EEE Modifications

P802.3bj comments 249, 250, 251

P802.3bm – address one obstacle to adopting an EEE objective

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Fundamental problems

- Page 54, line 45, clause 78.5 – Terminology is misleading – there aren't two kinds of wake, there are two kinds of sleep. The new kind of sleep does not follow the flow indicated in Figure 78-3 of the base document and requires another figure.
- Page 58, line 29, clause 80.1.2 - OTN Support – While P802.3bj does not have an OTN support objective, it is making non-backward compatible changes to P802.3ba interfaces causing them to fail to meet the OTN support objective. In addition, hope to reuse P802.3bj PCS changes for EEE should P802.3bm adopt EEE objectives
- Page 83, line 5 – Rapid Alignment Marker insertion is only needed for refresh and wake phases of normal wake operation and should not be used for "fast wake" as this prevents the PCS with EEE from being used for 40 Gb/s and 100 Gb/s optical interfaces

Terminology Issue

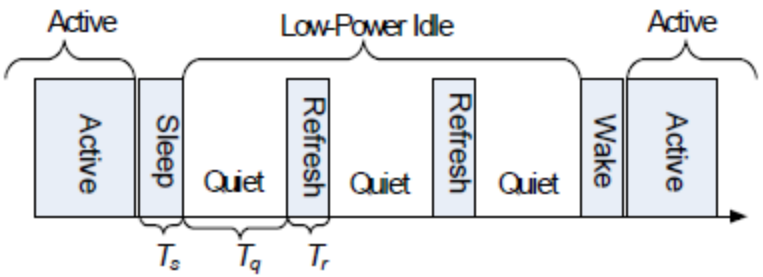


Figure 78–3—Overview of EEE LPI operation

- With what has been called “fast wake”, there is no Quiet period since the transmitter is left on. Refresh is implicit. There is no “Sleep” signal before the transmitter goes quiet. Ts, Tq, Tr are all irrelevant

Possible Alternate Figure

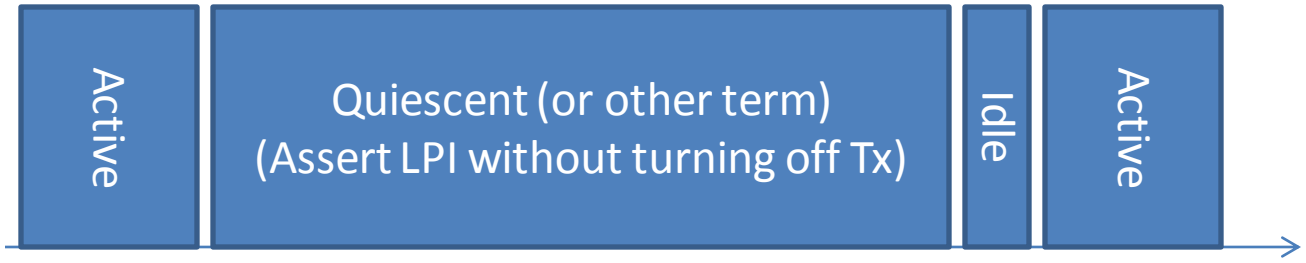


Figure 78-x-Overview of EEE without turning off Transmitter

- Note that Rapid Alignment Markers are needed for the “Refresh” and “Wake” steps of what has been called the “Normal Wake” process of Figure 78-3. They are not needed at all for the process of Figure 78-x which can simply send LPI control characters while maintaining alignment with normal alignment spacing

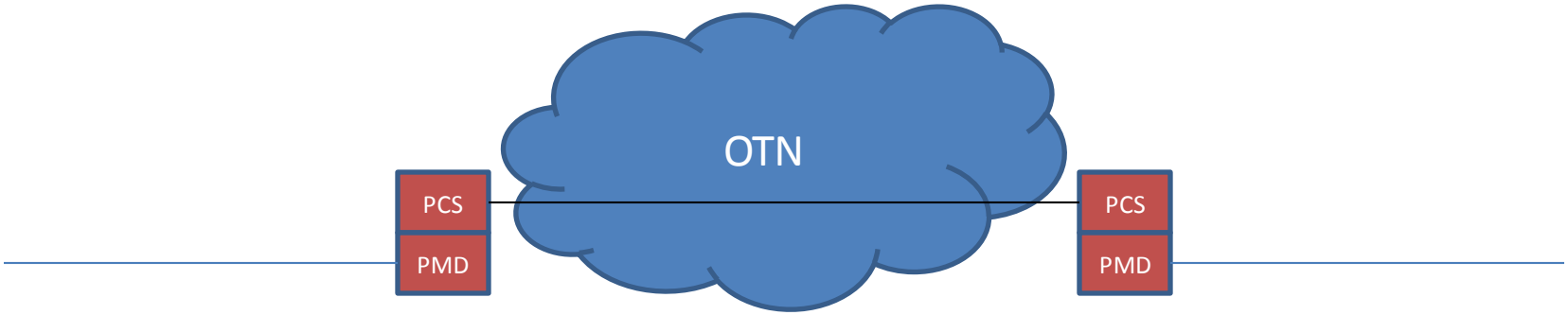
OTN Mapping for 40GBASE-R and 100GBASE-R

- Transparent (PCS) and non-transparent (MAC/GFP) mappings
- What is mapped is the PCS output, allowing different PMDs to be used at the OTN ingress/egress
- Restricted to 66B codeword set of Table 82-5 to permit 1024B/1027B transcoding of 40GBASE-R to fit OPU3
- PCS lane recovery and deskew so that combined ingress/egress links do not exceed the skew budget. Lane recovery in G.709 uses block diagrams from Figures 82-10, 82-11 of approved IEEE Std 802.3-2012 to recover the PCS lanes

Current “fast wake” process not compatible with OTN mapper

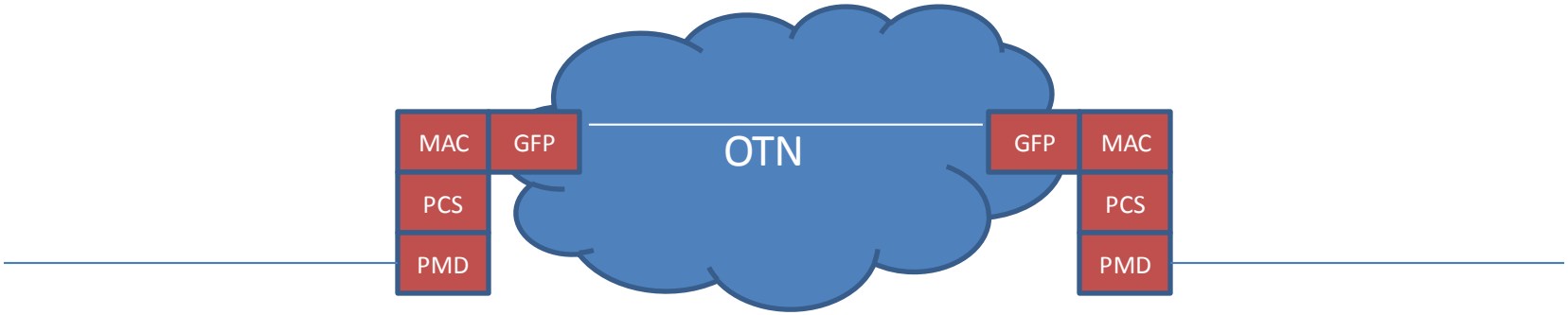
- In the current “fast wake” process the position of the alignment markers is different after the LPI section than it was before the LPI section
- The new alignment marker position is related to the point that the signal transitions from LPI
- This means that the mapper has to follow the RAMs so as to re-aquire the position of the normal alignment markers even though the alignment hasn’t changed (the transmitter and receiver have been on continuously)
- This is a major change to the OTN mapper / demapper processing without any alignment issue being fixed

Possible EEE support for PCS codeword transparently mapped Ethernet



- “Fast Wake” (or better terminology) only
- OTN mapper unaware of EEE
- EEE capability exchange between Ethernet endpoints transparently across the OTN (as if the connection were point-to-point)
- LPI assertion during quiescent period passed transparently over the OTN without change to PCS lane framing

Possible EEE support for GFP mapped Ethernet



- EEE-capable ports on OTN network elements
- EEE capability negotiation independently on ingress and egress links
- Could propose to add new client-management frame to GFP to convey LPI status between ingress and egress for EPL type services
- Note that services may be more complex than point-to-point EPL, e.g., different VLANS are connected to different egress ports

Proposals

- Replace “Normal Wake” and “Fast Wake” terminology with something more appropriate to describe the sleep state where the Tx is still on asserting LPI
- Insert a warning that “Normal Wake” (or the new name) EEE operation must be disabled for signals transparently mapped over OTN
- For “Fast Wake” (or the new name) quiescent state, change this operation to send LPI control characters while maintaining normal lane alignment markers to preserve compatibility with OTN mapper