

# 10GE-PON Broad market potential and economic feasibility

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Austin, TX - May 2006

## Goal

The study group should answer the 5 criteria

This presentation deals with 2 of those

- Broad market potential
- Economic feasibility

## Broad market potential

- The biggest market is fiber to the home (FTTH)
  - MDU numbers are much lower (total number of subscribers / subscribers per MDU)
  - Wireless backhaul is a niche, not served today by PON
- There is no justification to the study group unless FTTH is addressed

## Economical feasibility

- Access market is all about cost
- 10G EPON cost per subscriber (OPEX and CAPEX) should show advantage over other alternatives for supplying the same bandwidth
  - Is it cheaper than 1G P2P?
  - Is it cheaper than 1G EPON with reduced number of subscribers?
- There is no justification to the study group if either answer is NO

## 10G ONU cost structure

- 10G Optics (with 1G upstream) – x5 than 1G EPON optics
- 10G Optics (with 10G upstream) – x10 than 1G EPON optics (due to EML)
- 10G EPON MAC– x3 than 1G EPON MAC

### Overall:

- 10G ONU (with 1G upstream) – x3 than 1G ONU
- 10G ONU (with 10G upstream) – x3=5 than 1G ONU

## 10G OLT cost structure

- 10G Optics (with 1G upstream) – x10 than 1G EPON MAC
- 10G Optics (with 10G upstream) – x20 than 1G EPON MAC
- 10G EPON MAC – x3 than 1G EPON MAC
- 10G switches – x5 than 1G switches

### Overall

- 10G OLT (with 1G upstream) – x5 than 1G OLT
- 10G OLT (with 10G upstream) – x8 than 1G OLT

## How to bridge the gap?

- Define high split ratio for 10G
  - 1:128 @10KM
  - 1:64 @20KM
- OLT cost is shared among more users
  - Compensating OLT cost increase
- Fiber and labor cost is shared among more end points
  - Compensating ONU cost increase

## BW demand

- The common futuristic industry model for major services is

Service	BW	Multiplicity	Total
HDTV	12Mb/s	2	24Mb/s
SDTV	3Mb/s	2	6Mb/s
Web access	10Mb/s	1	10Mb/s

- Total is 40Mb/s



## BW supply for FTTH

- Typically, 1G EPON is deployed with 32 subscribers
  - BW per subscriber is  $1\text{G}/32 = 33\text{Mb/s}$
- 10G with 128 subscribers would supply 2.5 times more BW per user
  - $10\text{G}/128 = 80\text{M}$
- 1G EPON 1:32 barely supports the futuristic model
- 10G EPON 1:128 provides double than the model
  - Statistical multiplexing among so many subscribers further improves the supply

## Conclusion

- Broad market potential of 10G EPON is limited without addressing the FTTH segment
- Economical feasibility of 10G EPON is challenging
- The only way to bridge the gap is defining high split ratio model – 1:128 @10KM / 1:64 @20KM
- High split ratio 10G provides good upgrade path to 1G