

EMERGENCY RESPONDER COMMUNICATIONS ENHANCEMENT SYSTEM (ERCES)



Office of the Fire Marshal
Kellie M. Krujaick, Fire Marshal
June 2024





EMERGENCY RESPONDER COMMUNICATIONS ENHANCEMENT SYSTEM (ERCES)

DAS Systems and Grid Report Surveys.

Osceola County

This reference guide is provided to assist with the submittal of Grid Survey Reports and BDA/DAS Systems to Osceola County Fire Rescue, Emergency Services, and the Office of the Fire Marshal. It is not intended to serve as a step-by-step checklist for installation and system design. The information herein shall not be used as the sole source criteria for formal plan review design specification and or inspection of systems to be installed.

Office of the Fire Marshal - 2024



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



INTRODUCTION

The purpose of this document is to serve as a guide for qualified contractors and/or subcontractors performing occupancy radio signal strength testing within Osceola County and the associated Fire Rescue and Emergency Service Districts within Osceola County. This document is not intended to be a governing document, nor is it intended to supersede the Fire Marshal's authority to apply the Florida Fire Prevention Code (FFPC) requirements fairly and equitably as occupancy conditions dictate. Instead, it is intended to provide helpful information to those entities performing the scope of work described in this document. In referencing this document, it is assumed that the requirement to complete a radio signal strength test and provide evidence of compliant radio signal strength for occupancy has already been determined by statute, rule, and code/standard or through consultation with the AHJ.



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OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Definitions

The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

Approved – Acceptable to the authority having Jurisdiction.

Authority Having Jurisdiction - 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.

Antenna - A device connected to a radio receiver, transmitter, or transceiver that radiates the transmitted signal, receives a signal, or both.

Backbone - A communications cable in an in-building radio enhancement system that carries wideband signals important to the entire building, from the donor antenna, through the amplifiers, and to distribution antenna lines.

Delivered Audio Quality (DAQ) - A measure of speech intelligibility of land mobile radios.

Distribution Antenna - A radio antenna that is specifically designed to radiate RF energy into a building area, and is typically non-descript in appearance so as not to disturb the décor of the area.

Distribution Antenna Cable - A communications cable that carries RF energy in both directions along its length to distribution antennas in one or more places in the building.

Donor Antenna - Antennas used with two-way radio communications enhancement systems that provide the connection between the wide-area communications system of interest and the in-building system.

Donor Site - The specific wide-area communications site from which the donor antenna acquires services.

Path (Pathways) - Any circuit, conductor, optic fiber, radio carrier, or other means connecting two or more locations.

Portable Radio - A battery-operated, hand-held transceiver.

Power Source - The power obtained from a utility distribution system, an engine-driven generator, or a battery.

Radiating Cable - A coaxial cable that distributes small amounts of RF energy along its length by means of periodic breaks in the shield surrounding the center conductor.

Radio Frequency - The number of electromagnetic wave frequency cycles transmitted by a radio in 1 second.

Radio Licensing Authority - The government authority in a country that issues licenses for use of radio frequencies by authorized agencies and individuals.

Repeater - A device for receiving and re-transmitting one-way or two-way communication signals.

RF-Emitting Device - An active device that emits a radio frequency signal as part of a two-way radio communications enhancement system.

Two-Way Radio Communications Enhancement System - A combination of components, RF-emitting devices, antennas, cables, power supplies, control circuitry, and programming installed at a specific location to improve wireless communication at that location.



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



EVERGREEN DOCUMENT

Living Document. This document is periodically updated or revised at the discretion of the AHJ. The updated version will be posted on the Osceola County Office of the Fire Marshal page. <https://www.osceola.org/agencies-departments/fire-marshal/>

Effective with the release of this version, the requirements detailed in previous versions of this guideline are no longer applicable for permit processing, submission of grid reports, formal plan review, and inspection of BDA/DAS system installation.

NOTICE TO ALL BUILDING OWNERS, INTYERGRATORS, and SYSTEM DESIGNERS

Compliance by all buildings NFPA 1:11.10. In all new and existing buildings, minimum radio signal strength for fire department communications shall be maintained at a level determined by the AHJ.

- Included but not limited to; hospitals, shopping malls, big box stores, nursing and residential care homes, schools, college and university buildings and many other critical structures.**

DAS (Distributed Antenna System) Requirement. Florida Statute 633.202 (18), The authority having jurisdiction shall determine the minimum radio signal strength for fire department communications in all new and existing buildings. Two-way radio communication enhancement systems or equivalent systems may be used to comply with the minimum radio signal strength requirements. However, two-way radio communication enhancement systems or equivalent systems are not required in 1. apartment buildings 75 feet or less in height that are constructed using wood framing, provided that the building has less than 150 dwelling units and that all dwelling units discharge to the exterior or to a corridor that leads directly to an exit as defined by the Florida Building Code. Evidence of wood frame construction shall be shown by the owner providing building permit documentation which identifies the construction type as wood frame. 2. Buildings having less than 12,000 total gross square feet with no underground areas. 3. Apartments and transient public lodging establishments that are less than three stories high and that have direct access from the apartment or guest area to an exterior means of egress.. Existing high-rise buildings as defined by the Florida Building Code are not required to comply with minimum radio strength for fire department communications and two-way radio communication enhancement systems as required by the Florida Fire Prevention Code until January 1, 2025. However, by January 1, 2024, an existing high-rise building that is not in compliance with the requirements for minimum radio strength for fire department communications must apply for an appropriate permit for the required installation with the local government agency having jurisdiction and must demonstrate that the building will become compliant by January 1, 2025. Existing high-rise apartment buildings are not required to comply until January 1, 2025. However, existing high-rise apartment buildings are required to apply for the appropriate permit for the required communications installation by January 1, 2024.



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Currently Adopted Codes and Standards

As effective December 31, 2020. All projects permitted before this date shall comply with current adopted codes and standards.

Florida Fire Prevention Code (FFPC) Eighth Edition, 2023

Florida Building Code (FBC) Eighth Edition, 2023
NFPA 1225, 2022 Edition, Standard for the Installation, Maintenance, and Use of Emergency Services Communication Systems

NFPA 70, 2020 Edition, National Electrical Code

NFPA 780, 2020 Edition, Installation of lightning protection

NFPA 72, 2019 Edition, National Fire Alarm Code

Florida Administration Code: 61G15-33.005 Design criteria of Communication Systems

Florida State Statute 633.202 (18)

Grid Survey Reports and Radio Coverage

Submission of an Emergency Radio Signal Survey. NFPA 1.11.10 Accessing Osceola County's dispatch network without documentation of authorized approval is prohibited. Prior to conducting a walk test and or survey, an integrator must comply with the following requirements.

- 1. Obtaining authorization to conduct a walk test.** To receive authorization to Osceola County's Radio Service Network, and to schedule a walk test, submit your request to the following link radioservices@osceola.org.
- 2. 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.
- 3. General building areas.** General building areas shall be provided with 90 percent floor area radio coverage.



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Licensed or Certificate of Installing Contractors

If Osceola County radio services deems a DAS system is warranted during initial walk through, an integrator possessing an FCC-issued general radio operator's license (GROL) must conduct the frequency test and thereafter upload the grid report, survey, and design plans to the following link for formal review.

permits.osceola.org

If an integrator is not GROL licensed, a certification of in-building wireless communications system training issued by a nationally recognized organization, school or a certificate issued by the manufacturer of the equipment being installed shall be presented.

Application for System Installation

Where a two-way radio communications enhancement system is required, the design of the system shall be approved through a formal plan review conducted by the AHJ.

All system components shall be designed, installed, tested, inspected, and maintained in accordance with the manufacturer's published instructions and the requirements of the adopted version of NFPA 1225, Standard for Emergency Services Communications.

Permitting Process: The required permits are to be obtained at Osceola County Administration Building, Permitting Services, 1 Courthouse Square, Kissimmee, Florida 33441; or online at permits.osceola.org

The required permit for installation is as follows:

Fire Alarm Bi-Directional Amplifier (prefix FAB)

Submission of System Designs for Formal Plan Review

The design shall be performed by a RF system designer. All systems submitted for approval should consist of the following, as appropriate for the design:

- DAQ signal source level measurements in a format acceptable to the AHJ [e.g., DAQ, bit error rate (BER), signal to interference noise ratio (SINR)]
- Local code requirements and statement of compliance
- Building site plan, building floor plans, and elevation plans
- Donor RF link path profiles, link budgets, azimuths, and distances
- Donor antenna mounting details and donor antenna cable installation details
- Grounding and surge suppression details
- Backbone and distribution antenna cable diagrams
- Device locations on floor plans
- Pathway survivability design as applicable



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Submission of System Designs for Formal Plan Review

- Primary and backup power distribution design and wiring
 - Backup power calculations
 - Monitoring system design including fire alarm control unit (FACU) interfaces and annunciators
 - Donor/DAS antenna isolation calculations
 - Pre-installation predictive DAQ or signal coverage maps on floor plans
 - Designer qualifications
 - Installer qualifications
 - Test grids on floor plans, or walk plan if approved by AHJ
 - Manufacturers' specification sheets (i.e., cut sheets) for all equipment and cable
- * A separate electrical permit will be automatically generated and related with the FAB permit. The electrical permit will be reviewed and inspected by the building office**

Multiple Buildings, Campus design. Currently, all buildings required to have in-building radio enhancement shall be provided with individual backbone and BDA system.

A design incorporating a hybrid DAS system (use of fiber and coaxial) shall be formally reviewed and official determination shall be received prior to the start of installation.

Inspection and Test Requirements

Where two-way radio communications enhancement systems are installed, a system test shall be conducted, documented, and signed by a person approved by the AHJ upon system acceptance and at the request of the AHJ.

BDA/DAS systems are required to be inspected and tested annually or whenever structural changes occur including additions or remodels that could materially change the original field performance tests.

All relevant documentation for the DAS/BDA system, including the acceptance and or annual maintenance test reports, must be kept on the building premises and be made available to a Fire Inspector upon request.

Inspection Process

To schedule an inspection please see our website at permits.osceola.org

Fire Marshal Inspection: Customers should ensure the following information is available on site for use by the assigned fire inspector:

- Locations of the BDA/DAS system control equipment, amplifiers, signal boosters, backup battery systems, and any outdoor antennas.
- Grid Report. Diagram for each floor where coverage is provided, divided into a grid of 20 approximately equal test areas, and include pre-test received signal strengths and frequencies for each test area. Indicate all critical areas where 99% coverage is required.



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Inspection Process

- Copies of manufacturer specification sheets for all BDA/DAS systems components, including amplifiers, signal boosters, antennas, coax, couplers, splitters, combiners, filters, or any other passive components proposed. Include data sheets for the backup battery and charging system (if utilized), and include calculations to ensure the backup power requirements are met.
- Other information, manufacturer specs or documentation may be required at the discretion of the Fire Inspector assigned.

At the conclusion of successful acceptance testing, the integrator, owner and/or representative shall apply for a Radio Communications Enhancement System Retransmission Application. Contact Osceola County Radio Services at radioservices@osceola.org ALL DAS systems installed and approved in Unincorporated Osceola County shall be maintained for the life of the property.

Initial Acceptance Test Requirements

Where two-way radio communications enhancement systems are installed, a system test shall be conducted, documented, and signed by a person approved by the AHJ.

All systems initial acceptance testing documentation shall include a listing of the following:

- All system equipment utilized
- Manufacturer's data sheets
- Installation, testing, and maintenance documentation.
- As-built drawings showing all equipment locations.
- Written documentation acceptable to the AHJ of the initial system testing, including the DAQ measured at all locations in the building or areas covered by the installed system.
- Secondary power calculation.
- List of assigned frequencies.

DAQ Performance test. An integrator who is FCC/GROL licensed must conduct the acceptance survey test to verify compliance with required DAQ 3.0 performance of the system.

Final grid report. The final grid report must include all of the following.

1. Signal Strength.

- a. **Inbound.** A minimum inbound (or downlink) signal strength shall be sufficient to provide usable voice communications throughout the coverage area. The inbound signal level shall be sufficient to provide a minimum of DAQ 3.0 for either analog or digital signals.



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Initial Acceptance Test Requirements

- b. **Outbound.** A minimum inbound (or uplink) signal strength shall be sufficient to provide usable voice communications throughout the coverage area. The outbound signal level shall be sufficient to provide a minimum of DAQ 3.0 for either analog or digital signals.
- c. **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.
- d. **General building areas.** General building areas shall be provided with **90 percent** floor area radio coverage.
- e. Radio enhancement systems shall be designed to support two portable radios simultaneously transmitting on different talk paths or channels.

2. Technology. A spectrum analyzer and/or other comparable technology shall be used to ensure adequate reception and transmission of signal is not violated by other unauthorized carriers. The choice of technology used shall be identified in the report.

3. Use of Osceola County agencies. The Osceola County Police and or Fire Departments are not available to verify nor validate the required minimum radio signal performance of delivered audio quality (DAQ).

- a. **Use of Mobile Radios.** Due to security concerns, Osceola County Radio Services (FCC License Holder) does not currently have loaner program for rental or temporary assignment of radios programmed to its network. The performance of DAQ must be demonstrated by the installing integrator without the use of Osceola County's network.
- b. **Signal Strength.** The minimum inbound/outbound signal strength sufficient to provide voice communications throughout a coverage area is a Delivered Audio Quality DAQ of 3.0.
- c. **DAQ acceptance verification.**

4. At the conclusion of successful acceptance testing, a renewable permit shall be issued for the public safety radio enhancement system where required by the AHJ.

Deviation from Approved Plans

Where a modification or change deviates from an approved issued plan, affects system performance, Code compliance or product approvals, the AHJ may require that such changes be submitted and approved before installation proceeds. NFPA 1:14.5

Where required, revised plans and design documents shall be prepared by a registered design professional.



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Deviation from Approved Plans

Review and approval of a plan by the AHJ shall not relieve the applicant of the responsibility of compliance with this Code. NFPA 1.14.4

Any Code deficiencies noted during an inspection or after further review of plans must be corrected. The owner is responsible for correcting items noted during inspection or the plan review process even if such violations are brought to the attention of the AHJ and owner at a later date.

Mounting of the Donor Antenna(s)

To maintain proper alignment with the system designed donor site, donor antennas shall meet one of the following:

- Antennas shall be permanently affixed on the building.

Shell Building Requirements

All new buildings under construction where an in-building system is to be installed shall provide proof of minimum radio frequency coverage, Digital Audio Quality 3.0, and functionality prior to the issuance of a Certificate of Completion.

The backbone and/or donor riser arrangement shall be fully installed.

System installers submitting designs post formal plan review must follow the application process detailed under section "Submission of System Designs"

Phased Installation

In all cases of phased construction the backbone and/or donor riser shall be fully installed. Only the BDA system (Feeder distribution) is allowed to be phased per tenant, floor and/or building section.

A grid report indicating minimum coverage per phase shall be required prior to starting additional phases of installation. The AHJ may require revised plans to be submitted for in-field modifications and changes during installation under phasing conditions.

Temporary Certificate of Occupancy

Approval of a Temporary Certificate of Occupancy is conditional to the installing contractor providing confirmation by grid report that a DAS system under installation is fully functional and ready for use by the Osceola County Fire and Police Departments and other emergency response agencies. Upon approval of the design by the local authority having jurisdiction, the jurisdiction must require the installation of the two-way radio communication enhancement system within 12 months after the issuance of a temporary certificate of occupancy.

Certificate of Occupancy

There is no provision for issuance of a Certificate of Occupancy to a building wherein the required in-building two way communication system is not fully installed, tested and approved for use.



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Lightning Protection

Systems shall have lightning protection that complies with the current edition of NFPA 780: Standard for the Installation of Lightning Protection Systems. Where required by NFPA 780, system components shall be listed and labeled.

Qualifications. Installing contractor shall provide verifiable credentials and/or other satisfactory proof of experience to the AHJ upon request.

Where required by the AHJ, a Master label and or a letter of finding from Underwriters Laboratory (UL) shall be provided.

The system shall be grounded in accordance with NFPA 70, Chapter 8

Should there be a change in alterations to the building, modifications in its use, or renovations to the building exterior that could hinder the efficacy of the lightning protection system, the AHJ will require an inspection and test of the system. If the system fails under test and inspection, a lightning protection system compliant with NFPA 780 shall be required.

Backbone and Donor Riser Systems

The backbone, antenna distribution, radiating, or any fiber optic cables shall be rated as plenum cables.

Backbone cables shall be routed through an enclosure that matches the building's fire rating.

Protection. 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 comparable to the building's fire rating.

Orientation. The requirement for a rated enclosure applies to all in-building riser backbone(s) regardless of orientation, vertical or horizontal installations.

Underground Routing. Underground metallic and fiber-optic communication and signal cables in ducts or of the direct burial type shall be permitted to be brought above ground only at locations approved by the AHJ.

All raceways or ducts entering buildings from underground duct systems shall be effectively sealed with an identified sealing compound or other means acceptable to the AHJ to prevent moisture or gases from the underground duct system from entering the building.

Cable splices, taps, and terminal connections shall be located only where accessible for maintenance and inspection and where the AHJ has determined that no potential for damage to the cable due to falling structures or building operations exists.

Wiring Inside Buildings

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: [1221.5.5.2]

- Electrical metallic tubing
- Intermediate metal conduit
- Rigid metal conduit
- Surface metal raceways



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Wiring Inside Buildings

- Reinforced thermosetting resin conduit (RTRC)
- Metallic cable trays.

Note. Piping shall be identified in a manner that distinguishes DAS system piping from other runs.

Plenum rated armored cable systems. Listed incased plenum rated cables are acceptable as a metal raceway alternative, to level 1 pathway survivability. **The design and use shall be submitted for formal review and approval prior to installation.**

Use in riser applications. Shall be protected with an enclosure matching the buildings fire resistance when used as a riser or backbone system. Mechanical protection shall be required at the discretion of the AHJ.

Fiber–Optic cables. Conductors and fiber-optic cables shall be installed as far as possible without splices or joints.

Splices or joints shall be permitted only in listed and or rated junction terminal boxes, enclosures, or other approved termination devices.

Use of Rated Rooms.

1. Design of wiring method shall receive a formal plan review and approval prior to installation.
2. The connections, backbone and/or donor riser shall be provided with protection against physical damage in a method approved by the AHJ.
3. Passage of the antenna distribution cable in and out of the enclosure shall be fire-stopped comparable to the building's fire rating.
4. All other conditions of use not detailed will be considered during a formal plan review wherein all details presented.

Pathway Survivability

Backbone cables shall be routed through an enclosure that matches the building's fire rating.

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.

Use of listed 2 hr. rated coaxial cables. When used as the backbone and/or donor riser in lieu of an enclosure matching the building's fire rating, the distribution connections shall be designed to maintain comparable fire resistance rating of the cable.

- There shall be no installation of the cable prior to formal approval of the design proposed.

Conditions of installation may require mechanical protection from physical damage. When such is required, it will be communicated by the AHJ

All other considerations of pathway survivability shall be determined by formal plan review wherein all details and conditions are provided.

Vertical Shafts

Exit Stair Enclosures and Elevator Shafts in commercial buildings. Shall be enclosed in accordance with the criteria of NFPA 101.7.1.3.2 and protected in accordance NFPA 101.8.6.5.



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Vertical Shafts

Enclosures connecting four or more stories in new construction shall be protected with 2 hr. fire barriers.

- The connection between the riser and feeder coaxial cables shall be made within the 2-hour-rated enclosure, and passage of the feeder cable in and out of the 2-hour-rated enclosure shall be fire-stopped to 2-hour ratings.

Enclosures connecting three or less stories in new construction shall be protected with 1 hr. fire barriers.

- The connection between the riser and feeder coaxial cables shall be made within the 1-hour-rated enclosure, and passage of the feeder cable in and out of the 1-hour-rated enclosure shall be fire-stopped to 1-hour ratings.

Note. In cases where the building's fire rating is less than 1 hour, a fire resistance of no less than 1 hour shall be provided. There is no provision for installation of a backbone and/or donor riser system without fire-resistive protection.

Stair Enclosures

Backbone and/or donor riser shall be protected against physical damage in a manner approved by the AHJ. The construction of the physical protection shall not encroach nor obstruct the egress width required. The design of protection proposed shall be submitted for review and approved prior to installation.

Elevator Shafts

The connections, backbone and/or donor riser shall be protected against physical damage in a manner approved by the AHJ.

The passage of the antenna distribution cable in and out of the elevator shaft enclosure shall be fire-stopped to match the fire rating of the shaft.

Component Approval and Enclosures

RF emitting devices and cabling used in the installation of the public safety two-way radio communications enhancement systems shall be approved by the AHJ, and all RF emitting devices shall have the certification of the radio licensing authority and be suitable for public safety use prior to installation.

All repeater, transmitter, receiver, signal booster components, external filters, and battery system components shall be contained in a NEMA 4- or NEMA 4X-type enclosure(s).

Batteries that require venting shall be stored in NEMA3R-type enclosures.



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Non-Interference and Non-Public Safety System Degradation

No amplification system capable of operating on frequencies or causing interference on frequencies assigned to the jurisdiction by the FCC shall be installed without prior coordination and approval of Radio Services and OSCFR. (1221.9.6.5.1; 72.24.5.2.1.1)

The building manager/owner shall suspend and correct equipment installations that degrade the performance of the public safety radio system or public safety radio enhancement system.

Radio Coverage

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. [1221.9.6.7.3]

- Emergency Command Center(s)
- Exit Stairs
- Elevator Lobbies
- Sprinkler Sectional
- Fire Pump Rooms (s)
- Exit Passageways
- Standpipe Cabinets
- Valve Locations
- Other areas identified by the fire code official

General building areas shall be provided with 90 percent floor area radio coverage.[1221.6.9.7.4]

Radio Frequencies

BDA/DAS system owners are required by the FCC to register their BDA/DAS system (which the FCC identifies as 'signal boosters') with the FCC. This applies to those systems already placed in operation, in permitting or under construction. The FCC Rule requiring registration is CFR 47, FCC Part 90.219(d)(5). Additional information may be found at: <http://wireless.fcc.gov/signalboosters/part-90-boosters/index.html>

The amplification equipment must be FCC Type Accepted. Osceola County currently operates on a Motorola ASTRO P25 800MHz radio system.

All uplink signals (806-816 MHz) need to be confirmed with a Spectrum Analyzer for system oscillations and the uplink ERP is 5 watts or below (+37 dbm).



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Radio Frequencies

The AHJ shall maintain a list of all inbound/outbound frequency pairs for distribution to system designers. (1221.9.6.10.1) To ensure that BDA/DAS systems do not cause any harmful interference to the public safety radio system, building owners or their designees will be required to provide specific information about their BDA/DAS system and to coordinate system turn-up with Osceola County Radio Services.

Building owners or their designees can request authorization via a letter of "Request for Authorization: BDA/DAS Installation for In-Building Public Safety Radio System Coverage" to the Radio Services at radioservices.osceola.org and request the control channel to test for DAS/BDA.

Amplification Components

Buildings and structures that cannot support the required level of radio coverage shall be equipped with a radiating cable system or a distributed antenna system (DAS) with FCC-certified signal boosters, or both, or with a system that is otherwise approved, in order to achieve the required adequate radio coverage.

Signal Strength

Inbound. A minimum inbound signal strength of -105 dbm at the donor site, or other signal strength sufficient to provide usable voice communications, as specified by the AHJ, shall be provided throughout the coverage area. The inbound signal level shall be sufficient to provide a minimum of Delivered Audio Quality, DAQ 3.0 for either analog or digital signals.

Outbound. A minimum outbound strength of -105 dbm at the donor site shall be sufficient to provide usable voice communications, as specified by the AHJ, shall be provided throughout the coverage area. The outbound signal level shall be sufficient to provide a minimum of Delivered Audio Quality, DAQ 3.0 for either analog or digital signals.

Isolation

If a donor antenna exists, isolation shall be maintained between the donor antenna and all inside antennas and shall be a minimum of 20 dB above the signal booster gain under all operating conditions.

If used, signal boosters shall meet the following requirements, as well as any other requirements determined by the authority having jurisdiction:

1. Signal boosters shall have FCC certification prior to installation.
2. All signal boosters shall be compatible with both analog and digital communications simultaneously at the time of installation. The authority having jurisdiction shall provide the maximum acceptable propagation delay standard.

Power Sources

Primary Power Source. The primary power source shall be supplied from a dedicated branch circuit and comply with 72.10.6.5.1



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Power Sources

Branch Circuit.

The branch circuit supplying the fire alarm equipment(s) or emergency communication system(s) shall supply *no other loads* and shall be supplied by one of the following:

1. Commercial light and power
2. An engine-driven generator or equivalent in accordance with 10.6.11.2, where a person specifically trained in its operation is on duty at all times
3. An engine-driven generator or equivalent arranged for cogeneration with commercial light and power in accordance with 10.6.11.2, where a person specifically trained in its operation is on duty at all times

At least two independent and reliable power supplies shall be provided for all RF emitting devices and any other electronic components of the system: one primary and one secondary.

Secondary Power Source. The secondary power source shall consist of one of the following:

- A storage battery dedicated to the system with 12 hours of 100 percent system operation capacity.
- An automatic-starting, engine-driven generator serving the dedicated branch circuit or the system with at least 12 hours of 100 percent system operation capacity and storage batteries dedicated to the system with at least 2 hours of 100 percent system operation capacity and arranged in accordance with (72.10.6.11.3).

Monitoring. Monitoring the integrity of power sources shall be in accordance [1221.9.1.2.2]

System Monitoring

Fire Alarm System. 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; 1221.9.6.13.1(2)(a) and shall comply with the following:

- (1) Monitoring for integrity of the system shall comply with NFPA 72, Chapter 10.6.9 and Section 12.9.6
- (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 system component:
 - a) Loss of normal ac power
 - b) Failure of battery charger
- (4) The communications link between the fire alarm system and the two-way radio communications enhancement system must be monitored for integrity.



OSCEOLA COUNTY FIRE RESCUE

Emergency Responder Radio Coverage Systems (ERRC)
Submission of In-Building Two-Way Communication Systems for DAS/BDA



Dedicated Annunciation

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:

1. Normal ac power
2. Loss of normal ac power
3. Battery charger failure
4. Low-battery capacity (i.e., to 70 percent depletion)
5. Donor antenna malfunction
6. Active RF-emitting device malfunction
7. Active system component malfunction

The communications link between the dedicated monitoring panel and the two-way radio communications enhancement system must be monitored for integrity.



OSCEOLA COUNTY
FIRE RESCUE & EMS

