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
    - Submitted with D2.1 comments
- 2/21/25
    - Incorporate feedback including
        - Explicitly numbering all attributes and actions.
        - Correcting naming errors (aMPSE vs acMPSE, aMPD vs acMPD)
        - Move text around to have additions to attributes (vs actions) grouped together.
    - Re-submitted with D2.1 comments

1.3 Open Items

1.4 Table of Contents

Contents

2 Measurements/Telemetry

2.1 Common Information Elements

- Power – milliWatts
- Voltage - milliVolts
- Current - microAmps
- Energy - Joules or kiloJoules
- Time – seconds or milliseconds

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 for Measurement control & status

Attribute	Type	Bit #	Function	Units	Value/meaning
Capabilities	Bit String		Voltage measurement support		1 = supported 0 = unsupported
			Current measurement support		1 = supported 0 = unsupported
			Energy measurement support		1 = supported 0 = unsupported
			Reserved		
Voltage uncertainty	uint16			mV	
Current uncertainty	uint16			uA	
Power uncertainty	uint16			mW	
Energy uncertainty	uint16			J	
Measurement Active	Enum				1 = active 0 = idle

2.2.2 Additions to MPSE/MPD managed object classes for Measurement Results

Attribute	Type	Bit #	Function	Units	Value/meaning
Valid	Bit String	0	Voltage valid		1 = valid 0 = invalid
		1	Current valid		1 = valid 0 = invalid
		2	Power valid		1 = valid 0 = invalid
		15:xx	Reserved		
Voltage	uint16			mV	
Current	uint16			uA	
Power	uint16			mW	
Age	uint32		Milliseconds since measurement was performed.	ms	

2.2.3 Additions to MPSE/MPD action classes

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

3 Clause 30 text changes

3.1 Overview etc

In 30.2.2.1 Text description of managed objects

Change the last sentence of the description of oPHYEntity (changed text in ***bold italics***) to

oPHYEntity is the managed object that contains the MAU, ***MPD, MPSE***, PAF, PLCA, PSE, and PoDLPSE managed objects in a DTE

insert the following in alphabetical order by class name.

oMPD

If implemented, oMPD is contained within oPHYEntity. The oMPD managed object class provides the management controls necessary to allow an instance of a MPoE MPD(see 189.5) to be managed.

oMPSE

If implemented, oMPSE is contained within oPHYEntity. The oMPSE managed object class provides the management controls necessary to allow an instance of a MPoE MPSE(see 189.4) to be managed.

In 30.2.3 Containment

Insert two class objects into Figure 30–3 next to “oPLCA 30.16.1” with the same containment, and contents as follows

oMPSE 30.17.1

oMPD 30.17.2

In 30.2.5 Capabilities

Insert the following paragraphs before Table 30–1a—Capabilities

For managed MPSEs, the MPSE Basic Package is mandatory and the MPSE Recommended Package is optional. For a managed MPSEs to be conformant to this standard, it shall fully implement the PSE Basic Package.

For managed MPDs, the MPDs Basic Package is mandatory and the MPD Recommended Package is optional. For a managed MPD to be conformant to this standard, it shall fully implement the MPD Basic Package.

Insert the following tables after Table 30–11—PLCA capabilities and renumber any subsequent tables.

Table 30–12—MPoE MPSE capabilities

				MPSE Basic Package (mandatory)	MPSE Recommended Package (optional)
	aMPSEAdminState	ATTRIBUTE	GET	X	
	aMPSEPowerState	ATTRIBUTE	GET	X	
	aMPSETypeDiscovery	ATTRIBUTE	GET	X	
	aMPSEPoweringCounter	ATTRIBUTE	GET	X	
	aMPSEOverloadCounter	ATTRIBUTE	GET	X	
	aMPSEShortCircuitCounter	ATTRIBUTE	GET	X	
	aMPSEActualPower	ATTRIBUTE	GET		X
	aMPSECumulativeEnergy	ATTRIBUTE	GET		X
	aMPSECapabilities	ATTRIBUTE	GET	X	
	aMPSEMeasurementPowerUncertainty	ATTRIBUTE	GET		X
	aMPSEMeasurementVoltageUncertainty	ATTRIBUTE	GET		X
	aMPSEMeasurementCurrentUncertainty	ATTRIBUTE	GET		X
	aMPSEMeasurementEnergyUncertainty	ATTRIBUTE	GET		X
	aMPSEMeasurementActive	ATTRIBUTE	GET		X
	aMPSEMeasurementValid	ATTRIBUTE	GET		X
	aMPSEMeasurementVoltage	ATTRIBUTE	GET		X
	aMPSEMeasurementCurrent	ATTRIBUTE	GET		X
	aMPSEMeasurementPower	ATTRIBUTE	GET		X
	aMPSEMeasurementAge	ATTRIBUTE	GET		X
	acMPSEAdminControl	ACTION		X	
	acMPSEMeasurementControl	ACTION			X

Table 30–13—MPoE MPD capabilities

				MPD Basic Package (mandatory)	MPD Recommended Package (optional)
	aMPDType	ATTRIBUTE	GET	X	
	aMPDAdminState	ATTRIBUTE	GET	X	
	aMPDPowerState	ATTRIBUTE	GET	X	
	aMPDDiscoveryCounter	ATTRIBUTE	GET	X	
	aMPDMismatchCounter	ATTRIBUTE	GET	X	
	aMPDPoweredCounter	ATTRIBUTE	GET	X	
	aMPDNoPowerCounter	ATTRIBUTE	GET	X	
	aMPDActualPower	ATTRIBUTE	GET		X
	aMPDCumulativeEnergy	ATTRIBUTE	GET		X
	aMPDCapabilities	ATTRIBUTE	GET	X	
	aMPDMeasurementPowerUncertainty	ATTRIBUTE	GET		X
	aMPDMeasurementVoltageUncertainty	ATTRIBUTE	GET		X
	aMPDMeasurementCurrentUncertainty	ATTRIBUTE	GET		X
	aMPDMeasurementEnergyUncertainty	ATTRIBUTE	GET		X
	aMPDMeasurementActive	ATTRIBUTE	GET		X
	aMPDMeasurementValid	ATTRIBUTE	GET		X
	aMPDMeasurementVoltage	ATTRIBUTE	GET		X
	aMPDMeasurementCurrent	ATTRIBUTE	GET		X
	aMPDMeasurementPower	ATTRIBUTE	GET		X
	aMPDMeasurementAge	ATTRIBUTE	GET		X
	acMPDAdminControl	ACTION		X	
	acMPDMeasurementControl	ACTION			X

3.2 MPSE managed object class

3.2.1 MPSE attributes

Delete 30.17.1.1.8 aMPSEPowerAccuracy (replaced by aMPSEMeasurementPowerUncertainty) and renumber following attributes (aMPSECumulativeEnergy and aMPSECapabilities).

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:

A SEQUENCE that meets the requirements of the description below:

POWER-MEASUREMENT:

MPSE implements power measurement

VOLTAGE-MEASUREMENT:

MPSE implements voltage measurement

CURRENT-MEASUREMENT:

MPSE implements current measurement

ENERGY-MEASUREMENT:

MPSE implements energy measurement

Insert the following after 30.17.1.1.9 aMPSECapabilities

30.17.1.1.10 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 milliWatts.

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

30.17.1.1.11 aMPSEMeasurementVoltageUncertainty

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 milliVolts.

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

30.17.1.1.12 aMPSEMeasurementCurrentUncertainty

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 microAmps.

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

30.17.1.1.13 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 Joules.

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

30.17.1.1.14 aMPSEMeasurementActive

ATTRIBUTE

APPROPRIATE SYNTAX:

An ENUMERATED VALUE that has one of the following entries:

active

inactive

BEHAVIOUR DEFINED AS:

This attribute reports whether on-demand measurement is active.

MPSEs that do not support this measurement report ‘inactive’.;

3.2.2 MPSE measurement results

Insert the following after 30.17.1.1.14 aMPSEMeasurementActive.

30.17.1.1.15 aMPSEMeasurementValid
ATTRIBUTE
APPROPRIATE SYNTAX:
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
BEHAVIOUR DEFINED AS:
This attribute reports the validity of the measurement results.;

30.17.1.1.16 aMPSEMeasurementVoltage
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the voltage measurement in milliVolts.
MPSEs that do not support this measurement report a value of 0.;

30.17.1.1.17 aMPSEMeasurementCurrent
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the current measurement in microAmps.
MPSEs that do not support this measurement report a value of 0.;

30.17.1.1.18 aMPSEMeasurementPower
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the power measurement in milliWatts.
MPSEs that do not support this measurement report a value of 0.;

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

3.2.3 MPSE actions

Insert the following after 30.17.1.2.1 acMPSEAdminControl

30.17.1.2.1 acMPSEMeasurementControl
ACTION
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 measurement function.
MPSEs that do not support this measurement report 'idle' and reject 'active'.

3.3 MPD managed object class

3.3.1 MPD attributes

Delete 30.17.2.1.9 aMPDPowerAccuracy (replaced by aMPDMeasurementPowerUncertainty) and renumber following attributes (aMPDCumulativeEnergy and aMPDCapabilities).

Change 30.17.2.1.9 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.;

Change 30.17.2.1.10 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

Insert the following after 30.17.2.1.10 aMPDCapabilities

30.17.2.1.11 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 milliWatts.

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

30.17.2.1.12 aMPDMeasurementVoltageUncertainty

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 milliVolts.

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

30.17.2.1.13 aMPDMeasurementCurrentUncertainty

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 microAmps.

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

30.17.2.1.14 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 Joules.

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

30.17.2.1.15 aMPDMeasurementActive

ATTRIBUTE

APPROPRIATE SYNTAX:

An ENUMERATED VALUE that has one of the following entries:

active

inactive

BEHAVIOUR DEFINED AS:

This attribute reports whether on-demand measurement is active.
MPDs that do not support this measurement report 'inactive'.;

3.3.2 MPD measurement results

Insert the following after 30.17.2.1.15 aMPDMeasurementActive.

30.17.2.1.16 aMPDMeasurementValid
ATTRIBUTE
APPROPRIATE SYNTAX:
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
BEHAVIOUR DEFINED AS:
This attribute reports the validity of the measurement results.;

30.17.2.1.17 aMPDMeasurementVoltage
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the voltage measurement in milliVolts.
MPDs that do not support this measurement report a value of 0.;

30.17.2.1.18 aMPDMeasurementCurrent
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the current measurement in microAmps.
MPDs that do not support this measurement report a value of 0.;

30.17.2.1.19 aMPDMeasurementPower
ATTRIBUTE
APPROPRIATE SYNTAX:
INTEGER
BEHAVIOUR DEFINED AS:
This attribute reports the power measurement in milliWatts.
MPDs that do not support this measurement report a value of 0.;

30.17.2.1.20 aMPDMeasurementAge

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.;

3.3.3 MPD actions

Insert the following after 30.17.2.2.1 acMPDAdminControl

30.17.2.2.1 acMPDMeasurementControl

ACTION

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 measurement function.

MPDs that do not support this measurement report ‘idle’ and reject ‘active’.

END OF DOCUMENT