

LLDP Text¹: Only sections with changes are included.

Clause 79

79.3 IEEE 802.3 Organizationally Specific TLVs

Insert the row below in Table 79–1 and change the range in the subtype column of the last row to remove the assigned subtype value.

The currently defined IEEE 802.3 Organizationally Specific TLVs are listed in Table 79–1. Any additions or changes to these TLVs will be included in this clause.

Table 79–1—IEEE 802.3 Organizationally Specific TLVs

IEEE 802.3 subtype	TLV name	Subclause reference
1	MAC/PHY Configuration/Status	79.3.1
2	Power Via Medium Dependent Interface (MDI)	79.3.2
3	Link Aggregation (deprecated)	79.3.3
4	Maximum Frame Size	79.3.4
5	Energy Efficient Ethernet	79.3.5
TBD	Power Via MDI Measurements	79.3.6
–255	Reserved	—

79.3.2 Power Via MDI TLV

Clause 33 defines two option power entities: a Powered Device (PD) and Power Sourcing Equipment (PSE). These entities allow devices to draw/supply power over the sample generic cabling as used for data transmission. The Power Via MDI TLV allows network management to advertise and discover the MDI power support capabilities of the sending IEEE 802.3 LAN station. This TLV is also required to perform Data Link Layer classification as defined in 33.6. Figure 79–3 shows the format of this TLV.

Restore Figure 79-3 from 802.3-2012, change caption to “Power via MDI TLV format for Type 1 and Type 2”

¹ Text is directly related to LLDP extension presentation [wendt_1_1115_v100.pdf](#)

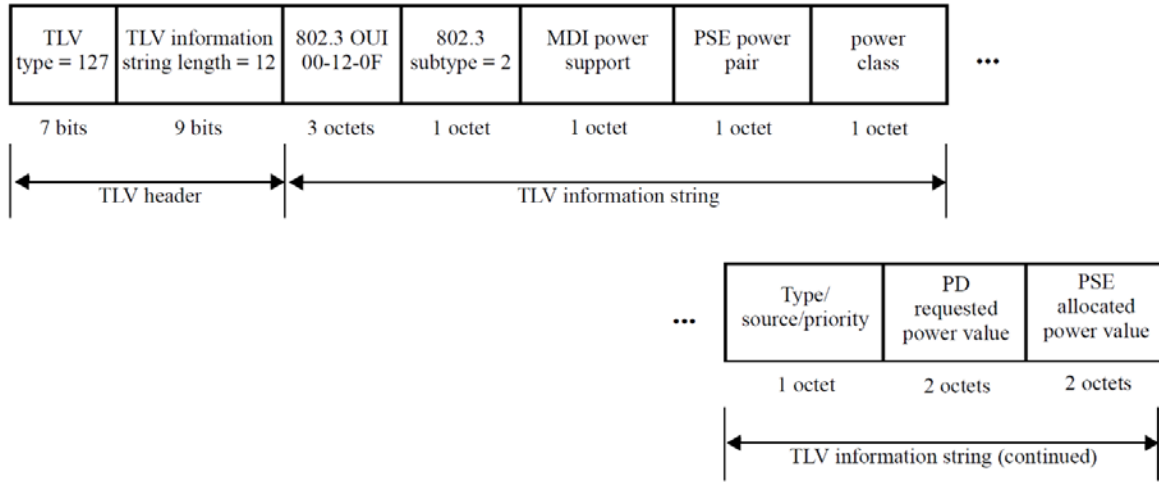


Figure 79-3—Power Via MDI TLV format

To support also long MDI TLVs a second frame size is defined as shown in Figure 79-3a

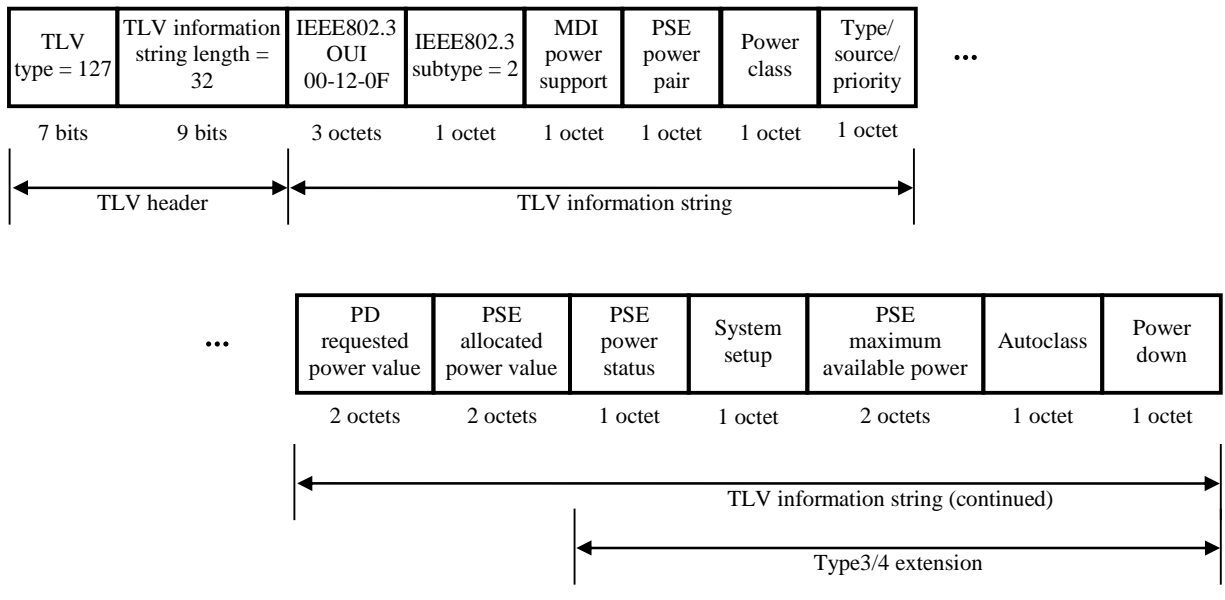


Figure 79-3a—Power Via MDI TLV format for Type 3 and Type 4

79.3.2.6a PSE maximum available power

The PSE maximum available power field shall contain the highest power the PSE can grant as defined in Table 79-5a. The PSE shall set the value of this field taking available power budget and hardware capabilities into account.

Table 79-6a—PSE Maximum available power value field

Bit	Function	Value/meaning
15:0	PSE Maximum available power	Power = 0.1 × (decimal value of bits) Watts.

	<u>power value</u>	<u>Valid values for these bits are decimal 1 through 999.</u>
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79.3.2.6c PD measurements

The PD-measured voltage value field may be included to carry the PD's measured voltage value at the port defined in Table 79-6c.

The PD-measured current value field may be included to carry the PD's measured current value at the port defined in Table 79-6c.

Table 79-6c—PD measurements

Bit	Function	Value/meaning
31:16	V_{PD}	$V_{PD} = 0.1 \times$ (decimal value of bits) V Valid values for these bits are decimal 1 through 570
15:0	$I_{PORT-PD}$	$I_{PORT-PD} = 0.1 \times$ (decimal value of bits) mA Valid values for these bits are decimal 1 through 9620

79.3.2.6d PSE measurements

The PSE-measured voltage value field may be included to carry the PSE's measured voltage value at the port defined in Table 79-6d.

The PSE-measured current value field may be included to carry the PSE's measured current value at the port defined in Table 79-6d.

Table 79-6d—PSE measurements

Bit	Function	Value/meaning
31:16	V_{PSE}	$V_{PSE} = 0.1 \times$ (decimal value of bits) V Valid values for these bits are decimal 1 through 570
15:0	$I_{PORT-PD}$	$I_{PORT-PD} = 0.1 \times$ (decimal value of bits) mA Valid values for these bits are decimal 1 through 9620

79.3.2.6c Autoclass

The Autoclass field shall contain the bits defined in Table 79-6c to control Autoclass. See 33.2.6.3, 33.3.5.3 and Annex 33-C for details on Autoclass. Using the Autoclass field to trigger a new Autoclass measurement allows a PD to change maximum power consumption.

Table 79-6c—Autoclass field

Bit	Function	Value/meaning
7:3	Reserved	Transmit as zero. Ignore on receive.
2	Autoclass	1 = PSE supports Autoclass

		<u>0 = PSE does not support Autoclass</u>
<u>1</u>	<u>Autoclass completed</u>	<u>1 = Autoclass measurement completed</u> <u>0 = Autoclass idle</u>
<u>0</u>	<u>Autoclass request</u>	<u>1 = PD requests Autoclass measurement</u> <u>0 = Autoclass idle</u>

The sequence of Autoclass as triggered by LLDP is listed in Table 79-d.

Table 79-6d— Sequence of events for Autoclass triggered via LLDP

<u>sequence</u>	<u>Function</u>
<u>1</u>	<u>PD switches to a mode where maximum power is consumed</u>
<u>2</u>	<u>PD sends LLDP frame with request autoclass=1 set</u>
<u>3</u>	<u>PSE sees the frame with request autoclass=1 and performs the measurement and budget reduction</u>
<u>4</u>	<u>PSE sends LLDP frame with completed autoclass=1 set</u>
<u>5</u>	<u>PD receives LLDP frame with completed autoclass=1 and sets request autoclass=0</u>
<u>6</u>	<u>PSE receives LLDP frame with request autoclass=0 and sets completed autoclass=0</u>

79.3.2.6d Request power down

The request power down field shall be set as defined in Table 79-6e. This field may be set to value 0xDD by a PD that no longer requires power from the PI.

Table 79-6e—PD Request power down field

<u>Bit</u>	<u>Function</u>	<u>Value/meaning</u>
<u>7:0</u>	<u>power down</u>	<u>Value = 0xDD triggers a power down.</u> <u>Any other value is ignored</u>

79.3.6 Power Via MDI Measurements TLV

Clause 33 defines two option power entities: a Powered Device (PD) and Power Sourcing Equipment (PSE). These entities allow devices to draw/supply power over the sample generic cabling as used for data transmission. The Power Via MDI Measurement TLV allows network management to read electrical measurement data from the sending IEEE 802.3 LAN station. Figure 79-7a shows the format of this TLV.

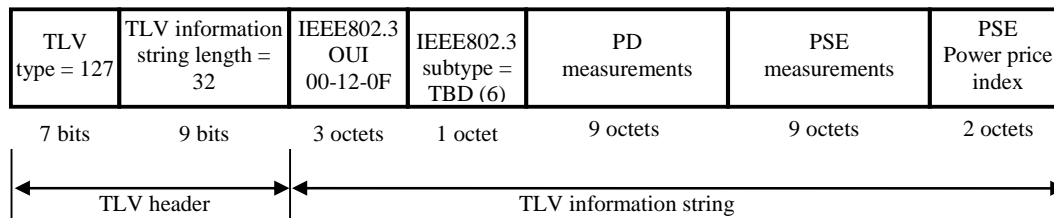


Figure 79-7a—Power Via MDI Measurements TLV format for Type 3 and Type 4**79.3.6.1 PD measurements**

The PD measured voltage value field may be included to carry the PD's measured voltage value at the port defined in Table 79-7a.

The PD measured current value field may be included to carry the PD's measured current value at the port defined in Table 79-7a.

The PD measured energy value field may be included to carry the PD's measured energy consumption value at the port defined in Table 79-7a.

Table 79-7a—PD measurements

<u>Bit</u>	<u>Function</u>	<u>Value/meaning</u>
<u>31:16</u>	<u>V_{PD}</u>	<u>$V_{PD} = 0.1 \times$ (decimal value of bits) V</u> <u>Valid values for these bits are decimal 1 through 570</u>
<u>15:0</u>	<u>$I_{PORT-PD}$</u>	<u>$I_{PORT-PD} = 0.1 \times$ (decimal value of bits) mA</u> <u>Valid values for these bits are decimal 1 through 9620</u>

<u>Bit</u>	<u>Function</u>	<u>Value/meaning</u>
<u>95</u>	<u>Voltage support</u>	<u>1 = PD supports voltage measurement</u> <u>0 = PD does not support voltage measurement</u>
<u>94</u>	<u>Current support</u>	<u>1 = PD supports current measurement</u> <u>0 = PD does not support current measurement</u>
<u>93</u>	<u>Energy support</u>	<u>1 = PD supports energy measurement</u> <u>0 = PD does not support energy measurement</u>
<u>92:91</u>	<u>Measurement source</u>	<u>Determine where the measurement is to be taken.</u> <u>0 0 = No request</u> <u>0 1 = Pairset Alternative A</u> <u>1 0 = Pairset Alternative B</u> <u>1 1 = Port total</u>
<u>90</u>	<u>Voltage request</u>	<u>Request voltage measurement</u> <u>Where power type = PSE</u> <u>1 = PSE request for voltage measurement</u> <u>0 = No request for voltage measurement</u> <u>Where power type = PD</u> <u>1 = Voltage measurement contains valid data</u> <u>0 = Voltage measurement disabled</u>
<u>89</u>	<u>Current request</u>	<u>Request current measurement</u> <u>Where power type = PSE</u> <u>1 = PSE request for current measurement</u> <u>0 = No request for current measurement</u> <u>Where power type = PD</u> <u>1 = Current measurement contains valid data</u> <u>0 = Current measurement disabled</u>

<u>88</u>	<u>Energy request</u>	<u>Request energy measurement</u> <u>Where power type = PSE</u> <u>1 = PSE request for energy measurement</u> <u>0 = No request for energy measurement</u> <u>Where power type = PD</u> <u>1 = Energy measurement contains valid data</u> <u>0 = Energy measurement disabled</u>
<u>87:80</u>	<u>Voltage accuracy</u>	<u>Number of useful significant bits in Voltage measurement data field (decimal value of bits).</u> <u>Valid values for these bits are decimal 1 through 16</u>
<u>79:72</u>	<u>Current accuracy</u>	<u>Number of useful significant bits in Current measurement data field (decimal value of bits).</u> <u>Valid values for these bits are decimal 1 through 16</u>
<u>71:64</u>	<u>Energy accuracy</u>	<u>Number of useful significant bits in Energy measurement data field (decimal value of bits).</u> <u>Valid values for these bits are decimal 1 through 32</u>
<u>63:48</u>	<u>Voltage measurement</u>	<u>$V_{Port_PD} =$ (decimal value of bits) mV</u> <u>Valid values for these bits are decimal 1 through 65000</u>
<u>47:32</u>	<u>Current measurement</u>	<u>$I_{Port_or\ I_{Port-2P}} = 0.1 \times$ (decimal value of bits) mA</u> <u>Valid values for these bits are decimal 0 through 20000</u>
<u>31:0</u>	<u>Energy measurement</u>	<u>Total energy consumed at the port or pairset</u> <u>value = $0.1 \times$ (decimal value of bits) in kJ^2 -since power on.</u>

Measurement values (Voltage measurement, Current measurement and Energy measurement shall be set to 0 in case the corresponding request bit is 0. If a device does not support a particular measurement, the corresponding measurement value shall be set to 0.

79.3.6.2 PSE measurements

The PSE measured voltage value field may be included to carry the PSE's measured voltage value at the port defined in Table 79-7b.

The PSE measured current value field may be included to carry the PSE's measured current value at the port defined in Table 79-7b.

The PSE measured energy value field may be included to carry the PSE's measured energy consumption value at the port defined in Table 79-7b.

Table 79-7b—PSE measurements

<u>Bit</u>	<u>Function</u>	<u>Value/meaning</u>
<u>95</u>	<u>Voltage support</u>	<u>1 = PSE supports voltage measurement</u> <u>0 = PSE does not support voltage measurement</u>

<u>94</u>	<u>Current support</u>	<u>1 = PSE supports current measurement</u> <u>0 = PSE does not support current measurement</u>
<u>93</u>	<u>Energy support</u>	<u>1 = PSE supports energy measurement</u> <u>0 = PSE does not support energy measurement</u>
<u>92:91</u>	<u>Measurement source</u>	<u>Determine where the measurement is to be taken.</u> <u>0 0 = No request</u> <u>0 1 = Pairset Alternative A</u> <u>1 0 = Pairset Alternative B</u> <u>1 1 = Port total</u>
<u>90</u>	<u>Voltage request</u>	<u>Request voltage measurement</u> <u>Where power type = PD</u> <u>1 = PD request for voltage measurement</u> <u>0 = No request for voltage measurement</u> <u>Where power type = PSE</u> <u>1 = Voltage measurement contains valid data</u> <u>0 = Voltage measurement disabled</u>
<u>89</u>	<u>Current request</u>	<u>Request current measurement</u> <u>Where power type = PD</u> <u>1 = PD request for current measurement</u> <u>0 = No request for current measurement</u> <u>Where power type = PSE</u> <u>1 = Current measurement contains valid data</u> <u>0 = Current measurement disabled</u>
<u>88</u>	<u>Energy request</u>	<u>Request energy measurement</u> <u>Where power type = PD</u> <u>1 = PD request for energy measurement</u> <u>0 = No request for energy measurement</u> <u>Where power type = PSE</u> <u>1 = Energy measurement contains valid data</u> <u>0 = Energy measurement disabled</u>
<u>87:80</u>	<u>Voltage accuracy</u>	<u>Number of useful significant bits in Voltage measurement data field (decimal value of bits).</u> <u>Valid values for these bits are decimal 1 through 16</u>
<u>79:72</u>	<u>Current accuracy</u>	<u>Number of useful significant bits in Current measurement data field (decimal value of bits).</u> <u>Valid values for these bits are decimal 1 through 16</u>
<u>71:64</u>	<u>Energy accuracy</u>	<u>Number of useful significant bits in Energy measurement data field (decimal value of bits).</u> <u>Valid values for these bits are decimal 1 through 32</u>
<u>63:48</u>	<u>Voltage measurement</u>	<u>$V_{\text{PORT_PSE}} = (\text{decimal value of bits}) \text{ mV}$</u> <u>Valid values for these bits are decimal 1 through 65000</u>
<u>47:32</u>	<u>Current measurement</u>	<u>$I_{\text{PORT_OR_PORT-2P}} = 0.1 \times (\text{decimal value of bits}) \text{ mA}$</u> <u>Valid values for these bits are decimal 0 through 20000</u>
<u>31:0</u>	<u>Energy measurement</u>	<u>Total energy consumed at the port or pairset</u>

		<u>value = 0.1 x (decimal value of bits) in kJ³ since power on.</u>
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Measurement values (voltage, current or energy) shall be set to 0 in case the corresponding request bit is 0. If a device does not support a particular measurement, the corresponding measurement value shall be set to 0.

79.3.6.3 PSE Power price index⁴

The PSE power price index field shall contain a linear index to the current value of electricity within the PSE. This is a 16 bit unsigned integer in the range 0 through 65,535, with 1,000 as a nominal value as defined in Table 79-7c. The PSE shall set the value of this field taking the availability of power from any external and internal resources, and the relative supply and demand balance, into account. A value of zero means that no power price index is available.

Table 79-7c—Power price index value field

<u>Bit</u>	<u>Function</u>	<u>Value/meaning</u>
<u>15:0</u>	<u>Power price index</u>	<u>Power price index = decimal value of bits. Valid values for these bits are decimal 1 through 65535.</u>

79.3.6.4 Power Via MDI Measurements TLV usage rules

An LLDPDU should contain no more than one Power Via MDI Measurements TLV.

79.4.2 IEEE 802.3 Organizationally Specific TLV/LLDP Local and Remote System group managed object class cross references

The cross references between the IEEE 802.3 TLVs and the LLDP Local System Group managed object class (see 30.12.2) attributes are listed in Table 79-9. The cross references between the IEEE 802.3 TLVs and the LLDP Remote System Group managed object class (see 30.12.3) attributes are listed in Table 79-10. The cross-references between the EEE TLV, the EEE Fast Wake TLV, and the EEE local (30.12.2) and remote (30.12.3) object class attributes are listed in Table 79-9 and Table 79-10.

Table 79-9—IEEE 802.3 Organizationally Specific TLV/LLDP Local System Group managed object class cross references

<u>TLV name</u>	<u>TLV variable</u>	<u>LLDP Local System Group managed object class attribute</u>
MAC/PHY Configuration/Status		
Power via MDI	Port class	aLldpXdot3LocPowerPortClass
	PSE MDI power support	aLldpXdot3LocPowerMDISupported
	PSE MDI power state	aLldpXdot3LocPowerMDIEnabled
	PSE pairs control ability	aLldpXdot3LocPowerPairControlable
	PSE power pair	aLldpXdot3LocPowerPairs
	Power class	aLldpXdot3LocPowerClass
	Power type	aLldpXdot3LocPowerType
	Power source	aLldpXdot3LocPowerSource

³ 1kWh Copyright © 2012 IEEE. All rights reserved.

⁴ Related to the proposals in 802.3 4PPOE LLDP Price 1.pdf made by Bruce Nordman, LBNL

	Power priority	aLldpXdot3LocPowerPriority
	PD requested power value	aLldpXdot3LocPDRequestedPowerValue
	PSE allocated power value	aLldpXdot3LocPSEAllocatedPowerValue
	<u>PSE power pair T3-4</u>	<u>aLldpXdot3LocPowerPairsT34</u>
	<u>Power class T3-4</u>	<u>aLldpXdot3LocPowerClassT34</u>
	<u>Power type T3-4</u>	<u>aLldpXdot3LocPowerTypeT34</u>
	<u>PD 4P-ID</u>	<u>aLldpXdot3Loc4PID</u>
	<u>PD PI</u>	<u>aLldpXdot3LocPDPI</u>
	<u>PSE available power</u>	<u>aLldpXdot3LocPSEMaxAvailPower</u>
	<u>PSE Autoclass support</u>	<u>aLldpXdot3LocPSEAutoclassSupport</u>
	<u>Autoclass completed</u>	<u>aLldpXdot3LocAutoclassCompleted</u>
	<u>Autoclass request</u>	<u>aLldpXdot3LocAutoclassRequest</u>
	<u>Power down</u>	<u>aLldpXdot3LocPowerDownRequest</u>
Link Aggregation (deprecated)		
Maximum Frame Size		
EEE		
EEE Fast Wake		
<u>Power via MDI Measurements</u>	<u>PD Voltage support</u>	<u>aLldpXdot3LocPDMeasVoltageSupport</u>
	<u>PD Current support</u>	<u>aLldpXdot3LocPDMeasCurrentSupport</u>
	<u>PD Energy support</u>	<u>aLldpXdot3LocPDMeasEnergySupport</u>
	<u>PD Measurement source</u>	<u>aLldpXdot3LocPDMeasurementSource</u>
	<u>PD Voltage measurement</u>	<u>aLldpXdot3LocPDMeasurementVoltage</u>
	<u>PD Current measurement</u>	<u>aLldpXdot3LocPDMeasurementCurrent</u>
	<u>PD Energy measurement</u>	<u>aLldpXdot3LocPDMeasurementEnergy</u>
	<u>PSE Voltage support</u>	<u>aLldpXdot3LocPSEMeasVoltageSupport</u>
	<u>PSE Current support</u>	<u>aLldpXdot3LocPSEMeasCurrentSupport</u>
	<u>PSE Energy support</u>	<u>aLldpXdot3LocPSEMeasEnergySupport</u>
	<u>PSE Measurement source</u>	<u>aLldpXdot3LocPSEMeasurementSource</u>
	<u>PSE Voltage measurement</u>	<u>aLldpXdot3LocPSEMeasurementVoltage</u>
	<u>PSE Current measurement</u>	<u>aLldpXdot3LocPSEMeasurementCurrent</u>
	<u>PSE Energy measurement</u>	<u>aLldpXdot3LocPSEMeasurementEnergy</u>
	<u>PSE Power price index</u>	<u>aLldpXdot3LocPSEPowerPriceIndex</u>

Table 79–10—IEEE 802.3 Organizationally Specific TLV/LLDP Remote System Group managed object class cross references

TLV name	TLV variable	LLDP Local System Group managed object class attribute
MAC/PHY Configuration/Status		
Power via MDI	Port class	aLldpXdot3RemPowerPortClass
	PSE MDI power support	aLldpXdot3RemPowerMDISupported
	PSE MDI power state	aLldpXdot3RemPowerMDIEnabled
	PSE pairs control ability	aLldpXdot3RemPowerPairControlable
	PSE power pair	aLldpXdot3RemPowerPairs
	Power class	aLldpXdot3RemPowerClass
	Power type	aLldpXdot3RemPowerType
	Power source	aLldpXdot3RemPowerSource
Copyright © 2012 IEEE. All rights reserved.	Power priority	aLldpXdot3RemPowerPriority

	PD requested power value	aLldpXdot3RemPDRequestedPowerValue
	PSE allocated power value	aLldpXdot3RemPSEAllocatedPowerValue
	<u>PSE power pair T3-4</u>	<u>aLldpXdot3RemPowerPairsT34</u>
	<u>Power class T3-4</u>	<u>aLldpXdot3RemPowerClassT34</u>
	<u>Power type T3-4</u>	<u>aLldpXdot3RemPowerTypeT34</u>
	<u>PD 4P-ID</u>	<u>aLldpXdot3Rem4PID</u>
	<u>PD PI</u>	<u>aLldpXdot3RemPDPI</u>
	<u>PSE available power</u>	<u>aLldpXdot3RemPSEMaxAvailPower</u>
	<u>PSE Autoclass support</u>	<u>aLldpXdot3RemPSEAutoclassSupport</u>
	<u>Autoclass completed</u>	<u>aLldpXdot3RemAutoclassCompleted</u>
	<u>Autoclass request</u>	<u>aLldpXdot3RemAutoclassRequest</u>
	<u>Power down</u>	<u>aLldpXdot3RemPowerDownRequest</u>
Link Aggregation (deprecated)		
Maximum Frame Size		
EEE		
EEE Fast Wake		
<u>Power via MDI Measurements</u>	<u>PD Voltage support</u>	<u>aLldpXdot3RemPDMeasVoltageSupport</u>
	<u>PD Current support</u>	<u>aLldpXdot3RemPDMeasCurrentSupport</u>
	<u>PD Energy support</u>	<u>aLldpXdot3RemPDMeasEnergySupport</u>
	<u>PD Measurement source</u>	<u>aLldpXdot3RemPDMeasurementSource</u>
	<u>PD Voltage measurement</u>	<u>aLldpXdot3RemPDMeasurementVoltage</u>
	<u>PD Current measurement</u>	<u>aLldpXdot3RemPDMeasurementCurrent</u>
	<u>PD Energy measurement</u>	<u>aLldpXdot3RemPDMeasurementEnergy</u>
	<u>PSE Voltage support</u>	<u>aLldpXdot3RemPSEMeasVoltageSupport</u>
	<u>PSE Current support</u>	<u>aLldpXdot3RemPSEMeasCurrentSupport</u>
	<u>PSE Energy support</u>	<u>aLldpXdot3RemPSEMeasEnergySupport</u>
	<u>PSE Measurement source</u>	<u>aLldpXdot3RemPSEMeasurementSource</u>
	<u>PSE Voltage measurement</u>	<u>aLldpXdot3RemPSEMeasurementVoltage</u>
	<u>PSE Current measurement</u>	<u>aLldpXdot3RemPSEMeasurementCurrent</u>
	<u>PSE Energy measurement</u>	<u>aLldpXdot3RemPSEMeasurementEnergy</u>
	<u>PSE Power price index</u>	<u>aLldpXdot3RemPSEPowerPriceIndex</u>

Clause 30: Management

Resulting additions for Clause 30 to be done later.