Signaling rate range

(comment #42)

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Assertions

- While +/−100 ppm is the “traditional” signaling rate tolerance, +/−50 ppm frequency references could be used without meaningful impact to cost
- Multiple Ethernet PHYs already specify higher precision references
- A smaller signaling rate range may be leveraged to improve performance margin (implementation-dependent)
- This presentation considers migration to a higher precision reference and compatibility with “legacy” designs

Some terminology

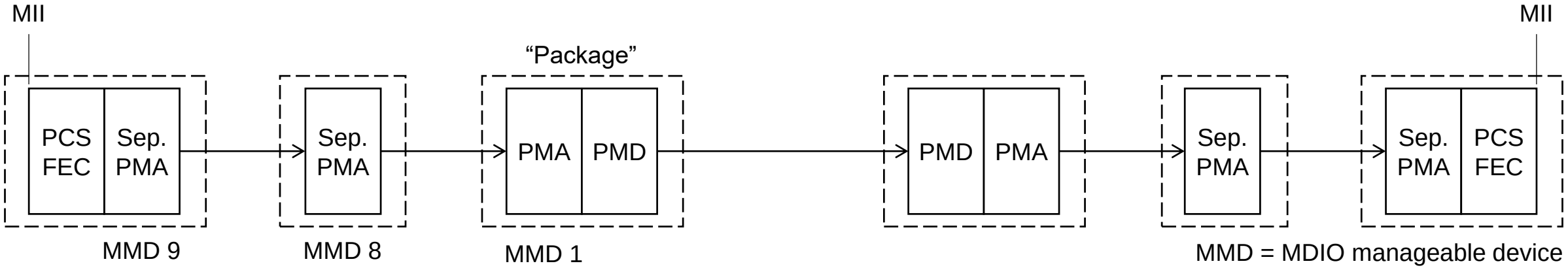
- Leverage terms defined in Clause 45
- Devices in package (see 45.1.1)

  Bits read as a one in this register indicate which MMDs are instantiated within the same package as the MMD being accessed.

  The definition of the term package is vendor specific and could be a chip, module, or other similar entity.

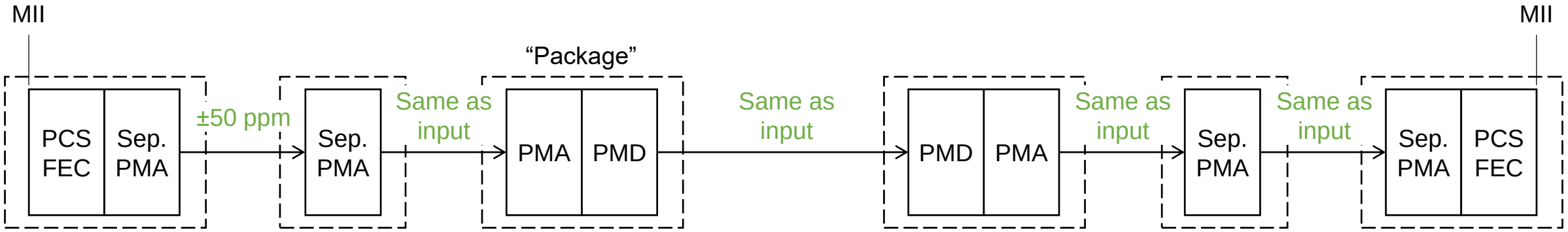
- Separated PMA (see 45.2.1)

  A PMA sublayer that is packaged with the PMD is addressed as MMD 1. More addressable instances of PMA sublayers, each one separated from lower addressable instances, may be implemented …



Key concepts

- For PMA and/or PMD instantiated within the same package as a PCS, the output signaling rate is specified to be within +/−50 ppm tolerance
- Other instances of PMA or PMD, the output signaling rate is derived from the input signaling rate (they cannot change the frequency)
- The medium independent interface (MII) is the only boundary where clock domains can be reconciled
- Input signaling rate tolerance remains +/−100 ppm for interoperability with implementations using 50 Gb/s (or lower) per lane electrical interfaces



Proposed changes to Table 162–10 and Table 163–5

Table 162−8–Summary of transmitter specifications at TP2

Parameter	Subclause reference	Value	Units
Signaling rate		53.125 ± ~~100~~50 ppm[a]	GBd

[a] For a PMD in the same package with a PCS sublayer. In other cases, the PMD signaling rate is equal to the signaling rate of the adjacent PMA sublayer.

[*Re-number any other table footnotes accordingly.*]

Table 163−5–Summary of transmitter specifications at TP0v

Parameter	Subclause reference	Value	Units
Signaling rate		53.125 ± ~~100~~50 ppm[a]	GBd

[a] For a PMD in the same package with a PCS sublayer. In other cases, the PMD signaling rate is equal to the signaling rate of the adjacent PMA sublayer.

[*Re-number any other table footnotes accordingly.*]

Proposed changes to Table 120F−1 and Table 120G−1

Table 120F−1–Host output characteristics at TP0a

Parameter	Subclause reference	Value	Units
Signaling rate per lane (range)		53.125 ± ~~100~~50 ppm[a]	GBd

[a] For a PMA in the same package with a PCS sublayer. In other cases, the PMA signaling rate is derived from the signaling rate presented to its input lanes by the adjacent PMA or PMD sublayer.

[*Re-number any other table footnotes accordingly.*]

Table 120G−1–Host output characteristics at TP1a

Parameter	Subclause reference	Value	Units
Signaling rate per lane (range)	~~120G.3.1.1~~	53.125 ± ~~100~~50 ppm[a]	GBd

[a] For a PMA in the same package with a PCS sublayer. In other cases, the PMA signaling rate is derived from the signaling rate presented to its input lanes by the adjacent PMA or PMD sublayer.

[*Re-number any other table footnotes accordingly.*]

- Also, remove 120G.3.1.1 and any other references to 120G.3.1.1.

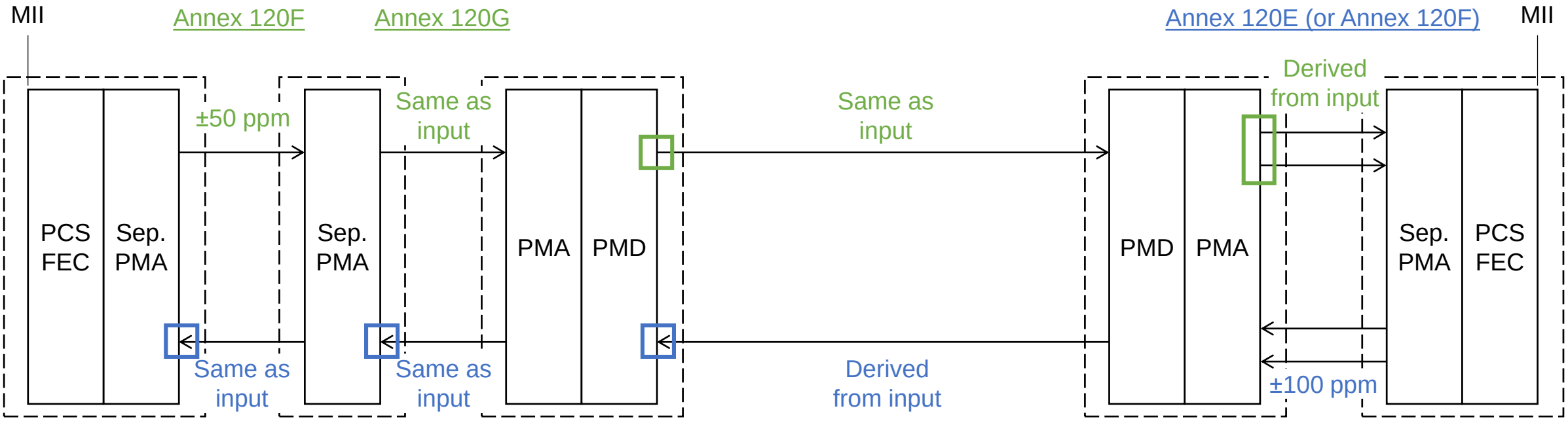
Why now?

- It has been suggested that this change be deferred to the next “higher speed” project
- However, the benefits associated with the proposed change are unrelated to the MAC rate — They are related to the physical lane rate
- Compatibility concerns will still exist at the next physical lane rate
- This proposal initiates an orderly transition to higher precision references while maintaining backwards compatibility

Back-up slide

Compatibility considerations

±50 ppm outputs comply with ±100 ppm requirements



±100 ppm input tolerance ensures compatibility with “legacy” implementations