
Background of the 29dB requirement

Akihiro OTAKA
Tsutomu TATSUTA

Introduction

In the last SG meeting, we proposed following requirements for the 10G EPON.

- (1) Bidirectional 10 Gb/s.
- (2) **Compatible fiber plant with 1Gb/s EPON.**
- (3) Migration (co-existence between 10G- and 1G-EPON).
- (4) Cost.
- (5) Bandwidth efficiency.

This presentation shows the background of the requirement; “29 dB allocation for the fiber plant”.

Background (1)

- The specification of ODN (optical distribution network) was developed as G.982 in 1996.
- Since then, fiber networks compatible with G.982 have been constructed, and therefore systems compatible with G.982 have been developed, such as B-PON, G-PON, and GE-PON.
- Additional Class B+ was developed for B/G-PON. This shows that Class B is insufficient.
- Optical path loss
class A: 20dB, class B: 25dB, class B+: 28dB, class C: 30dB
- In our experience of 1G-EPON installation, we need 29 dB for fiber plant.

Background (2)

- The attenuation coefficient of G.652 fiber is 0.5 dB/km@1310 nm and 0.4 dB/km@1550 nm.
- The real fiber plant requires larger loss than that calculated with these values.

(1) Many connection points

The fiber network has a tree topology constructed by many kinds of cables.

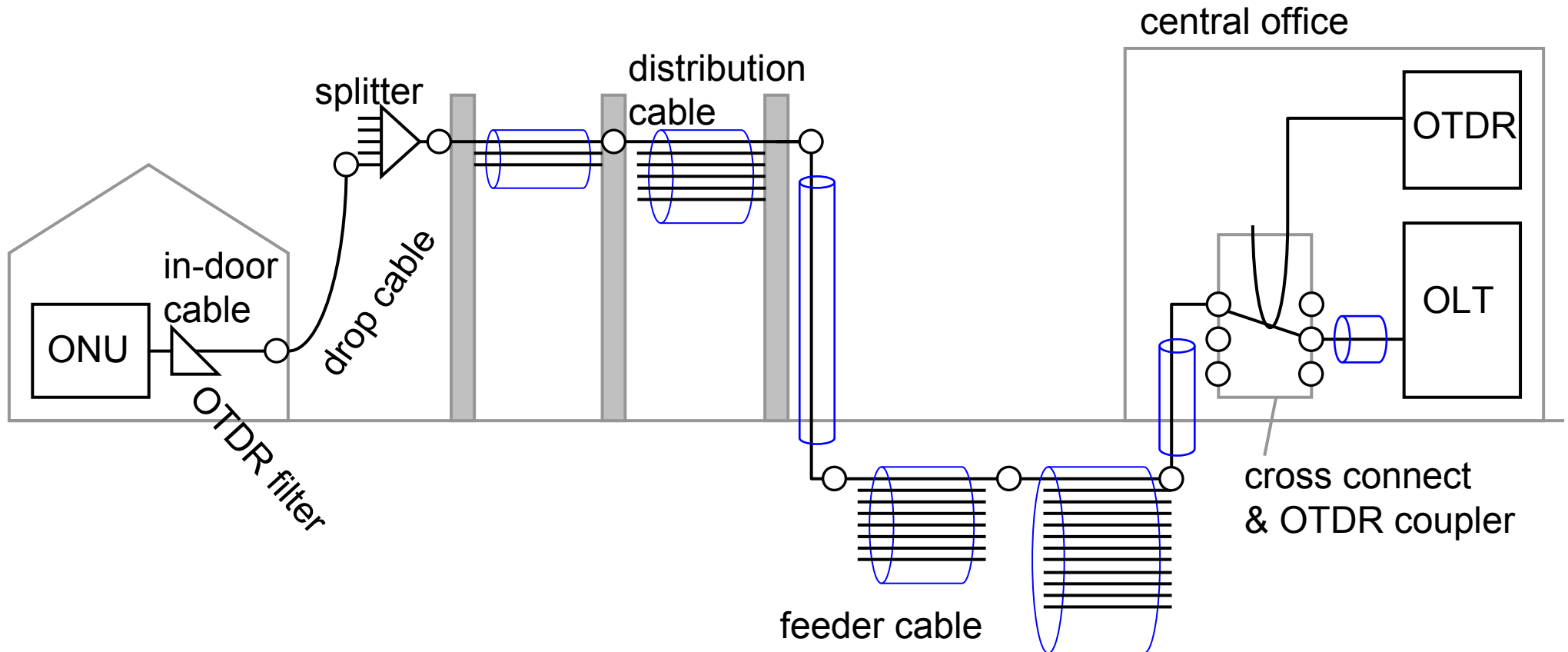
- Types of cables: in-door, drop, distribution, feeder, etc.
- Fiber counts (number of fibers in a cable) :

Higher fiber counts cable for near the CO, and smaller fiber counts one for near users.

(2) Maintenance and operation

- OTDR: Cut filter near ONU and coupler in CO cause loss.
- Connectors for rapid response to the demand fluctuation
- Cable reroute margin is necessary for long term operation.

Example of an optical access network configuration



○ connecting points
(fusion splice, mechanical splice, connector)