

# **400Gb/s 8x50G PAM-4 WDM 2km SMF PMD Discussion**

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400 Gb/s Ethernet Task Force  
SMF Ad Hoc Conference Call  
9 June 2015  
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# Select References

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- May 2015: 8x50G PAM-4 WDM Baseline Specifications  
[http://www.ieee802.org/3/bs/public/15\\_05/cole\\_3bs\\_01a\\_0515.pdf](http://www.ieee802.org/3/bs/public/15_05/cole_3bs_01a_0515.pdf)
- 8x50G PAM-4 WDM adoption for the 10km reach SMF PDM objective  
[http://www.ieee802.org/3/bs/public/15\\_05/motions\\_3bs\\_01\\_0515.pdf#page=10](http://www.ieee802.org/3/bs/public/15_05/motions_3bs_01_0515.pdf#page=10)
- Sept. 2014: 8x50G WDM Technology background  
[http://www.ieee802.org/3/bs/public/14\\_09/stassar\\_3bs\\_01b\\_0914.pdf](http://www.ieee802.org/3/bs/public/14_09/stassar_3bs_01b_0914.pdf)
- BTI  
[http://www.ieee802.org/3/bs/public/15\\_01/big\\_ticket\\_items\\_3bs\\_01\\_0115.pdf#page=19](http://www.ieee802.org/3/bs/public/15_01/big_ticket_items_3bs_01_0115.pdf#page=19)

# Technical Feasibility Status

2km SMF PMD Component Technology Demonstrated?	8x50G PAM-4 WDM (per cole_3bs_01a_0515)		4x100G PAM-4 WDM (per lewis_3bs_01a_0515)	
	High Performance High Cost	High Volume Cost Effective	High Performance High Cost	High Volume Cost Effective
TX Optics	Yes	Yes	Yes	No
RX Optics	Yes	Yes	No	No
PMA I/O	Yes	Yes	Yes	No
PMA	Yes	Yes	No	No
Select Recent References	cole_3bs_02_0515, stassar_3bs_01_0515, mazzani et. al OFC'15 TH5B.3 healey_3bs_01a_1114		way_3bs_01_0515, conroy_3bs_01_0515, stassar_3bs_01a_1114 tanaka_3bs_01a_0515	

8x50 PAM-4 WDM is the only cost effective solution consistent with P802.3bs time frame and planned deployment of 400G networks

# Discussion

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- It has always been the case that after many years of technology development, faster rate optics become lower cost than lower rate optics.
- This will be the case for 4x100G WDM. When technically feasible, and after many years of component development, it will be lower cost than 8x50G WDM.
- In the meantime, industry needs cost effective 8x50G WDM solutions that can be developed with existing technology to meet 400G Network deployment needs.
- If 2km 8x50G PMD is not available, End Users will have to use more expensive 10km 8x50G PMD (lower optical margin) for majority of their applications even though these do not require the 10km loss budget.

# Recommendations

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- Adopt 2km 8x50G PAM-4 WDM in P802.3bs for the 2km SMF PMD objective to enable cost effective solution for majority of applications that do not need 10km link budget
- Develop 2km and 10km SMF PMD specifications to interoperate at 2km reach to enable common deployment, and economies of scale through shared component volume
- Continue R&D of 100G PAM-4 component technology, for adopted 500m PSM4 PMD, and future 4x WDM SMF PMD
- Propose 2km 4x100 PAM-4 WDM in a future 802.3 project when the component technology has sufficiently matured to enable long lasting standard and cost effective solution

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Thank you