

To save or not to save ?

Some thoughts on EEE for 10G-EPON

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Motivation

- Significant interest in power saving features of next generation optical access systems
 - P802.3av 10G-EPON: indicated by carriers and vendors (see e.g. 3av_0803_kuroda_1.pdf, 3av_0804_kuroda_1.pdf, 3av_0805_kuroda_1.pdf)
 - FSAN/ITU-T, as indicated during recent joint workshop in Geneva (more materials presented at FSAN, though not public):
 - http://www.itu.int/dms_pub/itu-t/oth/06/13/T06130000100002PDFE.pdf
 - http://www.itu.int/dms_pub/itu-t/oth/06/13/T06130000100003PDFE.pdf
 - http://www.itu.int/dms_pub/itu-t/oth/06/13/T06130000200001PDFE.pdf
- Power saving stated as one of the top 3 priorities for NGOA systems
- Can 10G-EPON afford to ignore such requirements ?
 - Probably not if it is to attract carriers and meet their NGOA requirements
- But ...
 - Do we need to jump over this fence not knowing what is on the other side ?
 - Probably not – examine the topic more in detail before committing to extension of already stabilized specifications.

Questions without answers ...

- What is the achievable power saving for a typical 1G EPON ONU?
 - we need typical power consumption figures and activity periods for residential & business customers – decision should not be based on faith and conviction;
 - what duty cycles are achievable for correct and backward compatible operation of ONUs in the system – 80 – 99% idle or more ?
- What is the expected power consumption of a 10G-EPON ONU?
 - 10 x 1G EPON ONU? – doubtful, but need decent estimation from experts
- What power saving is achievable by introduction of EEE mechanisms?
 - 80 – 90 % ? More or less ?
- What is the relative added cost of EEE support in 10G-EPON?
 - New functionalities, more silicon, etc How much do we add to total ONU cost by adding new functions ? Do we impact optical front-end construction ?
- No specified EEE mechanism for 10G-EPON:
 - Reuse MPCP and extend it with additional DUs and information handshake ?
 - Create a lower level protocol ? What other options do we have ?
- Interoperability concerns:
 - Need to assure all ONUs can interoperate without problems

Power saving mode for 10G-EPON

- Proposals to support EEE mechanism in 10G-EPON are attractive:
 - Need to see more contributions on the actual mechanism and technical details
 - Probably an ad-hoc could be formed, chartered with:
 - examination of the power saving mode options,
 - potential power saving, and
 - introduction of EEE power saving mechanism to 10G-EPON once approved (changes to the draft, new state machines, etc.)
 - Work in close liaison with 802.3az on this topic
 - Present the 10G-EPON TF with conclusions regarding achievable power savings and added complexity to system operation
- Rough outline of activities:
 - Examine power consumption of 10G-EPON ONUs and estimate power saving through support for EEE mechanism
 - Propose changes to stable version of 802.3av draft, with indication of new functions, state machines etc.
 - After discussing the topic at TF, submit a comment and have the changes incorporated in the draft.