10.10.2 Low Temperature Test

10.10.2.1 An indoor dry product (intended for indoor use/dry locations) shall operate as intended following exposure to air at the lower of the following temperatures:

A 0 ±2 °C; or

B The lowest ambient operating temperature specified in the product's marking.

10.10.2.2 The unit is to be maintained in the normal supervisory condition at the test ambient until thermal equilibrium has been reached (4 h minimum).

10.10.2.3 An indoor damp and wet product (intended for indoor use in damp locations or wet locations) shall operate as intended following exposure to 20 cycles of temperature and humidity cycling. A temperature cycle consists of a change from a temperature of 25 ±5 °C at a humidity of 95 ±2 % relative humidity to the lower temperature indicated in Clause 10.10.2.1 for a period of 30 min, and back to a temperature of 25 ±5 °C at a humidity of 95 ±2 % relative humidity. The rate of change shall be 2 ±1 °C per min.

10.10.2.4 An outdoor damp and wet product (intended for outdoor use in damp locations or wet locations) shall operate as intended following exposure to 20 cycles of temperature and humidity cycling. A temperature cycle consists of a change from an ambient of 25 ±5 °C at a humidity of 95 ±2 % relative humidity to the lower of the temperatures indicated in Items (A) or (B) for a period of 30 min, and back to a temperature of 25 ±5 °C at a humidity of 95 ±2 % relative humidity. The rate of change shall be 2 ±1 °C per min.

A -40 ±2 °C; or

B The lowest ambient operating temperature specified in the product's marking.

10.10.2.5 For the test method, the product is to be placed in a position of intended use in an air-circulating environmental chamber. The environmental chamber is to be maintained at the appropriate temperature and humidity indicated in Clauses 10.10.2.1 through 10.10.2.4. At the completion of the exposure, while at the low temperature, the product is to be operated for all conditions of intended use.

10.10.3 High Temperature Test

10.10.3.1 An indoor dry product (intended for indoor use/dry locations) shall operate as intended following exposure to air at the higher of the following temperatures:

A 49 ±2 °C; or

B The highest ambient operating temperature specified in the product's marking.

10.10.3.2 The unit is to be maintained in the normal supervisory condition at the test ambient until thermal equilibrium has been reached (4 h minimum).

10.10.3.3 An indoor damp and wet product (intended for indoor use in damp or wet locations) shall operate as intended following exposure to 20 cycles of temperature and humidity cycling. A temperature cycle consists of a change from a temperature of 25 ±5 °C at a humidity of 95 ±2 % relative humidity to the higher temperature indicated in Clause 10.10.3.1 for a period of 30 min, and back to a temperature of 25 ±5 °C at a humidity of 95 ±2 % relative humidity. The rate of change shall be 2 ±1 °C per min.

10.10.3.4 An outdoor damp and wet product (intended for outdoor use in damp or wet locations) shall operate as intended following exposure to 20 cycles of temperature and humidity cycling. A temperature cycle consists of a change from an ambient of 25 ±5 °C at a humidity of 95 ±2 % relative humidity to the higher of the temperatures indicated below for a period of 30 min, and back to a temperature of 25 ±5 °C at a humidity of 95 ±2 % relative humidity. The rate of change shall be 2 ±1 °C per min.

A 66 ±2 °C; or

B The highest ambient operating temperature specified in the product's marking.

10.10.3.5 For the test method, the product is to be placed in a position of intended use in an air-circulating environmental chamber. The environmental chamber is to be maintained at the appropriate temperature and humidity as indicated in Clause 10.10.3.1 through 10.10.3.4. While in the high temperature test ambient, the unit shall be maintained in each condition of intended use (including alarm condition), other than normal supervisory, for a minimum of 2 h or until constant temperature of its parts is reached.

10.10.4 Humidity Test

10.10.4.1 An indoor dry product (intended for indoor use/dry locations) shall operate in the intended manner after having been exposed for 24 h to moist air having a relative humidity of 93 ±2 % at a temperature of 32 ±2 °C. At the completion of the exposure, while at the high humidity, the product is then to be operated for all conditions of intended use.

10.10.4.2 An indoor or outdoor, damp or wet product (intended for indoor or outdoor use, damp or wet locations) shall operate as intended during and after exposure for 240 h to air having a relative humidity of 95 ±3 % and a temperature of 60 ±2 °C. At the completion of the exposure, while at the high humidity, the product is then to be operated for all conditions of intended use.

10.10.5 Wet Location and Outdoor-Use Test

10.10.5.1 General

10.10.5.1.1 A product intended for either indoor/wet or outdoor/wet or damp installations shall be subjected to the tests indicated in Clauses 10.10.5.1.1 through 10.10.5.4.7, unless indicated otherwise.

10.10.5.2 Corrosion Tests

10.10.5.2.1 General

10.10.5.2.1.1 A product intended for outdoor/wet or damp locations shall operate as intended following the tests specified in Clauses 10.10.5.2.2.1 through 10.10.5.2.2.2.

10.10.5.2.1.2 Parts and sections of the product that are not intended to be exposed to weather shall be protected from exposure to the corrosive atmospheres representative of intended use.

10.10.5.2.1.3 The samples are not to be energized during these tests.

10.10.5.2.1.4 Two different samples of the product are to be used for each test exposure (total of six samples).

10.10.5.2.2 Salt Spray Test

10.10.5.2.2.1 The apparatus for salt spray (fog) testing is to consist of:

A A fog chamber having inside dimensions of 1.2 by 0.8 by 0.9 m;

B A salt-solution reservoir;

C A supply of conditioned compressed air;

D A dispersion tower constructed in accordance with ASTM B117, Standard Practice for Operating Salt Spray (Fog) Apparatus, for producing a salt fog;

E Sample supports;

F Provision for heating the chamber; and

G Necessary means of control.

10.10.5.2.2.2 The salt solution is to consist of 5 % by weight of common salt [sodium chloride (NaCl)] and distilled water, the pH value of the collected solution being between 6.7 – 7.2, with a specific gravity of 1.126 – 1.157 at 35 °C. The temperature of the chamber is to be maintained at 35 ±2 °C throughout the test.

10.10.5.2.2.3 The test samples are to be suspended vertically in the test chamber for 240 h (10 d).

10.10.5.2.3 Hydrogen Sulphide (H_2S) Test

10.10.5.2.3.1 The test samples are to be supported as intended in service in a closed chamber having openings for gas inlet and outlet for 240 h (10 d). The chamber is to be maintained at room temperature during the test. A small amount of water is to be maintained at the bottom of the chamber.

10.10.5.2.3.2 An amount of hydrogen sulphide equivalent to 1 % of the volume of the test chamber is to be introduced into the chamber each working day. Prior to each reintroduction of the gas, the chamber is to be purged of the residual gas-air mixture from the exposure of the previous working day.

10.10.5.2.4 Sulphur-Dioxide/Carbon-Dioxide (SO2-CO_2) Test

10.10.5.2.4.1 The test samples are to be supported as intended in service in a closed chamber having openings for gas inlet and outlet for 240 h (10 d). The chamber is to be maintained at room temperature during the test. A small amount of water is to be maintained at the bottom of the chamber.

10.10.5.2.4.2 An amount of sulphur dioxide equivalent to 1 % of the volume of the test chamber and an equal volume of carbon dioxide are to be introduced into the chamber each working day. Prior to each reintroduction of the gas, the chamber is to be purged of the residual gas-air mixture from the exposure of the previous working day.

10.10.5.3 Dust Test

10.10.5.3.1 The intended operation of a product intended for outdoor use shall not be impaired by an accumulation of dust.

10.10.5.3.2 A sample in its intended mounting position is to be placed de-energized in an airtight chamber having an internal volume of at least 0.08 m^3.

10.10.5.3.3 Approximately 0.06 kg of cement dust, maintained in an ambient room temperature of approximately 23 ±2 °C at 20 – 50 % relative humidity and capable of passing through a 200-mesh screen (see ASTM E11 Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves is to be circulated for 15 min by means of compressed air or a blower so as to completely envelop the sample in the chamber. The airflow is to be maintained at an air velocity of approximately 0.25 m/s.

10.10.5.3.4 Following the exposure to dust, the product is to be removed, mounted in its intended position, energized from a source of supply in accordance with, Subsection 10.2, Normal Operation, and examined for its intended operation.

10.10.5.4 Water Spray Test

10.10.5.4.1 The section of equipment intended to be exposed to an indoor or outdoor wet location shall withstand a rain exposure for 1 h without producing a risk of electric shock or affecting the intended operation. The test shall not result in wetting of live parts.

10.10.5.4.2 The product is to be de-energized and tested under the conditions most likely to cause the entrance of water into the enclosure. Each exposure is to be for 1 h and, when more than one exposure is required, drying of the unit prior to the second or subsequent exposure is not required.

10.10.5.4.3 Field-wiring connections are to be made in accordance with the wiring method specified for the product. Openings intended to terminate in conduit are to be sealed. Openings intended for the entry of a conductor(s) for an extra-low voltage circuit are not to be sealed unless seals are provided as a part of the product.

10.10.5.4.4 Products employing polymeric material(s) as all or part of the enclosure shall be subjected to the mould stress-relief distortion test as described in CAN/CSA-C22.2 No. 0.17, Evaluation of Properties of Polymeric Materials, prior to conducting this test.

10.10.5.4.5 Following each 1 h exposure, the product is to be examined to determine that no electrical parts are wetted and that there is no accumulation of water within the enclosure.

10.10.5.4.6 After each exposure, the complete product shall comply with the requirements of Subsection 10.8, Dielectric Voltage-Withstand Test. In addition, the product shall operate as intended.

10.10.5.4.7 The rain test apparatus is to consist of three spray heads mounted in a water supply rack as shown in Figure 7, Rain Test Spray-Head Piping. Spray heads are to be constructed in accordance with Figure 8, Rain Test Spray-Head. The water pressure for all tests is to be maintained at 34.5 kPa at each spray head. The unit is to be brought into the focal area of the three spray heads in such position and under such conditions that the greatest quantity of water will enter the product. The spray is to be directed at an angle of 45° to the vertical toward the louvers or other openings closest to live parts.

10.10.5.5 Gasket Testing

10.10.5.5.1 General

10.10.5.5.1.1 A gasket shall be of a material able to withstand the temperature and use to which it will be subjected. The gasket material shall be resistant to aging. A gasket that will be disturbed during routine servicing, such as during battery replacement, shall be formed of resilient material such as neoprene or silicone rubber.

10.10.5.5.1.2 A gasket of neoprene, rubber, neoprene composition, or rubber composition used in a product intended for wet locations shall be subjected to the test in Clause 10.10.5.5.2.1 and, when intended for outdoor use, the test in Clauses 10.10.5.5.3.1 and 10.10.5.5.3.2.

10.10.5.5.1.3 A gasket material other than those specified in Clause 10.10.5.5.1.2 meets the intent of the requirement when determined to have equivalent characteristics, including resistance to aging. Such material is determined resistant to aging when there is no visible evidence of deterioration (such as cracking, after flexing, softening, or hardening) after these characteristics are investigated.

10.10.5.5.2 Gasket Accelerated Aging Test

10.10.5.5.2.1 A gasket of elastomeric materials such as neoprene, rubber, neoprene composition, rubber composition or flexible cellular material used to prevent the entry of water into a product shall be subjected to an accelerated aging test as specified in Table 19, Accelerated Aging Conditions. Results are identified as satisfying the requirements in Clauses 10.10.5.5.1.1 through 10.10.5.5.1.3 when, following the test, there is no visible evidence of deterioration such as cracking after flexing, shrinkage, distortion, softening, hardening, or similar deterioration to an extent that affects the integrity of the seal intended to be provided by the material, when compared to unaged samples.

10.10.5.5.3 Gasket Low Temperature Test – Outdoor Use

10.10.5.5.3.1 The low temperature test is to be conducted on solid elastomer material, and both open and closed flexible cellular material utilized in products intended for outdoor use.

10.10.5.5.3.2 Three specimens of the gasket are to be subjected to 24 ±0.5 h at minus 40 ±2 °C. While at the test temperature, each specimen is to be bent within 5 s around the 6.4-mm mandrel to form a U-shaped bend. To minimize heat transfer to the specimen or “O” ring segment, gloves are to be worn. Each specimen is to be examined for evidence of cracking. Following the test, there shall be no visible evidence of deterioration such as cracking after flexing, shrinkage, distortion, softening, hardening, or similar deterioration to an extent that affects the integrity of the seal intended to be provided by the material, when compared to unconditioned samples.

10.10.5.6 Polymeric materials tests

10.10.5.6.1 A polymeric material used for (or as part of) the enclosure of a product intended for outdoor wet locations shall meet the requirements of the following tests in CAN/CSA-C22.2 No. 0.17, Evaluation of Properties of Polymeric Materials:

A Ultraviolet Light Exposure Test;

B Water Exposure and Immersion Test; and

C The Resistance to Impact Test, which is to be conducted as specified in CAN/CSA-C22.2 No. 0.17, Evaluation of Properties of Polymeric Materials (at a low temperature of minus 40 ±2 °C).

Exception: With regard to Items A and C, the examination of the property-retention parameters for a polymeric material not used as an enclosure, but attached to or exposed on the outside of the product such as a viewing window, need only include dimensional change with regard to affecting the water seal, and translucence such that viewing of required information is prohibited.

10.11 JARRING TEST

10.11.1 A product shall withstand jarring resulting from impact and vibration without:

A Resulting in a risk of shock or fire hazard;

B Causing false signalling operation of any part; and

C Impairing the subsequent intended operation.

10.11.2 Product utilizing freestanding, desktop, or other non-wall- or ceiling-type mounting shall comply with the requirements in Clause 10.11.1 when subjected to the jarring described in Clause 10.11.4.

10.11.3 Products weighing less than 13.5 kg and utilizing wall or ceiling mount configurations shall comply with the requirements in Clause 10.11.1 when subjected to the jarring described in Clause 10.11.4. Products weighing 13.5 kg or more and utilizing wall or ceiling mount configurations shall comply with the requirements in Clause 10.11.1 when subjected to the jarring described in Clause 10.11.4 or Clause 10.11.5. The direct impact shall be applied to the centre of the side of the product intended to be adjacent to the mounting surface during intended mounting.

10.11.4 An impact of 4.10 J is to be applied directly to any non-display area of the product by means of a 540 g, 50 mm diameter steel sphere swung through a pendulum arc from a height (h) of 775 mm. The at-rest suspension point of the steel sphere is to be 25.4 mm in front of the plane of the product to be impacted.

10.11.5 The product is to be mounted as intended to the centre of a 1.8 by 1.2 m nominal 19.1 mm thick plywood board secured in place at four corners. A 100 by 100 mm steel plate, 3.2 mm thick, shall be rigidly secured to the centre of the reverse side of the board. A 4.10 J impact is to be applied to the centre of the steel plate by means of a 540 g, 50 mm diameter steel sphere either (See Figure 9, Jarring Test):

A Swung through a pendulum arc from a height of 775 mm; or

B Dropped from a height of 775 mm depending upon the mounting of the equipment.

10.11.6 During this test, the product shall be connected to a rated source of supply voltage and tested while in the normal supervisory condition.

10.12 ENDURANCE TEST

10.12.1 General

10.12.1.1 The product shall be tested with supply circuit at rated voltage and frequency and with rated devices or equivalent loads connected to the output circuits.

10.12.1.2 The number of cycles shall be based upon the frequency of expected use, with each circuit of the product tested for the number of cycles and at the rate indicated in Table 20, Endurance Test Cycles:

A The product shall not show a manifestation of a fire or risk of electrical shock and shall be capable of operating in the intended manner after being subjected to repetitive signal operation; and

B There shall be no electrical or mechanical failure or evidence of approaching failure of the product components.

Exception: When circuits are not capable of the rate indicated in Table 20, Endurance Test Cycles, the test cycle rate shall be the maximum rate permitted by the design of the product.

10.12.1.3 The loads or equivalent loads specified in Clause 10.12.1.1 shall conform to the power factor loading indicated in Clause 10.13.1.4.

10.12.2 Integral Operating Devices

10.12.2.1 An operating device supplied as a part of a product [such as a switch, relay, or coding mechanism (except a time-limit cutout)], shall perform as intended when operated for the number of cycles and at the rate indicated in Table 20, Endurance Test Cycles. When an electrical load is involved, the contacts of the device are to make and break the normal current at the rated voltage. The load is to represent that which the device is intended to control or an equivalent load consistent with Clause 10.13.1.3. The endurance tests of these devices may be conducted in conjunction with the endurance test on a product.

10.12.3 Power Supplies

10.12.3.1 A product employing either power-supply circuitry or circuitry for the power-supply battery charger shall operate as intended following 6000 cycles operation as described in Clause 10.12.3.2.

Exception: For a signal transmitter and/or receiver employing only a battery charger, the product shall operate as intended after 500 cycles as specified in Clause 10.12.4.1.

10.12.3.2 With the input of the product connected to a voltage source in accordance with Subsection 10.1, General, a resistive load or loads drawing maximum rated output power shall be connected to the power supply output and then alternately applied and removed, or reduced to the manufacturer's specified minimum value at a rate consistent with Clause 10.12.1.1. Each cycle is to consist of the load application followed by the load removal (or reduction) for an equal time.

10.12.4 Battery Charger

10.12.4.1 For a product employing battery charger circuitry, the input circuit is to be connected to a source having a rated voltage defined by Subsection 10.1, General. A load drawing maximum charging current to a discharged battery, as defined in the Subsection 10.5, Battery Test, is to be applied to the charger circuitry for 5 s intervals for a total of 500 cycles.

10.12.5 Printers

10.12.5.1 A printer, whether separate or integral with a product, shall operate as intended after being subjected to 500 000 cycles of operation. A cycle shall consist of one full line of print or a status change recording, whichever is greater. Replacement of ink, ribbons, or other renewable components is acceptable during the conduct of the test.

10.12.6 Audible Signal Device

10.12.6.1 An audible signal device integral with a product shall operate as intended when the product is operated for 8 h of alternate 5 min periods of energization and deenergization, followed by 72 h of continuous energization. For this test, the product is to be connected to a source of rated voltage and frequency.

10.13 OVERLOAD TEST

10.13.1 Products Supplied From AC Power

10.13.1.1 A product that obtains power from AC power shall not show manifestation of a fire or risk of electrical shock and shall be capable of operating as intended after being subjected to 50 cycles of alarm signal operation at a rate of not more than 15 cycles per min with the supply circuit at 115 % of rated voltage, and at rated frequency. During the cycling output circuits that receive energy from the product's power supply shall be connected as described in Clauses 10.13.1.2 through 10.13.1.6. Each cycle shall

consist of starting with the product energized in the normal supervisory condition, actuating for alarm, and returning to the normal supervisory condition. There shall be no electrical or mechanical failure of any of the components of the product.

10.13.1.2 Rated loads are to be connected to those output circuits of the product that are energized from the product power supply. The loads shall be those devices normally intended for connection or other loads that have been determined to be equivalent. Where an equivalent load is used for a device consisting of an inductive load, the applicable power factor indicated in Clause 10.13.1.4 is to be used. The rated loads are established initially with the product connected to rated supply voltage and frequency, following which the input supply voltage is raised to 115 % of rating.

10.13.1.3 For direct current loads, an inductive load that has been determined to be equivalent is to have the required direct current resistance for the test current and the inductance (calibrated) to obtain the applicable power factor indicated in Clause 10.13.1.4 when connected to a 60 Hz potential equal to the rated direct current test voltage. When the inductive load has both the required direct current resistance and the required inductance, the AC current measured with the load connected to an alternating current circuit will be equal to the rated DC current multiplied by the applicable power factor indicated in Clause 10.13.1.4.

10.13.1.4 For output circuits intended for connection to notification appliances, the power factor is to be 0.60. The power factor of a motor load is to be 0.40 to simulate locked rotor conditions. When a circuit is specified for use in pilot duty applications, the power factor is to be 0.35. A power factor of 1.0 is to be used for all other applications.

10.13.1.5 Unless the device controlling a motor circuit has a horsepower rating, it is to be tested with the motor stalled.

10.13.1.6 A product for use with a grounded supply circuit is to be tested with the enclosure and all other normally grounded parts connected through a 15 A fuse to the grounding conductor of the supply circuit.

10.13.2 Separately Energized Circuits

10.13.2.1 A product shall be capable of operating in the intended manner after being subjected to 50 cycles of signal operation at a rate of not more than 15 cycles per min with the product connected to a source of rated voltage and frequency and 150 % rated loads applied to output circuits which do not receive energy from the product. There shall be no electrical or mechanical failure of any of the components of the product.

10.13.2.2 The test loads shall be set at 150 % of rated current while connected to a separate power source of rated voltage and frequency at the applicable power factor indicated in Clause 10.13.2.3.

10.13.2.3 For circuits intended for use with notification appliances, the power factor is to be 0.60 inductive. The power factor of a motor load is to be 0.40, inductive, to simulate locked rotor conditions. When a circuit is specified for use in pilot duty applications, the power factor is to be 0.35, inductive. Circuits rated for use with resistive loads shall use a power factor of 1.0. When no particular load application is specified, the power factor is to be 0.35, inductive.

10.13.3 Battery Charger Transfer Mechanism

10.13.3.1 A product using a transfer mechanism in conjunction with a power-supply battery charger or a battery charger shall be capable of operating in the intended manner after the transfer mechanism is subjected to 50 cycles, at a rate of not more than 15 cycles per min, of the greater of the two following currents

A 150 % of the maximum rated load (normal standby or alarm) current; or

B One that is equivalent to the maximum inrush current entering a discharged battery connected to the charging circuitry (a discharged battery is defined in Section 10.5, Battery Test,).

10.14 TRANSIENT TEST

10.14.1 General

10.14.1.1 When subjected to the tests described in Subsections 10.14.2, Externally-Induced Supply-Line Transients; 10.14.3, Internally-Induced Transients; and 10.14.4, Input/Output (Extra Low Voltage) Field-Wiring Transients, and while energized from a source of supply in accordance with Clause 10.1.4, a product shall:

A Not falsely annunciate alarms or troubles;

B Not falsely actuate outputs or releasing device(s);

C Not reset during an alarm condition;

D Experience no electrical or mechanical failure of any components of the product;

E Operate as intended following the test; and

F As appropriate, retain required stored memory (such as date, type, and location of a signal transmission) within the unit.

10.14.1.2 Products intended to interconnect to releasing devices shall be tested with each releasing device connected as specified in the installation wiring diagram/instructions.

10.14.2 Externally-Induced Supply-Line Transients

10.14.2.1 A product intended to be powered from AC power shall be subjected to supply line transients induced directly between the power supply circuit conductors of the equipment under test.

10.14.2.2 For this test, the product is to be connected to a transient generator capable of producing the transients described in Clause 10.14.2.3.

10.14.2.3 The transients produced are to be oscillatory and are to have an initial peak voltage of 6000 V. The rise time is to be less than 0.5 µs. Successive peaks of the transient are to decay to a value of not more than 60 % of the value of the preceding peak at a rate of 100 kHz until line voltage is attained. Each transient is to have a total duration of 20 µs and is to be applied at the peak of the 60 Hz waveform.

10.14.2.4 The product is to be subjected to 500 transient pulses induced at a rate of 6 transients per min. A total of 250 pulses are to be applied so that the transient is induced during the positive phase with reference to earth ground, and the remaining 250 pulses are to be induced during the negative phase with regard to earth ground. Of the total 250 pulses at each polarity, 225 are to be applied with the product in the normal supervisory condition and 25 are to be applied with the product in the alarm condition.

10.14.3 Internally-Induced Transients

10.14.3.1 The product is to be energized in the intended standby condition from a rated source of supply that is to be interrupted a total of 500 times. Each interruption is to be for approximately 1 s at a rate of not more than six interruptions per min. The test is to be conducted for each different type of secondary

power source configuration described in the installation document such as internal battery charging or connection to a separate battery charger. Where the system configuration involves two or more products, each with their own AC input, the test is to be conducted by momentarily interrupting the input to all products simultaneously.

10.14.4 Input/Output (Extra Low Voltage) Field-Wiring Transients

10.14.4.1 The product is to be energized in the normal standby condition while connected to a source of supply in accordance with Subsection 10.1, General. All field-wiring circuits are to be tested as specified in Clauses 10.14.4.2 and 10.14.4.3.

10.14.4.2 For this test, each output circuit is to be subjected to the transient waveforms specified in the Table 21, Transient Waveforms, as delivered into a 200 Ω load. The transient pulses are to be coupled directly onto the output circuit conductors of the equipment under test.

10.14.4.3 Each conductor of a circuit is to be subjected to 40 transient pulses induced at the rate of six pulses per min as follows:

A Twenty pulses (four at the 2400 peak voltage level and two at each of the other transient voltage levels specified in Clause 10.14.4.2) between each lead or terminal and earth ground, consisting of ten pulses of one polarity, and ten of the opposite polarity; and

B Twenty pulses (four at the 2400 peak voltage level and two at each of the other transient voltage levels specified in Clause 10.14.4.2) between any two circuit leads or terminals consisting of ten pulses of one polarity and ten pulses of the opposite polarity.

10.15 ELECTROSTATIC DISCHARGE TEST

10.15.1 When subjected to the tests described in Clauses 10.15.3 and 10.15.4, and while energized from a source of supply in accordance with Clause 10.1.4, a product shall:

A Not falsely annunciate alarms or troubles;

B Not falsely actuate outputs or releasing device(s);

C Not reset during an alarm condition;

D Experience no electrical or mechanical failure of any components of the product;

E Operate as intended following the test; and

F As appropriate, retain required stored memory (such as date, type, and location of a signal transmission) within the unit.

CAUTION: Potentially lethal voltages are involved – use safety precautions.

10.15.2 Products intended to interconnect to releasing devices shall be tested with each releasing device connected as specified in the installation wiring diagram/instructions.

10.15.3 The product is to be mounted in its intended mounting position on a 19 mm thick unpainted exterior grade plywood surface and connected to a source of supply in accordance with Subsection 10.1, General. The enclosure is to be connected to earth ground. The electro static discharge simulator shall produce 10 000 V through a network of 250 picofarad capacitor and a 1500 Ω resistor.

10.15.4 Twenty discharges, with at least 3 discharges for each mode of operation, are to be applied to different points on the exposed surface of the product, and the capacitors are to be recharged prior to each discharge. Ten discharges are to be made with one lead connected to earth ground and the other lead brought into contact with the product surface, followed by ten discharges with the polarity reversed.

10.16 RADIO FREQUENCY INTERFERENCE TEST

10.16.1 When subjected to the tests described in Clause 10.16.4, and while energized from a source of supply in accordance with Clause 10.1.4, a product shall:

A Not falsely annunciate alarms or troubles;

B Not falsely actuate outputs or releasing device(s);

C Not reset during an alarm condition;

D Experience no electrical or mechanical failure of any components of the product;

E Operate as intended following the test; and

F As appropriate, retain required stored memory (such as date, type, and location of a signal transmission) within the unit.

10.16.2 Products intended to interconnect to releasing devices shall be tested with each releasing device connected as specified in the installation wiring diagram/instructions.

10.16.3 To determine compliance with Clause 10.16.1, the product is to be energized from a source of rated voltage and frequency, interconnected as described in the installation wiring diagram/instructions, and subjected to the radio frequency interference described in Clause 10.16.4.

10.16.4 The radio frequency interference shall be as specified in Table 22, Radio Frequency Interference Levels. The radiating antennas shall be ¼ wave monopole and be placed 30 cm from the nearest edge of the product under test. The test is to be conducted with each antenna tip pointed directly at the product, and repeated with the antenna at a right angle to the first position, centered on the product. A total of six energizations in each of the two orientations are to be applied for each nominal frequency ±2 %, five to consist of 5 s on and 5 s off, followed by one consisting of a single 15 s energization.

10.17 EVALUATION OF CONFORMAL COATINGS ON PRINTED WIRING BOARDS

10.17.1 Test Program I

10.17.1.1 The following test program shall be utilized to determine the acceptability of a conformal coating in lieu of full electrical spacings for circuits at a potential of 30 V or less.

10.17.1.2 Eight samples of the printed wiring board, without electrical components installed and coated with the conformal coating, shall be utilized for the tests described in Clauses 10.17.1.3 and 10.17.1.4. Test leads are to be attached to the printed wiring (prior to the application of the coating) so as to allow for convenient application of the specified test potential.

10.17.1.3 Four specimens shall be conditioned to room ambient by exposure to ambient air at a temperature of 25 ±5 °C and 50 ±5 % relative humidity for not less than 24 h. Following the conditioning, the four samples shall be subjected to Subsection 10.8, Dielectric Voltage Withstand Test, for the 0 to 30