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Two-Way Radio Communication Enhancement System - Distributed Antenna System (DAS) and/or Bi-Directional Amplifier (BDA) Guidelines	NUMBER	SUBJECT	EFF. DATE
	TOPIC DAS and/or BDA		AUTHORIZATION

REFERENCES:
Florida Fire Prevention Code 8th Edition
NFPA 72 (2019 version): National Fire Alarm and Signaling Code
NFPA 1221 (2019 Version): Standards for the Installation, Maintenance, and Use of Emergency Services Communications Systems
Florida Administrative Code: 61G15-33.005 Design of Communication Systems
Florida State Statutes: Title XXXVII, Insurance – Chapter 633.202(18) Fire Prevention and Control

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IMPORTANT NOTES:

- **Any DAS or BDA testing and or installation within the City of Tallahassee & Leon County requires approval and shall follow these guideline [F.S. 633.202 (18)].**
- Permission is required through the City of Tallahassee Fire Department before any DAS/BDA testing is conducted within the jurisdiction. Permission forms are located at www.talgov.com.
- **From website Select (Service Tab, then Fire Tab, form under Additional Forms and Information)** and should be submitted to the Tallahassee Fire Department at DAStesting@talgov.com and shall be included as part of the final approved set of plans.
- All Contractors shall confirm frequency being used with the City of Tallahassee Radio Shop by contacting Chris Pandolfi chris.pandolfi@talgov.com, or 850-891-5159.
- **Any installation of a system requires a permit through the Growth Management Building Permitting Process.**
- To establish if an existing or new building requires a radio coverage solution the Building Owner or General Contractor shall produce **(through a qualified Company with G.R.O.L Certification)** a preliminary assessment or baseline report of the in-door radio signal. The report should include floor plans showing the radio signal levels throughout the facility in a grid system layout. The grid size dimension for measurement purposes shall be based on 20' x 20' (400sq.ft) max. It is recommended that the preliminary/baseline be performed after all construction personnel have left the job site and that all outer windows, sliding doors, & doors in stairwells are fully installed and closed.
- **Failure to perform the aforementioned guidelines can affect the RF signal penetration thus giving incorrect readings.**

- **Designer/Installer Qualifications:**

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a. The system designer shall be a Florida Licensed Professional Engineer (P.E.). Design documents shall be signed and sealed by the P.E.
b. The DAS and/or BDA **UL Components Declaration form** must be signed, notarized, and submitted with Plans **(forms located on www.talgov.com website).**
c. Lead installation technician shall be qualified in the installation, inspection and testing of the systems. The lead installation technician shall provide evidence of an FCC General Radiotelephone Operator License (G.R.O.L.) **Lead technician holding the G.R.O.L. license shall be present for all inspections.**

	DISTRIBUTED ANTENNA SYSTEM or BI-DIRECTIONAL AMPLIFIER
	Approval and Permit
1.	All system components shall be designed, installed, tested, inspected, and maintained in accordance with the manufacturer's published instructions and submitted for approval prior to installation according to the requirements of Section 9.6 **[NFPA1221:9.6.1]** Fire Plans Examiner **[FFPC 1.14.1] [F.S.633.332]**
2.	Plans shall be submitted for approval prior to installation. **[NFPA 1221:9.6.6.1]**
3.	Application for permit within the **CITY** should be submitted through www.talgov.com website. Select the below tabs in sequence on the website as they come up follow instructions step by step: • Services Tab • Growth Management • eGovernment Services • Customer Permitting Portal • Create Account if new contractor • In Person - Renaissance Building 435 North Macomb St, Tallahassee, Florida 32301
3.	Application for permit within the **COUNTY.** Only properly Florida licensed contractors that have registered with the County's permit portal can apply for an online permit. Contact the County for any questions and permitting (850) 606-1300.
5.	Electrical Plans are to be submitted with the radio communications enhancement system plans for approval. **[FAC61G15-33.005]**
6.	Electrical Engineering Documents for the communications systems must include the following information, if applicable to the project: (1) System riser diagram for each cabling system.

	(2) Equipment legend. (3) Cabling type and performance data of the transmission. (4) Device type and locations. (5) Backup power sources where applicable. (6) Installation, identification, and testing requirements. (7) Characteristics and locations for surge protective devices, if included in the engineering design. **[FAC.61G15-33.005]**
	Wiring and Pathway Survivability
7.	The backbone, antenna distribution, radiating, or any fiber-optic cables shall be rated as plenum cables. **[NFPA1221:9.6.2.1]**
8.	The backbone cables shall be connected to the antenna distribution, radiating, or copper cables using hybrid coupler devices of a value determined by the overall design. **[NFPA 1221: 9.6.2.2]**
9.	The backbone cables as well as the connection between the backbone cable and the antenna cables shall be made within 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. **[NFPA 1221: 9.6.2.3 & 9.6.2.4]**
10.	Two-way radio communications enhancement system shall have a pathway survivability of Level 1, Level 2, or Level 3. [NFPA72:24.3.13.8.1] **See Footnotes**.
11.	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] (6) Metallic cable trays. [NFPA1221:5.5.2]
12.	Systems shall have lightning protection that complies with NFPA 780.
	Component Enclosures
13.	All repeater, transmitter, receiver, signal booster components, optical-to-RF and RF-to-optical converters, external filters, batteries, and battery system components shall be

	contained in a NEMA4- or NEMA4X type enclosure(s). **[NFPA1221:9.6.11.2.1]**
14.	Batteries that require venting shall be stored in NEMA3R-type enclosures.
	Non-Interference and Non-Public Safety System Degradation
15.	No amplification system capable of operating on frequencies or causing interference on frequencies assigned to the jurisdiction by the licensing authority of the county of jurisdiction shall be installed without prior coordination and approval of the AHJ. **[NFPA1221:9.6.5.1]**
	Radio Coverage
16.	Critical areas, including Fire Command Centers, Fire Pump Rooms, Exit Stair, Exit Passageways, Elevator Lobbies, Standpipe Cabinets, Sprinkler Sectional valve locations, Generator Rooms, Mechanical Rooms, Elevator Rooms, Electrical Rooms, Underground garages, Underground Rooms, and other areas deemed critical by the AHJ, shall be provided with **99** percent floor area radio coverage. **[NAPA1221:9.6.7.4]** **NOTE: for TFD to gain clear radio perception within elevators we ask for indoor antenna to be place in close proximity of the elevators. If not, application for request to gain entrance into the elevator shafts must go through DBPR before installation.**
17.	General building areas shall be provided with **90** percent floor area radio coverage. **[NFPA1221:9.6.7.5]**
18.	Signal Strength shall be provided throughout the coverage area. The inbound and outbound signal level shall be sufficient to provide a minimum of DAQ 3.0 for either analog or digital signals. **[NFPA1221:9.6.81.2 & 9.6.8.2.2]**
	Radio Frequencies
19.	The signal booster must be registered with the FCC at www.fcc.gov/signal-boosters/registration.
20.	Frequency Changes. Systems shall be upgradeable to allow for instances where the jurisdiction changes or adds system frequencies to maintain radio system coverage as it was originally designed.
21.	All uplink signals (800-816 MHz) need to be confirmed with a Spectrum Analyzer for system oscillations and the uplink ERP is 5 watts or below(+37dbm.)
22.	**Frequencies:** The first four channels are configured control channels.

CHANNEL	FREQUENCY TX	FREQUENCY RX

	1	857.4625	812.4625
	2	857.3375	812.3375
	3	857.2125	812.2125
	4	856.9125	811.9125
	5	856.8125	811.8125
	6	856.4625	811.4625
	7	855.5125	810.5125
	8	856.2875	811.2875
	9	855.9625	810.9625
	10	855.9125	810.9125
	11	855.8125	810.8125
	12	855.6375	810.6375
	13	855.4125	810.4125
	14	855.3375	810.3375
	15	855.8875	810.8875
	16	855.1625	810.1625
	17	855.0875	810.0875
	18	855.0375	810.0375
	19	854.8625	809.8625
	20	855.7625	810.7625
	21	857.3125	812.3125
	22	854.4375	809.4375

23. **Tower Locations**

- 7th Avenue and Monroe St
- Myers Park
- Spray field on Tram Road
- Tom Brown Park
- HWY 59 NE Leon County
- Lantern Light Road

	• Hopkins Power Plant • Lake Talquin Dam
	Power Supplies
24.	At least two independent and reliable power sources shall be provided for all RF emitting devices and any other active electronic components of the system: one primary and one secondary. **[NFPA1221:9.6.12]**
25.	Primary Power Source-The primary power source shall be supplied from a dedicated branch circuit and comply with **NFPA 72. [NFPA 1221:9.6.12.1]**
26.	Secondary Power Source-The secondary power source shall consist of one of the following: (1) A storage battery dedicated to the system with 12 hours of 100 percent system operation capacity. (2) An alternative power source of 12 hours at 100 percent system operation capacity as approved by the AHJ. **[NFPA 112: 9.6.12.2]**
	System Monitoring
27.	The system shall include automatic supervisory signals for malfunctions of the two-way radio communications enhancement systems that are annunciated by the fire alarm system in accordance with NFPA 72, and shall comply with the following: (1) Monitoring for integrity of the system shall comply with [NFPA 72, Chapter 10.] (2) System supervisory signals shall include the following: (a) Donor antenna malfunction (b) Active RF-emitting device failure (c) Low-battery capacity indication when 70 percent of the 12-hour operating capacity has been depleted (d) Active system component failure (3) Power supply supervisory signals shall include the following for each RF-emitting device and active system components: (A) Loss of normal ac power (B) Failure of battery power (4) The communications link between the fire alarm system and the two-way radio communication enhancement system shall be monitored for integrity. [NFPA1221:9.6.13.1]
	Dedicated Annunciation
28.	A dedicated annunciator shall be provided within the fire command center to annunciate

	the status of all RF-emitting devices and active system component locations. This device shall provide visual and labeled indications of the following for each system component and RF emitting device: (a) Normal ac power (b) Loss of normal ac power (c) Battery charger failure (d) Low battery capacity (to 70 percent depletion) (e) Donor antenna malfunction (f) Active RF emitting device malfunction (g) System component malfunction The communication link between this device and the two-way communications enhancement system shall be monitored for integrity. **[NFPA1221:9.6.13.1 & 9.6.13.2]**
	Post Test:
29.	Permission must be granted by the City of Tallahassee Radio Shop. (Attn) Chris.pandolfi@talgov.com in order to transmit for post testing.
	Inspection & Acceptance Test by the AHJ
30.	All new systems shall have a rough in inspection and an acceptance test to verify that the system as installed meets the performance requirements of NFPA 1221, Section 9.6. The contractor may proceed with scheduling all inspections online through the **Customer Permit Portal, Task Code 933.**
31.	When scheduling Fire Department Acceptance Test inspection, the following personnel **shall** be required: a. DAS and/or BDA contractor b. Fire Alarm Contractor, if company that installed relays is not the installer of the fire alarm system, then the fire alarm system installing contractor shall be present as well.
32.	During the acceptance test of the system, the AHJ shall perform random voice tests and Received Signal Strength Indicator (RSSI) measurements throughout the entire facility. The AHJ will decide what areas of the building will be tested for RSSI and voice quality. The AHJ may request a test of the Uninterruptible Power Supply (UPS), the alarm, and the monitoring system.
	Annual Testing

33.	All systems shall be operationally tested at least annually to confirm system operation during normal operations.
	Footnotes*
Level 1	Pathway Survivability Level 1. Pathway survivability level 1 shall consist of pathways in buildings that are fully protected by an automatic sprinkler system in accordance with NFPA 13 with any interconnecting conductors, cables, or other physical pathways installed in metal raceways. **[NFPA72:12.4.2]**
Level 2	Pathway Survivability level 2. Pathway survivability level 2 shall consist of one or more of the following: (1) 2-hour fire-rated circuit integrity (CI) or fire-resistive cable (2) 2-hour fire-rated cable system (electrical circuit protective system(s)) (3) 2-hour fire=rated enclosure or protected area (4) Performance alternatives approved by the authority having jurisdiction. **[NFPA 72:12.4.3]**
Level 3	Pathway Survivability Level 3. Pathway Survivability level 3 shall consist of pathways in buildings that are fully protected by automatic sprinkler system in accordance with NFPA 13 and one or more of the following: (1) 2-hour fire-rated circuit integrity (CI) or fire-resistive cable (2) 2-hour fire-rated cable system [electrical circuit protective system(s)] (3) 2-hour fire-rated enclosure or protected area (4) Performance alternatives approved by the authority having jurisdiction.