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Technical Feasibility of 10Gb/s PHY for EPON

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IEEE 802.3 10Gb/s PHY for EPON Study Group , May 24-25 2006 Austin

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The preconditions for Our Technical Feasibility study

■ **Greenfield or Migration deployment ?**
–**Since IEEE802.3ah standard based EPON has been already deployed,
A migration deployment scenario should be considered.**

■ **Bandwidth efficiency**
–**To meet for future various broadband services, the bandwidth efficiency
should be considered the same as the current Gigabit EPON system.**

■ **Distance**
– **Distance between OLT and ONU should be considered the same as the
current Gigabit EPON system.**

■ **Fiber facility**
– **Not only new deployed fiber but also existing deployed fiber characteristics
should be considered.**

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The results of Technical feasibility Study(1/2)

No.	Item	Feasibility issue
1	10G burst transmit characteristics	▪ Ton (max) value of 10G burst transmit characteristics should be fix, After implementation testing of various ultra high speed response of APC technique. (reference : Gigabit EPON specified Ton (max) = 512 ns)
2	10G burst receive characteristics	▪ Treceiver_setting (max) value of 10G burst receiver characteristics should be fix, After implementation testing of various ultra high speed burst receiver technique for 64B/66B code spectrum characteristics. (reference : Gigabit EPON (8B10B code) specified Treceiver_ setting (max) = 400 ns)
3	Impact to MPCP standard	▪ If 10Gb/s EPON needs same bandwidth efficiency as Gigabit EPON, MPCP layer may change. ▪ Gigabit EPON uses a 16-ns time quantum as an upstream unit. But, the 64B/66B coding is used in 10 Giga Ethernet, the upstream burst signal should include a multiple of 66 bits. ▪ 165 bits of 64B/66B coding signal are accommodated in 16 ns. These bits are not decoded in receiver. ONU should stop the upstream data at the end of 66b block even if it has longer grant. This degrades the upstream bandwidth efficiency. ▪ The grant should be a multiple of 2 time quanta. Current 802.3ah does not consider such case.

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The results of Technical feasibility Study(2/2)

No.	Item	Feasibility issue
4	Option1 (DS10G/US1G) Bandwidth efficiency	▪ 10 Giga Ethernet is necessary as a core network interface. Since the Option1 PON upstream bandwidth is 1Gbps , 9Gbps is not used in the core network. This is not efficiency for future application.
5	Wavelength assignment	▪ 10Gb/s EPON PHY CFI was proposed DS wavelength 1550 nm / US wavelength 1310 nm. ▪ Wavelength should be carefully considered , because the 1550nm bandwidth is used for video application in the existing Gigabit EPON system.
6	System scalability and flexibility	▪ System scalability should be considered from Gigabit EPON to 10Gb/s EPON. ▪ The mixture of Gigabit EPON and 10Gb/s EPON should be considered.