# X. YANG module for Ethernet data terminal equipment (DTE) power via medium dependent interface (MDI) and Power over Data Lines (PoDL)

## **X. 1 Introduction**

This clause defines a YANG module to manage power via MDI Power Sourcing Equipment (PSE) and Power over Data Line PSE.

## **X.2 Overview**

IEEE Std 802.3 defines the hardware registers that will allow for management interfaces to be built for a DTE Power via MDI and Power over Data Line device. The YANG module defined in this clause extends the Ethernet-interface data module defined in Clause YY with the management objects required for the management of the DTE Power via MDI and Power over Data Line devices and ports.

## **X.3 Module structure**

The *ieee802-pse* YANG module of this clause focused on the configuration and monitoring of powering over Ethernet (PoE) function defined in IEEE Std 802.3, including power via MDI, as well as power over data line which can also be considered as the single pair PoE. The module augments the *ieee802-ethernet-interface* YANG module with attributes for PoE function. The module is partitioned into two major containers.

The poe-pse container under the configuration tree defines attributes used for configuring the ports on a PSE device from the management system. PSE devices here are Ethernet switches that support power Ethernet and devices that support power over Data Line.

The poe-pse container under operational state tree defines attributes for describing the status of ports on a PSE device to the management system. PSE devices here are Ethernet switches that support power Ethernet and devices that support power over Data Line.

Both poe-pse container under configuration tree and poe-pse container under operational state tree include two sub-containers: multi-pair container for powering via MDI PSE and single-pair container for powering over Data Line PSE.

## **X.4 Mapping of IEEE Std 802.3 Clause 30 managed objects**

This sub-clause contains the mapping between YANG data nodes included in *ieee802-pse* (see Table x-1) YANG module and the attributes defined in IEEE Std 802.3, Clause 30.

**Table x-1-mapping between IEEE Std 802.3, Clause 30 managed objects and**

**ieee802-pse YANG data nodes**

|  |  |
| --- | --- |
| **IEEE Std 802.3, Clause 30 managed object** | **ieee802-pse YANG data nodes** |
| **Managed objects** | **Attributes** | **container** | **data nodes** |
| oPSE (30.9.1) | aPSEAdminState | interfaces/ interface/ ethernt/poe-pse/multi-pair | pse-enable |
| aPSEPowerPairs | powering-pairs |
| aPSEPowerPairsControlAbility | pairs-control-ability |
| aPSEPowerDetectionStatus | interfaces-state/ interface/ ethernet/poe-pse/multi-pair | detection-status |
| aPSEPowerClassification | classifications |
| aPSEInvalidSignatureCounter | invalid-signature |
| aPSEPowerDeniedCounter | power-denied |
| aPSEOverLoadCounter | overload |
| aPSEShortCounter | short |
| aPSEMPSAbsentCounter | mps-absent |
| aPSEActualPower | actual-power |
| aPSEPowerAccuracy | power-accuracy |
| aPSECumulativeEnergy | cumulative-energy |
| oPoDLPSE(30.15) | aPoDLPSEAdminState | interfaces/ interface/ ethernt/poe-pse/single-pair | pse-enable |
| aPoDLPSEPowerDetectionStatus | interfaces-state/ interface/ ethernet/poe-pse/single-pair | detection-status |
| aPoDLPSEType | pse-type |
| aPoDLPSEDetectedPDType | detected-pd-type |
| aPoDLPSEDetectedPDPowerClass | pd-power-class |
| aPoDLPSEInvalidSignatureCounter | invalid-signature |
| aPoDLPSEInvalidClassCounter | invaid-class |
| aPoDLPSEPowerDeniedCounter | power-denied |
| aPoDLPSEOverLoadCounter | overload |
| aPoDLPSEMaintainFullVoltageSignatureAbsentCounter | fvs-absent |
| aPoDLPSEActualPower | actual-power |
| aPoDLPSEPowerAccuracy | power-accuracy |
| aPoDLPSECumulativeEnergy | cumulative-energy |

## **X.5 Security considerations for Ethernet data terminal equipment (DTE) power via medium dependent interface (MDI) and Power over Data Line Module**

There are a number of data modes defined in this YANG module as configuration with read-write. Such data nodes may be considered sensitive or vulnerable in some network environments. The support for configuration operations in a non-secure environment without proper protection can have a negative effect on network operations.

Setting the following data nodes to incorrect values can result in improper operation of the PSE, including the possibility that the PD does not receive power from the PSE port:

-- pse-enable

-- powering-pairs

Some of the readable operational state in this module may be considered sensitive or vulnerable in some network environments. These are as follows:

 -- pairs-control-ability

 -- classifications

 -- pd-power-class

 -- pse-type

 -- detected-pd-type

It is thus important to control GET access to these data nodes and possible to encrypt their values when sending them over the network.

## **X.6 Module definition**

### **X.6.1 Tree hierarchy**

module: ieee802-pse

 augment /if:interfaces/if:interface/eth-if:ethernet:

 +--rw poe-pse

 +--rw multi-pair!

 | +--rw pse-enable? boolean

 | +--rw powering-pairs? enumeration

 +--rw single-pair!

 +--rw pse-enable? boolean

 augment /if:interfaces-state/if:interface/eth-if:ethernet:

 +--ro poe-pse

 +--ro pse-pair-mode? identityref

 +--ro multi-pair

 | +--ro pairs-control-ability? boolean

 | +--ro detection-status? pse-detection-state

 | +--ro classifications? power-class

 | +--ro poe-statistics

 | | +--ro power-denied? uint32

 | | +--ro invalid-signature? uint32

 | | +--ro mps-absent? uint32

 | | +--ro overload? uint32

 | | +--ro short? uint32

 | | +--ro cumulative-energy? uint32

 | +--ro actual-power? decimal64

 | +--ro power-accuracy? uint32

 +--ro single-pair

 +--ro detection-status? podl-detection-state

 +--ro pse-type? enumeration

 +--ro detected-pd-type? enumeration

 +--ro pd-power-class? power-class

 +--ro poe-statistics

 | +--ro power-denied? uint32

 | +--ro invalid-signature? uint32

 | +--ro invalid-class? uint32

 | +--ro overload? uint32

 | +--ro fvs-absence? uint32

 | +--ro cumulative-energy? uint32

 +--ro actual-power? decimal64

 +--ro power-accuracy? uint32

 +--ro cumulative-energy? uint32

### **X.6.2 YANG module definition**