee Meeting.

Chair Rice said that FCC approval is required for turning on your BDA system. Mr. Gary Gray, City of Fort Lauderdale, added that even if a property owner has been required to install a BDA system, they can not turn the system on for testing without approval from the radio licensee.

Mr. Barry Smith, ORCAT, shared that he is interested in seeing more installers who are trained by manufacturers before attempting to get BDA plans reviewed by the ORCAT office.

Chair Rice returned to the presentation. He explained that the purpose of the guidelines is not to change the code, but to make the code clear and how to incorporate it. He added that no matter what the guidelines suggest, the Fire Marshal, FCC license holder, or electrical engineer has the last word because they are the Authority Having Jurisdiction (AHJ). There are methods available to contest an AHJ's decision, but it is a long process that can be avoided by adhering to their standards throughout the project.

A MOTION WAS MADE BY MR. ZACKRIA AND SECONDED BY MR. PRESTON TO APPROVE THE BROWARD COUNTY BOARD OF RULES AND APPEALS TWO-WAY RADIO COMMUNICATIONS ENHANCEMENT SYSTEMS (BORA RCES) GUIDELINES. THE MOTION PASSED BY UNANIMOUS VOTE.

Mr. Jonathan Franklin, Signal Communications, LLC, brought up that some of the technical issues that will be discussed further on in the meeting will be left out of the version of the guidelines that are being passed along to the Board. Mr. Franklin expressed his concern with the BDA Committee passing the guidelines on to the Board of Rules and Appeals. Chair Rice assured him that since the BORA RCES Guidelines are not code, once they go to the Board, the document can be amended as requirements evolve.

A MOTION WAS MADE BY CHAIR RICE AND SECONDED BY MR. ZACKRIA TO APPROVE CHAIR RICE HAVING AUTONOMY IN MAKING MINOR CHANGES TO THE BORA RCES GUIDELINES DOCUMENT IN PREPARATION FOR IT TO BE PRESENTED TO THE BOARD OF RULES AND APPEALS. THE MOTION PASSED BY UNANIMOUS VOTE.

Item 2: Education Program

Chair Rice explained his goal of offering continuing education courses which would provide equal opportunity by affording people in the industry an opportunity to advance through acquiring the proper training. He would like to offer the courses to engineers, inspectors, system integrators and contractors throughout Broward County. He has not determined if the classes will be 4-hour or 8-hour courses. By having varied professionals in the course together, there will be an opportunity to be enlightened by all of the different perspectives.

Chair Rice went on to say that the most difficult part of organizing the continuing education courses will be finding proper instructors. He encouraged the public to reach out to him or Mr. Kenneth Castronovo, Broward County Board of Rules and Appeals, if they have a qualified suggestion teaching about RF Design.

NO MOTION.

Item 3: Technical Issue: NFPA Definition of "Riser Cable"

Mr. Smith explained the importance of knowing exactly where the riser is located in a building. The riser's location will determine where the BDA system needs to be. Mr. John Foley, Safer Buildings Coalition, added that in a building, risers are like backbones.

Chair Rice said that by the next BDA Committee Meeting, he would come up with a definition for a "riser cable." His definition will serve as a starting point for the discussion of the definition.

NO MOTION.

Item 4: Technical Issue: Define the Requirements of NFPA 72 (2019), NFPA 1221 (2019)

Chair Rice explained that after reviewing the 2019 code, he cannot find any requirements that states that cables have to be installed in a metal raceway. He asked if anyone in the room has been able to find anything different. If one of these systems is installed, according to NFPA 1221 (2019), an entire system can be installed without conduit.

Mr. Gray said that that is not permitted in the City of Fort Lauderdale according to their city's AHJ guidelines. He added that conduit serves as physical protection.

NO MOTION.

Item 5: Technical Issue: Discuss "Coaxial Cable" Installed in a "Flexible Metal Conduit"

Mr. Franklin asked Chair Rice for clarification about the 2019 code not requiring metal raceways, armored cables or otherwise. Chair Rice confirmed that that the 2019 code does not provide any requirements for pathway survivability and metal raceways.

Mr. Chris Moseley, Power Design, shared that he challenged his company's manufacturer to design a solution to play a role in accomplishing level one survivability. He passed around his company's flexible metal conduit (FMC) prototype. Chair Rice asked if it is UL listed. Mr. Mosely said that he will have to have his manufacturer verify how the product is being listed. Chair Rice said that if the product is a listed FMC, then there is a strong possibility that the code has been met.

Mr. Thomas Sullivan, Mobile Communications, shared his concern with older buildings trying to meet current standards. It is much easier to equip newer buildings than the old ones. He said that it is difficult to install a BDA system in an old building because the cables cannot be put into conduit. He said that he does not know how it can be accomplished, but he suggested that there must be a proper way to assist building owners in providing protection for first responders.

Chair Rice suggested the Safer Buildings Coalition as a resource for bringing installing BDA systems in older buildings. Mr. John Foley, Safer Buildings Coalition, said that a committee met in January to discuss potential solutions, but they won't go into effect until 2021 or 2022.

Chair Rice agreed to address the issue of using the 2019 code at the next BDA committee meeting.

Mr. John Preston, Oakland Park Fire Rescue, explained that he believed that AHJ's would utilize the guidelines and only deviate beyond the guidelines when it is necessary.

Chair Rice mentioned that he intends to share the BORA RCES Guidelines PowerPoint presentation, so that everyone in attendance can have their own copy.

Chair Rice asked if anyone was familiar with UL 62368. Mr. Smith answered that it replaced UL 60950-01. Chair Rice reiterated that it does replace UL 60950 and will be effective on December 12, 2020.

Chair Rice announced that he would like to schedule another BDA Committee Meeting in four weeks and use that time to go into greater detail about the education program. As well as meet more often to discuss the technical issues so that every systems integrator and contractor will be prepared for what the instructors are looking for.

Mr. Lavrich said that he would like to thank Chair Dave Rice, and everyone involved for their input in the creation of the Broward County Board of Rules and Appeals Two-Way Radio Communications Enhancement Systems (BORA RCES) Guidelines.

NO MOTION.

Adjournment

Having no further business to go before the Committee, the meeting adjourned at 3:23PM.

Item 1:
Contact Information

2021 Committee to Address Uniform Procedures for Installation of Bi- Directional Amplifiers (BDAs)

Mr. David Rice, P.E. — **Chair - Board Member**
Electrical Engineer
R.C. Engineering, Inc.
5532 NW 106 Drive
Coral Springs, FL 33076
Phone: 954-757-7901
Cell: 954-655-7901
Email: drice@rc-eng.com

Mr. Robert Taylor, FM — **Board Member**
Fire Marshal
Town of Davie Fire Rescue Department
6901 Orange Drive
Davie, FL 33314
Phone: 954-448-1450
Email: robert_taylor@davie-fl.gov

Mr. Abbas Zackria, WZA Architects — **Board Member**
5813 N. Andrews Way
Fort Lauderdale, FL 33309
Phone: 954-522-4123 (x304)
Cell: 954-253-4166
Email: abbas@wza-architects.com

Mr. Bruce Bowers — **Fire Service Professional**
Division Chief, Fire Marshal
Coral Springs Fire Department
2801 Coral Springs Drive
Coral Springs, FL 33065
Phone: 954-346-1396
Cell: 754-224-1986
Fax: 954-346-1387
Email: bbowers@coralsprings.org

Mr. Jon-Paul Bryan — **Fire Service Professional**
Driver/Engineer - Fire Inspector
City of Miramar Fire Rescue Department
14801 SW 27th Street
Miramar, FL 33027
Phone: 954-638-5268
Email: jpbryan@miramarfd.org

Mr. Chris Clinton — **Fire Service Professional**

Fire Plans Examiner/Inspector
City of Hollywood Fire Rescue Department
2741 Stirling Road
Hollywood, FL 33312
Phone: 954-319-7388
Email: cclinton@hollywoodfl.org

Mr. Jose M. de Zayas — **FCC License Holder**

Office of Regional Communications and Technology
E911 Communications Administrator – Radio Systems
115 S Andrews Avenue #325
Fort Lauderdale, FL 33301
Phone: 954-357-8012
Cell: 954-770-8410
Fax: 954-357-8518
Email: jdezayas@broward.org

Mr. Robert "Bob" Dinello — **Electrical Inspector**

Electrical Plans Examiner/Inspector
City of Fort Lauderdale
700 NW 19 Avenue
Fort Lauderdale, FL 33311
Phone: 954-828-5893
Cell: 954-650-8334
Email: rdinello@fortlauderdale.gov

Mr. Jonathan Franklin, President — **BDA Provider**

Motorola Authorized Manufacturer's Representative,
Government & Public Safety,
Broward, Palm Beach and Miami-Dade Counties FL,
President, Signal Communications, LLC,
6820 Lyons Technology Circle Suite 115
Coconut Creek, FL 33073
Phone: 954-427-9830
Cell: 954-275-8854
Fax: 954-571-2070
Email: jf@signalcommunications.com

Mr. Kevin Grams, Public Safety Communications Manager — **FCC License Holder**

Public Safety Communications Manager
Plantation Police Department
451 NW 70th Terrace
Plantation, Florida 33317
Phone: 954-513-3478
Cell: 954-605-8054
Fax: 954-797-2234
Email: kgrams@psd.plantation.org

Ms. Lori Hastings — **Fire Service Professional**

Broward Sheriff's Office
Department of Fire Rescue and Emergency Services
2601 W Broward Boulevard
Fort Lauderdale, FL 33312
Phone: 954-375-3134
Cell: 954-593-9138
Email: lori_hastings@sheriff.org

Mr. Brad Higdon, President and CEO — **Fire Alarm Contractor**

Bass United Fire and Security Systems, Inc.
3000 Gateway Drive
Pompano Beach, FL 33069
Phone: 800-372-2770
Cell: 954-650-0857
Email: brad@bassunited.com

Mr. Howard Melamed, President CEO — **BDA Provider**

Cell Antenna Corporation
12453 NW 44th Street
Coral Springs, FL 33065
Phone: 954-340-7053 (x210)
Cell: 954-399-1025
Fax: 954-340-9086
Email: howard@cellantenna.com

Mr. John Preston, Fire Marshal — **Fire Service Professional**

Fire Marshal/Code Compliance Officer
Oakland Park Fire Rescue
5399 N Dixie Highway, Suite 2
Oakland Park, FL 33334
Phone: 954-630-4552
Fax: 954-229-0424
Email: johnp@oaklandparkfl.gov

Mr. Mike Sheehan, SIs Consulting — **Fire Protection Engineer**

SIs Consulting, Inc.
1825 Ponce De Leon Boulevard
Coral Gables, FL 33134
Phone: 786-352-7377
Email: msheehan@slsfire.com

Mr. Larry Sullivan — **Electrical Inspector**

Electrical Inspector
City of Deerfield Beach
89 SE 18th Avenue
Deerfield Beach, FL 33441
Phone: 954-520-1961
Email: lsullivan@cgasolutions.com

Committee Staff

Mr. Bryan Parks — **Board Chief Code Compliance Officer**
Chief Fire Code Compliance Officer
Board of Rules and Appeals
1 N University Drive, Suite 3500B
Plantation, FL 33324
Phone: 954-765-4500 (x9884)
Fax: 954-765-4504
Email: bparks@broward.org

Mr. Ken Castronovo — **Board Chief Code Compliance Officer**
Chief Electrical Code Compliance Officer
Board of Rules and Appeals
1 N University Drive, Suite 3500B
Plantation, FL 33324
Phone: 954-765-4500 (x9888)
Fax: 954-765-4504
Email: kcastronovo@broward.org

Ms. Brianna Curry — **Secretary**
Board of Rules and Appeals
1 N. University Drive, Suite 3500B
Plantation, FL 33324
Phone: 954-765-4500 (x9885)
Fax: 954-765-4504
Email: bcurry@broward.org

Committee to Address Uniform Procedures for Installation of Bi- Directional Amplifiers Members

Three Board Members
Five Fire Service Professionals
Two FCC License Holders
Two BDA Providers
Two Government Inspectors
One Fire Alarm Contractors
One Fire Protection Engineer

16 Total Committee Members

Appointment Guidelines

A. Committee Members may not have had any personal or business dealings with any BORA certified inspector or BORA staff employee for a period of 12 months prior to their appointment, nor anticipate any future interests of a similar nature, where the purpose of either is to derive direct or indirect benefit to the Committee Member. Committee Members will promptly advise the Administrative Director of any possible conflicts of interest for further determination as necessary. The Administrative Director will notify the Committee Appointees of this Board Policy when letter of appointments are sent.

B. Board Members and Alternates will only fill board members seats, except for the Fire Code Committee, the Board's Consumer Advocate and the representative of the Disabled Community.

C. None of the above Committees will include two or more individuals from the same private or government entity, except members of the Board of Rules and Appeals.

D. As members of a committee operating under the State of Florida Sunshine Law, committee members shall not discuss any potential committee topic among themselves except at a legally advertised meeting.

E. The above guidelines are also intended to apply to any Ad Hoc Committees or sub-committee that may be created.

F. Standing Committees are required to meet at least once each year.

Item 2:

Florida Statute FS 633.202(18), Update

Florida dbpr Department of Business & Professional Regulation

Division of Hotels and Restaurants
Bureau of Elevator Safety
2601 Blair Stone Road
Tallahassee, Florida 32399-1013
Phone: 850.487.1395 • Fax: 850.922.6208

Ron DeSantis, Governor

M E M O R A N D U M

TO: **Julius Halas, State Fire Marshal**

FROM: **Michelle Haynes, Chief, Bureau of Elevator Safety**

SUBJECT: **Emergency Responder Two-Way Radio Communications**

DATE: **February 17, 2021**

Currently adopted Florida Fire Prevention Code 7th Edition Section 1:11.10 requires that in all new and existing buildings, minimum radio strength be maintained at a level as determined by the authority having jurisdiction. Where required by the authority having jurisdiction, two-way radio communication enhancement systems shall comply with NFPA 1221 (2016 ed.). As outlined in F.S. 633, existing high-rise buildings have a separate compliance timeline. Though not specifically required, a two-way radio system for all emergency responders is allowed by NFPA 1221.

Obtaining the required radio coverage for areas designated critical areas and those deemed general areas necessitates that all portions of a building be considered. This includes the elevator shafts and hoistways which are dedicated to elevator related equipment only.

In order to install elements of these radio systems in an elevator hoistway, elevator owners must first file a petition for a variance with the Division of Hotels and Restaurants, Bureau of Elevator Safety ("Bureau"). Before the variance can be approved, the Bureau requires written documentation from the local fire authority having jurisdiction deeming the elevator hoistway as a critical area, as stated in NFPA 1221 (2016) 9.6.7.4. Since this section of NFPA 1221 does not specifically state that the hoistway is a critical area, the local fire authority having jurisdiction must pronounce it as such.

> *" NFPA 1221 (2016) 9.6.7.4 Critical Areas. Critical areas, such as the fire command center(s), the fire pump room(s), exit stairs, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations and other areas deemed critical by the authority having jurisdiction, shall be provided with 99 percent floor area radio coverage."*

Please share this information with your local offices. The Bureau will not approve variances for installation of radio systems equipment in elevator hoistways without a letter or email from the fire authority having jurisdiction deeming the hoistway as a "critical area".

If you have any questions please feel free to contact the Bureau at dhr.elevators@myfloridalicense.com.

Florida dbpr Department of Business & Professional Regulation

Division of Hotels and Restaurants
Bureau of Elevator Safety
2601 Blair Stone Road
Tallahassee, Florida 32399-1013
Phone: 850.487.1395 • Fax: 850.922.6208

Ron DeSantis, Governor

M E M O R A N D U M

TO: **Julius Halas, Director, Division of State Fire Marshal**

FROM: **Michelle Haynes, Chief, Bureau of Elevator Safety**

SUBJECT: **Emergency Responder Two-Way Radio Communications**

DATE: **February 18, 2021**

Currently adopted Florida Fire Prevention Code 7th Edition Section 1:11.10 requires that in all new and existing buildings, minimum radio strength be maintained at a level as determined by the authority having jurisdiction. Where required by the authority having jurisdiction, two-way radio communication enhancement systems shall comply with NFPA 1221 (2016 ed.). As outlined in F.S. 633, existing high-rise buildings have a separate compliance timeline. Though not specifically required, a two-way radio system for all emergency responders is allowed by NFPA 1221.

Obtaining the required radio coverage for areas designated critical areas and those deemed general areas necessitates that all portions of a building be considered. This includes the elevator shafts and hoistways which are dedicated to elevator related equipment only.

In order to install elements of these radio systems in an elevator hoistway, elevator owners must first file a petition for a variance with the Division of Hotels and Restaurants, Bureau of Elevator Safety ("Bureau"). Before the variance can be approved, the Bureau requires written documentation from the local fire authority having jurisdiction deeming the elevator hoistway as a critical area, as stated in NFPA 1221 (2016) 9.6.7.4. Since this section of NFPA 1221 does not specifically state that the hoistway is a critical area, the local fire authority having jurisdiction must pronounce it as such.

> *" NFPA 1221 (2016) 9.6.7.4 Critical Areas. Critical areas, such as the fire command center(s), the fire pump room(s), exit stairs, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations and other areas deemed critical by the authority having jurisdiction, shall be provided with 99 percent floor area radio coverage."*

Please share this information with your local offices. The Bureau will not approve variances for installation of radio systems equipment in elevator hoistways without a letter or email from the fire authority having jurisdiction deeming the hoistway as a "critical area".

If you have any questions please feel free to contact the Bureau at dhr.elevators@myfloridalicense.com.

Item 3:
Broward County P25 System, Update

Item 4:
Training

Item 5:
BORA Code 118, Proposed Changes

BORA CODE 118 PROPOSED CHANGES

lish policies and procedures in order to clarify the application of their provisions including the application of the variance procedures of any adopted flood hazard ordinances to the flood provisions of the FBC. The variance procedures herein shall not apply to section 3109 of the FBC, Building.

117.3 General. Where, in any specific case, different sections of the FBC or adopted flood hazard ordinances specify different materials, methods of construction or other requirements, the most restrictive shall govern.

EMERGENCY RESPONDER COMMUNICATIONS

Section 118 Two-Way Radio Communication Enhanced Public Safety Signal Booster Systems

ENHANCEMENT SYSTEMS (ERCES)

118.1 General.

118.1.1 The Two-Way Radio Communication Enhancement Public Safety Signal Booster System shall be installed as per NFPA 1-11.10, NFPA 70, NFPA 1221, and NFPA 72.

118.1.2 The Authority Having Jurisdiction (AHJ), in Broward County, for the Two-Way Radio Communication Enhancement Public Safety Signal Systems has two (2) permitting entities and multiple frequency licenses as follows:

1. The Installation and Wiring shall comply with the local municipality Building and Fire Departments permitting process and shall be approved by the local and county FCC Licensee prior to installation.
2. The FCC Licensees are:

   Broward County Regional Emergency Services and Communication Division

   City of Coral Springs

   City of Fort Lauderdale

   City of Hollywood

   City of Plantation

INSERT

OR BDA CONTRACTORS

118.1.3 The AHJ shall determine if a new building or existing building shall require that a two-way radio communication enhanced public safety signal booster system be installed to comply with NFPA 1-11.10.1. The Building owner shall install a public safety signal booster to meet this requirement if so directed.

118.1.4 Design. For new buildings, a temporary, partial or certificate of occupancy shall not be issued until the AHJ determines that the building is in compliance with NFPA 1-11.10.1. It is recommended that the local Development Review Committee (DRC) notify the new building owner, architect, and engineers of this requirement in writing before the building is designed. At the time of BDA permitting, a design package, comprising of block level diagrams, materials submittals, coverage measurements and predictions are required. Sufficient and substantial engineering design and support information and data shall be submitted with the application. A sealed submittal from an Engineer, with training and experience in electrical engineering, shall also be required.

118.1.5 To the extent authorized by law, Distributed Antenna Systems Integrators with Public Safety and/or Communication installation and repair experience, as a sub-contractor in association with qualified electrical contractors, ~~and~~ Fire Alarm contractors may install or repair Two-Way Radio Communication Enhancement Systems. Should the contractor of record fail to have radio communications installation and repair experience with Distributed Antenna Systems, the contractor of record shall sub-contract the installation or repair of non-fire alarm function to a qualified company, having knowledge of Radio communications installation and repair

118.2 Permit Documentation.

118.2.1 The following documentation shall be required for permitting a "Two-Way Radio Communication Enhancement System":

1. Signed and Sealed drawings shall be submitted to the FCC Licensee(s) for approval of the proposed installation of Two-Way Radio Communicating Enhanced Systems.
2. FCC Licensee(s) shall provide written approval of the sealed documents which shall be provided to the local Fire Prevention Bureau office at the time of plan submittal and prior to plan review.
3. Plans shall comply with FBC 107, NFPA 1, 1.7, NFPA 70, NFPA

1221, and NFPA 72. All plans shall be signed and sealed by an engineer.

4. Sealed floor plans showing radio coverage for critical and general areas using industry standard radio frequency computer generated propagation modeling.

5. Schedule of signal strength as per NFPA ~~72~~ 1221 or as agreed to by the Fire Code Official in consultation with the FCC licensee in writing.

6. Schedule of the system radio frequencies or band of frequencies.

7. Notation that the system is compatible with the Broward County Regional Emergency Services and Communication Division.

8. Plans shall show that the BDA enclosure shall be painted red. A sign affixed next to or stenciling on the enclosure shall be provided in high contrasting letters over a red background, weatherproof plaque and shall include the following information:

   a) Fire Department Signal Booster.

   b) Permit Number: _____.

   c) Serviced by: Vendor name and telephone.

9. INSERT

118.3 System Notifications.

118.3.1 The AHJ's for the FCC licensee along with Broward County Regional Emergency Services and Communication Division shall be notified in writing of the following events by the permit holder, the system vendor, and/or the building owner. The AHJ for the FCC Licensee shall approve the date and time and may request that the AHJ shall be present during the following events:

1. Initial system testing, with date and time start and finish.

2. Periodic system testing, with date and time start and finish.

3. System placed in operation with date and time.

118.4 Prior to the Initial Testing.

1. The vendor shall provide the system's settings prior to the initial system testing as accepted by the AHJ, FCC Licensee and Broward County Regional Emergency Services and Communication Division. The AHJ may ask for additional information prior to testing.

2. The system shall remain "off the air" until the initial testing with AHJ, FCC Licensee, Broward County Regional Emergency Systems and Communication Division, and the Fire Code Official are ready to begin and provide their approval.

118.5 Annual Test.

118.5.1 In addition to the annual fire alarm test, an annual test and report, in compliance with NFPA 72 Chapter 14, shall be completed by a qualified company having the knowledge of RF installation with training and experience of two-way radio communication enhanced radio systems to ensure that the original installed system is still in compliance.

118.5.2 Annual Test Report. The annual test report shall be maintained with the fire alarm log book and copies shall be submitted to the local AHJ and to City and Broward County Regional Emergency Services and Communication Division for review. All problems found, with any corrective action(s), shall be noted in the test report, along with the name and license number of the Fire Alarm Contractor and sub-contractor Inspection Company.

118.6. System Monitoring and Maintenance.

1. Any Public Safety Signal Booster system installed in a premises shall be tied into a fire alarm system for monitoring.

2. In case of failure, the building owner shall be notified within two (2) hours and he/she shall cause to occur an inspection of the system. If a trouble condition is found the system shall be repaired within forty-eight (48) hours of notification. If such repair proves to be longer in time or impossible to perform, a notification to the Fire Marshal shall be made indicating

9. ELEVATOR HOISTWAYS SHALL BE DEEMED CRITICAL AREAS AS STATED IN NFPA 1221 (2016) 9.6.7.4

the failure of the system, so that in case of emergency the system shall not be relied upon by the First Responders.

Any system installed shall have a service level agreement with a responsible company. Once the system is repaired the service company shall notify both the building owner and the fire marshal.

End
of Broward County Administrative Provisions for the 2020 FBC (7th Edition)

Parks, Bryan

From: Parks, Bryan
Sent: Tuesday, March 2, 2021 1:12 PM
To: David Rice - RC Engineering Inc (drice@rc-eng.com); Castronovo, Kenneth
Cc: Preston, John
Subject: Proposed Change

118.2 Permit Documentation.

118.2.1 The following documentation shall be required for permitting a "Two-Way Radio Communication Enhancement System":

1. City and County FCC Licensee shall approve proposed installation of Two-Way Radio Communicating Enhanced Systems prior to installation in writing or by sealing documents submitted for review.
2. City and County written approval or sealed documents shall be provided to the local Fire Prevention Bureau office at the time of plan submittal and prior to plan review.
3. Elevator shafts if required to have a Two-Way Radio Communication Enhancement System shall be considered Critical Areas.
4. Plans shall comply with FBC 107, NFPA 1, 1.7, NFPA 70, and NFPA 72.
5. Sealed floor plans showing radio coverage for critical and general areas using industry standard radio frequency computer generated propagation modeling.
6. Schedule of signal strength as per NFPA 72 or as agreed to by the Fire Code Official in consultation with the FCC licensee in writing.
7. Schedule of the system radio frequencies or band of frequencies.
8. Notation that the system is upgradable for frequency band coverage changes including at a minimum both 700/800 MHz
9. Plans shall show that the BDA enclosure shall be painted red. A sign affixed next to or stenciling on the enclosure shall be provided in high contrasting letters over a red background, weatherproof plaque and shall include the following information:
   a) Fire Department Signal Booster.
   b) Permit Number: _____.
   c) Serviced by: Vendor name and telephone.

Bryan Parks
Chief Fire Code Official
Suite 3500 B
Broward Board of Rules and Appeals
1 North University Drive
Plantation, Florida 33324

9.6.7* Radio Coverage.

9.6.7.1 Radio coverage shall be provided throughout the building as a percentage of floor area as specified in section below through section on amplification components.

9.6.7.2 The system shall adhere to the maximum acceptable propagation delay standard provided by the AHJ.

9.6.7.3 Radio coverage shall be determined by the AHJ.

9.6.7.4 Critical Areas. Critical areas, including fire command centers, fire pump rooms, exit stairs, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations, and other areas deemed critical by the AHJ, shall be provided with 99 percent floor area radio coverage.

Item 6:
BORA Guidelines, Proposed Changes

BORA ERCES Guidelines

Broward County Board of Rules and Appeals

Emergency Responder Communications Enhancement Systems (ERCES)

FBC Seventh Edition (2020)
Effective December 31, 2020

For BDA Committee Approval
2021-03-22

DRAFT EDITION
2021-03-22

Broward County Board of Rules and Appeals

Emergency Responder Communications Enhancement Systems (ERCES)

Guidelines

Table of Contents

Broward County Board of Rules and Appeals

Emergency Responder Communications Enhancement Systems (ERCES)

Guidelines

Part 1. Overview

Table of Contents

1.1 Purpose

An “Emergency Responder Communications Enhancement System” (ERCES) gives fire departments and law enforcement a reliable in-building communication system without detrimentally impacting the surrounding community’s Public Radio Communication Systems.

The purpose of these guidelines is to provide the designers, manufacturers, installers, inspectors, and FCC License Holders the tools to properly design, permit, install, and inspect a fully functional in-building communication enhancement system that meets the state and local codes for Broward County, Florida.

These are guidelines only and are not intended to be code items.

1.2 Background

Each municipality has an “Emergency Responder Communications System” for use by the fire department and law enforcement. These two-way radio systems generally work in open spaces without problems. However, these two-way radio systems do not always work inside buildings. Most buildings now require a signal repeater system located in the building to amplify the radio signal to allow the two-way radio system to work.

When these systems are not properly designed, installed, inspected, and maintained, then major communication problems can occur inside and outside of the building. One faulty system may take down the Public Safety Radio Communication System in a large part of a municipality. This faulty system would prohibit the fire department and law enforcement from communicating through their two-way radio system.

In 2015, BDA Systems installed in high rise buildings in the cities of Aventura and Hallandale Beach caused significant interference with the Broward County’s Public Safety Radio System. The Hallandale Beach System was improperly adjusted after the inspections were completed. Once the problems were identified, the building systems were immediately taken off-line, repaired, and re-inspected. The Broward County Administrator then asked Broward County Board of Rules and Appeals (BORA) to investigate the problems associated with the faulty installation and to review the existing codes and procedures to attempt to prevent this problem from occurring again.

BORA started up a temporary committee to address these problems. The committee found the following:

1. The state and local codes, Florida Building Codes (FBC), Florida Fire Prevention Code (FFPC), and NFPA 72, if followed, were sufficient and did not require any changes.
2. The problem was a procedural one. All three (3) codes required that the installation shall be permitted and the AHJ’s be notified. A new code section was added to the Florida Building Code (FBC), Broward County Edition, Chapter 1. This new section 118 set forth procedures requiring AHJ notification, among other requirements.

1.3 Codes and Requirements for Broward County

As of December 31, 2020, the following codes are in effect:

Florida Statute (FS)633.202(1)
Adopts the FFPC

Florida Statute (FS)633.202(18)
This statute pertains to high-rise buildings. (Subject to change)

Florida Building Code (FBC), Seventh Edition (2020)
Broward County Edition, Chapter 1,

Section 118	Two-Way Radio Communication Enhanced Public Safety Signal Booster Systems

Florida Fire Prevention Code (FFPC) Seventh Edition (2020)
NFPA 1 Fire Code (2018)

Section 1.4	Equivalencies, alternatives, and modifications
Chapter 2	Referenced Publications NFPA 70, NFPA 72 (2016), NFPA 780 (2017), NFPA 1221 (2016)
Section 11.10	Two-Way Radio Communication Enhancement System

NFPA 70 (NEC) (2017)

Section 90.7	Examination of equipment
Article 100	Definitions
Section 110.2	Approval (UL, etc.)
Section 100.2(B)	Approval (UL, etc.)
Article 800	Communications circuits
Article 810	Radio and television equipment

NFPA 72 (Fire Alarm) (2016)

NFPA 1221 (2016) Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems

1.4 Authorities Having Jurisdiction (AHJ)

The AHJ is defined as: “An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation or a procedure”.

In Broward County, Florida, the AHJ’s are as follows for the installation of Two-Way Radio Communications Enhancing Systems:

1. Local Municipalities
    A. Building AHJ (FBC)
    B. Electrical AHJ (NFPA 70)
    C. Fire Official AHJ (NFPA 72, NFPA 1221)
2. Broward County Elevator Inspection AHJ (if applicable)
   FBC-30, FS 399, FAC 61C-5, ASME A17-1
3. FCC License Holder
    A. Broward County Regional Emergency Services and Communication (RESC)
    B. Fort Lauderdale
    C. Coral Springs
    D. Plantation
    E. Hollywood

Note: Work shall not start on any project until a permit has been issued and signed by each of the AHJ’s:
Building, Electrical, Fire, Elevator (if applicable), FCC License Holder(s)

The system shall not be energized (including testing) until written authorization is obtained by the:
FCC License Holder(s) (FBC, Broward County Edition, 118.4)

A building certificate of completion, or occupancy shall not be issued until the permit work is completed and signed off by each of the AHJ’s:
(FBC, Broward County Edition, 118.1.4)

1.5 Design

The Emergency Responder Communications Enhancement System shall be designed by a Professional Engineer, licensed in the State of Florida. The Professional Engineer shall be available for Plan Review and Inspections if requested by the AHJ.

The FBC, Broward County Edition, Section 118 requires that the Professional Engineer have training and experience in Electrical Engineering.

Heat map drawings shall be prepared by the Professional Engineer or a Radio Frequency System Designer under the direct supervision of the Professional Engineer. Heat map drawings shall be prepared by a designer certified by the heat map software company. The drawings shall include the designer's name, certification level, the name of the heat map software company, software app name, and software app version.

1.6 Installation

The installation shall be completed by a qualified contractor. Contracting shall be in compliance with the State of Florida Electrical Contractor's Licensing Board (ECLB).

Only a licensed Electrical Contractor (EC), Fire Alarm Contractor (FAC), or BDA Contractor (BDAC) can contract to install a system. A systems integrator, which is not a licensed contractor, cannot contract for the installation. (FAC 61G6)

1.7 Permitting

Record drawings, signed and sealed by a qualified Professional Engineer, shall be submitted to each AHJ for plan review and approval. The FCC AHJ (License Holder) shall provide a written acceptance prior to the review by the other AHJ's. The drawings shall be approved by all AHJ's prior to the start of any work.

Refer to the applicable Code Compliance Plan Review Checklist for the requirements of each AHJ.

1.8 Inspections

The contractor shall coordinate all inspections as required by the AHJ's.

Note: Never energize the system for any reason without first passing the FCC AHJ initial inspection.

Refer to the applicable Code Compliance Inspection Checklist for the requirements of each AHJ.

1.9 Final Acceptance

A Certificate of Occupancy or a Certificate of Completion for a building shall not be given until the Emergency Responder Communications Enhancement System is approved by the Authority Having Jurisdiction. (Building, Electric, Fire, Elevator (where applicable), and FCC License Holder) (FBC, Broward County Edition, 118.1.4)

Broward County Board of Rules and Appeals

Emergency Responder Communications Enhancement Systems (ERCES) Guidelines

Part 2. Recommended Checklists

Table of Contents

2.1.1 Plan Review - Fire

Plans shall include the following information:

- ☐ 1. Building owner and address
- ☐ 2. Written sequence of operation
- ☐ 3. Signature and seal of the Engineer of Record with experience and training in electrical engineering. The name, PE number, business name, CA number, address, and contact information shall be shown on the plans. The AHJ may require that the Engineer of Record provide evidence of experience and training in Electrical Engineering. (NFPA 72-10.5)
- ☐ 4. Applicable codes and edition dates (NFPA 72 (2016))(NFPA 1221 (2016))
- ☐ 5. Building description showing building construction, building occupancy, total square footage, number of floors, total height of building (NFPA 1-1.7.12) (NFPA 72-7.4)
- ☐ 6. Floor plans showing device locations, fire-rated enclosures, conduit runs, and propagation modeling, etc. (NFPA 1) (NFPA 1-1.7.12) (NFPA 72-7.4)
- ☐ 7. Riser plans for systems (NFPA 1-1.7.12) (NFPA 72-7.4)
- ☐ 8. Specifications with manufacturer's parts numbers (NFPA 1-1.7.12) (NFPA 72-7.4)
- ☐ 9. Firewall penetration details, etc. (NFPA 1-12.7.5.1, NFPA 1-1.7.12) (NFPA 72-7.4)
- ☐ 10. Identify the panel and circuit breaker; show panel location on plan. (NFPA 1-1.7.12) (NFPA 72-7.4)
- ☐ 11. Show circuit breaker lock. (NFPA 1-1.7.12) (NFPA 72-10.6.5.4)
- ☐ 12. The BDA enclosure shall be painted red and a sign shall show permit number, vendor name, and telephone number. (FBC BC 118.2.1.8) Provide an information binder stored next to the BDA. Information shall include: (NFPA 72-7.5)
    - ☐ (1) As-built drawings
    - ☐ (2) Manufacturer's data sheets and specs
    - ☐ (3) Heat maps with the final signal strength readings
    - ☐ (4) Final signal strength measurements (dB)
    - ☐ (5) Maintenance contract
    - ☐ (6) Broward County RESC, FCC AHJ (License Holder), all other approvals, and elevator variance letter, if applicable.
    - ☐ (7) Maintenance repair log, expiration date, maintenance provider
- ☐ 13. Pathway survivability level shall be 1, 2, or 3. (NFPA 1221-5.10)
  All conductors shall be installed in raceways. (NFPA 1221-5)
- ☐ 14. The feeder and riser coaxial cables shall be rated as plenum cable (and installed in an enclosure) that matches the building's fire rating and pathway survivability. (NFPA 1221-9.6.2.1.1.1, NFPA-1.4)
- ☐ 15. Feeder cables installed in raceways per Pathway Survivability Level 1 do not have to be in a rated enclosure. (NFPA 1221, TIA 16.2, NFPA-1.4)
- ☐ 16. Radio coverage shall be a minimum of 99% in critical areas, such as the fire command center(s), the fire pump room(s), exit stairs, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations, and other areas deemed critical by the AHJ and 90% in general building areas. (NFPA 1221-9.6.7)
- ☐ 17. Inbound signal level shall be sufficient to provide a minimum of DAQ 3.0 (3.4). (NFPA 1221-9.6.8.1*)
  Outbound signal level shall be sufficient to provide a minimum of DAQ 3.0. (NFPA 1221-9.6.8.2)
- ☐ 18. Donor antenna isolation shall be a minimum of 20 dB above the inside antennas. (NFPA 1221-9.6.9)
- ☐ 19. System radio frequencies; system shall be capable of transmitting all public safety radio frequencies assigned to the FCC AHJ and be capable of using any modulation technology. (NFPA 1221-9.6.10.1)
- ☐ 20. Frequency changes. System shall be capable of upgrading. (NFPA 1221-9.6.10.2)

2.1.1 Plan Review - Fire (cont.)

☐ 21. System Components: Components shall be approved and compatible with the Public Safety Radio System. System shall be approved by the FCC License Holder. (NFPA 1221-9.6.11) (NFPA-1.1.4)

☐ 22. All repeaters, transmitter receptacles, signal booster components and battery system components shall be in a NEMA 4, 4X enclosure. (NFPA 1221-9.6.11.2) (NFPA 1-1.4) Exception: batteries may be installed in a NEMA 3R enclosure when the system is UL2524 listed.

☐ 23. Power supplies shall have at least two independent sources. (NFPA 1221-9.6.12)

☐ 24. The primary power source shall be supplied from a dedicated circuit and shall comply with NFPA 72. (NFPA 1221-9.6.12.1)

☐ 25. The secondary power source shall consist of one of the following (NFPA 1221-9.6.12.2):

- ☐ (1) Battery with at least 12 hours of operation at 100%
- ☐ (2) Battery with at least 24 hours of operation at 100%
  Legally required generator with at least 12 hours of operation at 100%

☐ 26. System Monitoring: The fire alarm system shall monitor the following items as a minimum (NFPA 1221-9.6.13.1):

- ☐ (1) Monitoring for integrity of the system shall comply with NFPA 72-10
- ☐ (2a) Donor antenna malfunction
- ☐ (2b) Active RF emitting device failure (70%)
- ☐ (2c) Low battery capacity indicator
- ☐ (2d) System component failure
- ☐ (3a) Loss of normal AC power
- ☐ (3b) Failure of battery charger
- ☐ (4) Communication link between the Dedicated Monitoring Panel and the BDA shall be monitored for integrity.

☐ 27. Dedicated Panel (annunciator panel) shall show (NFPA 1221-9.6.13.2):

- ☐ (1a) Normal AC power
- ☐ (1b) Loss of normal power
- ☐ (1c) Battery charger failure
- ☐ (1d) Low battery capacity
- ☐ (1e) Donor antenna malfunction
- ☐ (1f) Active RF emitting device malfunction
- ☐ (1g) System component malfunction
- ☐ (2) Communication link between the Dedicated Monitoring Panel and the BDA shall be monitored for integrity.

☐ 28. Technical Criteria (NFPA 1221-9.6.14)

- ☐ (1) Frequencies required
- ☐ (2) Location and effective radiated power (ERP) of the FCC AHJ radio site
- ☐ (3) Maximum propagation delay less than 30 micro-seconds
- ☐ (4) List of specifically approved system components
- ☐ (5) Other support technical information (Battery calculations)(NFPA 72-10.6.7.2.1)

☐ 29. When an elevator(s) is(are) present in the building, the AHJ may deem that the elevator hoistway and the elevator cab are critical areas. See Section 2.1.3 Plan Review-Elevators (NFPA 1221-9.6.7.4)

☐ 30. Systems shall have lightning protection that complies with NFPA 780. (NFPA 1221-9.6.3)

Note: This checklist is a minimum checklist. Coordinate with the local Fire AHJ for additional checklist items.

2.1.2 Plan Review - Electrical

Plans shall include the following information:

☐ 1. Building owner and address
☐ 2. N/A
☐ 3. Signature and seal of the Engineer of Record with experience and training in electrical engineering. The name, PE number, business name, CA number, address, and contact information shall be shown on the plans. (FBC BC 118.1.4) (61G15-30.003(2))
☐ 4. Applicable codes and edition dates (61G15-30.003(1b))
☐ 5. Building description showing building construction, building occupancy, total square footage, number of floors, total height of building (FAC 61G15)
☐ 6. Floor plans showing device locations, fire-rated enclosures, conduit runs, and propagation modeling, etc. (FBC BC 118.2.1.4)
☐ 7. Riser plans for systems (FAC 61G15)
☐ 8. Specifications with manufacturer's parts numbers and installation information (FAC 61G15-33)
☐ 9. Details, including firewall penetration, etc. (FAC 61G15) (NFPA 70 820-26)
☐ 10. Grounding and mounting details for antenna, mast, surge protection, BDA, power supply, battery enclosure, etc. (FAC 61G15) (NFPA 70-800,810)
☐ 11. Antenna NFPA 780 protection, if existing. If not existing, add system. (FAC 61G15) (NFPA 780)
☐ 12. Show how the system components are wired to power (120V). (NFPA 70-110.2(B)) Identify the Panel ID, Circuit ID, circuit breaker size, and wire size.
☐ 13. Circuit shall have an isolated ground, if required by the manufacturer. (NFPA 70)
☐ 14. Listing and labeling requirements (NFPA 70-110.2)
☐ 15. Identify minimum conduit sizes and minimum conduit 90-degree bend radiuses. (NFPA 70-110.3)
☐ 16. System equipment shall be installed in an air-conditioned and mechanically ventilated room where the manufacturer's installation document requires a temperature limitation and/or ventilation. (NFPA 70-110.3)

Note: This checklist is a minimum checklist. Coordinate with the local Electrical AHJ for additional checklist items.

2.1.3 Plan Review - Elevator

Plans shall include the following information:

When the Fire AHJ deems that the elevator hoistway and elevator cab are critical areas, a variance shall be obtained from the Broward County Elevator Inspection Services Section at Permitting prior to any work inside an elevator hoistway or elevator machine room. The variance shall be to install an antenna in the elevator hoistway(s) (ASME A17.1).

Note: The elevator code does not allow the elevator shaft to be used for coaxial cable risers. (ASME A17.1.2.8.1)

Note: This checklist is a minimum checklist. Coordinate with the local Elevator AHJ for additional checklist items.

2.1.4 Plan Review – Building (Structural)

☐ 1. Structural design calculations for antenna mast (if applicable, FBC BC 107.3.5)
☐ 2. Attachment and roof penetration details on plan for antenna mast (if applicable, FBC BC 107.3.5)
☐ 3. Floor plans showing fire-rated enclosures for cables and BDA room, including fire-rated UL designs (if applicable, FBC BC 107.3.5)
☐ 4. Riser plans showing fire-rated enclosure for cable, including fire-rated UL designs (if applicable, FBC BC 107.3.5)
☐ 5. Firewall penetrations, including UL designs (if applicable, FBC BC 107.3.5)

Note: This checklist is a minimum checklist. Coordinate with the local AHJ for additional checklist items.

2.1.5 Plan Review – FCC AHJ (License Holder)

For all installations in Broward County, the plans shall be approved by the Broward County FCC License Holder:

Broward County
Regional Emergency Services and Communications
Communications and Technology Division
1801 NW 64th St., Ste. 106A
Fort Lauderdale, FL 33309

Contact Information:
Jose M. DeZayas
954-357-8012 (O)
954-790-8410 (C)
JDeZayas@Broward.org (E)

For installations in the following cities, the plans shall also be approved by the local FCC License Holder:

1. Coral Springs

   Communication Technical Coordinator
   Coral Springs Police Department

   Contact Information:
   Thomas Ciampi
   TCiampi@CoralSprings.org

2. Fort Lauderdale

   Communication Shop
   1301 SW 2nd Ct., Building 5
   Fort Lauderdale FL

   Contact Information:
   Bobby Brown
   Telecommunications Coordinator
   Sustainability Department
   954-828-5554 (O)
   BOBrown@FortLauderdale.gov (E)

3. Hollywood

   Contact Information:
   Antonio Buehler
   AntonioBuehler@HollywoodFL.org

4. Plantation:

   Barry Stearns
   Fire Department
   954-797-2150 (O)
   BStearns@PSD.Plantation.org (E)

2.1.5 Plan Review – FCC AHJ (License Holder) (cont.)

Plans shall include the following information:

☐ 1. Building owner and address, all plans shall be signed and sealed by an engineer. (FBC BC 118.2)

☐ 2. Building description showing building construction, building occupancy, total square footage, number of floors, total height of building

☐ 3. Applicable codes and edition dates

☐ 4. Floor plans showing device locations, fire-rated enclosures, conduit runs, and propagation modeling, etc. Propagation (heat) map drawings shall include the following (FBC BC 118.2.1.4):

- ☐ Indoor Prediction Legend
- ☐ Pictogram Legend
- ☐ Calculations Legend
- ☐ Number of Channels
- ☐ Predictive propagation shown on floor plans
- ☐ Name of certified designer and company
- ☐ Materials Legend
- ☐ Cables Legend
- ☐ Frequencies or frequency bands for the Public Radio System(s)

☐ 5. Riser plans for systems

☐ 6. Specifications with manufacturer's parts numbers

☐ 7. Manufacturer's specifications for equipment; include equipment temperature limits.

☐ 8. Grounding and mounting details for antenna, mast, surge protector, BDA, power supply, battery enclosure. (IEEE 1692, TIA 569, TIA 607)

☐ 9. Notes on plans shall state:

"The system shall never be energized for testing or operation until written, or on site, approval is obtained from all applicable FCC License Holders."

☐ 10. Not Used

☐ 11. Inbound signal level shall be sufficient to provide a minimum of DAQ 3.0 (3.4). (NFPA 1221-9.6.8.1*) Outbound signal level shall be sufficient to provide a minimum of DAQ 3.0. (NFPA 1221-9.6.8.2)

☐ 12. Isolation shall be a minimum of 20 dB above the (maximum) signal booster gain under all operating conditions.

☐ 13. System radio frequencies: system shall be capable of transmitting (transporting) all public safety radio frequencies used by the FCC AHJ (License Holder) and be capable of using any modulation technology.

☐ 14. Frequency changes. System shall be capable of upgrading.

2.1.5 Plan Review - FCC AHJ (License Holder) (cont.)

☐ 15. System Components: Components shall be approved and compatible with the Public Safety Radio System.
Show the propagation delay.
Signal Boosters shall have FCC Certification. Power supplies shall have at least two independent supplies. Battery shall provide twelve (12) hour minimum operational run time. (Provide a battery calculation at 100%)

☐ 16. Technical Criteria

- ☐ (1) Frequencies or frequency bands required
- ☐ (2) Location and effective radiated power (ERP) of the FCC AHJ radio site
- ☐ (3) Maximum propagation delay (30 microseconds)
- ☐ (4) List of specifically approved system components
- ☐ (5) Other supporting technical information

☐ 17. When an elevator(s) is(are) present in the building, the AHJ may deem that the elevator hoistway and the elevator cab are critical areas. See Section 2.1.3 Plan Review-Elevators (NFPA 1221-9.6.7.9)

☐ 18. Other industry standards include IEEE 1692, TIA 569, and TIA 607.

Note: This checklist is a minimum checklist. Coordinate with the local FCC AHJ (License Holder) for additional checklist items.

2.2.1 Inspection - Fire

Final Inspection

Property Information

Property Name: _____ Permit #: _____ Inspection Date: _____

Property Address: _____

Contact Information:

BDA Equipment Provider: _____

BDA Licensed Contractor: _____

Fire Alarm Licensed Contractor: _____

Fire Alarm Monitoring Company: _____

Engineer of Record: _____

☐ 1. The latest approved record drawings, operation manuals, and maintenance manuals are on the site.

☐ 2. The following representatives are on the site for the inspection:

- ☐ Fire Inspector
- ☐ Broward County RESC
- ☐ Ft. Lauderdale TeleCom
- ☐ Electrical Inspector
- ☐ BDA equipment provider (systems integrator)
- ☐ BDA Licensed Contractor
- ☐ Fire Alarm Licensed Contractor
- ☐ Engineer of Record, only for re-inspections, if required by the AHJ
- ☐ Building Owner Representative

☐ 3. Fire Rated Enclosure openings and penetrations are properly sealed. (NFPA-1-12.7.5.1)

☐ 4. The installation complies with the pathway of survivability as shown on the approved record drawings.
Note: All conductors shall be installed in raceways. (NFPA 1221-5)

☐ 5. The system components match the approved record drawings for manufacturer and part numbers. (NFPA 1221-9.6.11.1) (NFPA-1.1.4)

☐ 6. The BDA enclosure shall be painted red and a sign shall show permit number, vendor name and telephone number. (FBC BC 118.2.1.8)

☐ 7. Provide an information binder stored next to the BDA. Information shall include: (NFPA 72-14.6.1.1) (FBC BC 118)

- ☐ (1) As-built drawings
- ☐ (2) Manufacturer's data sheets and specs
- ☐ (3) Heat map
- ☐ (4) Final signal strength measurement (dB)
- ☐ (5) Maintenance contract
- ☐ (6) Broward County RESC, FCC AHJ (License Holders), all other approvals and elevator variance letter, if applicable.
- ☐ (7) Maintenance repair log, expiration date, maintenance provider

☐ 8. Pathway survivability level shall be 1, 2, or 3. (NFPA 1221-5.10)
All conductors shall be installed in raceways. (NFPA 1221-5)

☐ 9. The feeder and riser coaxial cables shall be rated as plenum cable (and installed in an enclosure) that matches the building's fire rating and pathway survivability. (NFPA 1221-9.6.2.1.1.1, NFPA-1.4)

☐ 10. Feeder cables installed in raceways per Pathway Survivability Level 1 do not have to be in a rated enclosure. (NFPA 1221, TIA 16.2, NFPA-1.4)

2.2.1 Inspection - Fire (cont.)

- ☐ 11. Radio coverage shall be a minimum of 99% in critical areas, such as the fire command center(s), the fire pump room(s), exit stairs, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations, and other areas deemed critical by the AHJ and 95% in general building areas. (NFPA 1221-.9.3.1.2.1)
- ☐ 12. Inbound signal level shall be sufficient to provide a minimum of DAQ 3.0. (NFPA 1221-9.6.8.1) Outbound signal level shall be sufficient to provide a minimum of DAQ 3.0. (NFPA 1221-9.6.8.2)
- ☐ 13. Isolation shall be a minimum of 20 dB above the signal booster gain under all operating conditions. (NFPA 1221-9.6.9)
- ☐ 14. System radio frequencies: system shall be capable of transmitting all public safety radio frequencies assigned to the FCC AHJ (License Holder). (NFPA 1221-9.6.10.1) (FBC Broward Edition 2017-118)
- ☐ 15. Frequency changes: System shall be capable of upgrading. (NFPA 1221-9.6.10.2)
- ☐ 16. System Components: Components shall be approved and compatible with the Public Safety Radio System. (NFPA 1221-9.6.11)
- ☐ 17. All repeaters, transmitter receptacles, signal booster components and battery system components shall be in a NEMA 4, 4X enclosure. (NFPA 1221-9.6.11.2) (NFPA 1-1.4) Exception: batteries may be installed in a NEMA 3R enclosure when the system is UL2524 listed.
- ☐ 18. Power supplies shall have at least two independent sources. (NFPA 1221-9.6.12)
- ☐ 19. The primary power source shall be supplied from a dedicated circuit and shall comply with NFPA 72. (NFPA 1221-9.6.12.1)
- ☐ 20. The secondary power source shall consist of one of the following (NFPA 1221-9.6.12.2):
    - ☐ (1) Battery with at least 12 hours of operation at 100%
    - ☐ (2) Battery with at least 24 hours of operation at 100%
      Legally required generator with at least 12 hours of operation at 100%
- ☐ 21. System Monitoring: The fire alarm system shall monitor the following items as a minimum (NFPA 1221-9.6.13.1):
    - ☐ (1) Monitoring for integrity of the system shall comply with NFPA 72-10
    - ☐ (2a) Donor antenna malfunction
    - ☐ (2b) Active RF emitting device failure
    - ☐ (2c) Low battery capacity indicator
    - ☐ (2d) System component failure
    - ☐ (3a) Loss of normal AC power
    - ☐ (3b) Failure of battery charger
    - ☐ (4) Communication link between the FACP and the BDA shall be monitored for integrity.
- ☐ 22. Dedicated Panel (annunciator panel) shall show (Auto-notification within 3 minutes, 20 seconds) (NFPA 1221-9.6.13.2):
    - ☐ (1a) Normal AC power
    - ☐ (1b) Loss of normal AC power
    - ☐ (1c) Battery charger failure
    - ☐ (1d) Low battery capacity
    - ☐ (1e) Donor antenna malfunction
    - ☐ (1f) Active RF emitting device malfunction
    - ☐ (1g) System component malfunction
    - ☐ (2) Communication link between the FACP and the BDA shall be monitored for3 integrity.

2.2.1 Inspection - Fire (cont.)

☐ 23. Signage is provided to locate the BDA.
Fire Department signal booster permit number, service provider, expiration date, and contact telephone numbers are shown. (FBC 118.2.1.8) (NFPA 72-10.18.3.2)

☐ 24. Completed NFPA documentation specific to this system is provided. [NFPA 72-7.8.2; figure 7.8.2(a) and (b)]

☐ 25. Documentation is provided showing that a maintenance and service agreement has been entered into between the property owner and the provider of the BDA System.
(NFPA 72-14.4.10.1) (NFPA 72-14.4.10.6) (NFPA 72-14.6.1.1)

☐ 26. DAQ, Delivered Audio Quality, for the system is a minimum of DAQ 3.0. Include all floors, critical areas, elevator cabs, and general building areas. (NFPA 1221-9.6.7.3)

☐ 27. Where required by the manufacturer, the power receptacle shall be an isolated ground type receptacle and shall be connected to an isolated ground. (NFPA 1221-5.8.2)

☐ 28. Systems shall have lightning protection that complies with NFPA 780. (NFPA 1221-9.6.3)

Note: This checklist is a minimum checklist. Coordinate with the local Fire AHJ for additional checklist items.

2.2.2 Inspection - Electrical

☐ 1. **Rough Electrical Inspection** (FBC BC (2020)-1.110.3(B))

- ☐ Installation of conduits
- ☐ Installation of coaxial cables according to manufacturer's instructions
- ☐ Panels, BDA, and BBU shall be grounded.
- ☐ Antenna and mast (NFPA 70-810)
  - Grounding, Lightning Protection System (if installed)
  - Lead-in surge protection
- ☐ Power connection to the BDA
- ☐ Installation of conduits and equipment in fire-rated enclosures or rooms

☐ **2.Final Inspection**

- ☐ All electrical components are in place.
- ☐ Label "BDA" circuit breakers.

Note: This checklist is a minimum checklist. Coordinate with the local Electrical AHJ for additional checklist items.

2.2.3 Inspection - Elevator

☐ **1. Rough System Inspection**

- ☐ Elevator variance approved.
- ☐ Conduit and cable installed in elevator shafts.

☐ **2. Final Inspection**

- ☐ Antenna(s) installed in the elevator shaft.

Note: This checklist is a minimum checklist. Coordinate with the local Elevator AHJ for additional checklist items.

2.2.4 Inspection-Building (Structural)

☐ **Rough Inspections:**

- ☐ 1. Inspection for all fire-rated enclosures/penetrations for cables and BDA room (FBC BC 110.3)
  - a. Framing inspection, if applicable
  - b. Drywall inspection, if applicable
- ☐ 2. In progress roof penetrations (if applicable, FBC BC 110.3)

☐ **Final Inspections:**

- ☐ 1. Antenna mast installation (FBC BC 110.3)
- ☐ 2. Inspection for all fire-rated enclosures/penetrations for cables and BDA room (FBC BC 110.3)
- ☐ 3. Roof final (if applicable, FBC BC 110.3)

Note: This checklist is a minimum checklist. Coordinate with the local AHJ for additional checklist items.

2.2.5 Inspection - FCC AHJ (License Holder)

1. Initial Inspection

☐ 1. The system shall never be energized for testing or operation until written, or onsite approval is obtained from the FCC AHJ (License Holders).
(FBC BC 1.118.4.2.2)

☐ 2. Prior to the initial inspection, a letter from the Engineer of Record stating that the installation is complete and ready to be energized for testing shall be received by the FCC AHJ (License Holders). The system settings and pictures of the installed major components shall also be provided to the FCC AHJ (License Holders). (FBC BC – 1.118.4.2.1)

The following components shall be included in the letter and pictures:

- ☐ (1) BDA with information
  Permit Number; Serviced by _____; Telephone _____
- ☐ (2) Enclosures with battery charger and batteries installed, wired with a label showing the battery installation date.
- ☐ (3) All equipment shall be properly grounded per TIA 607 and Motorola R56 Standards.
- ☐ (4) Antenna mast shall be grounded and protected by to the NFPA 780 Lightning Protection System.
- ☐ (5) Antenna shall have surge protection installed and wired.

☐ 3.The contractor shall coordinate the inspection with all responsible parties.
The following shall be present at a minimum:

- ☐ Owners representative
- ☐ Electrical Contractor
- ☐ Fire Alarm Contractor
- ☐ BDA Vendor representative with analyzer and computer to gain access to the BDA program to check levels and settings.
- ☐ System Engineer of Record, if requested by the AHJ.
- ☐ Electrical AHJ
- ☐ Fire Official AHJ
- ☐ FCC AHJ(s) (License Holders) (There may be more than one.)

☐ 4. The Initial Inspection shall include the following:

- ☐ (1) The System shall be energized for the first time.
- ☐ (2) Items (1) through (10) in Section 2 above shall be inspected for compliance.
- ☐ (3) Check the noise floor of the BDA transmitter. The noise floor shall not rise more than 1.5 dB at the donor antenna.
- ☐ (4) System Engineer of Record shall attend all inspections, if requested by the AHJ.

2.2.5 Inspection - FCC AHJ (License Holder) (cont.)

2. Final Inspection

This Inspection is a joint effort between the Fire Official and the FCC AHJ (License Holders). Prior to the final inspection, the contractor shall provide to the Fire Official and to the FCC AHJ (License Holders) the following documentation showing that the building is ready for the final inspection.

After passing the initial inspection, the contractor shall submit to the FCC AHJ (License Holder) a Post Heat Map Study to show that all areas are covered per the code. A letter from the Engineer of Record shall state that the System is completed, fully operational, and ready for the final inspection.

The contractor shall coordinate the inspection with all responsible parties. The following shall be present at a minimum:

- ☐ Owners representative
- ☐ Electrical Contractor
- ☐ Fire Alarm Contractor
- ☐ BDA Vendor representative with analyzer and computer to gain access to the BDA program to check levels and settings.
- ☐ System Engineer of Record, if requested by the AHJ
- ☐ Electrical AHJ
- ☐ Fire Official AHJ
- ☐ FCC AHJ(s) (License Holders) (There may be more than one.)

Final Inspection:

- ☐ (1) Owner shall provide proof of a signed service agreement with the BDA vendor.
- ☐ (2) The noise floor of the BDA transmitter shall be rechecked. The noise floor shall not rise more than 1.5 DB at the donor antenna.

Note: This checklist is a minimum checklist. Coordinate with the local FCC License Holder AHJ for additional checklist items.

Item 7:

Frequently Asked Questions

Frequently Asked Questions

ERCES FAQ 2021-01

Question: Do the feeder and riser coaxial cables found in NFPA 1221-9.6 (2016), Two Way Radio Communications Enhancement Systems, have to comply with NFPA 1221-5.5 (2016), Wiring Inside Buildings?

Applicable Codes:

NFPA 1221-5.5 Wiring Inside Buildings

NFPA 1221-5.5.2 Where installed in buildings, conductors and fiber-optic cables shall be installed in accordance with NFPA 70 in any one of the following wiring methods:

(1) Electrical metallic tubing
(2) Intermediate metal conduit
(3) Rigid metal conduit
(4) Surface metal raceways
(5) Reinforced thermosetting resin conduit (RTRC)

NFPA 1221-5.5.2.1 Rigid polyvinyl chloride conduit shall be permitted where approved by the AHJ.

NFPA 1221-9.6

Discussion:

NFPA 1221-5.5.2 is for all wiring installed in buildings for all Pathways of Survivability.

Answer:

All feeder and riser coaxial cables shall comply with NFPA 1221-5.5 (2016), Wiring Inside Buildings.

Frequently Asked Questions

ERCES FAQ 2021-02

Question: What is required to comply with NFPA 1221-9.6.3 (2016)? What is the financial impact of this requirement on the project?

Applicable Codes:

NFPA 1221 (2016) 9.6.3* Systems shall have lightning protection that complies with NFPA 780.

NFPA 780-3.3.26* Lightning Protection System. A complete system of strike termination devices, conductors (which could include conductive structural members), grounding electrodes, interconnecting conductors, surge protection devices, and other connectors and fittings required to complete the system.

Discussion:

The lightning protection code, NFPA 780, is for complete systems to protect the entire structure or building. Protecting a portion of a structure or building is not addressed and is not allowed by this code. See the NFPA "Technical Question Response" attached.

This is also consistent with "United Laboratories, Inc." (UL) and the Lightning Protection Institute (LPI) requirements for Lightning Protection Systems. See the UL 96A Scope attached.

Lightning Protection Systems shall be installed by a qualified and certified Lightning Protection System Installer.

Note that "ESE" type Lightning Protection Systems do not comply with NFPA 780 and shall not be used.

Where the building is protected by a Lightning Protection System that complies with NFPA 780, The donor antenna may be placed within the Lightning Protection System's "Zone of Protection". If it is not possible to place the donor antenna within the "Zone of Protection", then the Lightning Protection System shall be modified to comply. Contact a qualified and certified Lightning Protection System installer. The financial impact is minimal.

Where the building is not protected by a Lightning Protection System that complies with NFPA 780, a new building Lightning Protection System shall be installed. The financial impact is a major concern. A new Lightning Protection System that complies with NFPA 780 could easily cost many times the cost of the BDA System.

Answer: Systems shall have lightning protection that complies with NFPA 780. Check with NFPA and FFPC for alternative methods. (NFPA 1.4 (2015))

Frequently Asked Questions

ERCSE FAQ 2021-03

Question: What is required to comply with NFPA 1221-9.6.2.1.1.1 (2016)?

Applicable Codes:

NFPA 1221-9,6,2,1,1,1 The feeder and riser coaxial cables shall be rated as plenum cables that match the building's fire rating and pathway survivability.

Discussion:

When this 2016 Code was published, there were no cables manufactured to match the building's fire rating and Pathway Survivability. Today there are cables available; however, they are not listed.

Answer:

NFPA 1.4 (2015) may be used to permit the following:
The feeder and riser coaxial cables shall be routed through an enclosure that matches the building's fire rating (NFPA 1221-9.6.2.3 (2019)).

Frequently Asked Questions

ERCES FAQ 2021-04

Question: NFPA 1221 (2016), Sections 9.6.2.1.1.1, 9.6.2.1.3, and 9.6.2.1.4 appear to be in conflict. TIA 16.2 for NFPA 1221 (2016) tried to resolve this problem. How does one comply?

Applicable Codes:

NFPA 1221-9,6,2,1,1,1 The feeder and riser coaxial cables shall be rated as plenum cables **that match the building's fire rating** and pathway survivability.
NFPA 1221-9.6.2.1.3 Riser coaxial cables shall be rated as riser cables and routed through a **2-hour rated enclosure**. [72:24.3.13.8.3]
NFPA 1221-9.6.2.1.4 The connection between the riser and feeder coaxial cables shall be made with 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.
NFPA 1221-9.6.2.1 (2019) The backbone, antenna distribution, radiating, or any fiber-optic cables shall be rated as plenum cables.
NFPA 1221-9.6.2.3 (2019) Backbone cables shall be routed through an enclosure that matches the building's fire rating.

Discussion:

NFPA 1221-9.6.2.1.1.1 and 9.6.2.1.4 were amended by TIA 16.2 to change from a 2-hour-rated enclosure to an enclosure matching the building's fire rating. However, NFPA 9.6.2.1.3 was not changed and still requires a 2-hour-rated enclosure.

Interpretation 1

Where code sections conflict, the more stringent code section applies.

1. Riser coaxial cables shall be rated a riser cables and routed through a 2-hour-rated enclosure.
2. The connection between a riser and feeder coaxial cable shall be made with a 2-hour-rated enclosure. (The riser cable shall be in a 2-hour-rated enclosure.)

Interpretation 2

The intent of the code shall be used. TIA 16.2 clearly changed sections 9.6.2.1.1.1 and 9.6.2.1.4 from a 2-hour-rated enclosure to an enclosure that matches the building's fire rating. This is intended for both riser and feeder cables. Section 9.6.2.1.3 should have been changed at that time.

This interpretation is also consistent with the latest NFPA 1221 **(2019)** code. The term "Backbone Cable" is the same as "Riser Cable".
NFPA 1221 (2019)-6.2.1 The backbone, antenna distribution, radiating, or any fiber-optic cables shall be rated as plenum cables.
NFPA 1221 (2019)-6.2.3 Backbone cables shall be routed through an **enclosure that matches the building's fire rating**.
NFPA 1221 (2019)-6.2.4 The connection between the backbone cable and the antenna cables shall be made with an **enclosure that matches the building's fire rating**, and passage of the antenna distribution cable in and out of the enclosure shall be fire-stopped.

One cannot mix code dates for enforcement. However, for a formal interpretation, one can look at the intent of a code where the code is not clear.
Riser cables shall be routed through an enclosure that matches the building's fire rating.

Answer: Use NFPA 1.4 (2015) for best interpretation.

Frequently Asked Questions

ERCES FAQ 2021-05

Question: Is an assembly of armored cable with coaxial allowed for use as riser or feeder cables?

Applicable Codes:

Discussion:

Answer: