IEEE 802.3da SPMD:
MPoE measurement control and reporting proposal

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1 Overview

1.1 Goals: Reporting and controls for MPoE power measurements

- Leverage previous work on PoE TLVs 79.3.8 (reuse or redefine)
- Telemetry
  - ~~Reuse 79.3.8 Power via MDI Measurements TLV~~

    OR

  - Define new Clause 30 objects to:
    - Report measurement capabilities
    - Trigger measurement actions
    - Report measurement results

1.2 Change log

- 1/6/2025
  - submitted for 802.3da D2.0 comment resolution
- 1/22/25
  - Split MPoE control using LLDP and measurement/telemetry into separate documents
- 2/19/25
  - Updated after management adhoc. Major changes include
    - Change xxxAccuracy and xxxxIntegrationTime attributes/fields to use the "uncertainty" idea from "79.3.8 Power via MDI Measurements TLV" – "Table 79–21—Measurements"
    - ~~-~~ Alignment with D2.1

1.3 Open Items

~~1.3~~1.4 Table of Contents

Contents

2 Measurements/Telemetry

2.1 Common Information Elements

- ~~Type – indicates system power type (30V vs 50V)~~
- Power – units 0.1 W
- Voltage - units of 1 mV
- Current - units of 0.1 mA
- Energy - units of J or kJ
- Time – seconds or milliseconds ~~or microseconds~~

Commented [PJ1]: Bitmap.
Does this affect other clause 30 attributes as well?

2.2 Clause 30 Measurement Proposal- summary

Define new Clause 30 objects for MPoE telemetry via MDI Measurement.

2.2.1 Additions to MPSE/MPD managed object classes

Attribute	Type	Bit #	Function	Units	Value/meaning
~~Measurement~~ Capabilities	Bit String	~~1~~	Voltage measurement support		1 = supported 0 = unsupported
		~~2~~	Current measurement support		1 = supported 0 = unsupported
		~~3~~	~~Power measurement support~~		~~1 = supported~~ ~~0 = unsupported~~
		~~4~~	Energy measurement support		1 = supported 0 = unsupported
		~~15:xx~~	Reserved		
Voltage ~~accuracy~~uncertainty	u~~U~~int16~~8~~			1 mV	
Current ~~accuracy~~uncertainty	uint16~~ui nt8~~			0.1 mA	
Power ~~accuracy~~uncertainty	uint16~~ui nt8~~			10 mW	
Energy uncertainty	uint16			J	
Measurement Active	Enum				1 = active 0 = idle
~~Energy~~	~~uint32~~			~~kJ~~	~~Energy consumed since last measurement~~

2.2.2 Additions to MPSE/MPD action classes

Attribute	Type	Bit #	Function	Units	Value/meaning
Perform Measurement	Enum				1 = Start 0 = idle

2.2.3 Additions to M~~New M~~PSE/MPD classes for Measurement Results ~~classes~~

Attribute	Type	Bit #	Function	Units	Value/meaning
Valid	Bit String	0	Voltage valid~~Measurement valid~~		1 = valid 0 = invalid
		1	Current valid~~Voltage valid~~		1 = valid 0 = invalid
		2	Power valid~~Current valid~~		1 = valid 0 = invalid
		~~3~~	~~Power valid~~		~~1 = valid~~ ~~0 = invalid~~
		15:xx	Reserved		
Voltage	uint16			1 mV	
Current	uint16			0.1 mA	
Power	uint16			10 mW	
Age	u~~U~~int32~~16~~		Millis~~S~~econds since measurement was performed.	ms~~secon ds~~	

3 Clause ~~30 Measurement Proposal – clause~~ 30 text changes

3.1 MPSE managed object class

~~3.1.1~~ MPSE attributes

~~Change the aMPSECumulativeEnergy "BEHAVIOUR DEFINED AS:" definition as follows:~~

~~Add "MPSEs that do not support this measurement report a value of 0." at the end of the current definition.~~

3.1.1

Delete 30.17.1.1.8 aMPSEPowerAccuracy (replaced by aMPSEMeasurementPowerUncertainty) and renumber following items.

Change aMPSECumulativeEnergy "BEHAVIOUR DEFINED AS:" definition to be:

A count of the cumulative energy supplied by the MPSE as measured at the MDI in kilojoules. MPSEs that do not support this measurement report a value of 0.;

Change aMPSECapabilities "APPROPRIATE SYNTAX:" definition to be:~~Add the following after 30.17.1.1.9 aMPSECumulativeEnergy~~

~~30.17.1.1. *nn* aMPSEMeasurementCapabilities~~

~~ATTRIBUTE~~

~~APPROPRIATE SYNTAX:~~

A SEQUENCE that meets the requirements of the description below:

POWER-MEASUREMENT:

MPSE implements power measurement

~~Voltage Measurement Support~~VOLTAGE-MEASUREMENT:

MPSE implements voltage measurement ~~1 = supported, 0 = unsupported~~

~~Current Measurement Support~~CURRENT-MEASUREMENT:

~~MPSE implements current measurement 1 = supported, 0 = unsupported~~

~~Power Measurement Support: 1 = supported, 0 = unsupported~~

ENERGY-MEASUREMENT:

~~Energy Measurement Support:~~ MPSE implements energy measurement ~~1 = supported, 0 = unsupported~~

~~BEHAVIOUR DEFINED AS:~~

~~This attribute reports the measurement capabilities of the MPSE .;~~

Insert the following after aMPSECapabilities

30.17.1.1. *nn* aMPSEMeasurementPowerUncertainty
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the uncertainty at the 95% confidence level (coverage factor k = 2) of this measurement in units of 10 mW.
MPSEs that do not support this measurement report a value of 0.;

30.17.1.1.*nn* aMPSEMeasurementVoltage~~Accuracy~~Uncertainty
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the uncertainty at the ~~accuracy of this measurement~~ 95% confidence level (coverage factor k = 2) of this measurement in units of 1 mV.
MPSEs that do not support this measurement report a value of 0.;

30.17.1.1. *nn* aMPSEMeasurementCurrent~~Accuracy~~Uncertainty
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the ~~accuracy~~uncertainty at the 95% confidence level (coverage factor ~~of~~k = 2) of this measurement in units of 0.1 m~~V~~.
MPSEs that do not support this measurement report a value of 0.;

~~30.17.1.1. *nn* aMPSEMeasurementPowerAccuracy~~
~~ATTRIBUTE~~
~~APPROPRIATE SYNTAX:~~
~~INTEGER~~
~~BEHAVIOUR DEFINED AS:~~
~~This attribute reports the accuracy of this measurement in units of 1 mV. MPSEs that do not support this measurement report a value of 0.;~~

30.17.1.1. *nn* aMPSEMeasurementEnergyUncertainty
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the uncertainty at the 95% confidence level (coverage factor k = 2) of this measurement in units of 1 J.
MPSEs that do not support this measurement report a value of 0.;

~~30.17.1.1. *nn* aMPSEMeasurementVoltageIntegrationTime~~

~~ATTRIBUTE~~
~~APPROPRIATE SYNTAX:~~
~~INTEGER~~
~~BEHAVIOUR DEFINED AS:~~
~~This attribute reports the accuracy of the measurement in units of 1 usec. MPSEs that do not support this measurement report a value of 0.;~~

~~30.17.1.1. *nn* aMPSEMeasurementCurrentIntegrationTime~~
~~ATTRIBUTE~~
~~APPROPRIATE SYNTAX:~~
~~INTEGER~~
~~BEHAVIOUR DEFINED AS:~~
~~This attribute reports the integration time of this measurement in units of 1 usec. MPSEs that do not support this measurement report a value of 0.;~~

~~30.17.1.1. *nn* aMPSEMeasurementPowerIntegrationTime~~
~~ATTRIBUTE~~
~~APPROPRIATE SYNTAX:~~
~~INTEGER~~
~~BEHAVIOUR DEFINED AS:~~
~~This attribute reports the accuracy of this measurement in units of 1 usec. MPSEs that do not support this measurement report a value of 0.;~~

30.17.1.1. *nn* aMPSEMeasurement Active
ATTRIBUTE
APPROPRIATE SYNTAX:
An ENUMERATED VALUE that has one of the following entries:
active
inactive
BEHAVIOUR DEFINED AS:
This attribute reports if on-demand measurement is active.
MPSEs that do not support this measurement report 'inactive'.;

3.1.2 MPSE actions

Insert ~~Add~~ the following after 30.17.1.2.1 acMPSEAdminControl

30.17.1.2.1 aMPSEMeasurementControl
ATTRIBUTE
APPROPRIATE SYNTAX:
An ENUMERATED VALUE that has one of the following entries:
active

Commented [PJ2]: Is "integration time " really useful/needed?

Commented [PJ3R2]: Leave in.

idle

BEHAVIOUR DEFINED AS:

This attribute is used to control the on-demand ~~energy~~ measurement function. MPSEs that do not support this measurement report 'idle' and reject 'active'.

3.1.3 MPSE Measurement Results

~~Add~~ Insert the following after 30.17.1.2.1 aMPSEMeasurementControl.

30.17.1.3 Measurement Results

30.17.1.3.1 acMPSEMeasurementValid
APPROPRIATE SYNTAX:
A SEQUENCE that meets the requirements of the description below:
POWER-VALID: ~~Measurement Valid: 1 = valid, 0 = invalid~~

Power measurement results are valid
VOLTAGE-VALID:
Voltage measurement results are valid ~~Voltage Measurement Valid: 1 = valid, 0 = invalid~~
CURRENT~~Current~~ -VALID:
Current measurement results are valid ~~Measurement Valid: 1 = valid, 0 = invalid~~
~~Power Measurement Valid: 1 = valid, 0 = invalid~~
BEHAVIOUR DEFINED AS:
This attribute reports the validity of ~~this~~ the measurement results. ~~MPSEs that do not support measurement report all bits set to 0~~.;

30.17.1.3.*nn* acMPSEMeasurementVoltage
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the voltage measurement in units of 1 mV.
MPSEs that do not support this measurement report a value of 0.;

30.17.1.3. *nn* acMPSEMeasurementCurrent
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the current measurement in units of 0.1 mA.
MPSEs that do not support this measurement report a value of 0.;

30.17.1.3. *nn* acMPSEMeasurementPower
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:

This attribute reports the power measurement in units of 10 mW.
MPSEs that do not support this measurement report a value of 0.;

30.17.1.3. *nn* acMPSEMeasurementAge
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the number of ~~seconds~~ milliseconds since the last measurement was performed.
MPSEs that do not support on-demand measurement report a value of 0.;

3.2 MPD managed object class

~~3.2.1~~ MPD attributes
3.2.1

Delete 30.17.2.1.9 aMPDPowerAccuracy (replaced by aMPDMeasurementPowerUncertainty) and renumber following items. ~~Change the aMPDCumulativeEnergy "BEHAVIOUR DEFINED AS:" definition as follows:~~

Change aMPDCumulativeEnergy "BEHAVIOUR DEFINED AS:" definition to be:
A count of the cumulative energy supplied to the MPD as measured at the MDI in kilojoules.
MPSEs that do not support this measurement report a value of 0.;

~~Add "MPDs that do not support this measurement report a value of 0." at the end of the current definition.~~Change aMPDCapabilities "APPROPRIATE SYNTAX:" definition to be:
APPROPRIATE SYNTAX:
A SEQUENCE that meets the requirements of the description below:
POWER-MEASUREMENT:
MPD implements power measurement
VOLTAGE-MEASUREMENT:
MPD implements voltage measurement
CURRENT-MEASUREMENT:
MPD implements current measurement
ENERGY-MEASUREMENT:
MPD implements energy measurement

~~Add~~Insert the following after aMPDCapabilities ~~30.17.2.1.9 aMPDCumulativeEnergy~~

30.17.2.1. *nn* aMPDMeasurementPowerUncertainty
ATTRIBUTE
APPROPRIATE SYNTAX:

INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the uncertainty at the 95% confidence level (coverage factor k = 2) of this measurement in units of 10 mW.
MPDs that do not support this measurement report a value of 0.;
~~30.17.2.1. *nn* aMPDMeasurementCapabilities~~

~~ATTRIBUTE~~
~~APPROPRIATE SYNTAX:~~
~~A SEQUENCE that meets the requirements of the description below:~~
~~Voltage Measurement Support: 1 = supported, 0 = unsupported~~
~~Current Measurement Support: 1 = supported, 0 = unsupported~~
~~Power Measurement Support: 1 = supported, 0 = unsupported~~
~~Energy Measurement Support: 1 = supported, 0 = unsupported~~
~~BEHAVIOUR DEFINED AS:~~
~~This attribute reports the measurement capabilities of the MPD .;~~

30.17.2.1.*nn* aMPDMeasurementVoltage~~Accuracy~~Uncertainty
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the ~~accuracy~~uncertainty at the 95% confidence level (coverage factor k = 2) of this measurement in units of 1 mV.
MPDs that do not support this measurement report a value of 0.;

30.17.2.1. *nn* aMPDMeasurementCurrent~~Accuracy~~Uncertainty
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the ~~accuracy~~uncertainty at the 95% confidence level (coverage factor k = 2) of this measurement in units of 0.1 mA.
MPDs that do not support this measurement report a value of 0.;

30.17.2.1. *nn* aMPDMeasurementEnergyUncertainty
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the uncertainty at the 95% confidence level (coverage factor k = 2) of this measurement in units of 1 J.
MPDs that do not support this measurement report a value of 0.;

~~30.17.2.1. *nn* aMPDMeasurementPowerAccuracy~~
~~ATTRIBUTE~~
~~APPROPRIATE SYNTAX:~~
~~INTEGER~~
~~BEHAVIOUR DEFINED AS:~~
~~This attribute reports the accuracy of this measurement in units of 10 mW. MPDs that do not support this measurement report a value of 0.;~~

~~30.17.2.1. *nn* aMPDMeasurementVoltageIntegrationTime~~
~~ATTRIBUTE~~
~~APPROPRIATE SYNTAX:~~
~~INTEGER~~
~~BEHAVIOUR DEFINED AS:~~
~~This attribute reports the integration time of this measurement in units of 1 usec. MPDs that do not support this measurement report a value of 0.;~~

Commented [PJ4]: Cross check PoE language

~~30.17.2.1. *nn* aMPDMeasurementCurrentIntegrationTime~~
~~ATTRIBUTE~~
~~APPROPRIATE SYNTAX:~~
~~INTEGER~~
~~BEHAVIOUR DEFINED AS:~~
~~This attribute reports the integration time of this measurement in units of 1 usec. MPDs that do not support this measurement report a value of 0.;~~

~~30.17.2.1. *nn* aMPDMeasurementPowerIntegrationTime~~
~~ATTRIBUTE~~
~~APPROPRIATE SYNTAX:~~
~~INTEGER~~
~~BEHAVIOUR DEFINED AS:~~
~~This attribute reports the integration time of this measurement in units of 1 usec. MPDs that do not support this measurement report a value of 0.;~~

30.17.2.1. *nn* aMPDMeasurement Active
ATTRIBUTE
APPROPRIATE SYNTAX:
An ENUMERATED VALUE that has one of the following entries:
active
inactive
BEHAVIOUR DEFINED AS:
This attribute reports if on-demand measurement is active.
MPDs that do not support this measurement report 'inactive'.;

3.2.2 MPD actions

~~Add~~Insert the following after 30.17.2.2.1 acMPDAdminControl

30.17.2.2.1 aMPDMeasurementControl
ATTRIBUTE
APPROPRIATE SYNTAX:
An ENUMERATED VALUE that has one of the following entries:
active
idle
BEHAVIOUR DEFINED AS:
This attribute is used to control the on-demand ~~energy~~ measurement function.
MPDs that do not support this measurement report 'idle' and reject 'active'.

3.2.3 MPD Measurement Results

~~Add~~Insert the following after 30.17.2.2.1 aMPDMeasurementControl.

30.17.2.3 Measurement Results

30.17.2.3.1 acMPDMeasurementValid
APPROPRIATE SYNTAX:
~~A SEQUENCE that meets the requirements of the description below:~~
A SEQUENCE that meets the requirements of the description below:
POWER-VALID:
Power measurement results are valid
VOLTAGE-VALID:
Voltage measurement results are valid
CURRENT-VALID:
Current measurement results are valid
~~Measurement Valid: 1 = valid, 0 = invalid~~
~~Voltage Measurement Valid: 1 = valid, 0 = invalid~~
~~Current Measurement Valid: 1 = valid, 0 = invalid~~
~~Power Measurement Valid: 1 = valid, 0 = invalid~~
BEHAVIOUR DEFINED AS:
This attribute reports the validity of the measurement results. ~~MPDs that do not support measurement report all bits set to 0.~~;

30.17.2.3.*nn* acMPDMeasurementVoltage
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the voltage measurement in units of 1 mV.

MPDs that do not support this measurement report a value of 0.;

30.17.2.3. *nn* acMPDMeasurementCurrent
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the current measurement in units of 0.1 mA.
MPDs that do not support this measurement report a value of 0.;

30.17.2.3. *nn* acMPDMeasurementPower
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the power measurement in units of 10 mW.
MPDs that do not support this measurement report a value of 0.;

30.17.2.3. *nn* acMPDMeasurementAge
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the number of seconds since the last measurement was performed.
MPDs that do not support on-demand measurement report a value of 0.;

END OF DOCUMENT