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 then 12000uF )

- POEplus will satisfy electrical energy hazard requirements by keeping power much less then 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