“Full Duplex Operation” for 100GBASE-ZR

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Introduction

- There has been an expressed desire to maintain consistency with terminology between ITU-T and IEEE 802.3, where possible.
- There has been some discussion regarding “full duplex operation.” This presentation explores full duplex operation as specified for Ethernet operation as it relates to potential configurations for a DWDM system.
- IEEE 802.3 defines 100 Gigabit Ethernet for full duplex operation only (See 80.1.1).

80.1.1 Scope

This clause describes the general requirements for 40 Gigabit and 100 Gigabit Ethernet. 40 Gigabit Ethernet uses the IEEE 802.3 MAC sublayer operating at a data rate of 40 Gb/s, coupled with any IEEE 802.3 40GBASE Physical Layer implementation. 100 Gigabit Ethernet uses the IEEE 802.3 MAC sublayer operating at a data rate of 100 Gb/s, coupled with any IEEE 802.3 100GBASE Physical Layer implementation. 40 Gb/s and 100 Gb/s Physical Layer entities, such as those specified in Table 80–1, provide a bit error ratio (BER) better than or equal to 10^{-12} at the MAC/PLS service interface.

40 Gigabit and 100 Gigabit Ethernet is defined for full duplex operation only.

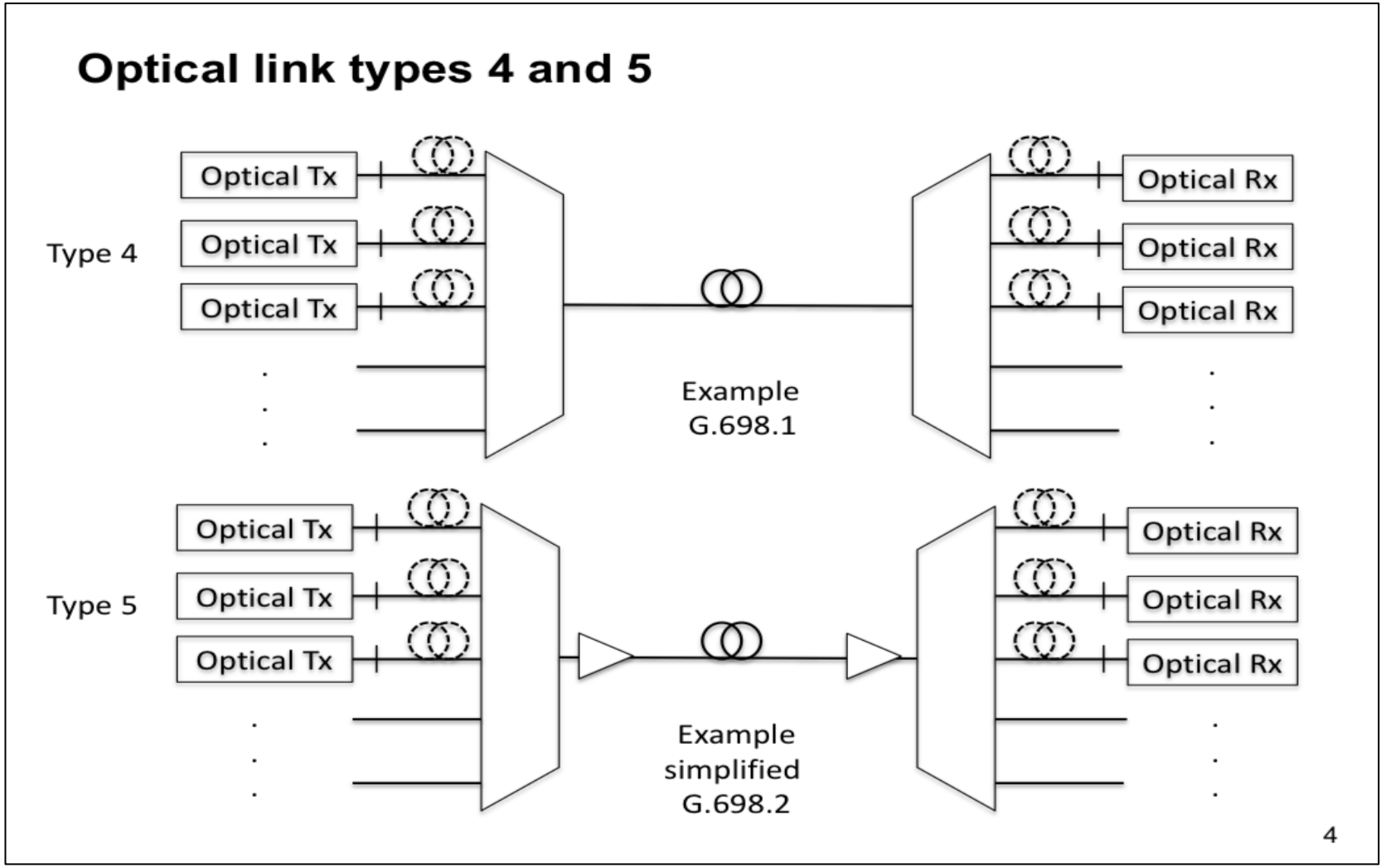
802.3 “Full-duplex” Definition

- Subclause 1.4.276 defines 'full duplex’ as:

  A mode of operation of a network, DTE, or Medium Attachment Unit (MAU) that supports duplex transmission as defined in IEEE 100. Within the scope of this standard, this mode of operation allows ***for simultaneous communication between a pair of stations***, provided that the Physical Layer is capable of supporting simultaneous transmission and reception without interference. (See IEEE Std 802.3.)

Full Duplex Operation in ITU-T G.698.2?

- "Full duplex" is not defined in G.698.2.
- The recommendation includes unidirectional DWDM applications at 100 Gb/s.
- Recommendation mentions bidirectional applications (See 5.2.2) and discusses propagation of signals in both directions on a single fiber.
- The emphasis of G.698.2 appears to be at the optical level.



http://www.ieee802.org/3/B10K/public/18_01/anslow_b10k_01_0118.pdf

IEEE P802.3ct D3.0

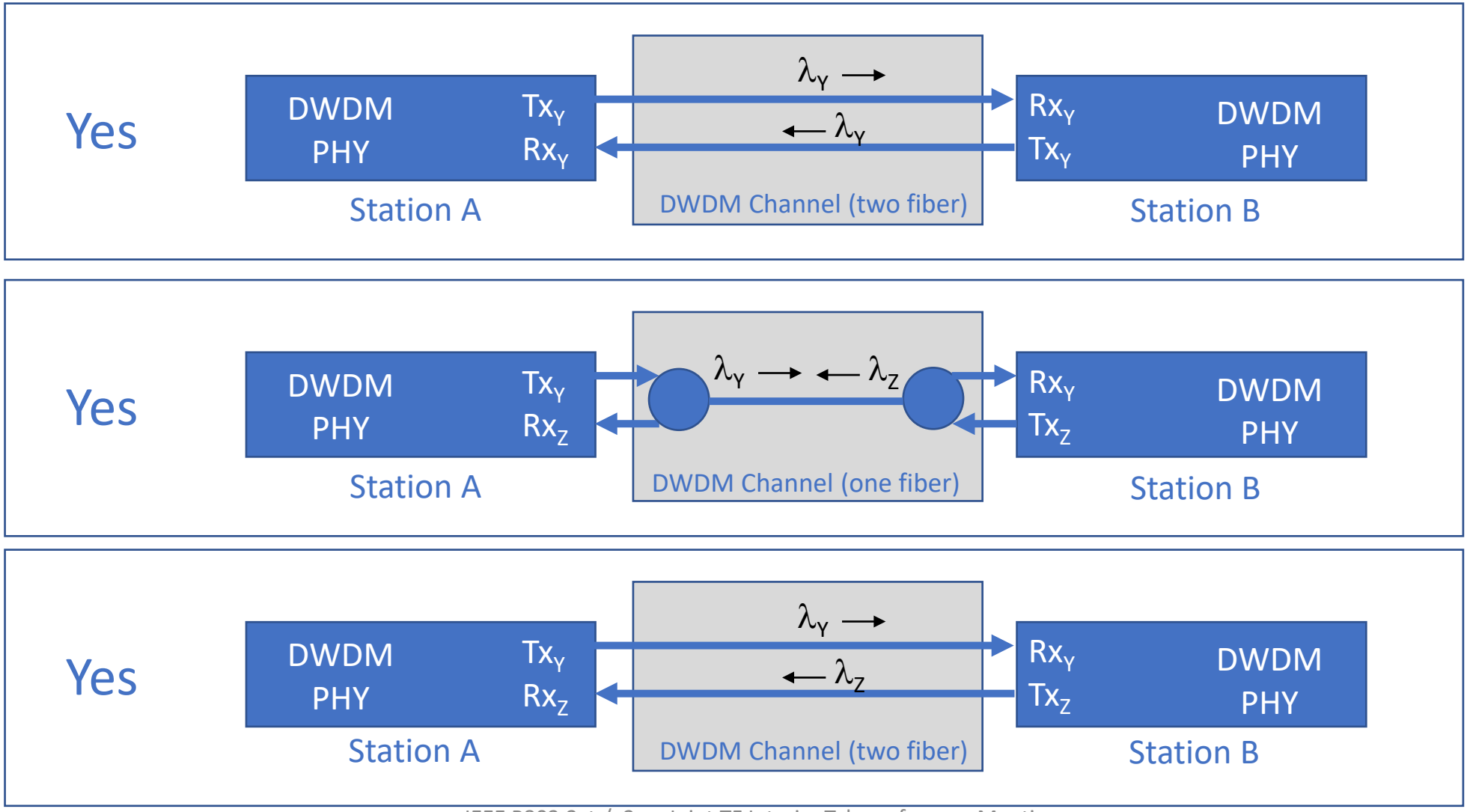
- Per P802.3ct D3.0
  - **1.4.237d DWDM system**: An aggregate of DWDM links optically multiplexed and demultiplexed onto and off either a single optical fiber or a single optical fiber per direction.
- 802.3ct provides for the ability for the transmit and receive wavelengths of the DWDM PHY to be configured independently.

Table 45–102o—Rx optical channel control register bit definitions

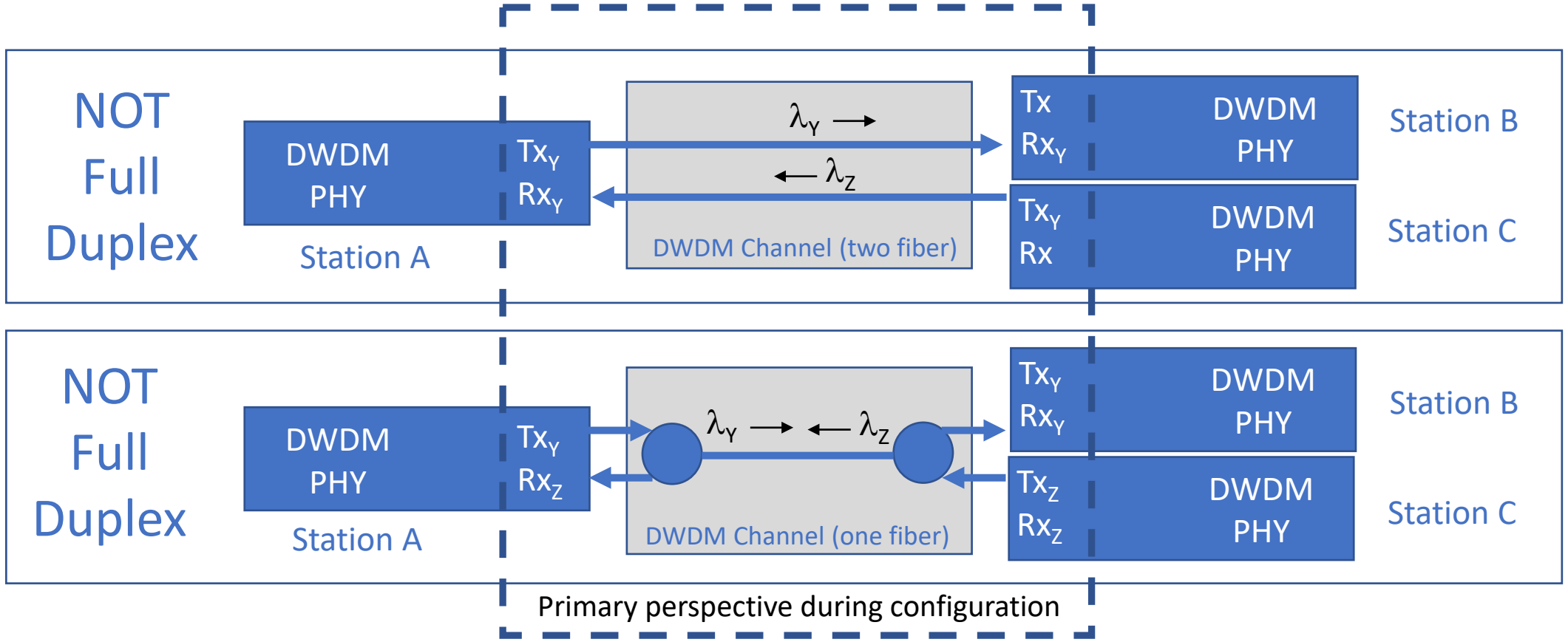
Bit(s)	Name	Description	R/W[a]
1.820.15	Tx Rx different optical channel ability	1 = PMD is able to operate with different Tx and Rx optical channels 0 = PMD is not able to operate with different Tx and Rx optical channels	RO
1.820.14:6	Reserved	Value always 0	RO
1.820.5:0	Rx optical channel index	Integer value of the Rx optical channel index	R/W

[a]R/W = Read/Write, RO = Read only

Use cases supported by 802.3ct/3cw, i.e. support Ethernet Full Duplex Operation



Other Possible Configurations



Not examples of full duplex operation as specified for 802.3 Ethernet (See Slide #3)

Summary

- IEEE 802.3 defines 100 Gigabit Ethernet for full duplex operation only (See 80.1.1).
- The use cases shown on Slide 6 are examples of full duplex operation as specified by IEEE P802.3ct for 100GBASE-ZR.