**Chapter 24 Emergency Communications Systems (ECS)**

24.1 Application

24.1.1

The application, installation, and performance of emergency communications systems and their components shall comply with the requirements of this chapter.

24.1.2\*

The requirements of this chapter shall apply to emergency communications systems within buildings and outdoor areas.

24.1.3

The requirements of Chapters 7, 10, 12, 17, 18, 21, 23, 26, and 27 shall also apply unless otherwise noted in this chapter.

24.1.4

Inspection, testing, and maintenance shall be performed in accordance with testing frequencies and methods in Chapter 14.

24.1.5

The requirements of this chapter shall not apply to Chapter 29 unless specifically indicated.

24.2 Purpose

24.2.1

The systems covered under Chapter 24 shall be for the protection of life by indicating the existence of an emergency situation and communicating information necessary to facilitate an appropriate response and action.

24.2.2

This chapter establishes minimum required levels of performance, reliability, and quality of installation for emergency communications systems but does not establish the only methods by which these requirements are to be achieved.

24.2.3

An emergency communications system is intended to communicate information about emergencies including, but not limited to, fire, human-caused events (accidental and intentional), other dangerous situations, accidents, and natural disasters.

24.3 General

24.3.1 Intelligible Voice Messages

24.3.1.1\*

Emergency communications systems shall be capable of the reproduction of prerecorded, synthesized, or live (e.g., microphone, telephone handset, and radio) messages with voice intelligibility in accordance with Chapter 18.

24.3.1.2\*

Where listed loudspeakers do not achieve the intelligibility requirements of the Code for a notification zone, nonlisted loudspeakers shall be permitted to be installed to achieve the intelligibility for that notification zone.

24.3.2\* Microphone Use

All users of systems that have microphones for live voice announcements shall be provided with posted instructions for using the microphone.

24.3.3\* Required Emergency Communications Systems

An emergency communications system shall be installed in occupancies where required by the authority having jurisdiction or by other applicable governing laws, codes, or standards.

24.3.4\* Nonrequired (Voluntary) Emergency Communications Systems

24.3.4.1

Nonrequired emergency communications systems and components shall meet the requirements of this chapter.

24.3.4.2

Nonrequired emergency communications systems and components shall be identified on the record drawings.

24.3.5 Ancillary Functions

24.3.5.1

Ancillary functions shall not impair the required operation of the emergency communications system.

24.3.5.2\*

Loudspeakers used for emergency communications system functions also providing ancillary functions shall meet the conditions of either 24.3.5.2(1) or (2):

The fire command center or the emergency command center as applicable shall be constantly attended by trained personnel, and selective paging is permitted by the authority having jurisdiction.

All of the following conditions shall be met:

The loudspeakers and associated audio equipment are installed or located with safeguards to resist tampering or misadjustment of those components essential for intended emergency notification.

The monitoring integrity requirements of 10.6.9 and Sections 10.19 and 12.6 continue to be met while the system is used for non-emergency purposes.

24.3.5.3

Ancillary functions shall be inspected and tested annually to verify they will not impair the operation of the fire alarm system or the mass notification system.

24.3.5.4

Where emergency communications systems utilize Class N pathways that are also shared Level 1 or Level 2 pathways as a means to support ancillary functions, devices, or interconnected systems, the shared pathways shall meet the requirements of 23.6.3.

24.3.5.4.1

In addition to the requirements of 23.6.3, a risk analysis shall be performed and approved by the AHJ.

24.3.6 Messages for One-Way Emergency Communications Systems

24.3.6.1\*

Messages shall be developed for each scenario developed in the emergency response plan.

24.3.6.2\*

24.3.6.2.1

Based on the emergency response plan, emergency messages shall have content that provides information and instructions to people in the building, area, site, or installation.

24.3.6.2.2

The proposed verbiage of prerecorded automatic emergency messages shall be identified on the permit plans and be approved by the authority having jurisdiction prior to their programming into the emergency voice communications system.

24.3.6.2.3

As a minimum, the proposed verbiage of prerecorded messages shall be in the official spoken language acceptable to the authority having jurisdiction.

24.3.6.2.4

Additional prerecorded message(s) shall be permitted as approved by the authority having jurisdiction.

24.3.6.3\*

A message template shall be developed for each message required in 24.3.6.1.

24.3.6.4

For an evacuation message, a tone in accordance with 18.4.2 shall be used with a minimum of two cycles preceding and following the voice message.

24.3.6.5

Test messages shall clearly state the phrase "This is a test."

24.3.7\* System Classification

Emergency communications systems (ECS) shall be designated as one-way or two-way.

24.3.7.1\*

One-way emergency communications systems shall consist of one or more of the following:

In-building fire emergency voice/alarm communications systems (EVACS) (see Section 24.4)

In-building mass notification systems (see Section 24.5)

Wide-area mass notification systems (see Section 24.6)

Distributed recipient mass notification systems (DRMNS) (see Section 24.7)

24.3.7.2

Two-way emergency communications systems shall consist of one or more of the following:

Two-way, in-building wired emergency services communications systems (see Section 24.8)

Two-way radio communications enhancement systems (see Section 24.9)

Area of refuge (area of rescue assistance) emergency communications systems (see Section 24.10)

Stairway communications systems (see Section 24.10)

Elevator landing communications systems (see Section 24.10)

Occupant evacuation elevator lobby communications systems (see Section 24.10)

24.3.8\* Mass Notification Layers

Emergency communications used for mass notification shall be categorized into layers and take into consideration type of audience and reach as follows:

Layer 1 relates to means of notification of occupants by systems/equipment installed inside a building and controlled only by authorized users (in-building ECS)

Layer 2 relates to means of notification of occupants on the exterior of a building and controlled only by authorized users (wide-area MNS)

Layer 3 relates to means of notification of personnel through individual measures (distributed recipient MNS)

Layer 4 relates to means of notification of personnel by public measures (broadcast radio, television, and so forth)

24.3.9\* Design Documentation

Design documents in accordance with Section 7.3 shall be prepared prior to installation of any new system.

24.3.9.1

Systems that are altered shall have design documents prepared that apply to the portions of the system that are altered.

24.3.9.2

Documents shall be revised as necessary following installation to represent as-built conditions and include record drawings.

24.3.10\* Control Unit Listing for Mass Notification Systems

Control units installed as part of a mass notification system shall be in compliance with this Code and at least one of the following applicable standards:

ANSI/UL 864, Standard for Control Units and Accessories for Fire Alarm Systems

ANSI/UL 2572, Mass Notification Systems

24.3.11 Building System Information Unit

A building system information unit that displays information and events from the mass notification system shall comply with 23.8.4.4.1 through 23.8.4.4.3.

24.3.12\* Risk Analysis for Mass Notification Systems

24.3.12.1\*

Each application of a mass notification system shall be specific to the nature and anticipated risks of each facility for which it is designed.

24.3.12.1.1

When an owner has developed a risk analysis in accordance with 24.3.12, such risk analysis shall be permitted to be used as a baseline in preparing the risk analysis for new or renovated facilities that are similar in nature.

24.3.12.2

The designer shall consider both fire and non-fire emergencies when determining risk tolerances for survivability for the mass notification system.

24.3.12.3

The detail and complexity of the risk analysis shall be commensurate with the complexity of the facility for which the mass notification system is designed.

24.3.12.4

The risk analysis shall be permitted to be limited in scope to address the communication requirements of an existing emergency response plan.

24.3.12.5

The risk analysis shall consider the number of persons, type of occupancy, and perceived peril to occupants.

24.3.12.6

The analysis shall be based on the maximum occupant load calculation for every occupiable room, building, area, space, campus, or region is expected to contain.

24.3.12.7

Occupancy characteristics shall comply with 24.3.12.7.1 and 24.3.12.7.2.

24.3.12.7.1

The risk analysis shall consider characteristics of the buildings, areas, spaces, campuses or regions, equipment, and operations that are not inherent in the design specifications.

24.3.12.7.2

Those elements that are not inherent in the design specifications, but that affect occupant behavior or the rate of hazard development, shall be explicitly identified and included in the risk analysis.

24.3.12.8

The risk analysis shall consider the following types of potential events, which are not all-inclusive but reflect the general categories that shall be considered in the risk analysis:

Natural hazards — Geological events

Natural hazards — Meteorological events

Natural hazards — Biological events

Human caused — Accidental events

Human caused — Intentional events

Technological — Caused events

24.3.12.9

The risk analysis shall include a review of the extent to which occupants and personnel are notified, based on the anticipated event (potential hazard).

24.3.12.10

The risk analysis shall be used as the basis for development of the ECS provisions of the facility emergency response plan.

24.3.13\* Emergency Response Plan Elements

A well-defined emergency response plan shall be developed in accordance with NFPA 1600 and NFPA 1620 as part of the design and implementation of a mass notification system.

24.3.14 Pathway Survivability

24.3.14.1

Pathway survivability levels shall be as described in Section 12.4.

24.3.14.2

Other component survivability shall comply with the provisions of 24.4.8.6.6.

24.3.14.3\*

The pathway survivability requirements in 24.3.14.4 through 24.3.14.12 shall apply to notification and communications circuits and other circuits necessary to ensure the continued operation of the emergency communications system.

24.3.14.4

In-building fire emergency voice/alarm communications systems shall comply with 24.3.14.4.1 or 24.3.14.4.2.

24.3.14.4.1

For systems employing relocation or partial evacuation, a Level 2 or Level 3 pathway survivability shall be required, unless otherwise permitted in 24.3.14.4.1.1 or 24.3.14.4.1.2.

24.3.14.4.1.1

Where notification zones are separated by less than 2-hour fire-rated construction, a pathway survivability of Level 1, 2 or 3 shall be permitted.

24.3.14.4.1.2

Where Class X or Class N system pathways are installed and the incoming and outgoing pathways are separated by at least one-third the maximum diagonal of the notification zone, a pathway survivability of Level 1, 2 or 3 shall be permitted.

24.3.14.4.2

For systems that do not employ relocation or partial evacuation, a Level 0, Level 1, Level 2, or Level 3 pathway survivability shall be permitted.

24.3.14.5

Pathway survivability levels for in-building mass notification systems shall be determined by the risk analysis.

24.3.14.6

Pathway survivability levels for wide-area mass notification systems shall be determined by the risk analysis.

24.3.14.7

Two-way in-building wired emergency communications systems that are installed where the building has less than 2-hour fire-rated construction shall have a pathway survivability of Level 1, 2, or Level 3.

24.3.14.8

Two-way in-building wired emergency communication systems that are installed where the building has 2-hour fire-rated construction or greater shall have a pathway survivability of Level 2 or 3.

24.3.14.9\*

Area of refuge (area of rescue assistance) emergency communications systems shall comply with 24.3.14.9.1 and 24.3.14.9.3.

24.3.14.9.1

Area of refuge wired emergency communications systems that are installed where the building has less than 2- hour fire-rated construction shall have a pathway survivability of Level 1, 2, or 3.

24.3.14.9.2

Area of refuge wired emergency communication systems that are installed where the building has 2-hour fire-rated construction or greater shall have a pathway survivability of Level 2 or 3.

24.3.14.9.3

Circuits intended to transmit off-premises shall have a pathway survivability of Level 0, Level 1, Level 2, or Level 3.

24.3.14.10

Elevator emergency communications systems shall have a pathway survivability of Level 0, Level 1, Level 2, or Level 3.

24.3.14.11

Central command station emergency communications systems shall have pathway survivability as determined by the risk analysis.

24.3.14.12

All other emergency communications system circuits shall have pathway survivability as determined by the risk analysis.

24.4\* In-Building Fire Emergency Voice/Alarm Communications Systems (EVACS)

Diagram

Section 24.4 shall be used in the design and application of in-building fire emergency voice/alarm communications for fire alarm systems.

UpCodes Diagrams

P

EVACS Systems

24.4.1 Automatic Response

The in-building fire emergency voice/alarm communications system shall be used to provide an automatic response to the receipt of a signal indicative of a fire alarm or other emergency.

24.4.1.1

When the monitoring location is constantly attended by trained operators, and operator acknowledgment of receipt of a fire alarm or other emergency signal is received within 30 seconds, automatic response shall not be required.

24.4.1.2

If acceptable to the authority having jurisdiction, the system shall permit the application of an automatic evacuation signal to one or more signaling zones and, at the same time, shall permit manual voice paging to the other signaling zones selectively or in any combination.

24.4.2 Voice Evacuation Messages

24.4.2.1

Unless otherwise permitted by 24.4.8, evacuation messages shall be preceded and followed by a minimum of two cycles of the emergency evacuation signal specified in 18.4.2.

24.4.2.2

Voice messages shall comply with the requirements of 24.3.1.

24.4.2.2.1

The following requirements shall be met for layout and design:

The loudspeaker layout of the system shall be designed to ensure intelligibility and audibility.

Intelligibility shall first be determined by ensuring that all areas in the building have the required level of audibility.

24.4.2.2.2\*

System design shall incorporate designation of acoustically distinguishable spaces (ADS) within the occupiable areas as required in Chapter 18.

24.4.2.2.3

Audibility shall be required in all areas in accordance with Chapter 18.

24.4.3 Positive Alarm Sequence

In-building fire emergency voice/alarm communications systems shall be permitted to use positive alarm sequence complying with 23.8.1.2.

24.4.4 Tones

The tone preceding any message shall comply with 24.4.4.1 through 24.4.4.4.

24.4.4.1

The tone preceding any message shall be permitted to be a part of the voice message or to be transmitted automatically from a separate tone generator.

24.4.4.2\*

Except as specified in 24.4.4.3, in occupancies where sleeping accommodations are provided and the voice message is intended to communicate information to those who could be asleep, a low frequency tone that complies with 18.4.6 shall be used.

24.4.4.3\*

In areas where sleeping accommodation are provided, but the voice communication system is used to communicate to occupants who are awake, the low frequency tone shall not be required.

24.4.4.4

Audible signal tones for alert or evacuation shall meet the audibility requirements of either 18.4.4 (public mode audible requirements), 18.4.5 (private mode audible requirements), 18.4.6.1 and 18.4.6.2 (sleeping area requirements), or 18.4.7 (narrow band tone signaling for exceeding masked thresholds), as applicable.

24.4.5 Operating Controls

24.4.5.1\*

Controls for the in-building fire emergency voice/alarm communications system shall be at a location approved by the authority having jurisdiction.

24.4.5.2

Controls shall be located or secured to allow access only by trained and authorized personnel.

24.4.5.3

Operating controls shall be clearly identified.

24.4.5.4

If there are multiple in-building fire emergency voice/alarm communications control locations, only one shall be in control at any given time.

24.4.5.5

The location having control of the system shall be identified by a visual indication at that location.

24.4.5.6

Manual controls shall be arranged to provide visual indication of the on/off status for their associated signaling zone.

24.4.5.7

If live voice instructions are provided, they shall perform as follows:

They shall override previously initiated signals to the selected notification zone.

They shall have priority over any subsequent automatically initiated signals to the selected notification zone.

If a previously initiated recorded message is interrupted by live voice instructions, upon release of the microphone, the previously initiated recorded messages to the selected notification zones shall not resume playing automatically unless required by the emergency response plan.

24.4.6 Loudspeakers

24.4.6.1\*

Loudspeakers and their enclosures shall be installed in accordance with Chapter 18.

24.4.6.2

Loudspeakers used as alarm notification appliances on fire alarm systems shall also be permitted to be used for mass notification.

24.4.7 Priority

24.4.7.1\*

Notification appliances required to provide special suppression predischarge notification shall not be overridden by other systems.

24.4.7.2

Priority of mass notification messages over fire alarm evacuation shall be permitted when evaluated by the stakeholders through a risk analysis in accordance with 24.3.12.

24.4.7.3

When the fire alarm system has been activated, and mass notification has been given priority over the fire alarm system, a distinctive audible and visual indication shall be provided at the building fire alarm control unit to indicate MNS is active.

24.4.7.4

It shall not be required to transmit this condition to a supervising station.

24.4.7.5

The fire alarm system shall not automatically override emergency mass notification messages.

24.4.8\* Relocation and Partial Evacuation

The requirements of 24.4.8 shall apply only to systems used for relocation or partial evacuation during a fire condition.

24.4.8.1

New systems employing relocation or partial evacuation shall require documentation in accordance with Sections 7.3, 7.4, and 7.5 in addition to the minimum documentation requirements of Sections 7.2 and 24.13.

24.4.8.2

Systems shall be provided with manual voice transmission capabilities selectively to one or more notification zones or on an all-call basis.

24.4.8.3

Where the system is used to transmit relocation instructions or other fire emergency non-evacuation messages, a 1-second to 3-second alert tone followed by a message (or messages where multi-channel capability is used) shall be provided.

24.4.8.3.1

The sequence [the alert tone followed by the message(s)] shall be repeated at least three times to inform and direct occupants in the signaling zone where the alarm initiation originated, as well as other signaling zones in accordance with the building fire safety plan.

24.4.8.3.2

Approved alternative fire alarm notification schemes shall be permitted as long as the occupants are effectively notified and are provided instructions in a timely and safe manner in accordance with the emergency response plan.

24.4.8.4

Where the system is used to transmit partial evacuation instructions, the alert tone specified in 24.4.2.1 followed by a message (or messages where multi-channel capability is used) shall be provided.

24.4.8.5

Where provided, loudspeakers in each enclosed stairway, each exit passageway, each occupant evacuation elevator lobby, and each group of elevator cars within a common hoistway or bank shall be connected to separate notification zones for manual paging only.

24.4.8.5.1

The evacuation signal specified in 18.4.2 shall not operate in elevator cars, exit stair enclosures, and exit passageways.

24.4.8.5.2

Manually activated loudspeakers shall be permitted in exit stair enclosures, exit passageways, and elevators in buildings that have emergency voice/alarm communications systems in accordance with Section 24.4.

24.4.8.6

The requirements of 24.4.8.6 shall apply to both audible (tone and voice) and visual notification appliance circuits.

24.4.8.6.1\*

Fire alarm systems used for partial evacuation and relocation shall be designed and installed such that attack by fire within a signaling zone does not impair control and operation of the notification appliances outside the signaling zone.

24.4.8.6.2

Performance features provided to ensure operational reliability under adverse conditions shall be described and technical justification provided in the documentation submitted to the authority having jurisdiction with the analysis required in 23.4.3.1.

24.4.8.6.3\*

All circuits necessary for the operation of the notification appliances shall be protected until they enter the notification zone that they serve by the protection provided by the pathway survivability level required in 24.3.14.4.1 or by performance alternatives approved by the authority having jurisdiction.

24.4.8.6.4

Where the separation of in-building fire emergency voice/alarm control equipment locations results in the portions of the system controlled by one location being dependent upon the control equipment in other locations, the circuits between the dependent controls shall be protected against attack by fire by the protection provided by the pathway survivability level required in 24.3.14.4.1 or by performance alternatives approved by the authority having jurisdiction.

24.4.8.6.5

Protection of circuits between redundant control equipment locations that are not mutually dependent shall not be required.

24.4.8.6.6

Where the separation of the in-building fire emergency voice/alarm control equipment occurs as in 24.4.8.6.4, and where the circuits are run through junction boxes, terminal cabinets or control equipment, such as system control units, power supplies and amplifiers, and where cable integrity is not maintained, these components shall, in addition to the pathway survivability required by 24.3.14.4.1, be protected by using one of the following methods:

A 2-hour fire-rated enclosure

A 2-hour fire-rated room

Other equivalent means to provide a 2-hour fire resistance-rating approved by the authority having jurisdiction

24.4.8.6.7

Paragraphs 24.4.8 through 24.4.8.6.6 shall not automatically apply when relocation or partial evacuation is of a non-fire emergency unless identified and required by a risk analysis.

24.4.9 Signal Zoning

24.4.9.1\*

Undivided fire or smoke areas shall not be divided into multiple notification zones.

24.4.9.2

If multiple notification appliance circuits are provided within a single zone, all of the notification appliances within the zone shall be arranged to activate or deactivate simultaneously, either automatically or by actuation of a common manual control.

24.4.9.3

Where there are different notification appliance circuits within a signaling zone that perform separate functions, such as presignal and general alarm signals and predischarge and discharge signals, they shall not be required to activate or deactivate simultaneously.

24.5\* In-Building Mass Notification Systems

The requirements of Section 24.5 shall apply to mass notification systems installed in buildings or structures for the purpose of notifying and instructing occupants in an emergency.

24.5.1\* General Performance

The performance, selection, installation, operation, and use of a mass notification system shall comply with the requirements of Section 24.5.

24.5.1.1

Interconnection of protected premises emergency control functions with the mass notification systems shall comply with Chapter 21.

24.5.1.2

An in-building mass notification system shall include one or more of the following components:

Autonomous control unit (ACU)

Local operating console (LOC)

Fire alarm control interface

Notification appliance network

Initiating devices

\*Interface to other systems and alerting sources

24.5.1.3

All mass notification system notification appliances that receive their power from a signaling line circuit of a mass notification system control unit shall be listed for use with the control unit.

24.5.1.4

Mass notification system components shall be installed, tested, and maintained in accordance with the manufacturer's published instructions and this Code.

24.5.1.5

In-building emergency mass notification operation shall be permitted to be initiated by manual or automatic means.

24.5.1.6

Mass notification system activation shall initiate recorded messages or live voice and visual notification.

24.5.1.7

The priority level of recorded messages shall be determined by the emergency response plan.

24.5.1.8

Only recorded messages determined by the emergency response plan to be of higher priority than fire alarm activation shall be permitted to override the fire alarm notification and initiate the mass notification priority indicator.

24.5.1.9

Activation of any other recorded message shall not interfere with the operation of fire alarm notification.

24.5.1.10

Initiation of live voice announcements from microphones on the fire alarm system at an ACU, and at an LOC, shall not automatically place the fire alarm system in a mass notification priority mode.

24.5.1.11

Combination of mass notification with fire alarm systems shall be permitted and shall meet the requirements of 23.8.4.

24.5.2 System Operation

24.5.2.1\*

Authorized personnel shall be permitted to control message initiation over the mass notification system.

24.5.2.2\*

Where required by the emergency response plan, the mass notification system shall provide the capability for authorized personnel to remotely activate live and prerecorded emergency messages.

24.5.2.3\*

Operating controls shall be clearly identified.

24.5.2.4

If there are multiple control locations, only one shall be in control at any given time.

24.5.2.5\*

Any ACU shall provide a control status of all interconnected LOCs.

24.5.2.6

If there are multiple control locations, a visual indication shall be provided at all other control locations indicating that another control location is in use.

24.5.2.7

Manual controls shall be arranged to provide visual indication of the on/off status for their associated notification zone.

24.5.2.8

If live voice instructions are provided, they shall perform as follows:

Override previously initiated signals to the selected notification zone(s).

Have priority over any subsequent automatically initiated signals to the selected zone(s).

24.5.2.9

A manual means shall be provided at each mass notification system control location to permit the mass notification system to relinquish control of the fire alarm system.

24.5.2.10\*

During the period after the mass notification system has seized control of the audible and visual notification appliances, but before the mass notification system relinquishes control, the mass notification system shall activate the audible and visual notification appliances at least once every 30 seconds.

24.5.3 Notification Coverage

24.5.3.1\*

The mass notification system shall provide for live voice and prerecorded localized messaging within a protected individual building, areas surrounding the building, and other outdoor designated areas.

24.5.3.2

System design shall incorporate designation of acoustically distinguishable spaces (ADS) within any occupiable areas as required in Chapter 18.

24.5.3.3

Notification zones shall be established on the basis of a risk analysis.

24.5.3.4\*

If the mass notification system serves more than one building, it shall be capable of providing separate messages to one individual building or to multiple buildings at any given time.

24.5.4 Loudspeaker Circuits

24.5.4.1\*

Loudspeaker circuits used for mass notification that are not fire alarm circuits shall be exempt from the monitoring requirements of this Code, provided that alternate methods of achieving comparable reliability are accepted by the authority having jurisdiction.

24.5.4.2

Survivability for loudspeaker circuits used for mass notification shall be determined by the risk analysis for the building.

24.5.5 Impairments

The requirements of Section 10.21 shall be applicable when a mass notification system is impaired.

24.5.6 Inspection, Testing, and Maintenance Requirements

Mass notification systems shall be inspected, tested, and maintained in accordance with the manufacturer's published instructions and the inspection, testing, and maintenance requirements of Chapter 14.

24.5.7\* System Response Priorities

Priority levels shall be established on the basis of the risk analysis.

24.5.8 Initiation Indication

The source of system activation shall be visibly and audibly indicated at the emergency command center and at the building control unit, unless otherwise required by the emergency response plan.

24.5.9 Initiating Devices

24.5.9.1

Devices connected to a mass notification system for the purpose of initiating an automatic response to an emergency shall be evaluated based on the emergency response plan.

24.5.9.2\*

All mass notification initiating devices shall be listed for their intended purpose.

24.5.9.3

Where no listed device exists for the detection required by the emergency response plan, nonlisted devices shall be permitted to be used if their failure will not impair the operation of the mass notification system.

24.5.9.4

Non-fire emergency manual actuating stations (boxes) shall be listed to ANSI/UL 2017, Standard for General-Purpose Signaling Devices and Systems.

24.5.9.5

Non-fire emergency manual actuating boxes shall have tactile markings, be of a contrasting color to manual fire alarm boxes on the protected premises, and not be red.

24.5.9.6

Non-fire emergency manual actuating boxes shall be installed similarly to manual fire alarm boxes in accordance with the requirements of 17.15.4, 17.15.6, and 17.15.9.2.

24.5.10\* Secure Access of Fire Alarm/Mass Notification System Interface

Access to, and physical protection of, the fire alarm/mass notification system interface shall be determined by the risk analysis and as defined in the emergency response plan.

24.5.11 Autonomous Control Unit (ACU)

24.5.11.1

Where provided, the building ACU shall monitor and control the notification appliance network.

24.5.11.2

Building occupants meeting the requirements of 24.5.2.1 shall be permitted to initiate communications from the ACU.

24.5.11.3

Unless otherwise identified in the emergency response plan, actions taken at the building ACU shall take precedence over actions taken at any remote location, including the LOC, or inputs from a wide-area mass notification system.

24.5.11.4

When there are multiple ACUs controlling the same notification appliance network, only one shall be in control at any given time.

24.5.11.5

When the ACU is integrated with the building fire alarm control unit to form one combined system that performs both functions, the system shall meet the standby power requirements of this chapter.

24.5.11.6

When a combined system is installed with an ACU and fire alarm control unit and placed in separate equipment enclosures, the ACU and fire alarm control unit shall be interfaced as required by this chapter.

24.5.11.7

When the ACU is part of a stand-alone mass notification system and no fire alarm system exists, the ACU shall meet the requirements of this chapter.

24.5.12 Local Operating Console (LOC)

24.5.12.1\*

Building occupants meeting the authorized personnel requirement of 24.5.2.1 shall be permitted to initiate communications from the LOC.

24.5.12.2

The use of lock wire seals or break-glass-type enclosures to house the operating consoles for the system, or equivalent protection against unauthorized use, shall be permitted.

24.5.12.3

Operating controls shall be clearly identified.

24.5.12.4

If there are multiple control locations, only one shall be in control at any given time.

24.5.12.5

The location having control of the system shall be identified by a visual indication at that location.

24.5.12.6

If live voice instructions are provided, they shall override previously initiated signals to the selected notification zone(s) and shall have priority over any subsequent automatically initiated signals to the selected zone(s).

24.5.12.7

Upon initiation of an emergency message, a visual indication shall be provided to the user that the LOC is connected to the audio network.

24.5.12.8

Manual controls shall be permitted to provide visual indication of the on/off status for their associated notification zone.

24.5.12.9

The emergency message shall be an all-call basis unless otherwise permitted by 24.5.12.10.

24.5.12.10

Selective notification zone paging shall be permitted only if the LOC has manual controls with visual indication of the on/off status for each associated notification zone.

24.5.13 Voice Message Priority

24.5.13.1\*

The priority of mass notification messages shall be established using the emergency response plan.

24.5.13.2

The local building mass notification system shall have the ability to override the fire alarm system with live voice or manual activation of a higher priority message, but only where that message and operation are approved under the emergency response plan.

24.5.13.3

All other messages shall also be prioritized by using the emergency response plan.

24.5.13.4

When identified by the emergency response plan, messages from the mass notification system shall be permitted to take priority over fire alarm messages and signals.

24.5.13.5

If the fire alarm system is in the alarm mode and a recorded voice message is playing, or the audible signals are sounding, and then the mass notification system is activated, it shall cause deactivation of all fire alarm-initiated audible and visual notification.

24.5.13.6

After the mass notification system relinquishes control, the following shall occur:

Without an active fire alarm signal, the fire alarm system shall automatically restore to normal operation.

\*With an active fire alarm signal, the fire alarm system shall operate based on the emergency response plan.

24.5.13.7

Overriding of fire alarm audible and visual notification signals shall cause an audible and distinctive visual indication at each affected fire alarm control unit to indicate the MNS is active.

24.5.13.8

The fire alarm signal deactivation function shall be permitted to occur only when both the fire alarm system is in an alarm condition and notification is being given by the mass notification system.

24.5.13.9

When the fire alarm notification is overridden as permitted in 24.5.13.8, all other features of the fire alarm system shall remain unaffected.

24.5.14\* Mounting of LOC Controls

24.5.14.1

Controls that are intended to be accessed by authorized users shall be mounted in accordance with 24.5.14.

24.5.14.2

LOC controls, including switches, microphone, latches, and so forth, shall be located above the finished floor a minimum of 36 in. (910 mm) and a maximum of 48 in. (1.22 m) where the horizontal reach is less than 10 in. (254 mm).

24.5.14.3

If a horizontal reach of 10 in. (254 mm) to 24 in. (610 mm) is required, the maximum elevation shall be limited to 42 in. (1.07 m) above the finished floor and the minimum elevation shall be limited to 28 in. (711 mm).

24.5.14.4

Text and visual indicators, including lamps, screens, displays, instructions, or labels, associated with control or operation shall be visible within all points of elevation between 40 in. (1.02 m) and 60 in. (1.52 m) above the finished floor.

24.5.14.5

Where controls and information are provided in accordance with 24.5.14.2 through 24.5.14.4, provision of additional or redundant controls shall be permitted within the same vicinity at an elevation or reach other than those indicated.

24.5.14.6

Dimensions other than those identified in 24.5.14.2 through 24.5.14.4 shall be permitted when documented within the emergency response plan that ADA guidelines are not applicable, or when otherwise required by the AHJ.

24.5.15 Volume Control

24.5.15.1

Local controls shall be permitted to adjust volume levels of ancillary functions.

24.5.15.2

Upon activation of an emergency signal, the system shall override any local volume setting to deliver at a preset volume setting that has been established through testing and acceptance of sound level and speech intelligibility as required by this Code.

24.5.16 Visual Notification

24.5.16.1

Where audible notification is provided, mass notification systems shall also provide visual notification information to serve the hearing impaired and for high-noise areas.

24.5.16.2

The visual notification required by 24.5.16.1 shall be accomplished using visual notification appliances.

24.5.16.3

In addition to the visual notification appliances required by 24.5.16.1, textual, graphic, or video displays shall be permitted.

24.5.16.4

Transmission of visual notification and messages shall be simultaneous to audible notification and messages.

24.5.17 Visual Appliances

24.5.17.1

Where visual notification appliances are used, they shall meet the requirements of 24.5.17.2 through 24.5.17.10.

24.5.17.2

Visual notification appliances shall be of a sufficient quantity and intensity and located so as to meet the intent of the design and be in compliance with Section 18.5.

24.5.17.3

Visual notification appliances used in combination systems where the same visual notification appliance is used for both mass notification and fire notification shall comply with the following:

Be clear or nominal white, meeting the listing requirements of ANSI/UL 1971, Standard for Signaling Devices for the Hearing Impaired

Have no marking or be marked with the word "ALERT" stamped or imprinted on the appliance

Be visible to the public

24.5.17.4

In situations where existing notification appliances previously used exclusively for fire alarm applications, and are marked with the word "FIRE," and are to be used for other emergency notification purposes, field modification to the marking shall be permitted, provided that it is accomplished by one of the following methods:

Replacement of the manufacturer's approved escutcheon or trim plate

Covering of, or removal of, the word "FIRE" using a manufacturer's approved method

Installation of a permanent sign directly adjacent or below the notification appliance indicating that it is multipurpose and will operate for fire and other emergency conditions

24.5.17.5

Visual notification appliances with colored lenses shall be marked with the listed effective intensity using the lens color installed.

24.5.17.6

The spacing of colored visual notification appliances shall be in accordance with public mode spacing requirements of Section 18.5 using the effective intensity as the basis for spacing.

24.5.17.7

Where visual notification appliances are used solely for mass notification, the word "ALERT" shall be stamped or imprinted on the appliance and be visible to the public.

24.5.17.8

Where colored visual notification appliances are used solely for mass notification, they shall be listed to an applicable standard such as ANSI/UL 1638, Visible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories.

24.5.17.9

Visual notification appliances with nominal white light output that are listed to ANSI/UL 1971, Standard for Signaling Devices for the Hearing Impaired, and visual notification appliances with other than nominal white light output that are listed to ANSI/UL 1638, Visible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories, shall be considered as meeting the intent of this Code.

24.5.17.10

Visual notification appliances used for mass notification shall meet the synchronization requirements of Section 18.5.

24.5.18\* Textual and Graphical Visual Appliances

24.5.18.1

Textual and graphical visual notification appliances shall be permitted to be used for primary or supplemental notification.

24.5.18.2\*

Textual and graphical visual notification shall be considered to be primary notification where it is the only method used to convey emergency mass notification information to the general public or to specific individuals.

24.5.18.3

Primary and supplemental textual and graphical visual appliances shall meet the requirements of Chapter 18.

24.5.18.4

Primary textual and graphical visual appliances other than a main control unit shall be permitted to not have a dedicated primary power circuit as required by Chapter 10 but shall meet all other requirements for the monitoring of primary power and all requirements for secondary power.

24.5.18.5

Textual and graphical visual appliances shall be permitted to be used for nonemergency purposes.

24.5.18.6

Emergency textual and graphical messages shall override nonemergency textual and graphical messages.

24.5.18.7

Supplemental textual and graphical visual appliances that are not monitored for integrity or loss of communication by a control unit shall be provided with visual status indicators, including loss of communication or loss of power, that are clearly visible on the appliance.

24.5.18.8

Addressable primary textual and graphical visual appliances using signaling line circuits shall meet the performance requirements of Section 23.6.

24.5.18.9

Non-addressable primary textual and graphical visual appliance circuits shall meet the performance requirements of Section 23.7.

24.5.19 Tactile Notification Appliances

Where tactile notification appliances are provided for emergency notification, they shall meet the requirements of Section 18.10.

24.5.20\* Video Alerting

Video display systems that provide alerts and messages to video appliances shall be permitted to be used to supplement mass notification.

24.5.21 Supplemental Notification

Supplemental notification shall be permitted to provide additional information or more detailed instructions than those transmitted by the primary notification means.

24.5.22 Interfaces

Any abnormal condition that would prevent reliable emergency operation of any interfaced system shall be annunciated both audibly and visibly as a trouble signal at the affected control location.

24.5.22.1 Fire Alarm Control Interface (FACI)

24.5.22.1.1

Where a fire alarm system is installed covering all or part of the same building or other area as the mass notification system, an interface shall be provided between the systems for operational coordination purposes.

24.5.22.1.2

A listed barrier gateway in accordance with 10.3.1, integral with, or attached to, each control unit or group of control units, as appropriate, shall be provided to prevent the other systems from interfering with or controlling the fire alarm system.

24.5.22.1.3\*

The fire alarm control interface shall coordinate signals to and from each system to accomplish the following:

Indicate the failure at the system control unit that will be impaired

Provide an audible and distinctive visual indication at the affected FACU(s) to indicate the MNS is active.

Cause the fire alarm system to deactivate all audible and visual notification appliances whose operation could interfere with the intelligibility of the mass notification message or that will deliver conflicting information to occupants

Not permit the fire alarm system to turn off audible and visual notification appliances for special suppression predischarge notification required by 24.4.7.1

Where required by the emergency response plan or by other governing laws, codes, or standards, or by other parts of this Code, or by the authority having jurisdiction, provide for a supervisory signal to a supervising station with a response as directed by the emergency response plan that is indicative of the mass notification system overriding the fire alarm system notification appliances during simultaneous fire and mass notification events

24.5.22.1.4

If the fire alarm control interface is used to broadcast nonemergency messages, music, or other signals over the fire alarm notification appliance circuits, the operation shall meet the requirements of 24.5.15 and 23.8.4.

24.5.22.2 Interfaces to Emergency Control Functions

The mass notification system shall be permitted to provide emergency control functions in accordance with Chapter 21 as required by the emergency response plan and as permitted by the authority having jurisdiction.

24.5.22.2.1

When mass notifications systems are controlling building life safety systems, the mass notifications systems equipment shall be listed for ANSI/UL 864, Control Units and Accessories for Fire Alarm Systems.

24.5.22.3 Interfaces With Wide-Area Mass Notification Systems

24.5.22.3.1\*

Individual building mass notification systems shall be permitted to interface with wide-area mass notification systems.

24.5.22.3.2

The in-building mass notification system shall not be activated or controlled by a wide-area mass notification system, unless the wide-area mass notification system also meets the design and performance requirements of this chapter or has been deemed to be acceptable by the risk analysis and the authority having jurisdiction.

24.5.23 Combination Emergency Communications Systems

24.5.23.1\*

When the mass notification system is integrated with the building fire alarm control unit to form one combined system that performs both functions, the system shall comply with this chapter.

24.5.23.2

All components that affect the operation of the fire alarm system shall be listed for fire alarm use and shall be in compliance with applicable standards such as ANSI/UL 864, Standard for Control Units and Accessories for Fire Alarm Systems.

24.5.24 Public Address (PA) Systems Used for Emergency Communications

24.5.24.1

The voice communications or public address system that is to be used for mass notification shall be evaluated by the emergency communications system designer, as defined in Chapter 10, to determine applicability and compliance.

24.5.24.2\*

Evaluation documentation in accordance with 7.3.9 shall be provided by the emergency communications system designer attesting to the fact that the public address system has been evaluated and meets the needs of the emergency response plan and, where not compliant with the prescriptive requirements of Chapter 24, shall provide equivalent system performance requirements.

24.5.25 Public Address (PA) System Interface With Facility Fire Alarm System

24.5.25.1

When a public address system is used to deliver mass notification messages, the public address system shall provide (either internally as a design feature or with an approved or listed external controller) for a signal to control the facility's fire alarm system for the purpose of deactivating the fire alarm audible and visual notification appliances in accordance with 24.5.22.1.

24.5.25.2

All of the following features shall be provided in, or added to, the public address system:

Emergency messages must have priority over nonemergency messages.

All individual or zone loudspeaker volume controls must default to the emergency sound level when used for an emergency mass notification message.

When monitoring of circuit integrity is provided by the public address system, monitoring must continue, even if local loudspeaker volume controls are placed in the "off" position.

The required visual notification appliance network (i.e., visual notification appliances and textual signs) must be provided where required.

24.6\* Wide-Area Mass Notification Systems

24.6.1 Voice Messages

24.6.1.1

Voice messages shall comply with the requirements of 24.3.1.

24.6.1.2

Where required by the emergency response plan, multiple languages shall be permitted to be used.

24.6.1.3

Where required by the emergency response plan, specific warning tones shall be provided.

24.6.2\* Password Protection

Wide-area mass notification systems shall have multiple levels of password protection access control, including levels for system administrators, system operators, maintainers, supervisors, and executives, or other means to limit access to system controls shall be provided based on the emergency response plan.

24.6.3\* External Connections

Wide-area mass notification systems shall be permitted to connect to regional mass notification systems and public emergency alarm reporting systems as defined in this Code, and public reporting systems as defined in NFPA 1221.

24.6.4 Emergency Command Center

Refer to Section 24.11 for requirements of an emergency command center.

24.6.5\* High Power Loudspeaker Array (HPLA)

When required by the risk analysis, high power loudspeaker arrays (HPLAs) shall be provided, installed, and maintained.

24.6.5.1

The HPLA shall be arranged in such a manner to provide intelligible voice and audible tone communications.

(A)

When multiple HPLAs are used, they shall be arranged in physical or virtual notification zones so that each notification zone can be individually controlled by the emergency command center.

(B)\*

HPLAs shall be designed to maintain the intelligibility of voice signals within the notification zone in accordance with the requirements of Chapter 18.

24.6.5.2

Secondary power for HPLAs used for wide-area mass notification systems shall have sufficient capacity to operate the unit for a minimum of 3 days in standby, followed by 60 minutes of operation at full load.

24.6.5.3

An HPLA shall have the capability to provide voice communications and tones as determined by the emergency response plan.

24.6.5.4\*

An HPLA shall operate in the environment in which it is located, considering such factors as temperature, humidity, wind, dust, vibration, and other environmental factors.

24.6.6 High Power Loudspeaker Array Enclosures

24.6.6.1

Enclosures for HPLAs shall be of the NEMA 4 or 4X type.

24.6.6.2

HPLA enclosures shall have intrusion detection that signals the emergency command center.

(A)

The signal shall be initiated whenever the door of the enclosure is in the open position.

(B)

The transmitted signal shall be a latching supervisory signal.

24.6.7 High Power Loudspeaker Array Mounting

24.6.7.1

HPLAs shall be mounted at a minimum mounting height that is based on the rated output of the array.

24.6.7.2\*

HPLAs shall be installed at a height and orientation to prevent hearing damage to anyone in the immediate vicinity of the appliances.

24.6.7.3

All external conductors (conductors passing outside of the HPLA equipment cabinet) shall be provided with surge suppression to minimize potential equipment damage from lightning strikes.

24.6.8 High Power Loudspeaker Array Noise Consideration

HPLA notification zones shall not be used to provide mass notification inside any structures.

24.6.9\* High Power Loudspeaker Array Structural Loads, Wind, and Seismic Design

HPLAs and their supporting structures shall meet the structural, wind, and seismic loads as identified in the risk analysis.

24.6.10 Textual Visual Appliances

Textual visual appliances shall meet the requirements of Section 18.9 and 24.5.18.

24.6.10.1

After loss of primary power, primary textual visual notification appliances shall have sufficient secondary power to operate for a minimum of 2 hours of continuous display time during an emergency event.

24.6.10.2

Scrolling message boards shall be provided with means to control the scrolling rate.

24.6.11 Interfaces With Wide-Area Mass Notification Systems

Interfaces between wide-area mass notification systems and in-building mass notification systems, other alert and notification systems, regional mass notification systems, and off-site interfaces shall have a standard interface method (such as an audio line-level output and multiple relay contacts) or supply the necessary communications protocols to provide interoperability and a secure communications link.

24.6.11.1

The interface shall be such that the primary function of both systems shall not be compromised.

24.6.11.2

The interface shall be monitored for integrity in accordance with 10.6.9, Section 10.19, and Section 12.6, so that an abnormal condition that could prevent reliable system operation is audibly and visibly annunciated as a trouble signal at both systems' control units.

24.6.12 Control Hierarchy

There shall be a predefined control hierarchy between the wide-area mass notification system, the in-building mass notification system, and the regional mass notification system for information flow from the remote control center, as well as information from specific locations.

24.6.13 Communications Links

24.6.13.1

The wide-area mass notification system, including communications links, shall minimize the potential for interference from jamming, spoofing, hacking, eavesdropping, or other malicious acts.

24.6.13.2

The wide-area mass notification system shall have a primary and redundant communications link with minimal functional and spatial interconnection with each other.

24.6.13.3

Wide-area and in-building mass notification systems equipment and interface methods connecting to or utilizing public emergency alarm reporting systems and associated communications infrastructure shall be electrically and operationally compatible so as not to interfere with the public emergency alarm reporting systems.

24.7\* Distributed Recipient Mass Notification Systems (DRMNS)

24.7.1\* Overview

Distributed recipient mass notification system (DRMNS) alerting shall not be used in lieu of required audible and visual alerting mass notification systems but shall be integrated with mass notification systems whenever possible.

24.7.2\* Targeted Recipients

The DRMNS shall be capable of sending alert messages to target recipients.

24.7.3 Network Security Compliance

DRMNSs shall be installed behind the appropriate Internet system firewalls to protect the integrity of the network.

24.7.4 Network Architecture

The network shall be provided with net-centric architecture that fully supports local designated standards and security requirements.

24.7.5\* Delivery Methods

The DRMNS shall be capable of sending alert messages to end users (recipients) via multiple delivery methods.

24.7.6\* Backup Distributed Recipient Mass Notification Systems

A DRMNS used to send emergency messages shall be provided with a backup configuration to facilitate distribution of messages.

24.8\* Two-Way, In-Building Wired Emergency Services Communications Systems

24.8.1

Two-way telephone communications equipment shall be listed for two-way telephone communications service and installed in accordance with Section 24.8.

24.8.2

Two-way telephone communications service, if provided, shall be for use by the fire service and collocated with the in-building fire emergency voice/alarm communications equipment.

24.8.3

Monitoring of the integrity of two-way telephone communications circuits shall be in accordance with 10.19.2.

24.8.4

Additional uses shall be permitted to include signaling and communications for a building fire warden organization and signaling and communications for reporting a fire and other emergencies (e.g., voice call box service, signaling, and communications for guard's tour service).

24.8.5

Variation of equipment and system operation provided to facilitate additional use of the two-way telephone communications service shall not adversely affect performance when used by the fire service.

24.8.6\*

Two-way telephone communications service shall be capable of permitting the simultaneous operation of any five telephone stations in a common talk mode.

24.8.7

A notification signal at the control equipment, distinctive from any other alarm, supervisory, or trouble signal, shall indicate the off-hook condition of a calling telephone circuit.

24.8.8

Where a selective talk telephone communications service is supplied, a distinctive visual indicator shall be furnished for each selectable circuit, so that all circuits with telephones off-hook are continuously and visibly indicated.

24.8.9

A means for silencing the audible call-in signal sounding appliance shall be permitted, where both of the following conditions are met:

The means is key-operated or located in a locked cabinet or provided with protection to prevent use by unauthorized persons.

The means operates a visual indicator and sounds a trouble signal whenever the means is in the silence position and no telephone circuits are in an off-hook condition.

24.8.10

If a selective talk system is used, means as specified in 24.8.9 shall be permitted, provided that subsequent telephone circuits going off-hook operate the distinctive off-hook signal.

24.8.11

Two-way telephone systems with common talk mode (i.e., a conference or party line circuit) shall be permitted.

24.8.12

In buildings provided with a two-way telephone communications system, at least one telephone station or jack shall be provided at the following locations:

Each floor level

Each notification zone

Each elevator cab

Elevator lobbies

Elevator machine room(s)

Emergency and standby power room(s)

Fire pump room(s)

Area(s) of refuge

Each floor level inside an enclosed exit stair(s)

Other room(s) or area(s) as required by the authority having jurisdiction

24.8.13

If the two-way telephone system is intended to be used by fire wardens in addition to the fire service, the minimum requirement shall be a selective talk system, where phones are selected from the control location.

24.8.14

Telephone circuits shall be selectable from the control location either individually or, if approved by the authority having jurisdiction, by floor or stairwell.

24.8.15

If the control equipment provided does not indicate the location of the caller (common talk systems), each telephone station or telephone jack shall be clearly and permanently labeled to allow the caller to identify his or her location to the control center by voice.

24.8.16

If telephone jacks are provided, two or more portable handsets, as determined by the authority having jurisdiction, shall be stored at each control center for use by emergency responders.

24.8.17

Wall-mounted telephone appliances or related jacks shall be not less than 36 in. (910 mm) and not more than 66 in. (1.68 m) above floor level with clear access to the appliance that is at least 30 in. (760 mm) wide.

24.8.18

If accessible to the general public, one telephone appliance per location shall be not more than 48 in. (1.22 m) above floor level.

24.8.19\*

All circuits necessary for the operation of two-way telephone communications systems shall be installed in accordance with the pathway survivability requirements in 24.3.14.7.

24.9 Two-Way Radio Communications Enhancement Systems

24.9.1 Non-Interference

24.9.1.1

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 the authority having jurisdiction.

24.9.1.2

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

24.9.2 Installation and Design

All in-building two-way radio communications enhancement systems shall be designed, installed, and maintained in accordance with NFPA 1221.

24.10\* Area of Refuge (Area of Rescue Assistance) Emergency Communications Systems, Stairway Communications Systems, Elevator Landing Communications Systems, and Occupant Evacuation Elevator Lobby Communications Systems

24.10.1

Where required by the enforcing authority, governing laws, codes, or standards, any communications system specified in this section shall be installed in accordance with 24.10.2 through 24.10.11.

24.10.2\*

The communications system shall comprise remotely located communications stations, a master control unit, and a primary and secondary power supply as required by Section 10.6.

24.10.2.1

When a remote communications station(s) is activated by a building occupant(s), a two-way live voice communication shall be required to operate between the remote communications station(s) and a constantly attended location.

24.10.2.2\*

The master control unit shall be installed in a central control point within the building.

24.10.2.3\*

The constantly attended location shall be located either within the building or at an off-site monitoring location and shall be approved by the authority having jurisdiction.

24.10.3

The remote communications stations and the master control unit shall communicate with each other via pathways based on their performance capabilities under abnormal (fault) conditions in accordance with the requirements for Class A, Class B, Class N, or Class X pathways specified in Chapter 12.

24.10.4

All pathways between the remote communications stations and the master control unit shall be monitored for integrity.

24.10.5\*

If the central control point is not constantly attended, the master control unit shall have a timed automatic communications capability to connect with an off-site constantly attended monitoring location approved by the authority having jurisdiction, where trained personnel can initiate the appropriate response.

24.10.6\*

In the event of an off-site connection, a signal shall be transmitted to the off-site monitoring location, identifying the specific building prior to initiating the live voice two-way communication.

24.10.7\*

The physical locations of the remote communications stations and the master control unit shall be as designated by the building code in force and the system designer and approved by the authority having jurisdiction.

24.10.8

The specific location of each remote communications station shall be identified on the master control unit display on a floor and area basis.

24.10.9

The remote communications stations shall provide for hands-free, two-way communication, provide an audible and visual signal to indicate communication has occurred, and indicate to the receiver the location sending the signal.

24.10.10

Instructions for the use of the two-way communications system, instructions for summoning assistance via the two-way communications system, and written identification, including in braille, of the location shall be posted adjacent to each remote communications station.

24.10.11\*

The communications systems specified in this section shall be permitted to be integrated with each other or other two-way emergency communications system(s) provided they are installed in accordance with Section 24.10.

24.11\* Information, Command, and Control

The requirements of Section 24.11 shall apply to the communications methods and equipment used to receive and transmit information between premises sources or premises systems and the emergency command center(s).

24.11.1\* Emergency Command Center for Emergency Communications Systems

24.11.1.1\*

The location and accessibility of the emergency command center shall be determined by the risk analysis and approved by the emergency management coordinator.

24.11.1.2

The emergency command center shall contain the following:

The in-building fire emergency voice/alarm communications system equipment including:

Fire alarm system controls

Fire alarm system annunciator

In-building fire emergency voice/alarm communications system controls

Area of refuge (area of rescue assistance) emergency communications systems equipment

Elevator emergency communications systems equipment

Distributed recipient MNS control stations where provided

Tables and chairs to accommodate emergency management staff

Other equipment/information deemed necessary by the facility emergency response plan such as:

Displays indicating the location of the elevators and whether they are operational

Status indicators and controls for air-handling systems

Fire fighter's control panel for smoke control systems

Fire department communications unit

Controls for unlocking stairway doors simultaneously

Security systems

Emergency and standby power status indicators

Telephone for emergency use with controlled access to the public telephone system

Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, security systems, fire-fighting equipment, and fire department access

Generator supervision devices, manual start, and transfer features

Other monitoring, control, information display, and management systems associated with operation of the ECC

24.11.1.3

The level of security at the emergency command center shall be defined in the emergency response plan.

24.11.1.4\*

Emergency command center personnel requirements shall be defined in the documentation in the emergency response plan.

24.11.1.5\*

Individuals expected to operate an emergency communications system shall be properly trained in the purpose, functions, procedures, and anticipated actions of such systems.

24.11.1.6

The emergency command center shall be capable of receiving voice messages by telephone or radio and transmitting via equipment at the emergency command center.

24.11.1.7

The emergency command center operator shall have the ability to monitor inputs/sensors and control output devices automatically, manually, or automatically with operator override.

24.11.2 Emergency Communications Control Unit (ECCU)

24.11.2.1

An emergency communications control unit (ECCU), where identified by the risk analysis, and defined in the emergency response plan, shall be provided at each emergency command center.

24.11.2.2

The system operator shall be able to broadcast live voice signals or activated prerecorded voice messages, tones, and other signals.

24.11.2.3

The signals shall be selectable to individual buildings; zones of buildings; individual outdoor loudspeaker arrays; zones of outdoor loudspeaker arrays; or a building, multiple buildings, outside areas, or a combination of these, in accordance with the emergency response plan established for the premises.

24.11.2.4

The central control emergency communications control unit shall automatically or manually assign priorities to all transmitted signals.

24.11.2.5

In wide-area mass notification systems, the emergency command center shall have a primary emergency communications control unit.

24.11.2.6

Multiple emergency communications control units shall be permitted.

24.11.3\* Signals

Where identified by the risk analysis and defined in the emergency response plan, the emergency communications control unit shall be permitted to automatically or manually send different messages or signals to different locations.

24.11.4 Power Supplies

24.11.4.1

All control units shall meet the power supply requirements of Section 10.6 and 24.11.4.2.

24.11.4.2

The power supply for the emergency command center for emergency communications systems shall include an uninterrupted power source with capacity sufficient to support the emergency response plan established for the specific premises.

24.11.5 Transmission

Signals shall be capable of being automatically or manually transmitted to a regional or national emergency response center or to other nearby facilities that have a need to be alerted of the emergency.

24.11.6\* Other Systems

The emergency command center shall be capable of interfacing with and controlling other notification systems, such as telephone dialers, tone alert systems, computer network alerting systems, pagers, facsimile machines, textual devices, and other visual control signs, as determined by the emergency response plan.

24.11.7 Inspection, Testing, and Maintenance

Inspection, testing, and maintenance shall be performed on a periodic basis, as described in Chapter 14, to verify and ensure proper system operation and readiness.

24.12\* Performance-Based Design of Mass Notification Systems

The requirements of Section 24.12 shall apply to mass notification systems designed using performance-based practices.

24.12.1 Goals and Objectives

The performance-based design shall meet the following goals and objectives:

The design criteria, design brief, system performance, and testing criteria are developed in accordance with this section.

The system disseminates information to the target audience in an accurate and timely manner.

The design and performance criteria are specific to the nature and anticipated risks of each location.

Message initiation can be effected by all responding entities responsible for the safety and security of those affected by the events of concern.

24.12.2\* Qualifications

The performance-based design and risk analysis shall be prepared by a design professional certified or approved by the authority having jurisdiction.

24.12.3 Independent Review

The authority having jurisdiction shall be permitted to require an approved, independent third party to review the proposed design brief and provide an evaluation of the design to the authority having jurisdiction.

24.12.4 Final Determination

The authority having jurisdiction shall make the final determination as to whether the performance objectives have been met.

24.12.5 Maintenance of Design Features

The design features required for the system to continue to meet the performance goals and objectives of this Code shall be maintained for the life of the building.

24.12.6 Performance Criteria

24.12.6.1 General

All designs shall meet the goals and objectives specified in 24.12.1 and shall be considered equivalent, provided that the performance criterion in 24.12.6.2 is met, the design team concurs with the design, and the risk analysis considers the following factors:

Number of persons to be notified

Occupancy characteristics

Anticipated threat

Staff capabilities

Coordination with the emergency response plan

24.12.6.2 Performance Criterion

The performance criterion shall include timely and accurate notification of all persons within the boundaries of the mass notification system in a medium to which they can respond when given directions by responding entities.

24.12.6.3\* Design Team

The design team shall be comprised of the design professional, the owner or owner's representative, representatives of the authority having jurisdiction, and representatives of the responding entities.

24.12.6.4 Risk Analysis

The design of the mass notification system shall be based upon a risk analysis prepared in accordance with 24.3.12 specific to the nature and anticipated risks of each facility for which it is designed.

24.12.6.5 Operational Status and System Effectiveness

The performance of the system shall reflect the documented performance and reliability of the components of those systems or features, unless design specifications are incorporated to modify the expected performance.

24.12.6.5.1

The inclusion of trained employees as part of the mass notification system shall be identified and documented.

24.12.6.5.2 Emergency Response Personnel

The design shall consider the characteristics or other conditions related to the availability, speed of response, effectiveness, roles, and other characteristics of emergency response personnel.

The design of the mass notification system shall include the preparation of a design brief that is prepared utilizing recognized performance-based design practices.

24.12.6.6.1

Design specifications and briefs used in the performance-based design shall be clearly stated and shown to be realistic and sustainable.

24.12.6.6.2

Specific testing requirements that are necessary to maintain reliable performance shall be stated in the design brief.

24.13 Documentation for Emergency Communications Systems

24.13.1 New Systems

Documentation requirements for new emergency communications systems shall comply with Sections 7.3 through 7.8 in addition to the minimum requirements of Section 7.2.

