

sine wave. Test conditions shall be as follows:

(i) The radiated electric-field (E-field) shall be uniform and linearly polarized in a horizontal plane.

(ii) The test shall be performed with each of the six faces of the monitor facing the antenna. All cables shall be aligned with the horizontal E-field vector over the majority of their length throughout the test. For exposure methods in which the monitor cables cannot be extended fully, if the length of any conducting cable is greater than 1.5 meters, the first 0.75 meters of cable (closest to the monitor) shall be aligned with the horizontal E-field vector and the remaining length shall be bundled in a noninductive, serpentine configuration.

(iii) The test shall be performed with all monitor components and cables positioned at an appropriate distance from any radio frequency (RF)-reflecting object and at a distance from any conducting ground plane that is appropriate for tabletop equipment.

(iv) Patient simulators used during the test shall be either simple passive devices, isolated from earth ground using fiber optic links, or battery operated and shielded. For impedance and electrocardiograph sensors, testing for erroneous breath and heartbeat detection shall be performed using a 1-kilohm resistor as a patient simulator, or a more suitable value defined by the manufacturer for a particular model of apnea monitor. Testing for erroneous breath detection shall also be performed using a battery operated simulator set to produce electrocardiograph signals, but not respiration signals (i.e., set to the apnea mode). Testing for all other fault conditions shall be performed using a battery operated simulator set to produce both respiration signals and electrocardiograph signals.

(v) Connections not normally used during monitor operation that are made to the monitor to assess performance during the test shall be isolated using fiber optic links.

(3) *AC voltage fluctuations, transients, and conducted interference.* The following requirements apply to all monitors that recharge batteries or operate from the AC power line:

(i) *Steady-state voltage.* The monitor shall remain in compliance with this standard, without changing a voltage selection switch, when powered from line voltages between 95 and 132 volts root-mean-square. For monitors intended for home use, the battery power backup shall activate automatically when the line voltage falls below the minimum level necessary for line powered monitor operation, which

shall be no greater than 95 volts root-mean-square, and line powered operation shall automatically resume when the line voltage returns to the 95- to 132-volt range.

(ii) *Dropout.* The monitor shall operate in compliance with this standard during and after line voltage dropouts for durations of 10 milliseconds and less.

(iii) *Slow sags and surges.* The monitor shall operate in compliance with this standard during and after line voltage surges to 150 volts root-mean-square and sags to 90 volts root-mean-square, for durations of 500 milliseconds and less.

(iv) *Fast transient bursts.* The monitor shall operate in compliance with this standard during and after bursts of transients of 0.5, 1, and 2 kilovolts applied to AC power leads, and transients of 0.25, 0.5, and 1 kilovolts coupled by way of a capacitive clamp to signal leads, when tested according to IEC 801-4, with the exception that the burst repetition frequency shall not exceed 30 per minute.

(v) *Fast surges.* The monitor shall operate in compliance with this standard during and after exposure to common-mode and differential-mode combination voltage/current transients, both positive and negative, applied to AC power leads.

(A) The test generator used shall have the following specifications:

Open-circuit voltage, differential mode: 0.5 and 1 kilovolts.

Open-circuit voltage, common mode: 0.5, 1, and 2 kilovolts.

Open-circuit voltage risetime: 1.2 microseconds.

Open-circuit voltage falltime: 50 microseconds.

Generator source impedance: 2 kilohm.

Short-circuit current risetime: 8 microseconds.

Short-circuit current falltime: 20 microseconds.

Peak short-circuit current: 1 kilo ampere.

(B) Capacitive coupling shall be used to apply the combination wave to the AC power leads of the monitor under test. Surges shall be applied at the point where the monitor normally would be connected to AC line power.

(C) A decoupling network shall be used to isolate the monitor under test from the AC power network.

(D) A line-to-line test (differential mode) shall be performed using 0.5 and 1-kilovolt surges of both positive and negative polarity applied using a generator source impedance of 2 kilohm and coupling capacitance of 18 micro farads.

(E) A line-to-ground and a both-lines-to-ground test (common mode) shall be performed using 0.5, 1, and 2-kilovolt surges of both positive and negative polarity applied using a generator source impedance of 12 kilohm (10-kilohm resistor in series with test generator) and coupling capacitance of 9 micro farads.

(F) Surges at each amplitude and polarity shall be applied at phase angles of 0, 45, 90, 135, 180, 225, and 270 degrees with respect to the AC line.

(G) Each test shall be repeated 10 times at a rate between 1 and 30 surges per minute.

(vi) *Conducted electromagnetic energy.* The monitor shall operate in compliance with this standard during and after exposure to both differential and common mode conducted electromagnetic energy on the AC power leads at frequencies between 150 kilo Hertz and 80 megahertz at voltages of 0.3, 1, and 3 volts root-mean-square (when unmodulated), amplitude modulated 80 percent with a 0.5 hertz sine wave, added to the power line voltage, when tested according to CS02 of the standard MIL-STD-462, with the modifications and additions specified in paragraphs (b)(3)(vi)(A) through (b)(3)(vi)(E) of this section. If continuous sweep of the test frequency is used, the sweep rate shall not exceed 1×10^{-3} decades per second. If discrete frequency steps are used, the maximum step size is 1 percent of the test frequency, and the minimum dwell time is 10 seconds per step.

(A) The impedance of AC inputs shall be stabilized using line impedance stabilization networks appropriate for the test frequency range.

(B) The power leads under test shall be elevated 5 centimeters above the ground plane.

(C) The interference signal shall be injected at a distance of 5 centimeters from the point at which AC line power enters the monitor. For battery chargers which plug directly into AC outlets, a 10 centimeter length of wire shall be added between the line impedance stabilization networks (LISN's) and the charger. The low-voltage output cable of the charger shall be elevated 5 centimeters above the ground plane.

(D) The differential-mode test shall be conducted as specified in CS02 of the standard MIL-STD-462. The lead between the capacitor and the AC line shall be as short as possible.

(E) The common-mode test shall be conducted as specified in paragraph (b)(3)(vi) of this section, except that two identical capacitors shall be used, one connected from the signal source to the