



# IEEE802.3 4P Task Force Ripple and Noise requirements for Type 3 and 4 systems

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# Objectives

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- To derive the requirements for differential noise and common mode noise for Type 3 and 4 PSEs and PDs
- Proposing a base line text for Tables 33-11 and 33-18

# Background

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- DM and CM noise for PSEs and PDs are defined over 2 pairs in Table 33-11 and 33-18 for frequencies up to 1MHz.
- For Frequencies >1MHz it is defined by 33.4.4 and 33.4.6.
- Data integrity is affected by DM and CM noise.
  - Data integrity is not function of PD power level if DM and CM limits are met.

# Type 3 Ripple and Noise requirements

- Type 3 has ripple and noise sources at the PI for each pair set.
- Each 2P noise source affects the 2P data on that pairs.
- As a result IEEE802.3-2012 ripple and noise requirements are the same per each pair set for Type 3 and 4 systems.
- For 10GBaseT applications, the ripple and noise requirements up to 1MHz is the same.
- For CM and DM noise above 1MHz:
  - Amplitude as specified by 33.4.4 and 33.4.6.
    - Proposal to diff noise to be reduced to:
      - $(10\text{mVpp} / f)$  for  $1 \leq f < 10$ .
      - $1\text{mVpp}$  for  $10 \leq f \leq 500$  MHz where  $f$  is the frequency in MHz.
- Same applies for type 4.

# Baseline text proposal for Table 33-11

Item	Parameter	Symbol	Unit	Min	Max	PSE Type	Additional information
3	Power feeding ripple and noise						
	$f < 500$ Hz		$V_{pp}$		0.500	1, 2,3,4	See 33.2.7.3.
	500 Hz to 150 kHz				0.200		
	150 kHz to 500 kHz				0.150		
	500 kHz to 1 MHz				0.100		

### 33.2.7.3 Power feeding ripple and noise

The specification for power feeding ripple and noise in Table 33–11 shall be met for common-mode and/or pair-to-pair values for power outputs from (IHold max × VPort\_PSE min) to PType min for PSEs at static operating VPort\_PSE. The limits are meant to preserve data integrity. To meet EMI standards, lower values may be needed. For higher frequencies, see 33.4.4, ~~and~~ 33.4.5 and 33.4.6.

Note: DM noise up to 1MHz will be addressed in later work.

# Baseline text proposal for Table 33-11 cont

## 33.4.4 Common-mode output voltage

The magnitude of the common-mode AC output voltage measured according to Figure 33–21 and Figure 33–22 at the transmit PI while transmitting data and with power applied,  $E_{cm\_out}$ , shall not exceed:

For 10/100/1000Mb/s: 50 mV peak ~~when operating at 10 Mb/s, and 50 mV peak-to-peak when operating at 100 Mb/s or greater. The for frequency of the measurement shall be~~ from 1 MHz to 100 MHz.

For 10GBaseT systems: TBD mV peak, for 1 MHz to 500 MHz.

## 33.4.6 Differential noise voltage

For 10/100/1000Mb/s: The coupled noise,  $E_{d\_out}$  in Figure 33–22, from a PSE or PD to the differential transmit and receive pairs shall not exceed 10 mV peak-to-peak when measured from 1 MHz to 100 MHz under the conditions specified in 33.4.4, item 1) and item 2).

For 10GBase-T: The coupled noise,  $E_{d\_out}$  in Figure 33–22, from a PSE or PD to the differential transmit and receive pairs shall not exceed the following requirements under the conditions specified in 33.4.4, item 1) and item 2):

$$\frac{10mV_{pp}}{f} \quad \text{for } 1 \leq f < 10$$

$$1mV_{pp} \quad \text{for } 10 \leq f < 500$$

Where  $f$  is the frequency in MHz.

# Baseline text proposal for Table 33-18

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- Change Table 33-18 item 10, PD Type column  
from: 1,2  
To: ,2,3,4

# Summary

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- Noise and Ripple requirements for Type 3 and 4 system are identical to Type 3.
- It is proposed to update IEEE802.3-2012 as shown in the baseline proposal slides 5,6 and 7.