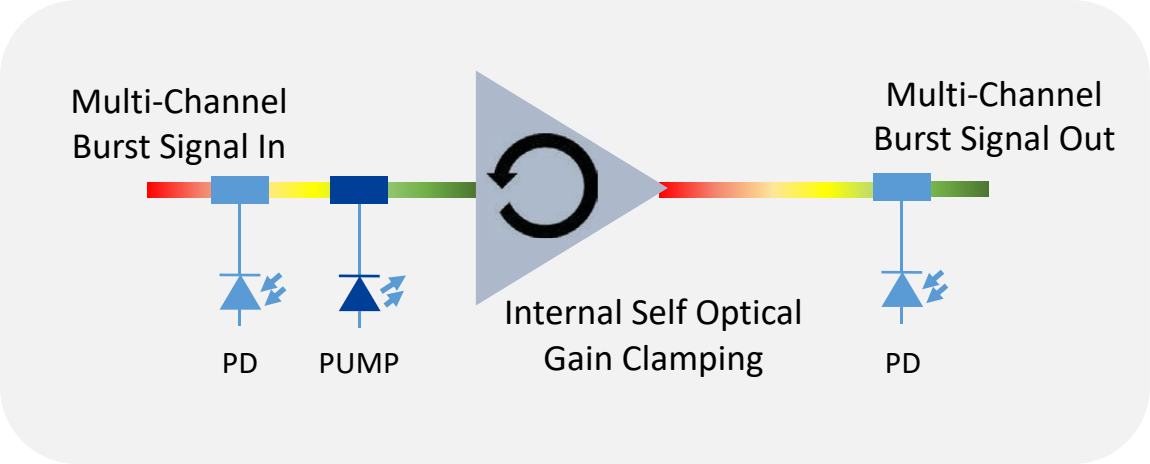
Burst-mode capable EDFAs

Results and slides by Qing Wei (Accelink)

Burst-Mode EDFA for Upstream

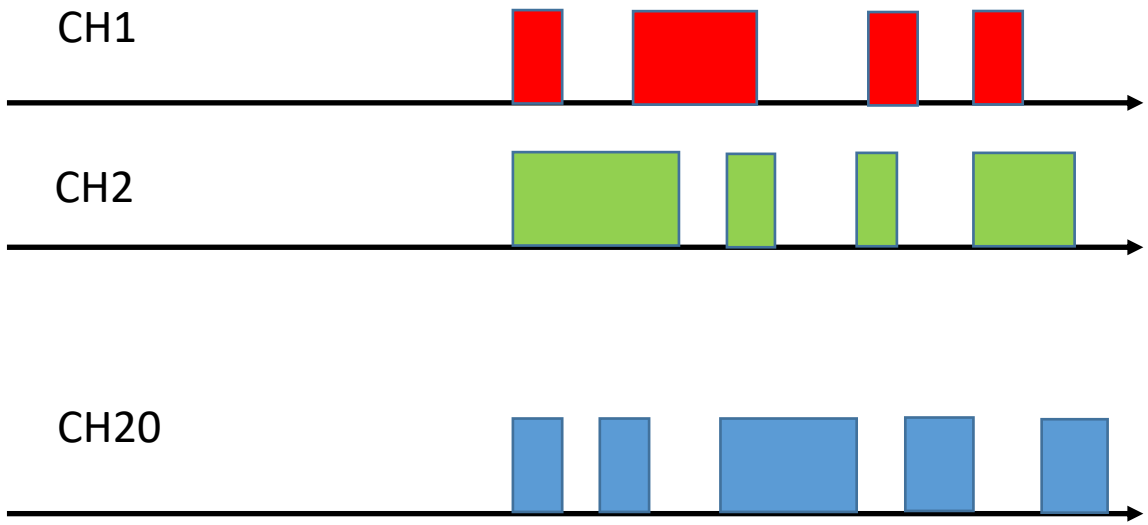


Burst-Mode EDFA Function Diagram

Feasibility of the burst-mode EDFA for Upstream

- Burst-mode EDFA is based on mature optical components such as Erbium doped fiber, traditional pump laser and passive optical components. All the key optical materials are widely used in traditional EDFA products and are readily available.
- A burst-mode EDFA is an excellent candidate for the upstream amplifier. Usual EDFA transient effects are suppressed by **gain clamping.**
- Burst-mode EDFAs also have low NFs (typically <5.5 dB) and GF (typically<1dB) which make link budget enough for point to multi-point architecture.

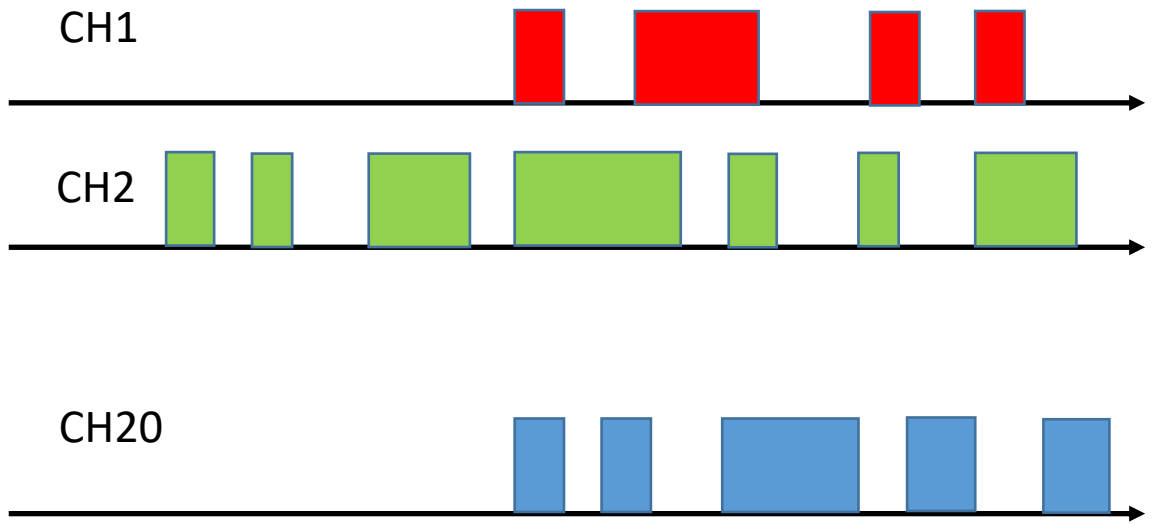
Extreme testing



Laser off

Transmit data

- All channels are turned on simultaneously
- Measure one channel



Other ch laser off

Other channels transmit data

- All but probe channel are turned on simultaneously
- Probe channel always on
- Measure probe channel

Example: Accelink Burst-Mode EDFA Performance

Figure 1-1, 20 channels burst on at same time, -13dBm Per Ch, Monitor one of the channels, Gain excursion:0.5dB

Figure 1-2, 19 channel burst on, total 20 channels Monitor the stable channel

Burst mode EDFA can suppress the gain excursion below than 0.6dB typically even when 20 channels burst on at same time. The cross talk is very small in the worst case for the other 19 channels burst on at same time.

Example: Accelink Burst-Mode EDFA Performance

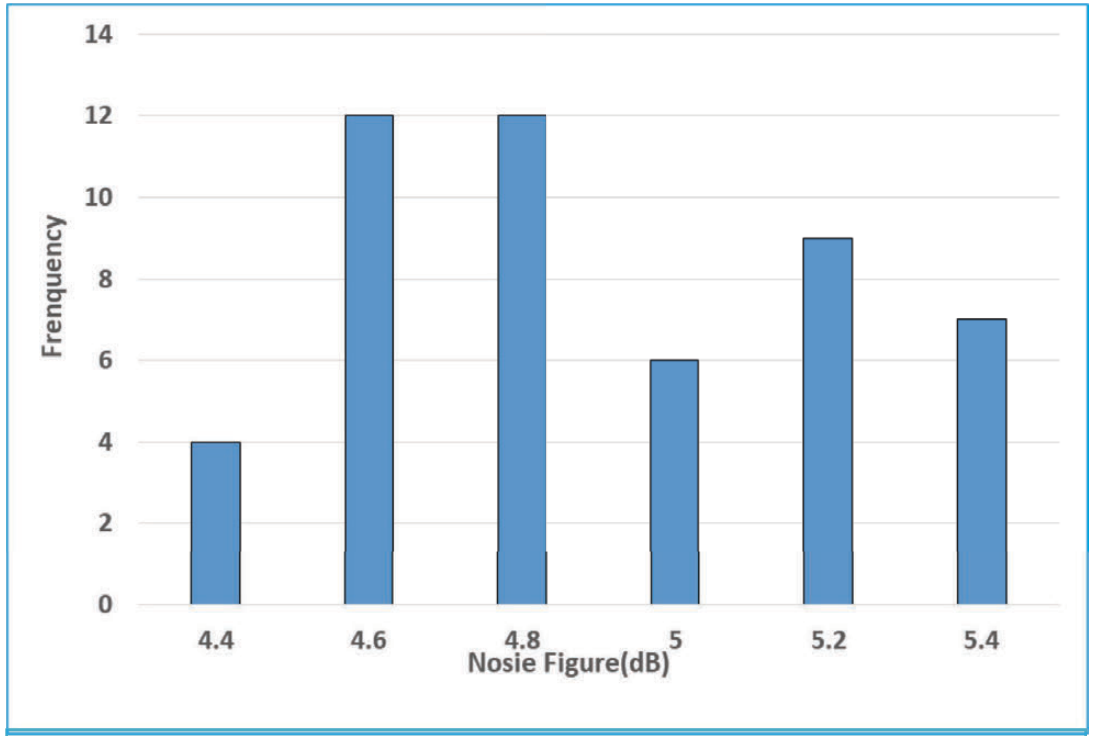


**Figure 2-1, Max Nosie Figure at room temperature,
20 channels cover 1530nm to 1546nm,
per channel input power is around -33dBm**

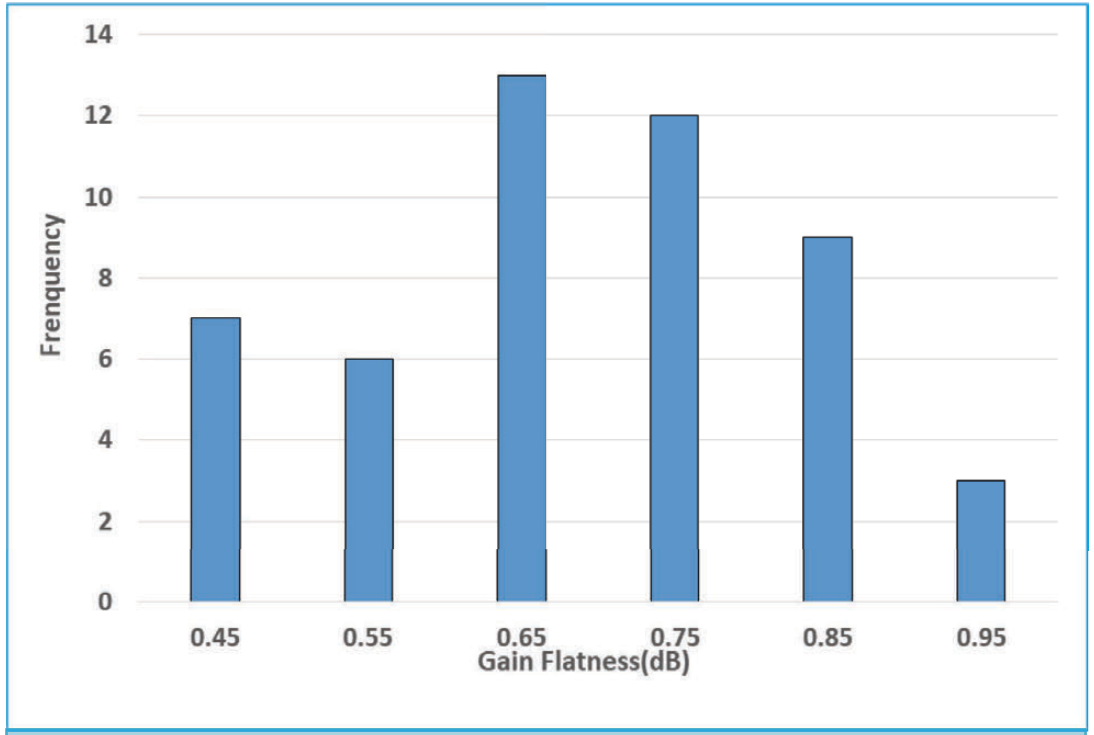


**Figure 2-2, Gain Flatness at room temperature,
20 channels cover 1530nm to 1546nm,
per channel input power is around -33dBm**

Note: Those test data come from the mass product of burst-mode EDFA which have been deployed in field.

Capability for System Migration In Future

- Burst-mode EDFA can easily cover the upgrade wavelength range of Super-PON system with almost same optical design (just small changes on a few optical components)
- Clamping performance can keep same for upgrade wavelength range.
- NF become more critical in higher speed system (10G, 25G…) and the excellent NF of burst-mode EDFA can create more margin for OSNR budget
- For 25G application in future, this burst-mode EDFA can also works well with integrated DCM or TDC (tunable dispersion compensator)

Thanks!

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