5

5.15 System Cost

The system cost for any access technology can be examined in a number of ways.

5.15.1 Bandwidth Cost

Given the need to compare three different generations (1G-EPON, 10G-EPON, and NG-EPON) of access equipment, the most effective manner is to examine the relative cost of providing symmetric dedicated (CIR only) 1 Gb/s of subscriber bandwidth, irrespective of the actual OLT architecture, number of ports supported by the OLT, port density per line card, etc. It is assumed that the cost for 1 Gb/s for the given OLT is calculated in a fully loaded architecture, i.e., all uplink and PON cards are accounted for and populated with the necessary optics. The cost of corresponding ports on the edge router is not accounted for in this comparison.

Using data provided by [ovum] and assuming the cost of dedicated (CIR only), symmetric 1 Gb/s of bandwidth provided by a 1G-EPON OLT in Q1 2008 as a unit (100%), the first generation of 10/10G-EPON OLTs (around Q3 2011) exhibited the bandwidth cost of approximately 37%. The bandwidth cost for 1G-EPON in Q3 2011 also decreased to roughly 45%. The bandwidth cost for both 1G-EPON and 10G-EPON systems have decreased since then, with Q3 2014 bandwidth cost in 1G-EPON at 22% and in 10G-EPON at 21%.

It is expected that the bandwidth cost in NG-EPON (when such systems become commercially available) is at most at the similar level to 1G-EPON and 10G-EPON at the time, while providing higher density (higher number of connected customers) and higher aggregate capacity.

5.15.2 Other Comparison Metrics

Editorial Note (to be removed prior to publication): This section should address the relative cost of an NG-EPON system compared to other access network technologies. The Ad-Hoc requests contributions to this section.

5.16 Expected Availability Timeframe

The anticipated timeline for the commercial availability of NG-EPON systems depends on a number of factors, including the target application for the access system, operator's investment in EPON technology so far, technical condition of the existing ODN, and others.

For residential applications, 10/10G-EPON is expected to address the bandwidth demand from power users until at least 2018-2020 timeframe, when the next generation access solution may be needed. The need for NG-EPON for residential access will be mainly driven by the power users, primarily for SOHO applications generating substantial volume of traffic in both downstream and upstream directions. In this scenario, the coexistence of NG-EPON with 10G-EPON and likely with 1G-EPON on the same ODN for extended period of time is likely to be required to avoid the need to repurchase OLT ports that were already paid for.

For business applications, 10/10G-EPON is expected to run of bandwidth around 2017 for the majority of typical L2 applications, including cell tower backhaul, MEF services, and DIA. Some of the emerging business-class applications, such as cell tower fronthaul, are expected to drive bandwidth exhaustion in 10G-EPON and push

forward the development and then deployment of NG-EPON. The economics of using PON architecture for such high data rate services are expected to be mainly driven by the need for fiber conservation and ever increasing cost of civil construction, especially in densely populated areas. The more efficient use of ODN spectrum when compared to typical CWDM P2P links is expected to be the main advantage of a multi-wavelength NG-EPON architecture.

Editorial Note (to be removed prior to publication): Editorial Note (to be removed prior to publication): This section should address the timeframe in which an NG-EPON system should be available for deployment by service providers.