

Bright House Networks and Extended EPON

**IEEE 802.3 ExEPON Study Group
January, 2012**

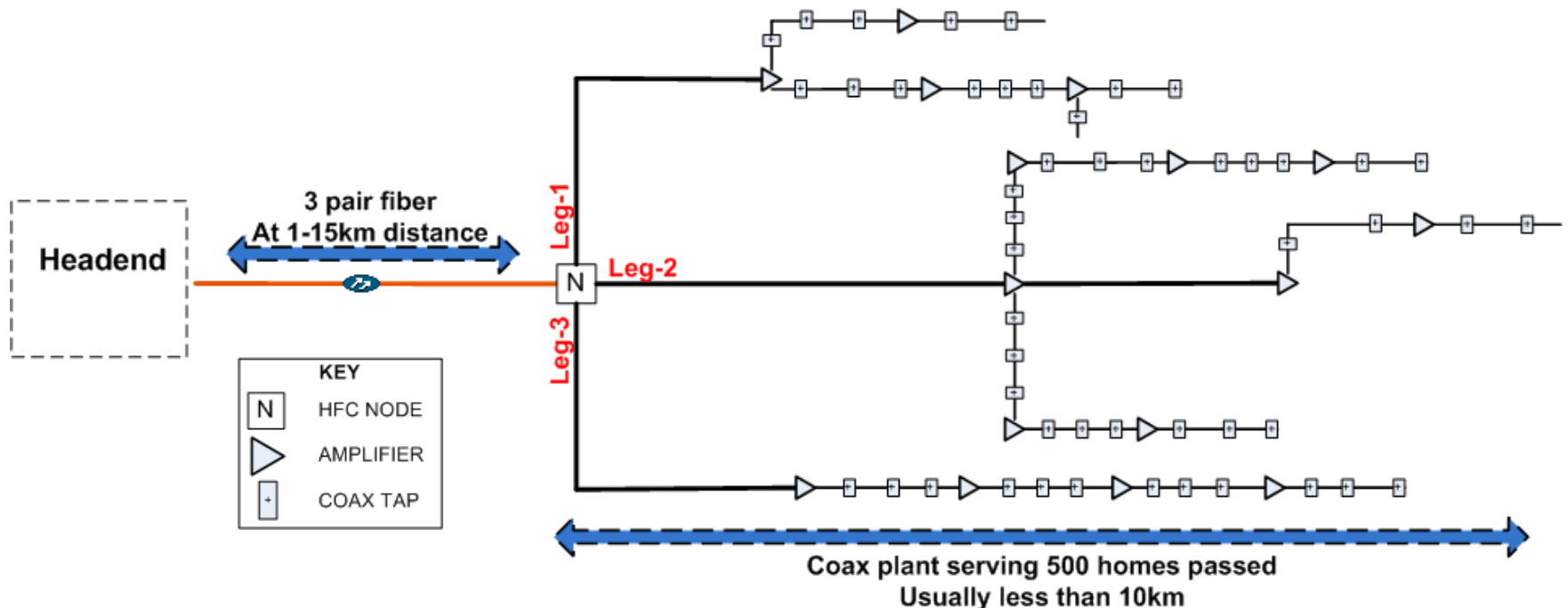
Edwin Mallette

Agenda

- © BHN Existing Hybrid Fiber Coax Model
- © All-Fiber Model
- © Loss Budget Calculation
- © Desired Power Budgets

BHN Hybrid Fiber Coax

- Existing hybrid fiber-coax (HFC) plant typically has some “node” fiber – commonly 6 fibers or less pulled to the HFC Node though in more recent builds the number of fibers headend to node is much higher.
- Distance from Headend to Node is usually within 15km, average distance is between 5 and 10km.
- Common distance at BHN from Node to end of line on coax plant is less than 10km; average is 4-5km.

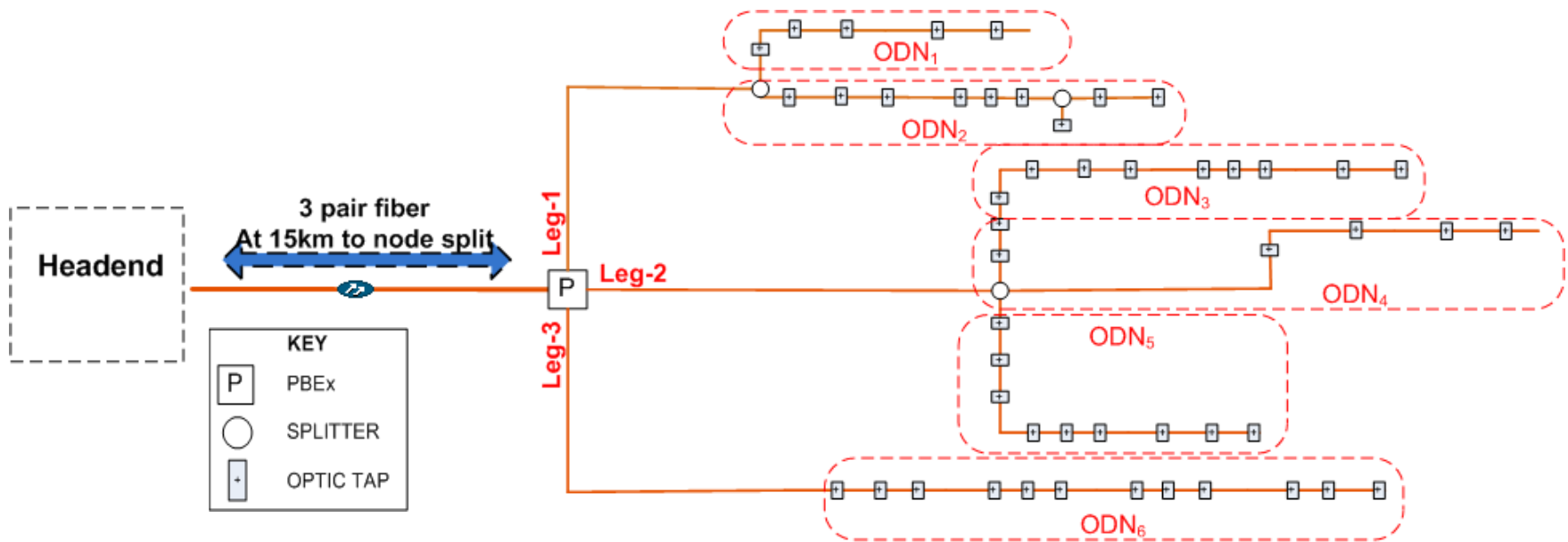


All-Fiber Model

- The model below describes a scenario where all segments of the coaxial plant for a specific node is overbuilt with fiber.
- This model segments a grouping of ~500 homes passed into 5-6 ODNs.
- Distance from headend to node is 15km and distance from the PBEx to end of line is an additional 10km.
- Total distance is 25km with <128 splits per ODN.

Application Note:

Distance: 25km, Splits per ODN: <128.



Power Budget Calculation

- The next slide describes desired power budgets and splits the power budget across a PBEx and passive optics.
- The table below defines the set of observed and assumed values in arriving at the needed power budget for the scenarios included on the following slide.
- The splice penalty is included in the upstream and downstream loss values.
- Connector loss for the splitter is included in splitter insertion loss.

Parameters	Units	Value	Note
Upstream optical fiber loss	dB/km	0.4	Observed
Downstream optical fiber loss	dB/km	0.35	Observed
Connector Loss	dB/pair	0.3	Observed
Connectors	-	4	Assumed
Splitter Loss	dB	3.6 (normalized)	Assumed
Transmitter and dispersion penalty	dB	2	Assumed

Target Power Budget

- Below are typical scenarios of interest which include supportable ODN designs with and without a PBEx.
- The assumption is that to support higher than PR(X)30 power budgets in the upstream and downstream, uniform power classes would be deployed across an ODN to avoid operational complexity.

The model on page 4 only places the PBEx at the HFC node enclosure – 256 Splits at 25km = deeper PBEx placement.

Scenario	PBEx (at NODE)	Passive Budget	Total Budget
<64 Splits at <20km	N/A	32.2dBm	32.2dBm
64 Splits at 25km	6.6dBm Gain	27.6dBm	34.2dBm
<128 Splits at 10km	N/A	31.7dBm	31.7dBm
<128 Splits at 25km	6.6dBm Gain	31.1dBm	37.7dBm
<256 Splits at 25km	7.7dBm Gain	~33.5dBm	41.2dBm



Questions?