



# Coexistence Dilemmas of 25GEPON & 2x25GEPON with Legacy PONs and Solutions



Eugene (Yuxin) Dai  
Cox Communications  
802.3ca 100G EPON TF, IEEE Plenary Meeting  
Chicago, March, 2018

# Background

- A motion passed (12) in the Nov. 2017 meeting that indicated a NEW US wavelength for third 25G

11/8/2017 4:24 PM

<b>Motion #12</b>		
2x25G -EPON shall WDM coexist with 10G-EPON, i.e., the second upstream channel (US1) in any 2x25G EPON shall not re-use one of the two options for 25G US0 (US0-B and US0-A).		
Moved: Ed Harstead	Second: Ed Walter	
For: 16	Against: 4	Abstain: 7
Technical ( $\geq 75\%$ ) Motion Passed		

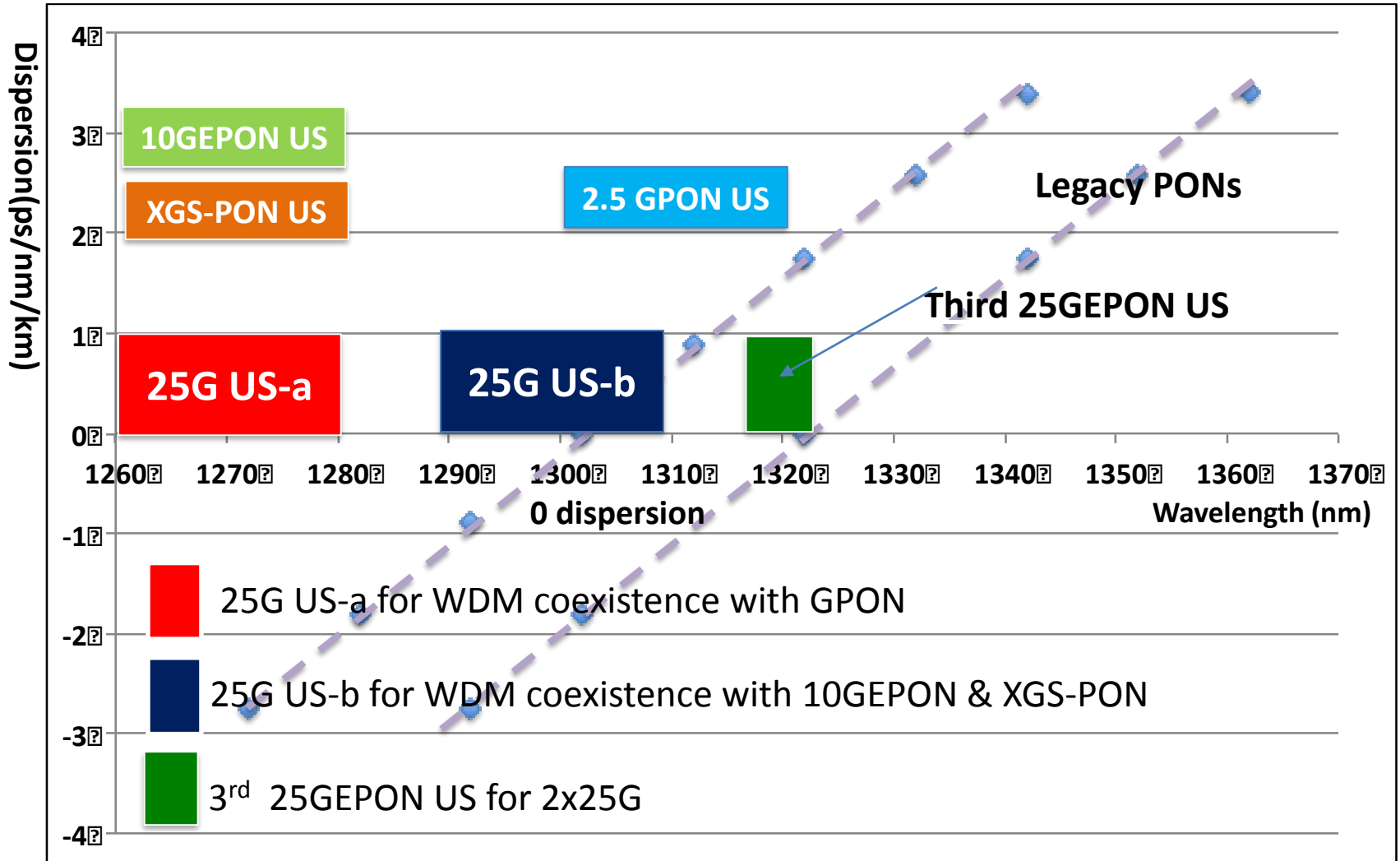
- A motion passed (15) in the Jan. 2018 meeting that defined this new 10GEPON US wavelength

<b>Motion #15</b>		
Adopt 1320±2nm as one of the upstream channels.		
Moved: John Johnson	Second: Daisuke Umeda	
For: 15	Against: 3	Abstain: 10
Technical ( $\geq 75\%$ ) Motion Passed		

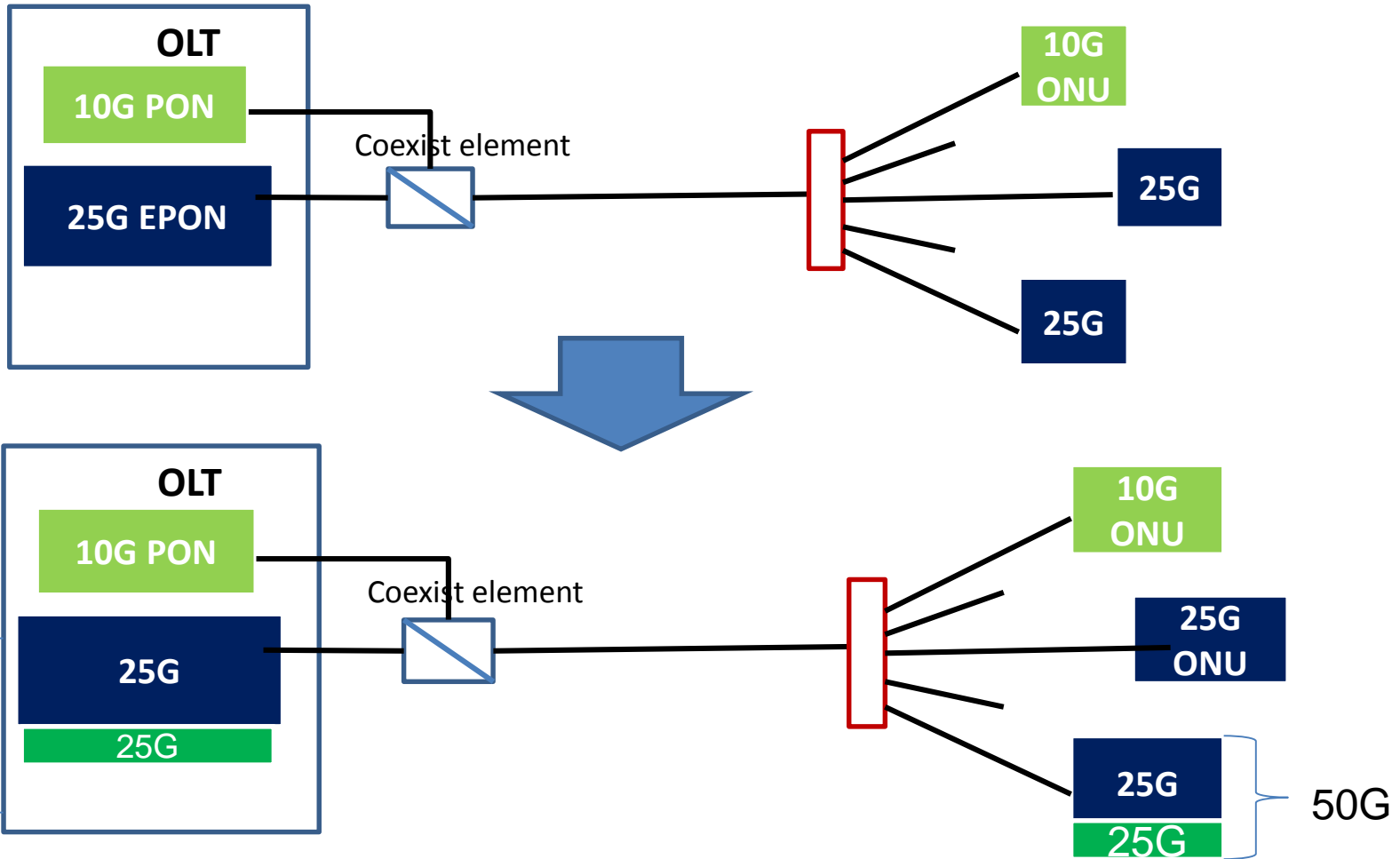
The Chair requested a Roll Call vote, the details of the roll call vote are recorded below.

The solution has negative impacts on 25G to 50G migration

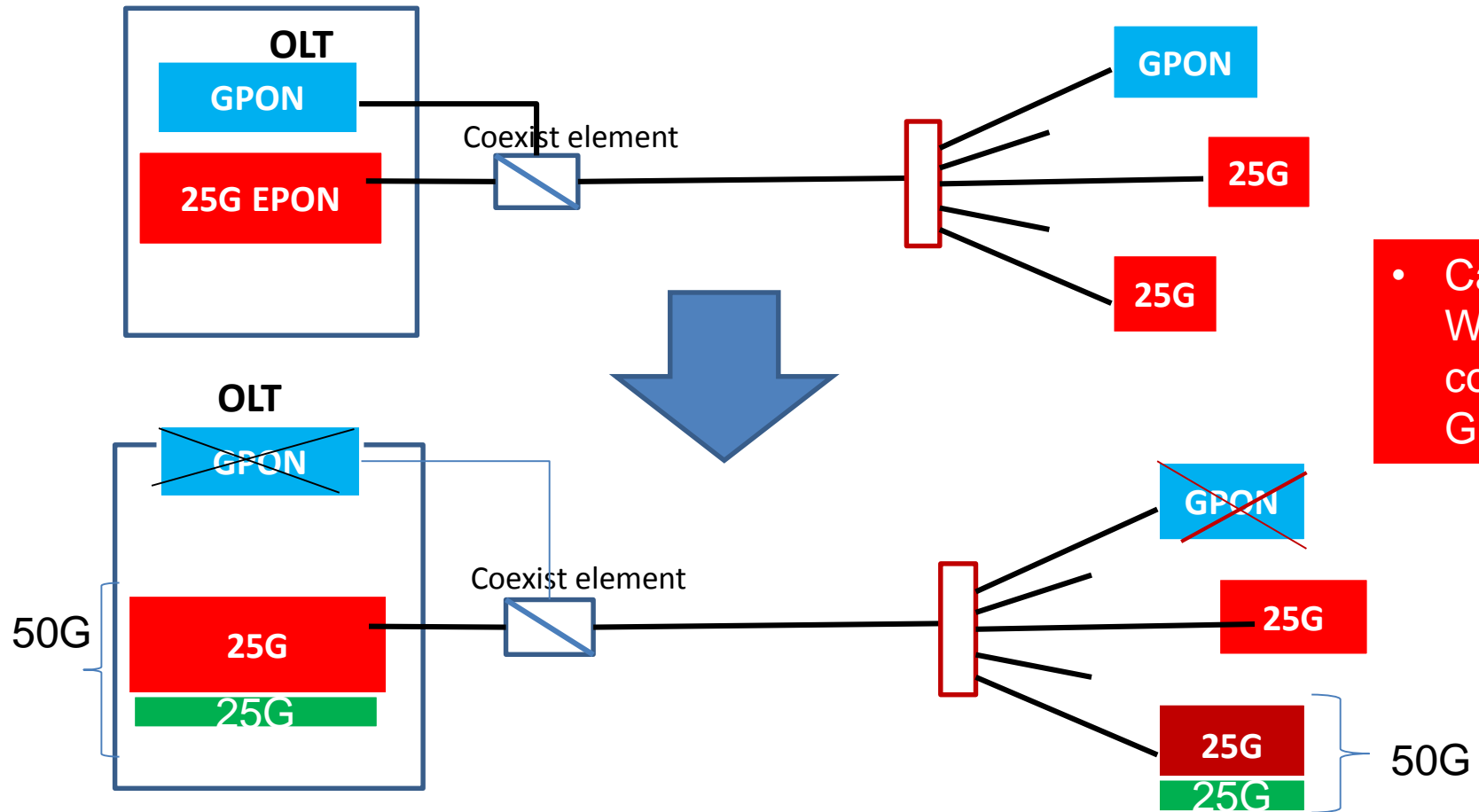
# Coexistence of 25GEPON/2x25GEPON with legacy PONs – What it looks like



# Migration of blue 25G to 2x25G (blue+green, from 10G PON coexistence)



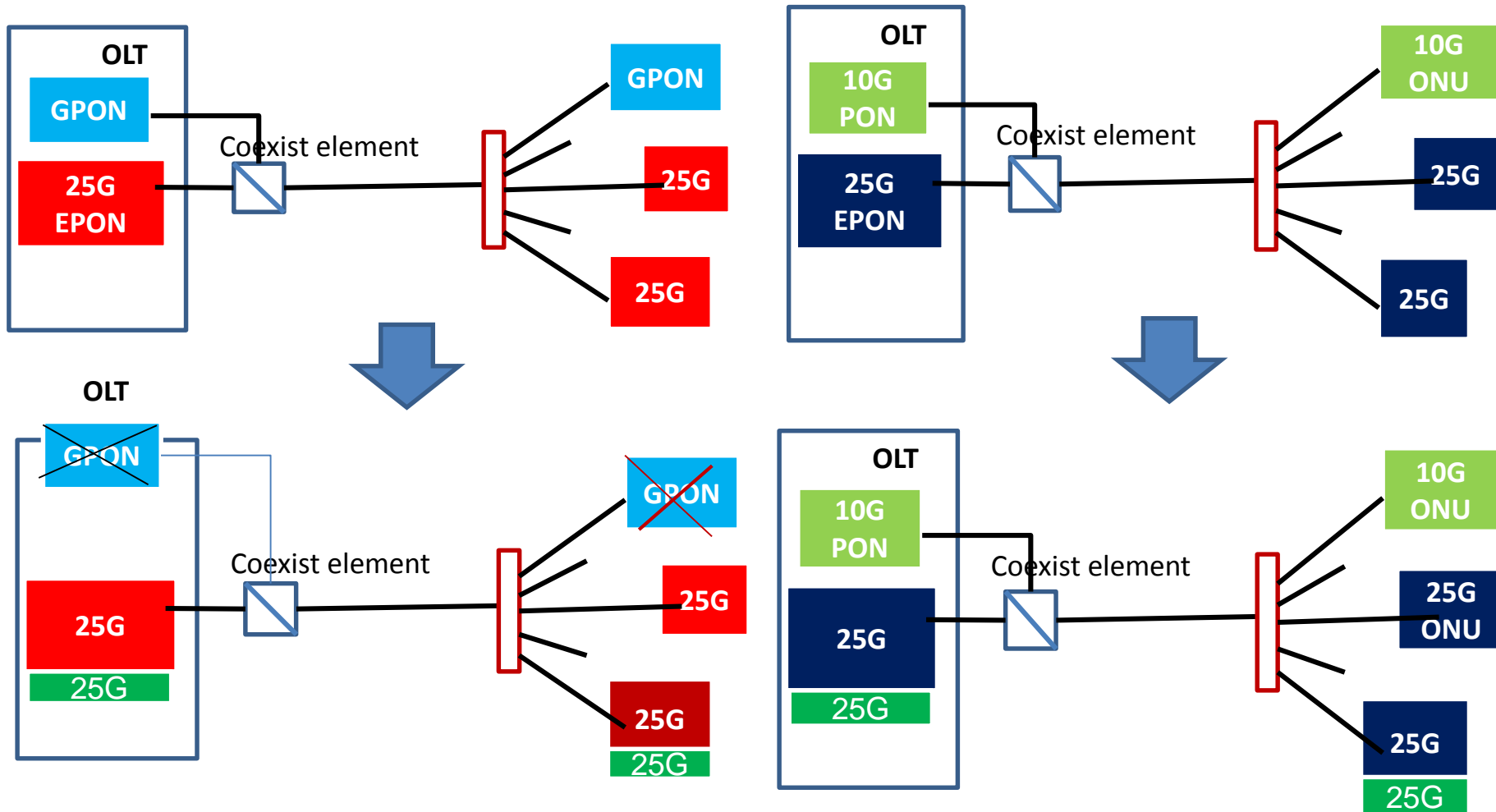
# Migration of red 25G to 2x25G (red+green, from GPON coexistence)



• Cannot WDM coexist with GPON

When migrates to 2x25G GPON has to be removed

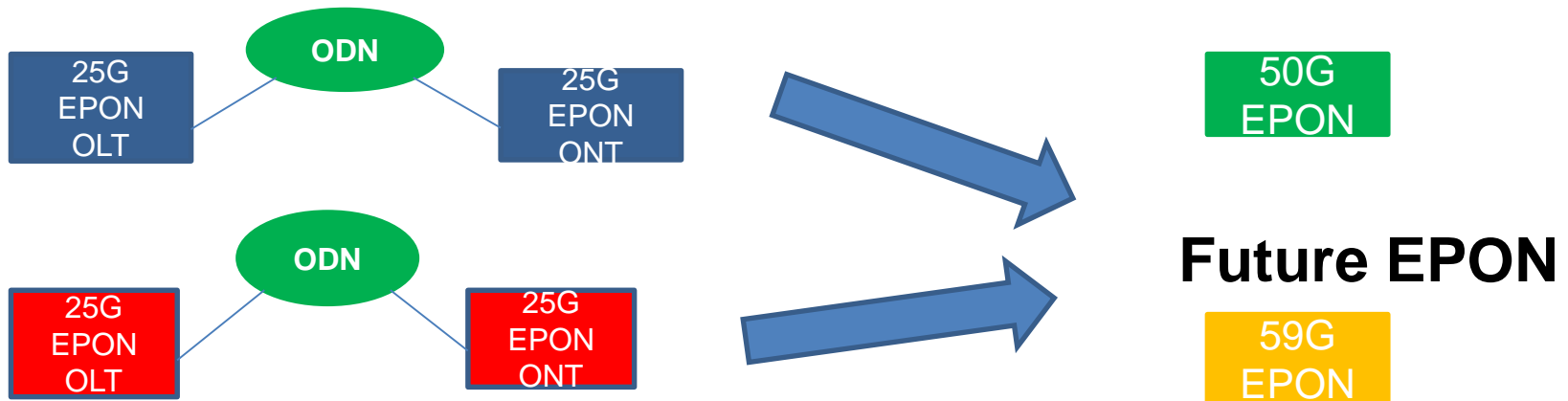
# End up with two types (colors) of 2x25G



Two types (colors) of 50G ONUs (with 2x25G) in the field

# When can we unify PON PMD?

- Operators deployed GPON and XGS-PON/XG-PON will end up with 2 types of 2x25G ONUs
- It will divide the market and increase operational cost by creating two 25G islands (dai\_3ca\_02a\_0917)

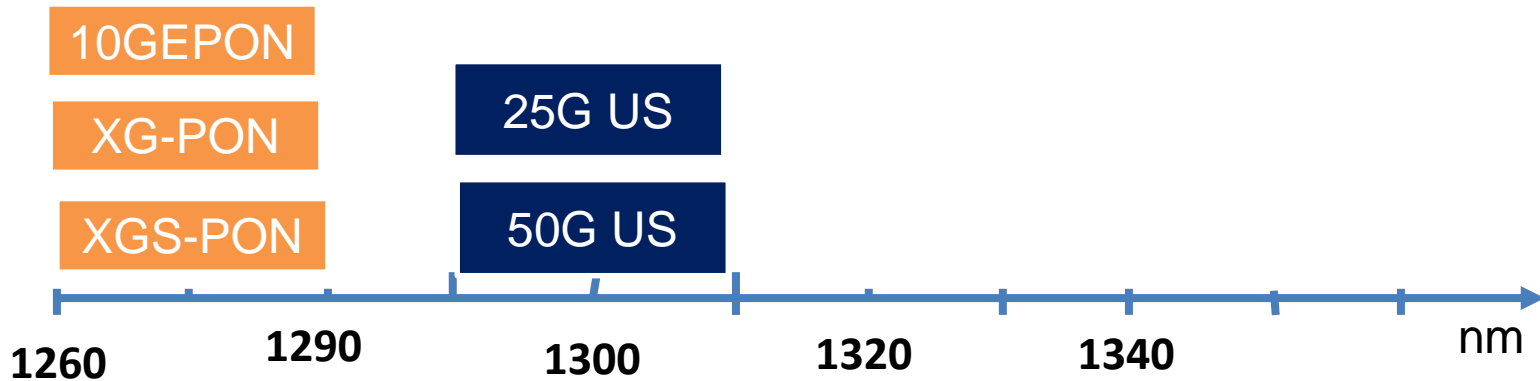


Blue and red 25G EPON islands (dai\_3ca\_02a\_0917) Two colored 50G?

- **Two colored 25GEPON.**
- **Two colored 50G with 2x25G.**
- **Two colored 100G? When can we have unified PMD?**

# Unify 50G PMD with single channel

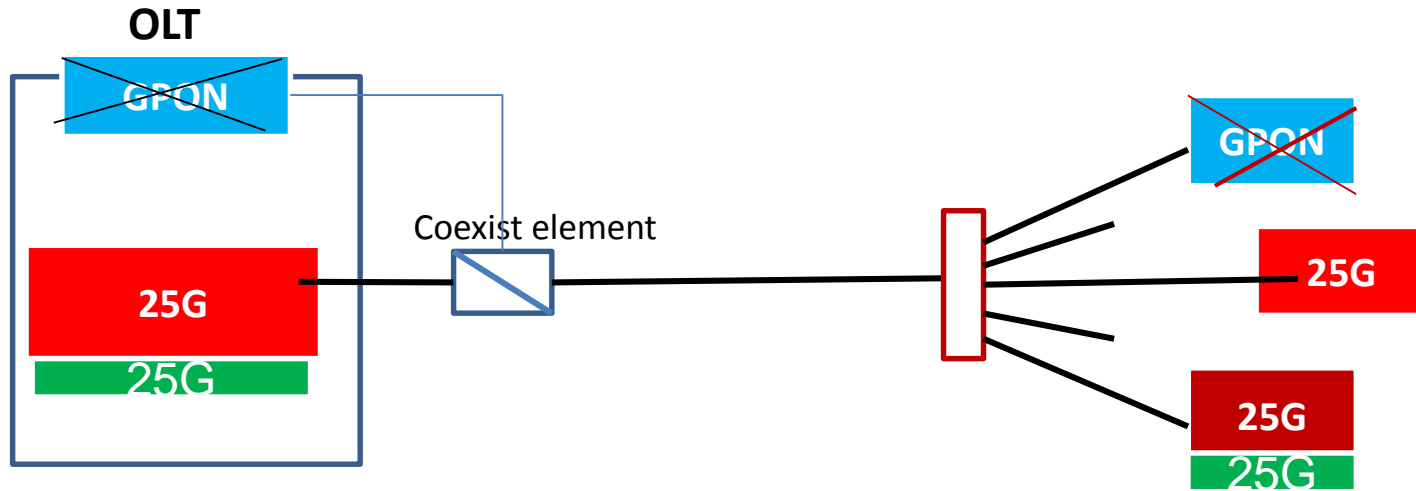
## Single channel 50G may solve the dilemma



- 50GEPON WDM coexist with XGS-PON/XG-PON, 10GEPON
- 10G to 50G is the preferred upgrade path (5X rate increase)
- Blue 25G can TDM coexist with 50G (same frame structure, feasible with dual rate RX), or directly migrating to 100G

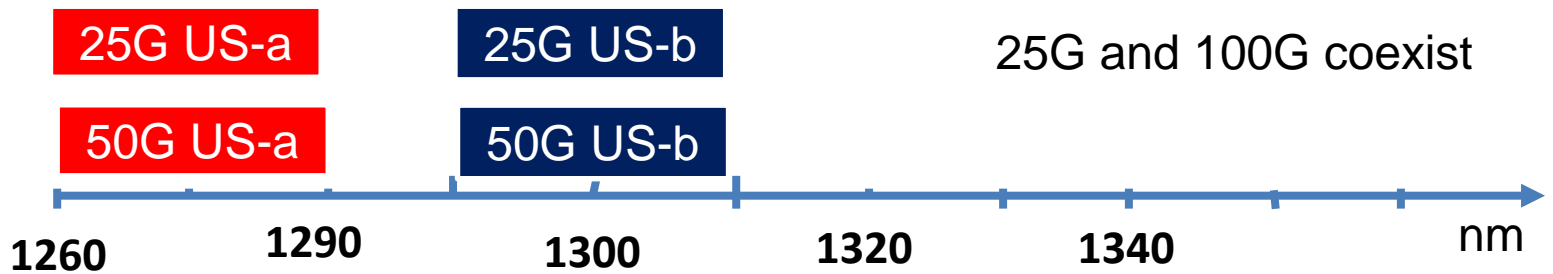
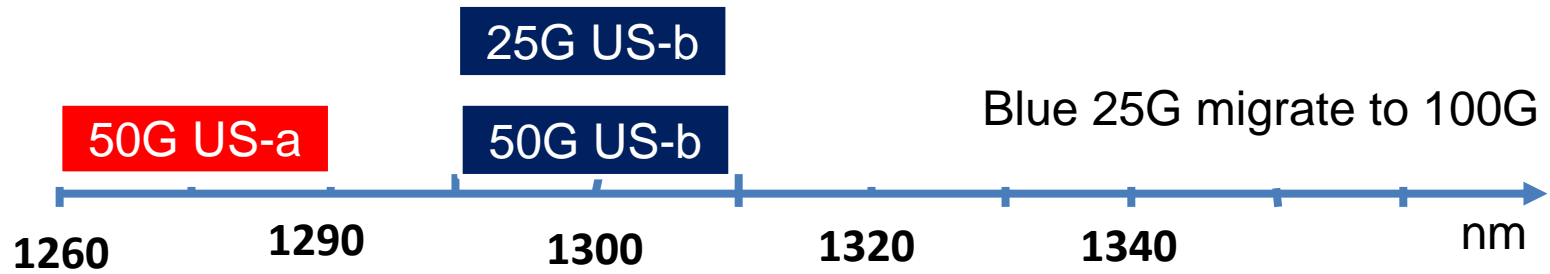
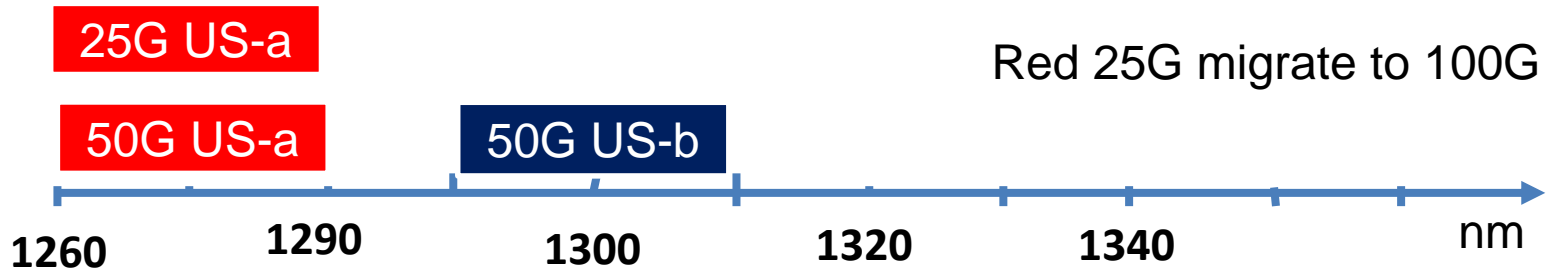


# The migration path for red 25G



- Red 25G will end up standalone
  - It does not coexist with XGS-PON, XG-PON
  - It does not coexist with GPON
- Red 25G directly migrates to 100G (4x rate increase)

# Unify 100G PMD



# Conclusions

## - unify PMD at 50G and 100G for PON

- Colored 25G islands don't propagate to 50G
- PON 50G PMD is unified – blue 50G US-b
- Red 50G does not stand alone; it is only appears in 2x50G configuration
- PON100G PMD is unified – 2x50G
- Entire solution reuse GPON and 10GPON upstream resources; no new spectra are needed
- Save other O band resource for future >100G PON
- A solution towards converged PON



Thanks

Eugene.dai@cox.com