

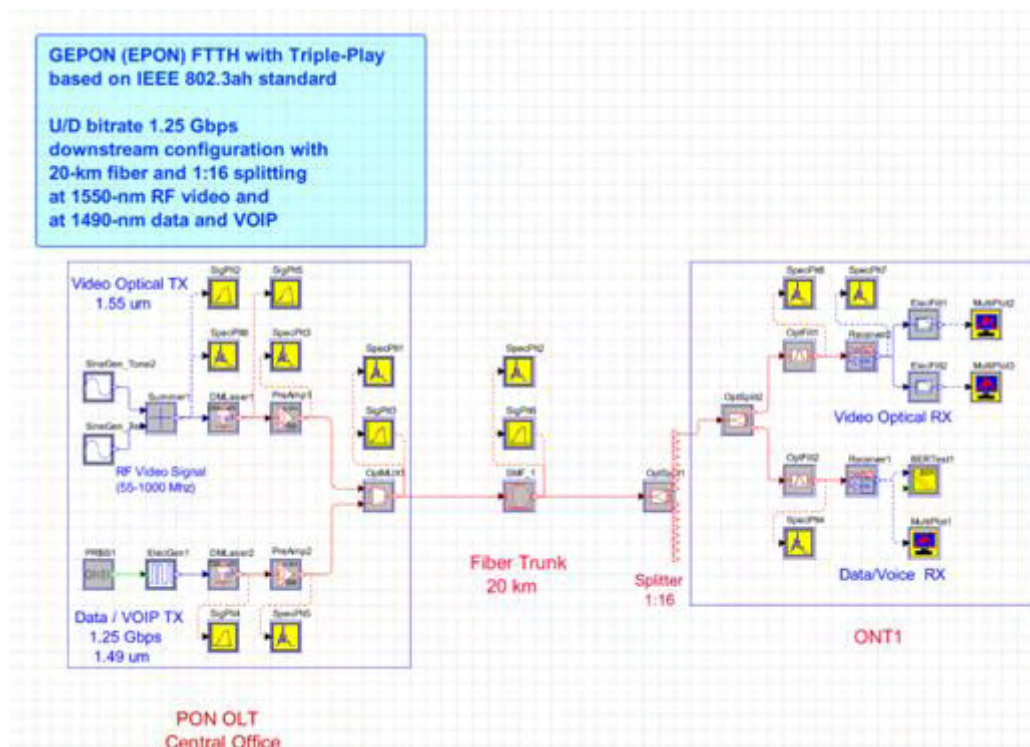
## FTTH System with GEPON Access Architecture

Tools Used: OptSim

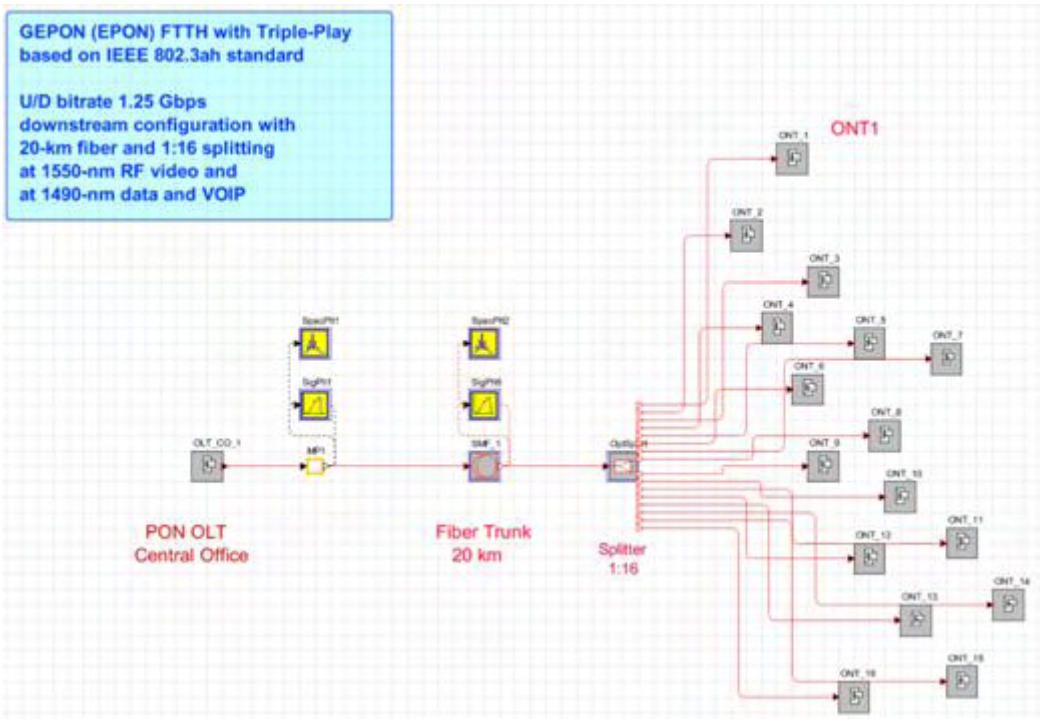
This example demonstrates an OptSim design for FTTH GEPON link. Here we consider typical GEPON FTTH design for downlink with 16 subscribers and 20-km reach. Passive optical network (PON) access architecture is the accepted choice of triple-play (voice, video, and data) service delivery from service providers to the end users in FTTH (fiber-to-the-home) access networks. Three major PON technologies are currently accepted as the basis for FTTH deployments: Broadband PON (BPON), Gigabit PON (GPON), and Ethernet PON (EPON or GEPON). GEPON architecture is specified by IEEE 802.3ah standard and supports Gigabit Ethernet 1.25 Gbps transmission rate for data component in both down- and up-link configuration.

In a PON, the active optoelectronics are situated on either ends of the passive network. An optical line termination (OLT) device is installed in the central office (CO), and an optical network termination (ONT) device is installed on the other end, in or near each home or business site. Fiber distribution is done using a tree-and-branch architecture.

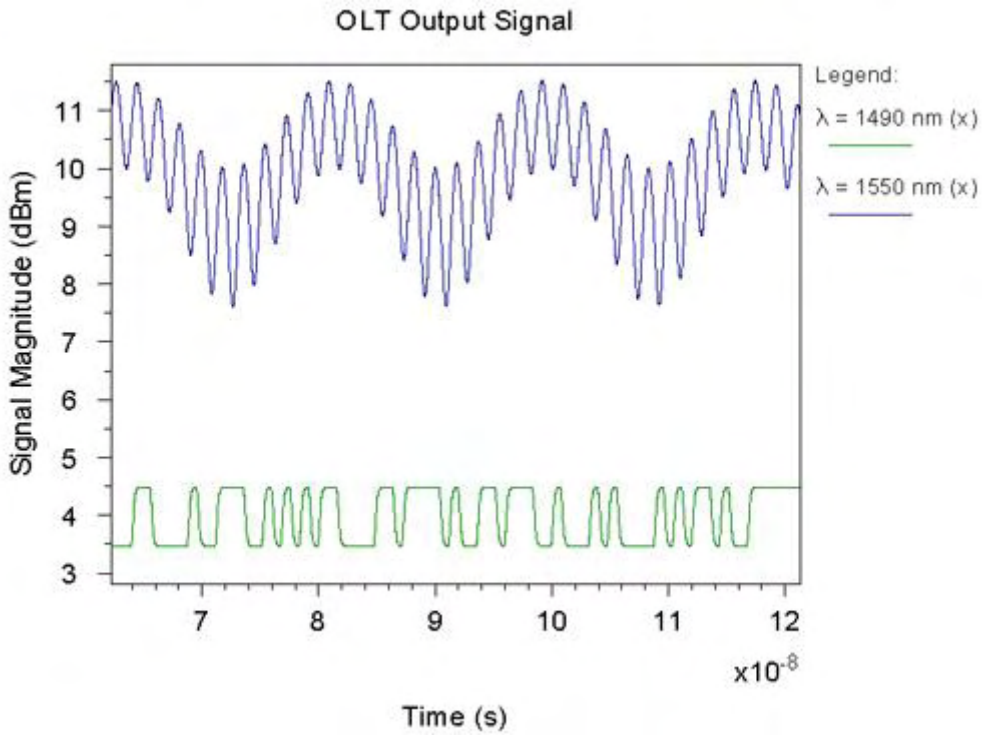
The figure below depicts the layout for this example:



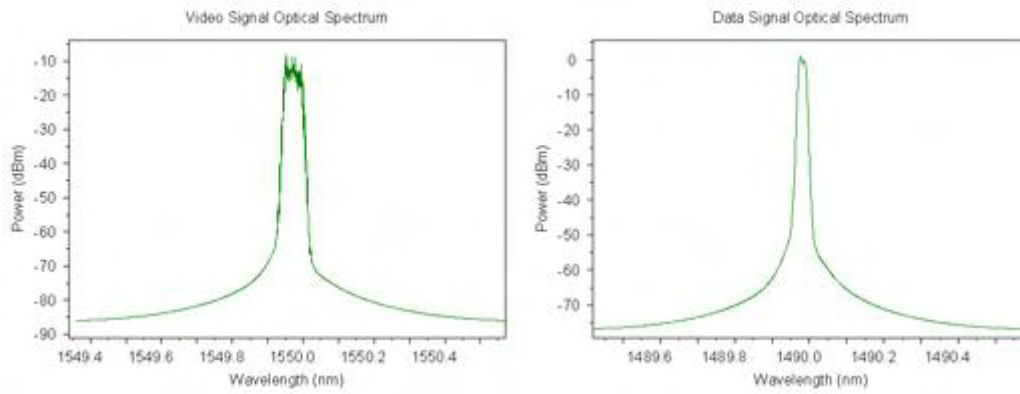
The figure below shows shows full 16-users GEPON configuration - here each ONT block is a compound component.



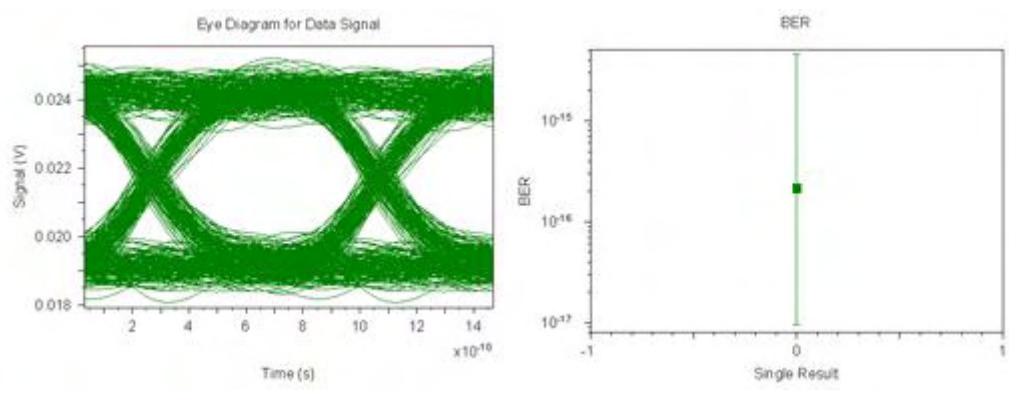
The diagram below shows the OLT output optical waveforms for data and video signal:



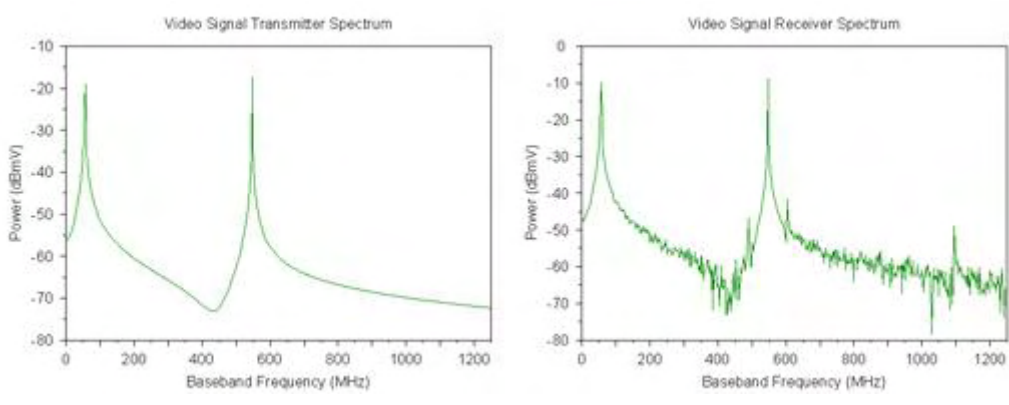
The following figure shows OLT output optical spectra for data and video signals:



Next two figures depict results at the received side for ONT\_1, namely, the received eye diagram for data signal and the corresponding BER.



The figure below shows the received RF spectrum of video signal with two tones (channels) recovered, and for comparison the RF video spectrum at the transmitter:



In summary, we described a simple example for typical layout of FTTH GEAPON system in OptSim. This layout can be further modified to study links with more specific details and provided components specifications. For example, a fiber trunk can consist of few fiber spans and splices, the drop-off cables from splitter to users ONTs can be added. The upstream configuration can be studied as well.