

# IEEE 802.3 POEP Study Group

## Safety considerations for POE and POEplus

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# Objective of this presentation

- **To address POEplus safety-related issues/ concerns**
- **To answer safety-related questions asked on the reflector**



# General principles of IT equipment safety

- The Standard for Safety of Information Technology Equipment (ITE), IEC 60950-1, considers the following hazards:
  - Electric shock
    - IEEE802.3af address this issue by keeping operating voltage below 60VDC(SELV)
    - Keeping POEplus voltage at 60VDC or below will prevent electric shock and will be backwards compatible with IEEE802.3af



# General principles of IT equipment safety

## ■ Electrical Energy related hazards

– Hazardous energy level:

- 240VA or more for 60 s or more, or
- Stored energy of 20J or more, at a potential of 2V or more

## ■ IEEE 802.3af addresses this issue by:

- keeping port power level much below 240VA (15.4W), and
- PD capacitor < 180uF. (Dangerous energy level of capacitance at 57V is more than 12000uF )

## ■ POEplus will satisfy electrical energy hazard requirements by keeping power much less than 240W and PD capacitors close to IEEE802.3af value



# General principles of IT equipment safety

## ■ Fire hazards

- IEEE802.3af addresses this issue by requiring ports to comply with the requirements for a Limited Power Source (LPS), i.e., <100W (Sub-clause 2.5 of IEC 60950-1)
  - **POEplus standard should keep LPS requirement too.**
- Protection of the telecommunication wiring from overheating and catching fire is achieved by limiting the max current (Sub-clause 6.3 of IEC 60950-1).
  - The maximum current should not exceed a current limit for specific wire gauge.
  - The current limit is 1.3A if such wiring is not specified.
- **Since POEplus will need to meet much more stringent FCC current requirements, then POEplus will not violate any safety standard requirements**



# General principles of IT equipment safety

- Other ITE Hazards: Mechanical hazards, Radiation hazards, Chemical hazards, etc.

-Not relevant to POE

- Electrical Isolation

The electrical isolation in POEplus should comply with sub-clause 33.4.1 IEEE802.3af, i.e., isolation requirements between SELV circuits and telecommunication network connections (sub clause 6.2 IEC 60950-1).



# Summary

- **POEplus will not present any new safety issues by keeping the same safety limitation and recommendation as IEEE802.3af.**
- **Most important safety parameters in POEplus :**
  - **Port voltage level should be 60Vdc or less;**
  - **Port power level should satisfy LPS requirements (<100W); and**
  - **Electrical isolation shall withstand 1500 Vrms for 60sec applied as specified in sub-clause 6.2 IEC 60950-1**



# Annex A

- Answers for some safety questions discussed on the reflector





# Electrical isolation environments

- Environment A:
  - **Ethernet lines are inside the building and do not cross any AC powering boundaries. This a typical business environment and all ports can share the same PSE**
  
- Environment B:
  - **Ethernet lines cross the boundary between separate AC power systems or the boundaries of a single building**

Reference: IEEE802.3af, sub-clause 33.4.1.1



# Separation POE circuits from earth

- **There shall be insulation between circuitry intended to be connected to POE and earth**
- **Insulation is subjected to an electric strength test:**
  - 1500VAC at 50-60Hz for 60 sec between POE ports and earth in environment A.**
  - 1500VAC at 50-60Hz for 60 sec between POE ports and earth, 1500VAC at 50-60Hz for 60 sec between ports in environment B**

Reference: IEEE802.3af, sub-clause 33.4.1

