



Orange County Fire Rescue

Two-Way Radio Communication Enhancement Systems

Distributed Antenna System General Requirements

REFERENCES:

Florida Fire Prevention Code 6th Edition

NFPA 72 (2013 Version): National Fire Alarm and Signaling Code

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

Orange County Code of Ordinances: Chapter 18- Fire Prevention and Protection, Sec. 18-32

Florida Administrative Code: 61G15-33.005 Design of Communication Systems

Florida State Statutes: Title XXXVII, Insurance - Chapter 633.202 (18) and 633.551, Fire Prevention and Control

DISTRIBUTED ANTENNA SYSTEM

Approval and Permit

1. Electrical plans are to be submitted with the building plans for approval. (FAC 61G15-33.005)
2. Electrical Engineering Documents for communications systems must include the following information, if applicable to the particular 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 of surge protective devices, if included in the engineering design. (FAC.61G15-33.005)
3. Application for installation must be made to the Office of the Fire Marshal, 7079 University Blvd, Winter Park, FL 32792 (F.S. 633.551) and (FFPC 1.14.1)
4. All system components shall be designed, installed, tested, inspected, and maintained in accordance with the manufacturers' published instructions and the requirements of Section 9.6 (1221:9.6.1)

Wiring and Pathway Survivability

5. The feeder and riser coaxial cables shall be rated as plenum cables that match the building's fire rating and pathway survivability. (1221:9.6.2.1.1.1)
6. Two-way radio communications enhancement system shall have a pathway survivability of Level 1, Level 2, or Level 3. (1221:9.6.2.1.1) See footnote
7. 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 Sec. 5.5.2)
8. The feeder coaxial cables shall be connected to the riser coaxial cable using hybrid coupler devices of a value determined by the overall design. (1221:9.6.2.1.1.2)
9. Riser coaxial cables shall be rated as riser cables and routed through a 2-hour-rated enclosure. [72:24.3.13.8.3]



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10.	The connection between the riser and feeder coaxial cables shall be made within 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. (1221:9.6.2.1.4)
11.	Systems shall have lightning protection that complies with NFPA 780.
Component Enclosures	
12.	All repeater, transmitter, receiver, signal booster components, external filters, and battery system components shall be contained in a NEMA4- or NEMA4X-type enclosure(s). (1221:9.6.11.2)
Non-Interference and Non-Public Safety System Degradation	
13.	No amplification system capable of operating on frequencies or causing interference on frequencies assigned to the jurisdiction by the licensing authority of the country of jurisdiction shall be installed without prior coordination and approval of OCFRD-OFM (1221:9.6.5.1)
Radio Coverage	
14.	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. (1221:9.6.7.4)
15.	General building areas shall be provided with 90 percent floor area radio coverage. (1221:9.6.7.4)
16.	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. (1221:9.6.8)
Radio Frequencies	
17.	Application to retransmit on 800mhz radio system must be made to the Orange County Radio Division. Att: Richard.Steiner@ocfl.net
18.	The signal booster must be registered with the FCC at www.fcc.gov/signal-boosters/registration .
Power Supplies	
19.	At least two independent and reliable power supplies shall be provided for all RF emitting devices and any other components of the system: one primary and one secondary. (1221:9.6.12)
20.	Primary Power Source- The primary power source shall be supplied from a dedicated branch circuit and comply with <i>NFPA 72</i> .
21.	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



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	System Monitoring
22.	<p>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:</p> <p>(1) Monitoring for integrity of the system shall comply with NFPA 72, Chapter 10.</p> <p>(2) System supervisory signals shall include the following:</p> <ul style="list-style-type: none">(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) System component failure <p>(3) Power supply supervisory signals shall include the following for each RF emitting device and system component:</p> <ul style="list-style-type: none">(a) Loss of normal ac power(b) Failure of battery charger <p>(4) The communications link between the fire alarm system and the two-way radio communications enhancement system must be monitored for integrity. (1221:9.6.13.1)</p>
	Dedicated Panel
23.	<p>(1) A dedicated monitoring panel shall be provided within the fire command center to annunciate the status of all RF emitting devices and system component locations. The monitoring panel shall provide visual and labeled indications of the following for each system component and RF emitting device:</p> <ul style="list-style-type: none">(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 <p>(2) The communications link between the dedicated monitoring panel and the two-way radio communications enhancement system must be monitored for integrity. (1221:9.6.13.2)</p>
	Before acceptance testing, please send DAS test results to OFMpermits@ocfl.net



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Footnote*

5.10.2 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. [72:12.4.2]

5.10.3* 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

[72:12.4.3]

5.10.4 Pathway Survivability Level 3. Pathway survivability Level 3 shall consist of pathways in buildings that are fully protected by an 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.