Spectral Isolation parameters for 802.3cw DWDM Black Link

Eric Maniloff - Ciena

IEEE P802.3cw

May 23, 2022

Background

The issues associated with inter-channel crosstalk definitions are detailed in:

https://www.ieee802.org/3/cw/public/adhoc/21_0201/maniloff_3cw_01a_210201.pdf

The approach to defining the black link spectral definitions currently in 802.3cw was presented in:

https://www.ieee802.org/3/cw/public/tf_interim/21_0429/maniloff_3cw_01a_210429.pdf

This presentation briefly summarizes the approach used in 802.3cw, and provides values for adjacent channel spectral isolation

Methodology overview

- The following will be defined in 802.3cw:
  - Transmit Spectral mask Max and Min
  - DWDM channel passband
  - DWDM black link adjacent channel spectral attenuation
- Details of the methodology are provided in the contributions referenced

DWDM Channel Passband

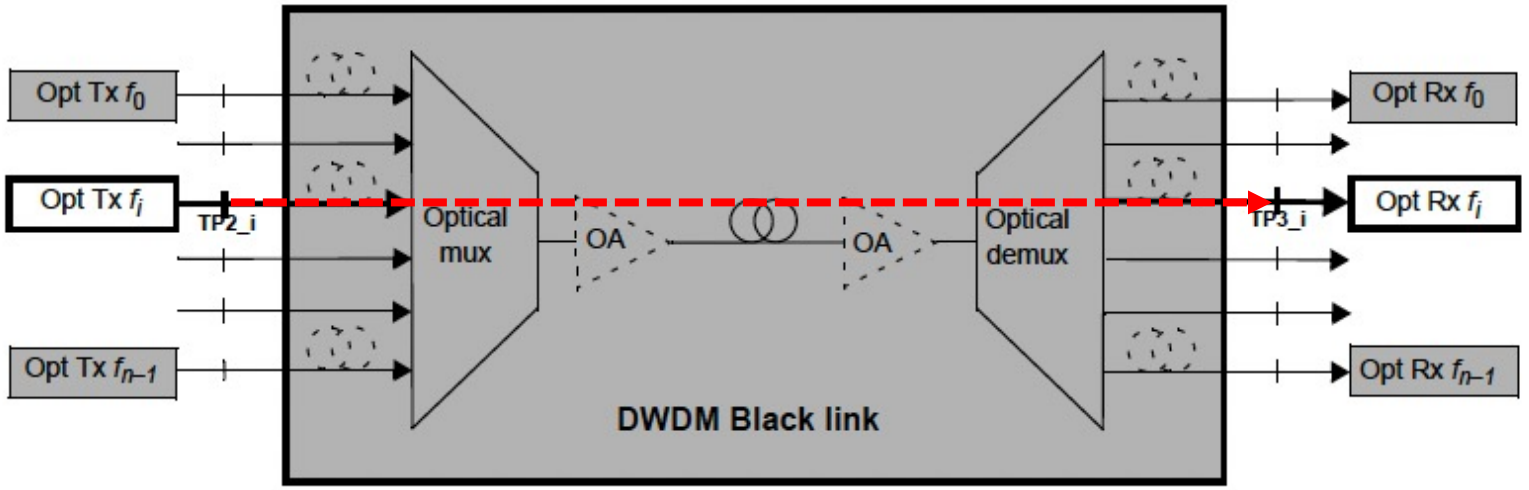


Figure 156–3—Black link example configuration for specifying *n* DWDM channels

The DWDM channel passband (TP2_i to TP3_i) can be calculated based on mux and demux filter assumptions

- Filter Bandwidths, roll-offs, and frequency offsets can be defined to calculate a spectral mask for the signal channel

DWDM channel Passband: Recommended parameters

- DWDM channel passband width is specified to the center of the channel f_0
- The following parameters for Mux & Demux have been used in 802.3cw D1.5 to derive the DWDM channel passband:
  - BW min = 70GHz
  - BW max = 76GHz
  - Filter order = 3
  - |Center frequency variation| ≤ 4 GHz

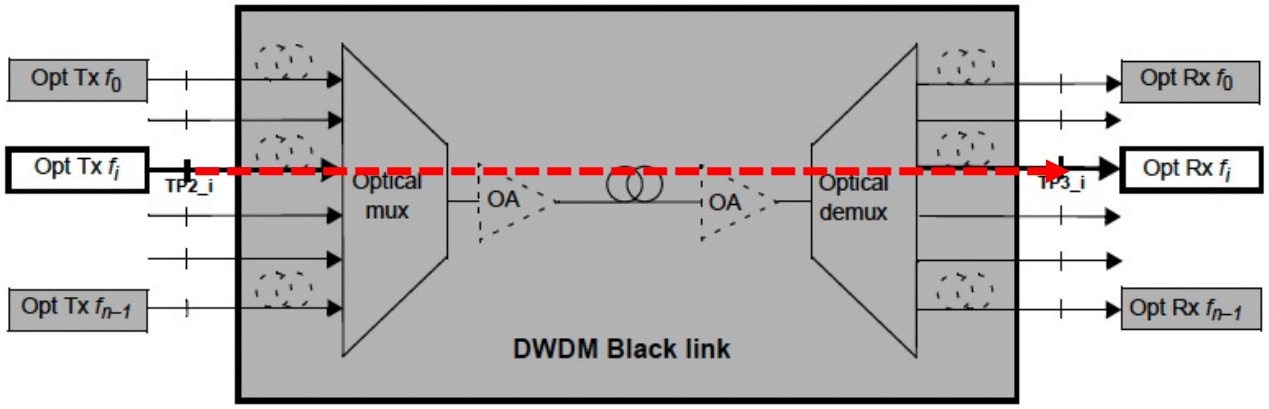


Figure 156–3—Black link example configuration for specifying *n* DWDM channels

Adjacent channel isolation specification

- Filter parameters are used to calculate the adjacent channel isolation in a black link approach
- The following parameters for Mux & Demux are used to derive the DWDM black link adjacent channel spectral attenuation:
  - BW max = 76GHz
  - Filter order = 3
  - |Center frequency variation| ≤ 4 GHz
  - Insertion loss variation ≤ 1.5dB
  - Adjacent channel floor = -30dB

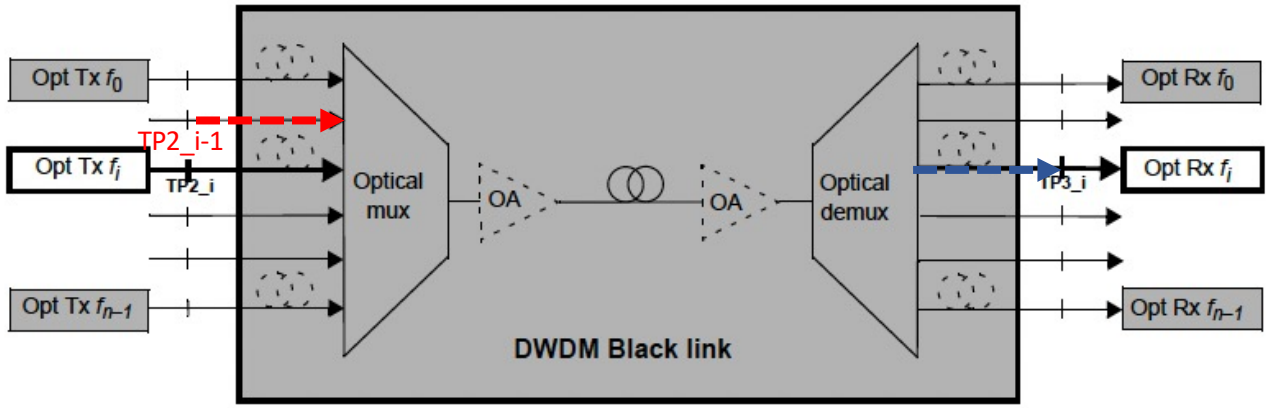
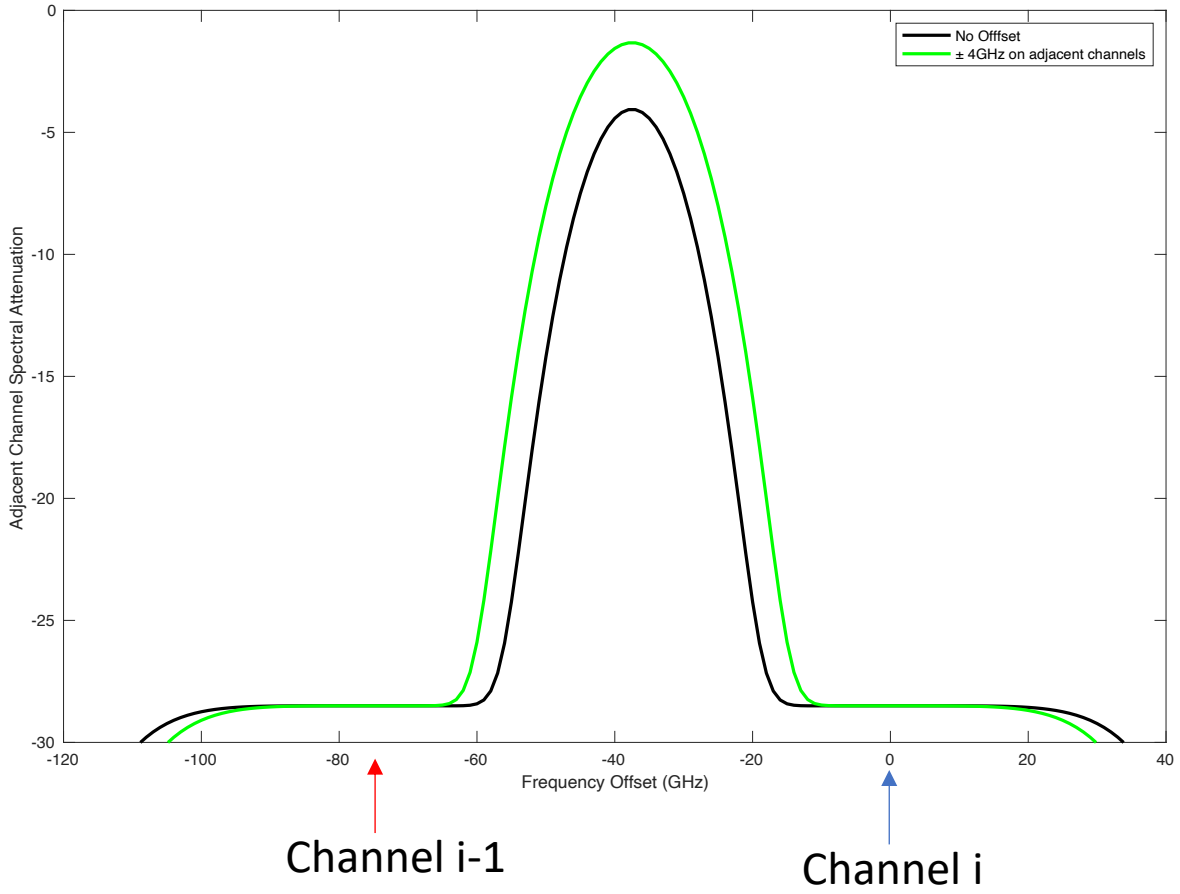


Figure 156–3—Black link example configuration for specifying *n* DWDM channels

Adjacent Channel Isolation



- Spectral Isolation from TP2_i-1 to TP3_i: The Green curve shows the worst case for adjacent channel spectral isolation based on slide 6 parameters

Specification for adjacent channel attenuation

- Specification values:
  - The spectral attenuation from an adjacent channel frequency divided by the attenuation at the center frequency of a signal channel will be less than the values presented in the table at the right
- The TBD values in Table 156-9 in 802.3cwD1p5 should be replaced by these values

Frequency Offset	Isolation (dB)
0	-28.5
±15	-25.9
±20	-15.9
±25	-8.0
±30	-3.5
±35	-1.6
±40	-1.6
±45	-3.5
±50	-8.0
±55	-15.9
±60	-25.9
±65	-28.5
±70	-28.5
±75	-28.5

Summary

- The approach for defining black link spectral parameters used in P802.3cw was reviewed

- The values on Slide 8 should be used to specify adjacent channel isolation in 802.3cw

Thanks!