Background on comment, final reply from Adee from our email exchange:

Within 802.3 it is obvious that when numeric values are transmitted or accessed through management objects, binary encoding is used. It is pervasive across the standard. There is no need to state that.

For internal representation, the standard does not require binary encoding or resolution – implementation can choose binary encoding, decimal, floating point or whatever; it's invisible.

Here is an example from an area I'm more familiar with… Clause 78 (EEE) includes timing parameters, which are communicated over TLVs. Within this clause, the encoding of time values is not mentioned at all; reading clause 78 you only encounter the time values. The only place where they are encoded is in the TLV definition in clause 79…

79.3.5.1 Transmit T_w

Transmit $T_{w\_sys\_tx}$ (2 octets wide) shall be defined as the time (expressed in microseconds) that the transmitting link partner will wait before it starts transmitting data after leaving the Low Power Idle (LPI) mode. This is a function of the transmit system design and may be constrained, for example, by the transmit path buffering. The default value for Transmit $T_{w\_sys\_tx}$ is the T_{w_phy} defined for the PHY that is in use for the link. The Transmitting link partner expects that the Receiving link partner will be able to accept data after the time delay Transmit $T_{w\_sys\_tx}$ (expressed in microseconds).

As you can see the binary encoding is implicit. People will understand that the real value should be encoded to binary for transmission, and the received binary field should be decoded to the real value. All that is needed to encode/decode is the units (microseconds) and the width (two octets).

This is in the same clause 79 that 802.3bt is amending – adding other TLVs – so I think changing the style isn't necessary.

I searched for "decimal value". In D2.1 there are 32 occurrences.

And more back ground from another Adee email:

These comments state that "decimal value of bits" is an unnecessary qualification for values in managed objects and transmitted bit fields, and the formulas which use this qualification are uncommon and therefore possibly confusing for readers of management-oriented clauses.

Some observations:

1. Physical values such as voltage or power (as used in the formulas) are independent of the units they are expressed at, and of the base or other encoding in which they may be written.
2. A physical value can be represented internally as a binary integer, floating point, ASCII string, BCD or whatever. This is implementation specific and out of scope as long as it does not affect interoperability. Therefore variables and functions inside clauses typically don't specify representations; any representation that creates compliant behavior is fine. This principle is maintained in most of the clauses I'm familiar with or have reviewed recently (your experience is surely wider but I hope you agree). I suggest making clause 30 align with similar clauses and avoid specifying internal representations.
3. The encoding becomes important when a value is encoded into a bit field that is transmitted to another device, or is accessed through management. Therefore, in clauses 30 and 79, and in some other specific cases, the encoding rules should be specified.
4. <u>To answer your question</u>: The default encoding in clauses 30 and 79 is unsigned binary integer, and for this encoding, the resolution and the variable size should be specified. Therefore, in clauses 30 and 79 the suggested changes include specifying the units or adding "expressed in mW" or the like. But I see is no need to explicitly state "unsigned binary integer", as this is not done in other cases in these clauses.

Also, “decimal value” should not be used, as the value is independent of base.

5. The phrase "decimal value of bits" and the form of the equation it appears in do not appear anywhere in the existing 802.3, except for a couple of cases in clause 33 and in related parts of clauses 30 and 79. I suggest that 802.3bt should align with the style of the Ethernet standard. The few existing cases can be changed in maintenance in the future.

--end of background

Start of suggested Remedy:

Page 35, Line 35
Change: A GET attribute that returns the PD requested power value. For a PD, it is the power value that the PD has currently requested from the remote system. PD requested power value is the maximum input average power the PD ever draws under this power allocation if accepted. For a PSE, it is the power value that the PSE mirrors back to the remote system. This is the PD requested power value that was used by the PSE to compute the power it has currently allocated to the remote system. The PD requested power value is encoded according to Equation (79–1), where *X* is the decimal value of aLldpXdot3LocPDRequestedPowerValue.;
To: A GET attribute that returns the PD requested power value in units of 0.1 W (see Equation (79-1), where aLldpXdot3LocPDRequestedPowerValue is *X*). For a PD, it is the power value that the PD has currently requested from the remote system. PD requested power value is the maximum input average power the PD ever draws under this power allocation if accepted. For a PSE, it is the power value that the PSE mirrors back to the remote system. This is the PD requested power value that was used by the PSE to compute the power it has currently allocated to the remote system.;

Page 35, Line 50
Change: A GET attribute that returns the PSE allocated power value. For a PSE, it is the power value that the PSE has currently allocated to the remote system. The PSE allocated power value is the maximum input average power that the PSE wants the PD to ever draw under this allocation if it is accepted. For a PD, it is the power value that the PD mirrors back to the remote system. This is the PSE allocated power value that was used by the PD to compute the power that it has currently requested from the remote system. The PSE allocated power value is encoded according to Equation (79–2), where *X* is the decimal value of aLldpXdot3LocPSEAllocatedPowerValue.;
To: A GET attribute that returns the PSE allocated power value in units of 0.1 W (see Equation (79-2), where aLldpXdot3LocPSEAllocatedPowerValue is *X*). For a PSE, it is the power value that the PSE has currently allocated to the remote system. The PSE allocated power value is the maximum input average power that the PSE wants the PD to ever draw under this allocation if it is accepted. For a PD, it is the power value that the PD mirrors back to the remote system. This is the PSE allocated power value that was used by the PD to compute the power that it has currently requested from the remote system.;

Page 36, Line 13
Change: A GET attribute that returns PD measured voltage value. For a PD, it is the measured voltage value that the PD has currently measured and sent to the remote system. PD measured voltage value is the voltage measured at its PI. The PD measured voltage value is encoded according to Table 79–7f, where *X* is the decimal value of aLldpXdot3LocPDMeasuredVoltageValue.;
To: A GET attribute that returns PD measured voltage value in units of 1 mV (see Table 79-7b). For a PD, it is the measured voltage value that the PD has currently measured and sent to the remote system. PD measured voltage value is the voltage measured at its PI.;
[commenter note, see other comment that suggests changing 79-7f to 79-7b].

Page 36, Line 25
Change: A GET attribute that returns PD measured current value. For a PD, it is the measured current value that the PD has currently measured and sent to the remote system. PD measured current value is the current measured

at its PI. The PD measured current value is encoded according to Table 79–7f, where *X* is the decimal value of aLldpXdot3LocPDMeasuredCurrentValue.;
To: A GET attribute that returns PD measured current value in units of 0.1 mA (see Table 79-7b). For a PD, it is the measured current value that the PD has currently measured and sent to the remote system. PD measured current value is the current measured at its PI.;
[commenter note, see other comment that suggests changing 79-7f to 79-7b].

Page 36, Line 37
Change: A GET attribute that returns PSE measured voltage value. For a PSE, it is the measured voltage value that the PSE has currently measured and sent to the remote system. PSE measured voltage value is the voltage measured at its PI. The PSE measured voltage value is encoded according to Table 79–7g, where *X* is the decimal value of aLldpXdot3LocPSEMeasuredVoltageValue.;
To: A GET attribute that returns PSE measured voltage value in units of 1 mV (see Table 79-7c). For a PSE, it is the measured voltage value that the PSE has currently measured and sent to the remote system. PSE measured voltage value is the voltage measured at its PI.;
[commenter note, see other comment that suggests changing 79-7g to 79-7c].

Page 36, Line 49
Change: A GET attribute that returns PSE measured current value. For a PSE, it is the measured current value that the PSE has currently measured and sent to the remote system. PSE measured current value is the current measured at its PI. The PSE measured current value is encoded according to Table 79–7g, where *X* is the decimal value of aLldpXdot3LocPSEMeasuredCurrentValue.;
To: A GET attribute that returns PSE measured current value in units of 0.1 mA (see Table 79-7c). For a PSE, it is the measured current value that the PSE has currently measured and sent to the remote system. PSE measured current value is the current measured at its PI.;
[commenter note, see other comment that suggests changing 79-7g to 79-7c].

Page 42, line 18
Change: The default value for this field is the hexadecimal value FFFF.;
To: The default value for this field is 0xFFFF.;

Page 182, Line 46
Change: The copy of the PD Requested Power Value field in the Power Via MDI TLV that the PSE receives from the remote system. This variable is mapped from the aLldpXdot3RemPDRequestedPowerValue attribute (30.12.3.1.17). Actual power numbers are represented using an integer value that is encoded according to Equation (79–1), where *X* is the decimal value of MirroredPDRequestedPowerValue.
To: The copy of the PD Requested Power Value field in the Power Via MDI TLV that the PSE receives from the remote system in units of 0.1 W (see Equation (79-1), where MirroredPDRequestedPowerValue is *X*). This variable is mapped from the aLldpXdot3RemPDRequestedPowerValue attribute (30.12.3.1.17).

Page 183, Line 4
Change: The copy of the PSE Allocated Power Value field in the Power Via MDI TLV that the PD receives from the remote system. This variable is mapped from the aLldpXdot3RemPSEAllocatedPowerValue attribute (30.12.3.1.18). Actual power numbers are represented using an integer value that is encoded according to Equation (79–2), where *X* is the decimal value of MirroredPSEAllocatedPowerValue.
To: The copy of the PSE Allocated Power Value field in the Power Via MDI TLV that the PD receives from the remote system in units of 0.1 W (see Equation (79-2), where MirroredPSEAllocatedPowerValue is *X*). This variable is mapped from the aLldpXdot3RemPSEAllocatedPowerValue attribute (30.12.3.1.18).

Page 183, Line 20
Change: Integer that indicates the actual PD power value of the local system. The actual PD power value for a PD is the maximum input average power (see 33.3.8.2) the PD ever draws under the current power allocation. Actual

power numbers are represented using an integer value that is encoded according to Equation (79–1), where *X* is the decimal value of PDMaxPowerValue.
To: Integer that indicates the actual PD power value of the local system in units of 0.1 W (see Equation (79-1), where PDMaxPowerValue is *X*). The actual PD power value for a PD is the maximum input average power (see 33.3.8.2) the PD ever draws under the current power allocation.

Page 183, Line 25
Change: Integer that indicates the PD requested power value in the PD. The value is the maximum input average power (see 33.3.8.2) the PD requests. This power value is encoded according to Equation (79–1), where *X* is the decimal value of PDRequestedPowerValue. This variable is mapped from the aLldpXdot3LocPDRequestedPowerValue attribute (30.12.2.1.17).
To: Integer that indicates the PD requested power value in the PD in units of 0.1 W (see Equation (79-1), where PDRequestedPowerValue is *X*). The value is the maximum input average power (see 33.3.8.2) the PD requests. This variable is mapped from the aLldpXdot3LocPDRequestedPowerValue attribute (30.12.2.1.17).

Page 183, Line 31
Change: Integer that indicates the PSE allocated power value in the PSE. The value is the maximum input average power (see 33.3.8.2) the PD ever draws. This power value is encoded according to Equation (79–2), where *X* is the decimal value of PSEAllocatedPowerValue. This variable maps to the aLldpXdot3LocPSEAllocatedPowerValue attribute (30.12.2.1.18).
To: Integer that indicates the PSE allocated power value in the PSE in units of 0.1 W (see Equation (79-2), where PSEAllocatedPowerValue is *X*). The value is the maximum input average power (see 33.3.8.2) the PD ever draws. This variable maps to the aLldpXdot3LocPSEAllocatedPowerValue attribute (30.12.2.1.18).

Page 183, Line 41
Change: A temporary variable used to store Power Value. Actual power numbers are represented using an integer value that is encoded according to Equation (79–1) or Equation (79–2), where *X* is the decimal value of TempVar.
To: A temporary variable used to store Power Value in units of 0.1 W according to Equation (79–1) or Equation (79–2), where TempVar is *X.*

Page 185, Line 7
Change: The new maximum power value that the PSE expects the PD to draw. Actual power numbers are represented using an integer value that is encoded according to Equation (79–2), where *X* is the decimal value of PSE_NEW_VALUE.
To: The new maximum power value that the PSE expects the PD to draw in units of 0.1 W according to Equation (79–2), where PSE_NEW_VALUE is *X*.

Page 185, Line 14
Change: The new maximum power value that the PD wants to draw. Actual power numbers are represented using an integer value that is encoded according to Equation (79–1), where *X* is the decimal value of PD_NEW_VALUE.
To: The new maximum power value that the PD wants to draw in units of 0.1 W according to Equation (79–1), where PD_NEW_VALUE is *X*.

Page 217, Line 13
Change: The Length/Type field of an IEEE 802.3 LLDP frame is a 2-octet field that contains the hexadecimal value: 88-CC. This value carries the Type interpretation (see 3.2.6), and has been universally assigned for LLDP.
To: The Length/Type field of an IEEE 802.3 LLDP frame is a 2-octet field that contains 0x88CC. This value carries the Type interpretation (see 3.2.6), and has been universally assigned for LLDP.

Page 221, Line 8
Change: Power = 0.1 * (decimal value of bits) Watts.   Valid values for these bits are decimal 1 through 999.
To: Power expressed in units of 0.1 W. Valid values for these bits are 1 through 999.

Page 221, Line 18
Change: *X* is the decimal value of the power value field, bits 15:0
To: *X* is the power value field, bits 15:0

Page 221, Line 33
Change: Power = 0.1 * (decimal value of bits) Watts. Valid values for these bits are decimal 1 through 999.
To: Power expressed in units of 0.1 W. Valid values for these bits are 1 through 999.

Page 221, Line 42
Change: *X* is the decimal value of the power value field, bits 15:0
To: *X* is the power value field, bits 15:0

Page 224, Line 5
Change: Power = 0.1 * (decimal value of bits) Watts. Valid values for these bits are decimal 1 through 999.
To: Power expressed in units of 0.1 W. Valid values for these bits are 1 through 999.

Page 227, Line 5
Change: Number of useful significant bits in Voltage measurement data field (decimal value of bits). Valid values for these bits are decimal 1 through 16
To: Number of useful significant bits in Voltage measurement data field. Valid values for these bits are 1 through 16

Page 227, Line 9
Change: Number of useful significant bits in Current measurement data field (decimal value of bits). Valid values for these bits are decimal 1 through 16
To: Number of useful significant bits in Current measurement data field. Valid values for these bits are 1 through 16

Page 227, Line 12
Change: Number of useful significant bits in Energy measurement data field (decimal value of bits). Valid values for these bits are decimal 1 through 32
To: Number of useful significant bits in Energy measurement data field. Valid values for these bits are 1 through 32

Page 227, Line 15
Change: VPort_PD-2P = (decimal value of bits) mV Valid values for these bits are decimal 1 through 65000
To: VPort_PD-2P expressed in units of 1 mV. Valid values for these bits are 1 through 65000
[commenter note, see other comment that suggests changing 65000 to 57000].

Page 227, Line 18
Change: IPort or IPort-2P = 0.1 * (decimal value of bits) mA Valid values for these bits are decimal 0 through 20000
To: IPort or IPort-2P expressed in units of 0.1 mA. Valid values for these bits are 0 through 20000

Page 227, Line 21
Change: Total energy consumed at the port or pairset value = 0.1 * (decimal value of bits) in kJ since power on.
To: Total energy consumed at the port or pairset expressed in units of 0.1 kJ since power on.

Page 228, Line 31
Change: Number of useful significant bits in voltage measurement data field (decimal value of bits). Valid values for these bits are deci- mal 1 through 16.
To: Number of useful significant bits in Voltage measurement data field. Valid values for these bits are 1 through 16

Page 228, Line 34
Change: Number of useful significant bits in current measurement data field (decimal value of bits). Valid values for these bits are deci- mal 1 through 16.
To: Number of useful significant bits in Current measurement data field. Valid values for these bits are 1 through 16

Page 228, Line 38
Change: Number of useful significant bits in energy measurement data field (decimal value of bits). Valid values for these bits are deci- mal 1 through 32.
To: Number of useful significant bits in Energy measurement data field. Valid values for these bits are 1 through 32

Page 228, Line 41
Change: VPort_PSE-2P = (decimal value of bits) mV. Valid values for these bits are decimal 1 through 65000.
To: VPort_PSE-2P expressed in units of 1 mV. Valid values for these bits are 1 through 65000
[commenter note, see other comment that suggests changing 65000 to 57000].

Page 228, Line 44
Change: IPort or IPort-2P = 0.1 × (decimal value of bits) mA. Valid values for these bits are decimal 0 through 20000.
To: IPort or IPort-2P expressed in units of 0.1 mA. Valid values for these bits are 0 through 20000

Page 228, Line 47
Change: Total energy consumed at the port or pairset. Value = 0.1 × (decimal value of bits) in kJ since power on.
To: Total energy consumed at the port or pairset expressed in units of 0.1 kJ since power on.

Page 229, Line 14
Change: Power price index = decimal value of bits. Valid values for these bits are decimal 1 through 65535.
To: Power price index. Valid values for these bits are 1 through 65535.