



Emergency Responder Communications Enhancement System (ERCES) Plan Review Check Sheet

- Approved Radio Signal Strength test demonstrating need for ERCES [NFPA 1225:18.2.1]
- Provide building owner/agent and address [61G6 FAC]
- Provide scope of work narrative [FFPC 1:1.7.12.3]
- FCC GROL license holder name and number noted on cover sheet [NFPA 1225:18.2.1]
- EF/EC contractor name, address, city, state and license number on each drawing. [NFPA 1225:18.2.1] (Must be licensed EF or EC)
- Signature and seal of the Engineer of Record (EOR).
 - Name, PE number, business name, address, and contact information provided the plans.
 - AHJ may require that the EOR provide evidence of experience and training in Electrical Engineering. [61G15-30.003(2) FAC/NFPA 1225:18.2.2]
- Note indicating design conforms to the following codes/edition dates:
 - Florida Fire Prevention Code, 7th Edition
 - NFPA 1225 (2022)
 - NFPA 70 (2017)
 - NFPA 72 (2019)
 - FCC Title 47 CFR
 - Motorola R56
 - IEEE 1692
 - TIA 569, and TIA 607.
 - UL 2524/UL 60950 [61G15-30.003(1b) FAC]
- Provide building description indicating:
 - building construction type
 - building occupancy
 - total square footage
 - number of floors
 - total height of building [NFPA 1225:18.2.1]
- Note indicating the proposed system will transmit all public safety radio frequencies assigned to the AHJ and capable of using any modulation technology. [NFPA 1225:18.11]
- Note indicating system components will be compatible with the existing public safety radio system. [NFPA 1225:18.11]
- Note indicating system is upgradable. [NFPA 1225:18.11.2]
- Note on cover sheet stating: *“The system shall never be energized for testing or operation until written, or on site, approval is obtained from the FCC License Holder.”* [NFPA1225:18.12.2]
- Note indicating an information binder, to be stored near the amplifier, shall be provided and include:
 - As-built drawings
 - Manufacturer’s data sheets and specs
 - Heat map (if applicable)
 - Final radio signal strength measurement grid (dB)



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- Maintenance contract
- Final Retransmission Agreement
- Maintenance Repair Log [NFPA 1225:18.15.6]
- Note indicating placard (1-inch-high white letters on red background) will be posted on or near the FACP stating: “*This building is equipped with an Emergency Radio Communications Enhancement System*”. [PCR&T]
- Provide equipment specification sheets with manufacturer’s part numbers for ALL proposed system components that includes equipment temperature limits. [NFPA 1225:18.2.1]
- Note indicating that active RF-emitting components (signal boosters) meet the following:
 - FCC Certification prior to installation.
 - Minimum Class B (Class A preferred) [PCR&T]
 - Compatible with both analog and digital communications simultaneously. [NFPA 1225:18.12.2]
- Note indicating that all repeaters, transmitters, receivers, signal-booster components, remote annunciators and operational consoles, power supplies, and battery charging system components shall be listed and labeled in accordance with UL 2524. [NFPA 1225:18.12.1.3]
- Note indicating the proposed radio signal strength coverage shall meet 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
 - 95% in non-critical areas**. [NFPA 1225:18.8]
- Note indicating isolation between the donor antenna and all inside antennas ***shall be a minimum of 20 dB above the signal booster gain***. [NFPA 1225:18.10]
- Complete set of drawings including:
 - Original approved RSS test grid plan with initial signal test results
 - Riser diagram
 - Sequence of operation in either an input/output matrix or narrative form
 - Date of each sheet origination and any subsequent revisions noted
 - Each sheet shall be numbered
 - Clearly labeled match lines [NFPA 1225:18.2.1]
- Provide floor plan sheet, drawn to a graphic scale, for each floor detailing:
 - Floor or level identification
 - Point of compass
 - Room/area descriptions
 - Layout of system device locations, control equipment, and FACP location (if applicable)
 - System riser location(s)
 - Locations of monitor/control interfaces to other systems
 - Type and number of system components/devices on each feeder, on each floor or level
 - All fire-rated enclosures (call out fire-rated enclosure for cables and ERCES room)
 - All material architectural details (doors, windows, etc.)
 - Riser/feeder pathway type(s) and conduit runs



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- Type and quantity of connectors and conduit for each riser/feeder.
- Propagation modeling (if provided) [NFPA 1225:18.2.1]
- Riser diagram shall correlate with the floor plan and include:
 - General arrangement of the system in building cross-section
 - Number of risers
 - Type and number of components in each riser
 - Type and number of components/devices on each feeder, on each floor/level. [NFPA 1225:18.2.1]
- Wiring diagrams provided for all control equipment, power supplies, battery chargers, and annunciators and include:
 - Identification of the control equipment depicted
 - Location(s) of control equipment
 - All field wiring terminals and terminal identifications
 - All circuits connected to field wiring terminals and circuit identifications
 - All indicators and manual controls
 - Connections to supervising station signaling equipment. [NFPA 1225:18.2.1]
- Provide antenna mast structural installation details:
 - Mast shall be designed and installed per FBC, current edition. [NFPA 1225:18.3.3.3]
 - Donor antenna orientation shall be coordinated with Pinellas County R&T.
 - Include FAA lighting (if applicable)
 - Shall be rated 160MPH or higher wind gusts [NFPA 1225:18.3.3.3]
 - Shall meet the wind loading requirements of the FBC and ANSI/TIA-222-G [PCR&T]
 - Compliance with antenna/mast structural requirements shall be certified by a Florida-licensed professional structural engineer.
 - Antennas shall be permanently affixed on the building or to approved sled-mounts.
 - Sled-mounted antennas shall have a visible sign affixed stating “*Movement or repositioning of this antenna is prohibited without approval from the AHJ.*” [NFPA 1225:18.3.3.1]
- Provide antenna technical and performance notes:
 - Donor antenna orientation shall be coordinated with Pinellas County R&T.
 - Donor antenna shall be:
 - Narrow band
 - High gain
 - Vertically polarized
 - Designed for specific frequency band
 - Yagi or corner-reflector type recommended [PCR&T]
- Propagation (heat) map drawings, if provided, shall include the following:
 - Indoor prediction legend
 - Materials legend
 - Pictogram legend
 - Cables legend
 - Calculations legend
 - Number of channels and frequencies



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- Predictive propagation on floor plans
- Name of certified designer and company [NFPA 1225:18.2.1]
- Note indicating propagation delay shall not exceed 8 μ S. [PCR&T]
- Battery calculations for battery secondary power source. [NFPA 1221(2019):9.6.6.1]
- Provide all firewall penetration details. [61G15 FAC]
- Indicate that backbone and antenna distribution cable(s):
 - Will be installed per Chapters 7 and 8 of NFPA 70
 - Mechanical protection of work and raceways for coaxial cables shall comply with NFPA 70, Article 820 [NFPA 1221:18.12]
- Backbone cables and components installed in NFPA 13 fully-sprinklered buildings shall not be required to be fire resistive. [NFPA 1225:18.12.3.3]
- Note indicating that all backbone cables and components installed in non-sprinklered, partially sprinklered, or high-rise buildings will meet one of the following:
 - Use a cable with a **listed** fire-resistance rating *or* be installed in a protected enclosure/area in accordance with the following:
 - Where the primary structural frame of a building is required to have a fire-resistance rating of 2 hours or more or is heavy timber construction, **the minimum fire-resistance rating shall be 2 hours.**
 - Where the primary structural frame of a building is required to have a fire-resistance rating of less than 2 hours, **the minimum fire resistance rating shall be 1 hour.**
 - Where the primary structural frame of a building does not require a fire-resistance rating, **a fire resistance rating shall not be required.** [NFPA 1225:18.12.3.4]
- Backbone and distribution antenna cables installed in a fire-resistant enclosure/area, shall meet both of the following:
 - The connection between the backbone cable and the distribution antenna cables shall be made within an enclosure/area.
 - Passage of the distribution antenna cable in and out of the enclosure/area shall be fire-stopped to an equivalent rating of the enclosure/area. [NFPA 1225:18.12.3.5]
- The following shall be contained in a NEMA 4 or 4X enclosure:
 - Repeater
 - Transmitter
 - Signal booster components
 - Optical-to-RF and RF-to-optical converters
 - External filters [NFPA 1225:18.3.1.2]
- The following shall be contained in a minimum NEMA 3R-type (or higher) enclosure:
 - Battery system components
 - Batteries that require venting shall be in a NEMA-3R type enclosure. [NFPA 1225:18.3.1]
- Note indicating that signal booster enclosure(s) shall be fire engine red color, with locking mechanism, and 1-inch-high contrasting letters with the following data:
 - Fire Department Radio Signal Booster
 - Permit Number _____



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- Serviced by _____ [PCR&T]
- Indicate power supply has at least two independent sources.
 - **Primary** power shall be from a dedicated circuit in compliance with NFPA 72.
 - Primary power shall be permanently connected.
 - Supplied from a dedicated branch circuit
 - Protected from overvoltage. [NFPA 1225:18.13.1]
 - **Secondary** power source shall be either of the following:
 - Dedicated storage battery with 12 hours of operation at 100% capacity.
 - Approved alternative power source with 12 hours of operation at 100% capacity.
 - Life Safety generator with at least 12 hours of operation at 100% and a battery with at least 2 hours of operation at 100%. [NFPA 1225:18.13.2]
- Note indicating the building fire alarm system will supervise the following:
 - Donor/distribution antenna malfunction
 - Signal booster failure
 - Active system component failure
 - Loss of AC power
 - Low-battery indication when 70 percent of the operating capacity is depleted
 - Failure of battery charger
 - Link between ERCES and FACP shall be monitored for integrity [NFPA 1225:18.14.1.2]
- Provide dedicated panel (annunciator panel) that shall indicate:
 - Normal AC power
 - Loss of normal AC power
 - Signal booster malfunction
 - Battery charger failure
 - Low battery capacity
 - Donor/distribution antenna malfunction
 - Active system component malfunction
 - Link between annunciator and ERCES shall be monitored for integrity. [NFPA 1225:18.14.2]
- Detail grounding and mounting details for antenna, mast, surge protection, amplifier, power supply, battery enclosure, etc. [61G15 FAC]
 - Connected to building electrical ground system and coaxial lightning protector
 - Motorola R56 and Harris Site Grounding and Lightning Protection Guidelines
 - Antenna, antenna mast, and antenna discharge units shall be grounded per NFPA 70, Article 820. [NFPA 1225:18.4.4]
- Provide antenna lightning protection. [NFPA 1225:18.4]
 - Impedance 50 Ω
 - Frequency range as needed
 - VSWR/SWR = 1.1:1 or better
 - Insertion Loss = 0.1dB or better
 - Impulse Discharge Current = 10KA or better
 - Turn-on voltage = 600V



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- Turn-on time = 2.5nS for 2kV/nS
 - Energy Throughput Rating = 5nJoules for 3kA (8/20 μ S waveform)
 - Continuous handling RF power = 100W or better [PCR&T]
 - Donor antenna coaxial cables shall be protected by listed antenna discharge units in accordance with NFPA 70, Article 820. [NFPA 1225:18.4.1]
 - Antenna discharge units shall be listed in accordance with UL 497C. [NFPA 1225:18.4.2]
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- Indicate the panel and circuit breaker ID; detail panel location on submission [NFPA 72]
 - Indicate provision of circuit breaker lock for primary power source. [NFPA 72]
 - Indicate circuits will have an isolated ground, if required by the manufacturer. [NFPA 70]
 - Indicate system equipment (amplifier/transmitter, battery pack) will be installed in air-conditioned/mechanically ventilated room/space/box where the manufacturer's installation specifications recommend a temperature/humidity limit. [NFPA 70:110.3]