FEC codeword filling performance

Pete Anslow, Ciena

IEEE P802.3bs Task Force, Logic Ad Hoc, 23 October 2015

Introduction

The method for filling the two codewords that are interleaved to form the 400GbE PCS lanes remains open.

It is assumed that the PCS lanes are formed using either of option 8 or option 8a from anslow_3bs_03_0915 with the worst case skew as shown on the next two pages.

This document evaluates the FEC performance difference between serial and parallel filling of the two FEC codewords.

8. Pre-interleaved from 2 codewords

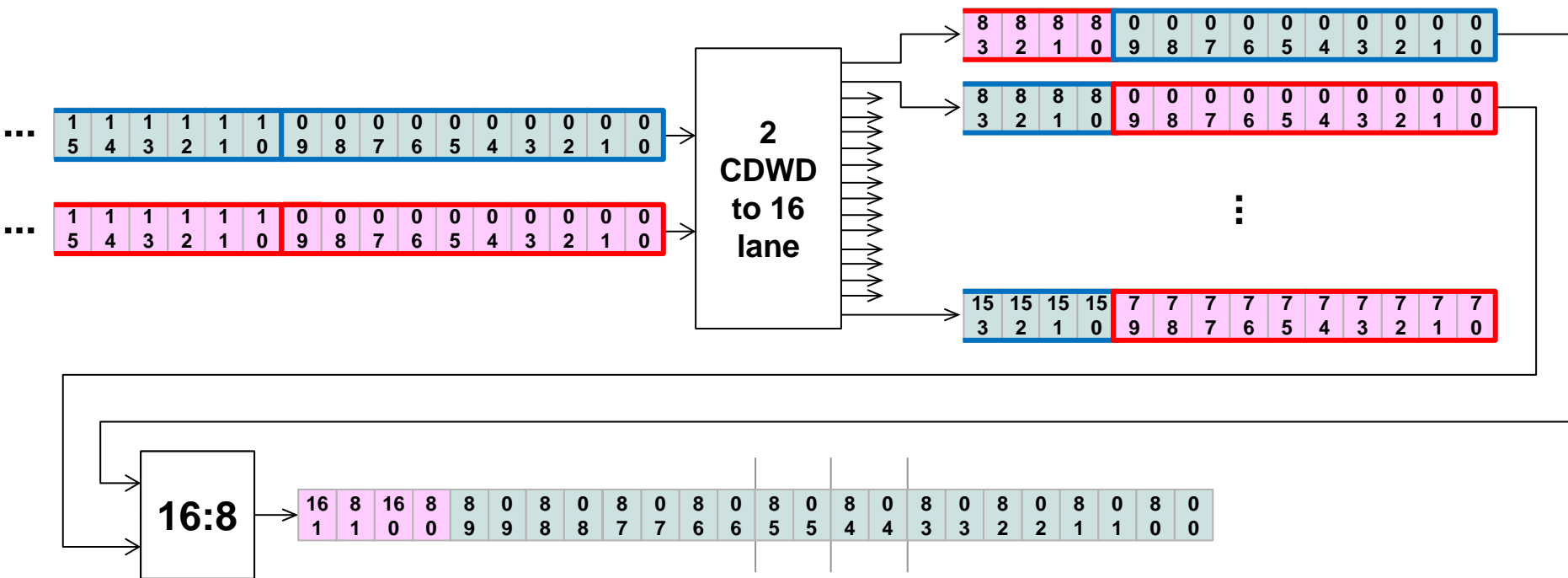Symbol interleave from 2 FEC codewords. Bit multiplex in the PMA.
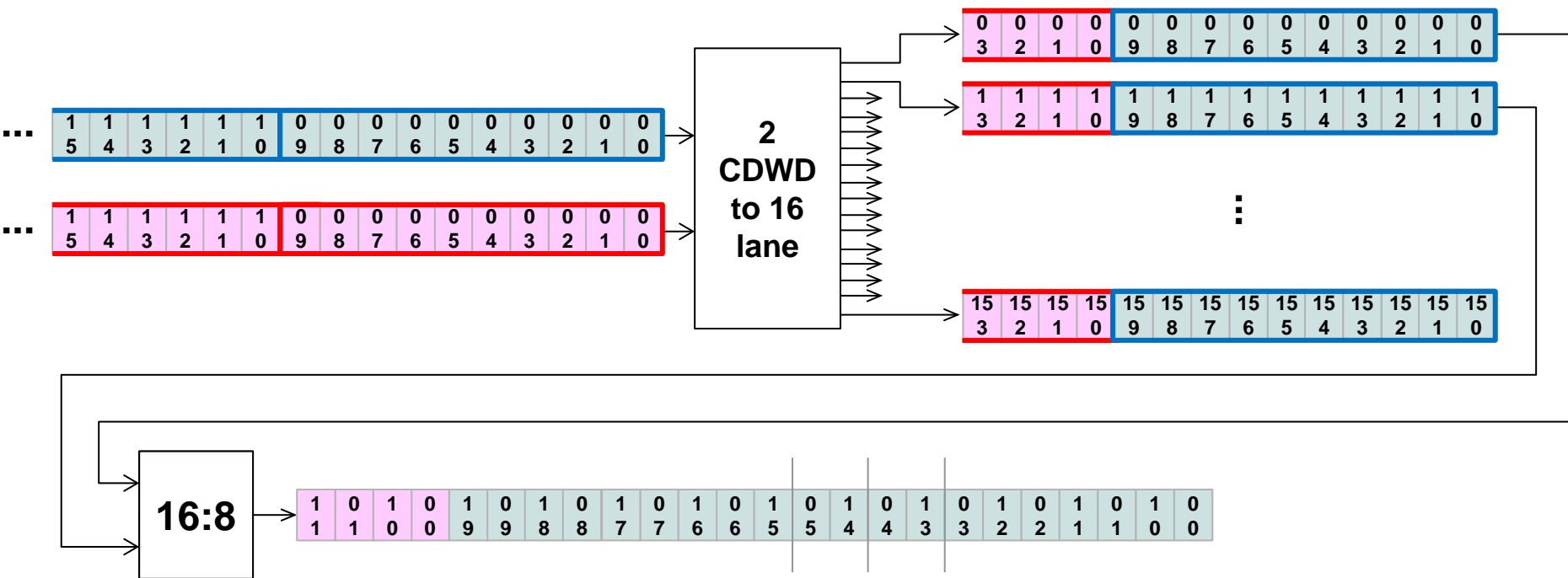
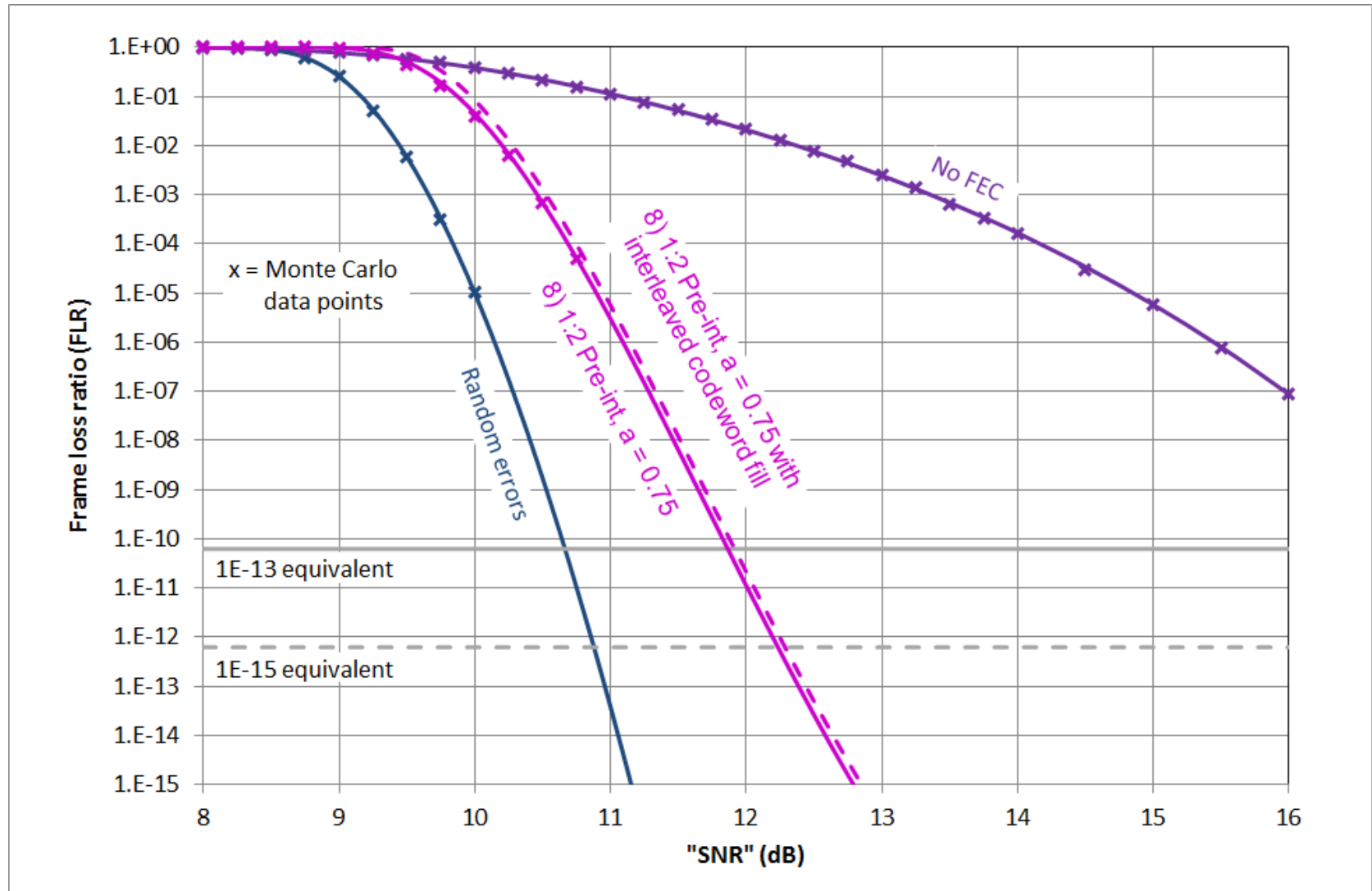Worst case with no skew.

8a. Pre-interleaved from 2 codewords

Option B from bliss_3bs_01_0915
Symbol interleave from 2 FEC codewords. Bit multiplex in the PMA.

Worst case with 10-bit skew.

RS(544,514) Option 8 pre-interleaved results

Results for RS(544,514) 50G, all gain used for PAM4

For reference, if all of the coding gain were to be used for the 50G PAM4 link, the BERs at the FEC input required to give FLRs equivalent to that of a BER of 1E-13 and 1E-15 are:

	At FEC input	
	FLR = 6.2E-11	FLR = 6.2E-13
No FEC	1E-13	1E-15
1:2 Pre-interleaved (8), a=0.75, parallel fill	1.6E-4*	7.8E-5*
1:2 Pre-interleaved (8), a=0.75, serial fill	1.8E-4*	8.6E-5*
Random errors	3.2E-4	2.3E-4

Note – these values are the BER **including** the additional errors due to the bursts. To account for burst errors, the values marked with "*" have been multiplied by 4 when a = 0.75.

Multi-part link results

The BER of the electrical sub-links for a penalty of ~0.1 dB optical in the optical sub-link are shown in the table below.

	At slicer output for FLR = 6.2E-11			
	Total electrical		Optical	
1:2 Pre-interleaved (8), a=0.75, parallel fill	Burst	2.7E-5*	Random	2.4E-4
1:2 Pre-interleaved (8), a=0.75, serial fill	Burst	3.5E-5*	Random	2.4E-4
Random errors	Random	8.2E-5	Random	2.4E-4

Note – these values are the BER **including** the additional errors due to the bursts. To account for burst errors, the values marked with "*" have been multiplied by 4 when a = 0.75.

Thanks!