UL 2524

Outline of Investigation for In-building 2-Way Emergency Radio Communication Enhancement Systems

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Summary of Topics

This First issue of the Outline of Investigation for In-building 2-Way Emergency Radio Communication Enhancement Systems, UL 2524, covers products (e.g. repeater, transmitter, receiver, signal booster components, external filters, and battery charging system components) used for in-building 2-way radio emergency radio communication enhancement systems installed in a location to improve wireless communication at that location.

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APPENDIX A

Standards for Components..... A1

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INTRODUCTION

1 Scope

1.1 These requirements cover products (e.g. repeater, transmitter, receiver, signal booster components, external filters, and battery charging system components) used for in-building 2-way radio emergency radio communication enhancement systems installed in a location to improve wireless communication at that location.

1.2 These requirements cover products to be employed in accordance with the following Model Building and Installation Codes:

a) Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems, NFPA 1221;

b) National Electrical Code, NFPA 70;

c) National Fire Alarm Code, NFPA 72;

d) Fire Code, NFPA 1;

e) Life Safety Code, NFPA 101;

f) International Fire Code

1.3 The products covered by this standard are intended to be used in combination with other products and devices to form an in-building 2-way radio emergency radio communication enhancement system. An installation document(s) provided with the product describes the various products needed to form an in-building 2-way radio emergency radio communication enhancement system and their intended use and installation.

1.4 These requirements address the safety and operational requirements prior to installation.

1.5 These requirements do not include determination of compliance with regulations of the Federal Communications Commission (FCC). Should products covered by these requirements be required to comply with FCC regulations, a report of verification from the manufacturer is required as evidence of such compliance.

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2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components used in the products covered by this standard.

2.1.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

2.1.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.1.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

2.2 Units of measurement

2.2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

2.3 Undated references

2.3.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

3 Glossary

3.1 ACKNOWLEDGE - Action taken to confirm that a message or signal has been received, such as pressing a button.

3.2 ACTIVE RADIO FREQUENCY EMITTING DEVICE - A powered device that emits a radio frequency signal as part of an in-building 2-way radio emergency radio communication enhancement system.

3.3 ADVERSE CONDITION - Any condition occurring in a circuit or communication path that interferes with the proper signaling or interpretation of status-change signals or both. Conditions include radio frequency interference.

3.4 AIR-HANDLING SPACE - Space used for environmental air-handling purposes other than ducts or plenums. The space over a hung ceiling used for environmental air-handling is an example.

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3.5 ANNUNCIATOR - A unit containing one or more indicator lamps, alphanumeric displays, or other equivalent means in which each indication provides status information about a circuit, condition, or location.

3.6 AVERAGE VALUE - The sum of all instantaneous values of current (or voltage), averaged over one-half of an alternating cycle.

3.7 BATTERY CHARGER - A product intended to deliver sufficient current to maintain storage batteries in their fully-charged condition while the batteries are not connected to a load. The storage batteries are intended to provide a secondary source of operating power in response to failure of the primary source of operating power.

3.8 CIRCUIT CLASSIFICATIONS:

a) High-Voltage Circuit - A circuit involving a potential of not more than 600 V nominal and having characteristics in excess of those of a low-voltage circuit.

b) Low-Voltage Circuit - A circuit involving a potential of not more than 30 V alternating current (AC) rms, 42.4 V direct current (DC) or peak.

c) Power-Limited Circuit - A circuit wherein the power is limited as specified in Tables 44.1 and 44.2.

3.9 DISCHARGED BATTERY - A standby battery discharged as described in 34.2.

3.10 DISTINCTIVE SIGNALS - Signals obtained from different sounding appliances (such as bells, horns, sirens, and buzzers) or from a single appliance (such as an electronic horn) where a continuous signal is obtained under one condition and a pulsing signal under another.

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

3.12 END-OF-LINE DEVICE - A device installed at the end of a circuit for the purpose of monitoring the circuit for fault conditions.

3.13 EXTERNAL CIRCUITS - Circuits or wiring leaving the product.

3.14 FAULT - An open, ground, or short-circuit condition on any line extending from a product.

3.15 FIELD WIRING - Conductors to be installed by others to connect a product to source(s) of supply, devices, other products, and loads.

3.16 FIRE COMMAND CENTER - The principal attended or unattended location where the status of the detection, alarm communications, and control systems is displayed and from which the system can be manually controlled.

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3.17 FIXED EQUIPMENT - Any equipment product that is intended to be permanently connected electrically to the wiring system.

3.18 GROUNDED CONDUCTOR - A conductor employed to connect the intentionally grounded circuit of a wiring system to a grounding electrode.

3.19 GROUND FAULT - A circuit impedance to ground sufficient to result in the annunciation of a trouble condition.

3.20 GROUNDING CONDUCTOR - A conductor employed to connect non-current-carrying parts of equipment, raceways, and enclosure to a grounding electrode at the service which is, in turn, connected to earth ground or to some conducting body which serves in place of earth ground.

3.21 OPEN FAULT - A circuit impedance increase sufficient to prevent normal operation.

3.22 OPERATOR - Individual(s) responsible to access and operate the product and/or system, but does not have access to portions of the product required for servicing and maintenance.

3.23 OPERATOR INTERFACE - Providing controls for manually operating the product/system.

3.24 PATH (PATHWAY) - Any conductor, optic fiber, radio carrier, or other means for transmitting information between two or more units and/or locations.

3.25 POWER SUPPLY - A source of electrical operating power including the circuits and terminations connecting it to the dependent product/system components.

3.26 POWER SUPPLY-BATTERY CHARGER - A power supply that serves the dual function of providing operating power and charging storage batteries. The power supply is usually permanently connected to storage batteries, and the power supply-battery combination is intended to provide all of the electrical operating power required by the equipment to which the combination is connected, when the equipment is operating in its intended manner.

3.27 REPEATER - A device for receiving and re-transmitting two-way communication signals.

3.28 RESET - A control function that attempts to return a system or device to its normal non-alarm state.

3.29 RISK OF ELECTRIC SHOCK - A risk of electric shock is determined to exist at any part if:

a) The potential between the part and earth ground or any other accessible part is more than 42.4 V peak, and

b) The continuous current flow through a 1500 W resistor connected across the potential exceeds 0.5 mA.

3.30 RISK OF FIRE - A risk of fire is considered to exist at any two points in a circuit where:

a) The open circuit voltage is more than 42.4 V peak and the energy available to the circuit under any condition of load including short circuit, results in a current of 8 A or more after 1 min of operation; or

b) A power of more than 15 W can be delivered into an external resistor connected between the two points.

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3.31 STANDBY POWER SOURCE - Provides power when the primary power source fails.

3.32 STORAGE BATTERY - Any battery which, by design or construction, is intended to be recharged.

3.33 SUPERVISORY SIGNAL - A signal indicating the need of action in connection with the supervision of watchmen, sprinkler and other extinguishing systems or equipment, or with the maintenance features of other protective systems.

3.34 SUPPLEMENTARY - Refers to equipment or operations not required by this standard.

3.35 SUPPLEMENTARY DEVICE - A device intended to be connected to a supplementary device circuit.

3.36 SUPPLEMENTARY-DEVICE CIRCUIT - A circuit provided by a product for controlling a device, the operation of which is supplementary to the primary initiating and indicating devices of the control unit.

3.37 TROUBLE SIGNAL - A visual or audible signal indicating a fault condition of any nature, such as a circuit break or ground or other trouble condition occurring in the device or wiring associated with a protective signaling system.

3.38 USER - An individual who operates or services the product.

3.39 WIRE-TO-WIRE FAULT - A wire-to-wire (short circuit) fault is determined to be a resistance of 0.1 W or less across the circuit.

4 Reserved

CONSTRUCTION

5 General

5.1 A product shall use materials that have been determined to comply with the requirements for the particular use, as indicated by the performance requirements of this standard.

5.2 Metals, when required to meet the requirements of this standard, shall not be used in such combination as to cause galvanic action that will increase the risk of fire, electric shock, injury to persons, or impair the operation of a product associated with the safety of life and/or property protection.

5.3 Where breakage or deterioration of a part such as an enclosure, a frame, a guard, or the like can result in a risk of injury to persons, the part shall be constructed to meet the demand or expected loading conditions.

5.4 The requirement in 5.3 applies also to those positions of a part adjacent to a moving part identified to involve a risk of injury to persons.

5.5 Electrical equipment with nonmetallic enclosures and other non-metallic discrete objects, intended to be installed in air-handling spaces shall additionally comply with the requirements in the Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces, UL 2043.

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