

Principle 2

HIGH QUALITY IMPLEMENTATION

The voting system is implemented using high quality best practices.

2.7 - The voting system performs reliably in anticipated physical environments.

The requirements in this section deal with the capability of voting devices to withstand electrical disturbances as well as for voting devices to not cause electrical disturbances in other devices or people. Conformance to the Federal Communications Commission, Part 15, Class B requirements largely deals with these issues, and the requirements here address items not covered by Class B.

2.7-A Electrical disturbances

All voting devices must continue to operate in the presence of electrical disturbances generated by other devices and people and must not cause electrical disruption to other devices and people.

Discussion

Voting devices located in a polling place or other places need to continue to operate despite disruption from electrical emanations generated by other devices, including static discharges from people. Likewise, voting devices need to operate without causing disruption to other devices and people due to electrical emanations from the devices.

2.7-A.1 FCC Part 15 Class A and B conformance

Voting devices must comply with the requirements of the Federal Communications Commission, Part 15:

1. Voting devices located in polling places must comply with Class B requirements.
2. Voting devices located in non-place setting, e.g., back offices, must minimally comply with Class A requirements.

2.7-A.2 Power supply – energy service provider

Voting devices located in polling places must be powered by a 120 V, single phase power supply derived from typical energy service providers.

Discussion

It is assumed that the AC power necessary to operate the voting system will be derived from the existing power distribution system of the facility housing the polling place. This single-phase power

may be a leg of a 120/240 V single phase system, or a leg of a 120/208 V three-phase system, at a frequency of 60 Hz.

2.7-A.3 Power port connection to the facility power supply

All electronic voting systems installed in a polling place must comply with Class B emission limits affecting the power supply connection to the energy service provider.

Discussion

The normal operation of an electronic system can produce disturbances that will travel upstream and affect the power supply system of the polling place, creating a potential deviation from the expected electromagnetic compatibility of the system. The issue is whether these actual disturbances (after possible mitigation means incorporated in the equipment) reach a significant level to exceed stipulated limits.

2.7-A.4 Leakage via grounding port

All electronic voting systems installed in a polling place must comply with limits of leakage currents effectively established by the trip threshold of all listed Ground Fault Current Interrupters (GFCI), if any, installed in the branch circuit supplying the voting system.

Discussion

Excessive leakage current is objectionable for two reasons:

For a branch circuit or wall receptacle that could be provided with a GFCI (depending upon the wiring practice applied at the particular polling place), leakage current above the GFCI built-in trip point would cause the GFCI to trip and therefore disable the operation of the system.

Should the power cord lose the connection to the equipment grounding conductor of the receptacle, a personnel hazard would occur. (Note the prohibition of “cheater” adapters in the discussion of general requirements for the polling place.)

2.7-A.5 Outages, sags and swells

All electronic voting systems must be able to withstand, without disruption of normal operation or loss of data, a complete loss of power lasting two hours.

Discussion

The Information Technology industry has adopted a recommendation that IT equipment should be capable to operate correctly for swells reaching 120 % of the nominal system voltage with duration ranging from 3 ms to 0.5 s and permanent overvoltages up to 110 % of nominal system voltage.

2.7-A.6 Withstand conducted electrical disturbances

All electronic voting systems shall withstand conducted electrical disturbances that affect the power ports of the system.

2.7-A.7 Emissions from other connected equipment

All elements of an electronic voting system shall be able to withstand the conducted emissions generated by other elements of the voting system.

2.7-A.8 Electrostatic discharge immunity

All electronic voting systems shall withstand, without disruption of normal operation or loss of data, electrostatic discharges associated with human contact and contact with mobile equipment (service carts, wheelchairs, etc.).

Discussion

Electrostatic discharge (ESD) events can originate from direct contact between an “intruder” (person or object) charged at a potential different from that of the units of the voting system, or from an approaching person about to touch the equipment – an “air discharge.” The resulting discharge current can induce disturbances in the circuits of the equipment. This requirement is meant to ensure that voting devices are conformant to the typical ESD specifications met by other electronic devices used by the public such as ATMs and vending kiosks.

2.7-A.9 Radiated radio frequency emissions

All electronic voting systems installed in a polling place shall comply with emission limits according to the Rules and Regulations of Class B for radiated radio-frequency emissions.

Discussion

Electronic equipment in general and modern high-speed digital electronic circuits in particular have the potential to produce unintentional radiated and conducted radio-frequency emissions over wide frequency ranges. These unintentional signals can interfere with the normal operation of other equipment, especially radio receivers, in close proximity.