

# Single- $\lambda$ 50G-EPON wavelength plan

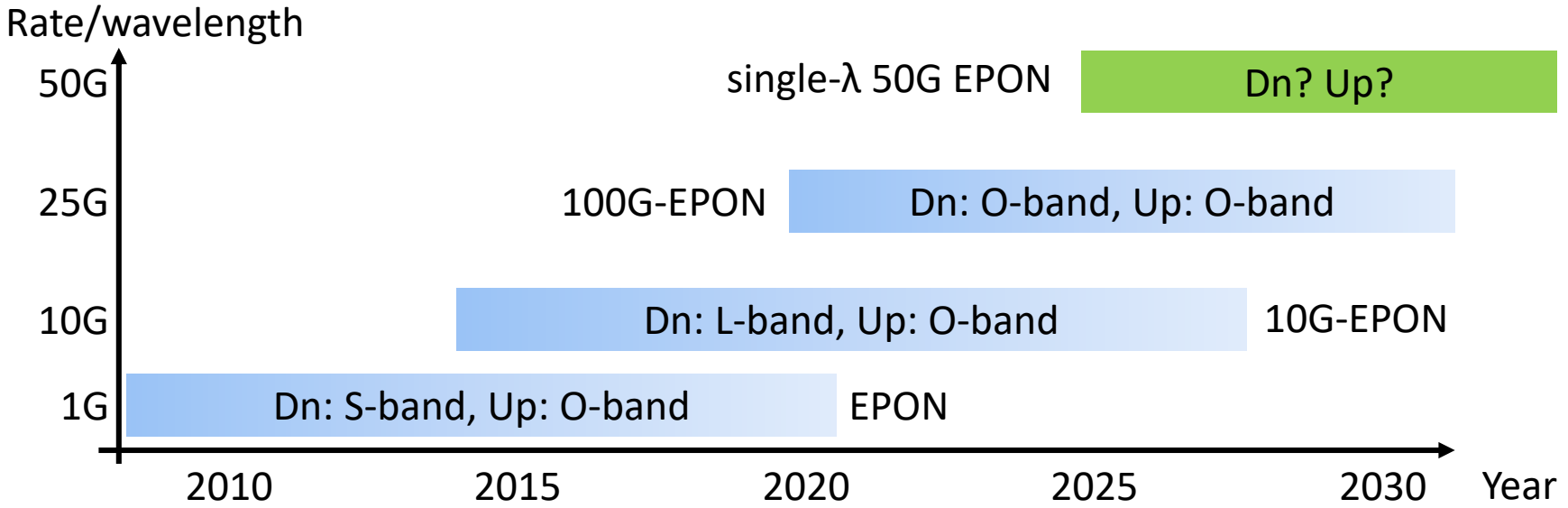
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# Coexistence of single-λ 50G-EPON

- 1G-EPON will not be used after 2020 because it's bandwidth is not enough to satisfy bandwidth requirements of future services.
- It seems that standardization work of single-λ 50G-EPON would be started after 2020 considering current deployment status of 10G-EPON and 100G-EPON standardization work in 802.3ca TF.
- Single-λ 50G-EPON must be coexisted with both 10G-EPON and 100G-EPON.



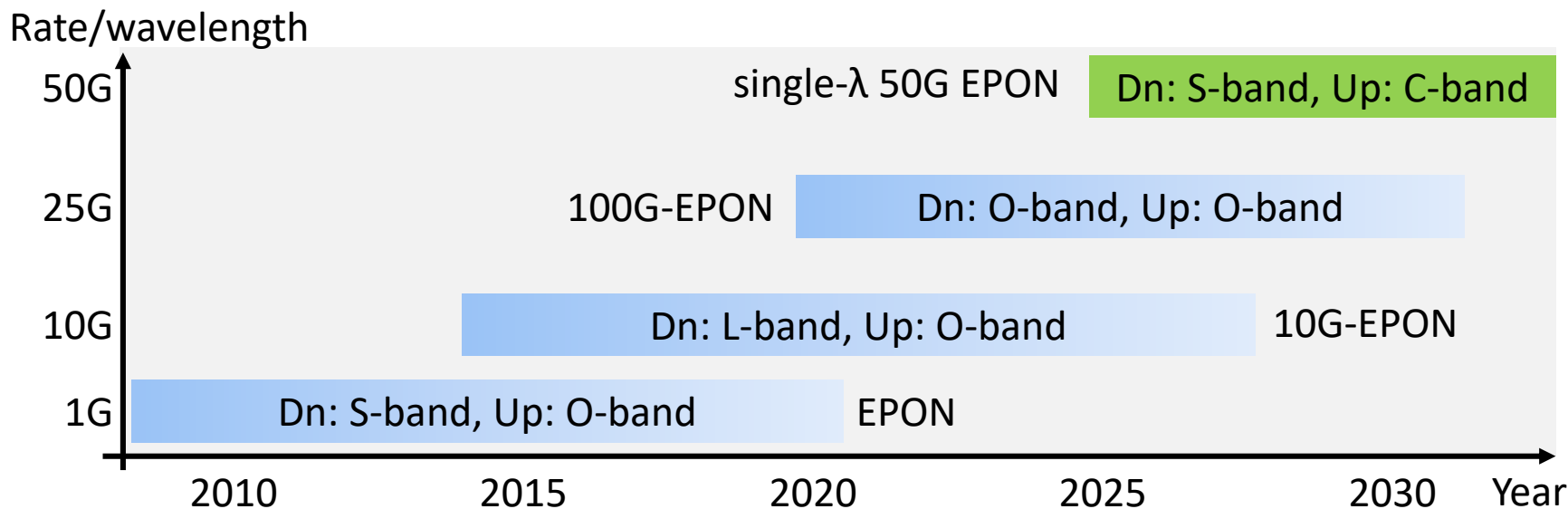
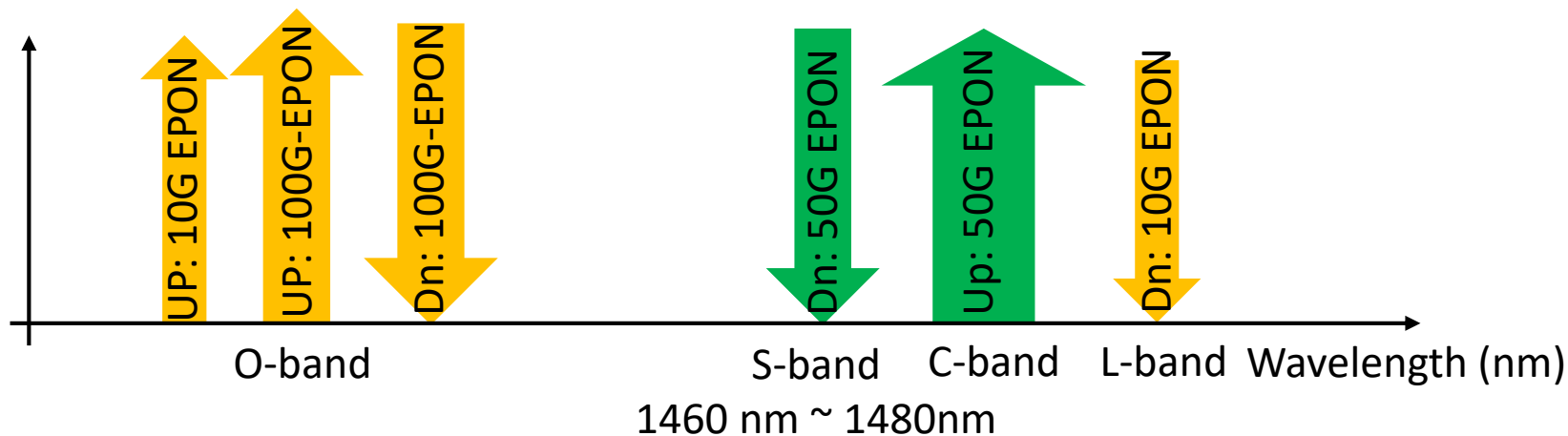
# Dispersion tolerance for 50 Gb/s signal

- As described a previous contribution ([http://www.ieee802.org/3/ca/public/meeting\\_archive/2017/09/liu\\_3ca\\_2a\\_0917.pdf](http://www.ieee802.org/3/ca/public/meeting_archive/2017/09/liu_3ca_2a_0917.pdf)), to overcome dispersion penalty of 50 Gb/s signal is the most important issue to implement single- $\lambda$  50G-EPON.
- It looks natural that a modulation format of single- $\lambda$  50G-EPON will be selected among NRZ, ODB, EDB, DMT, and PAM4 as 100G-EPON TF did when TF selected the modulation format (NRZ) of 25G signal in O-band.
- O-band must be a good candidate for the wavelength plan of single- $\lambda$  50G-EPON due to less dispersion penalty of 50 Gb/s signal in all modulation format.
- However, current wavelength plan proposals for 100G-EPON occupied almost of O-band in order to allow low-cost and simple configured optical components such as TOSA, BOSA and passive filter.
- Therefore, there is not enough wavelength band in O-band for new single- $\lambda$  50G-EPON in O-band.

# Wavelength plan for single- $\lambda$ 50G-EPON

- In 2025, S-band and C-band (bandwidth :  $\sim 80$  nm) will be used for single- $\lambda$  50G-EPON because 1G-EPON will be no more used.
- 80 nm of bandwidth is wide enough to set two wavelengths for downstream and upstream signals and it makes easy to design BOSA.
- Major consideration when 50 Gb/s signals are transmitted in S-band or C-band is how they overcome dispersion penalty.
- Digital signal processing technology is a good candidate to overcome dispersion penalty. We expect that digital signal processing technology will be matured and be easy to adapt for PON optical modules after 2025.
  - Electrical dispersion compensation, electrical duo binary and coherent PON...

# Wavelength plan for single-λ 50G EPON



# Conclusions

- We discuss the wavelength plan for single- $\lambda$  50G-EPON in S-band and C-band considering future PON standardization and technical development status.
- We propose that O-band (1290 nm ~ 1360 nm) should be assigned for only 100G-EPON to make a simple wavelength plan and cost effective system.
- We expect that digital signal processing based PON which operates in S-band and C-band will be a candidate for a single- $\lambda$  50G-EPON after 2020.