Properties of interleaved PRBS31

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Introduction

Comment 75 against D 2.2 caused the offsets between the various PRBS31 sequences generated by the PMA to be modified as:

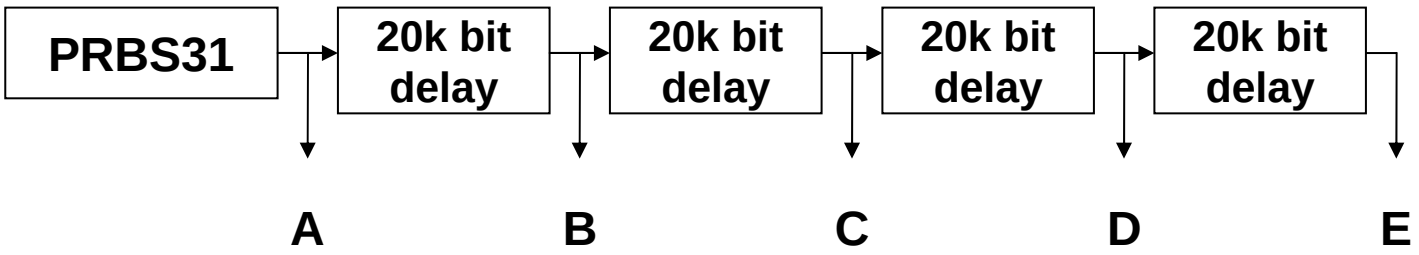
"To avoid correlated crosstalk, it is highly recommended that the PRBS31 patterns generated on each lane be generated from independent, random seeds or at a minimum offset of 20 000 UI between the PRBS31 sequence on any lane and any other lane."

Comment 54 against draft 2.3 proposes to change this to:

"To avoid correlated crosstalk, it is highly recommended that the PRBS31 patterns generated on each PCS lane be generated from independent, random seeds or at a minimum offset of 20 000 UI between the PRBS31 sequence on any PCS lane and any other PCS lane."

This contribution analyses the properties of five PRBS31 bit streams separated by 20,000 bits after they have been bit interleaved by a 10:4 gearbox.

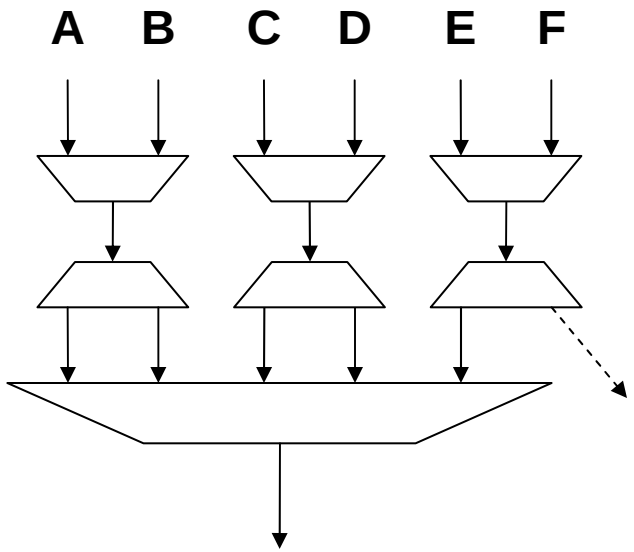
Bit stream



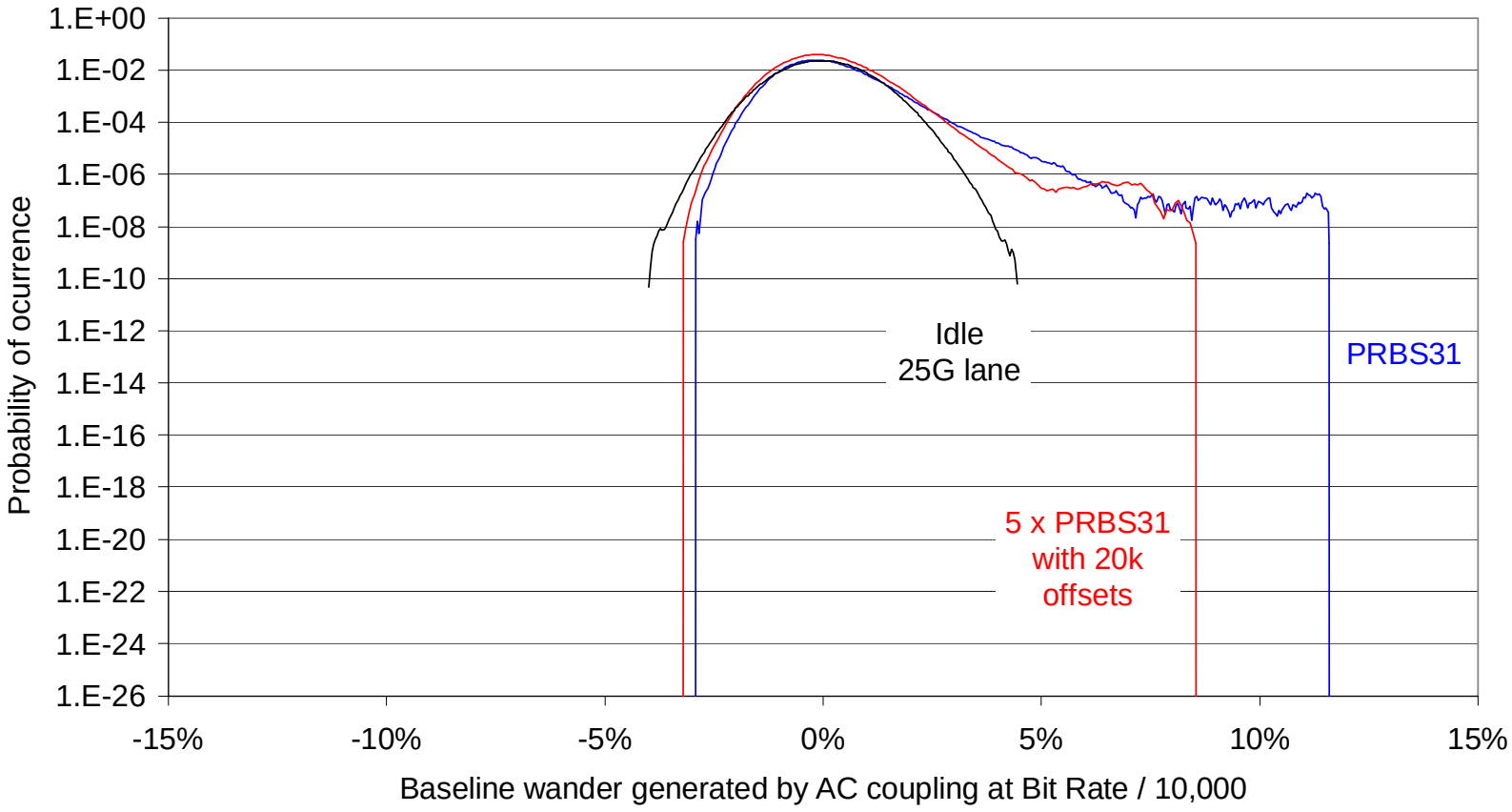
Simulated sequence:

ABCDE ABCDE …

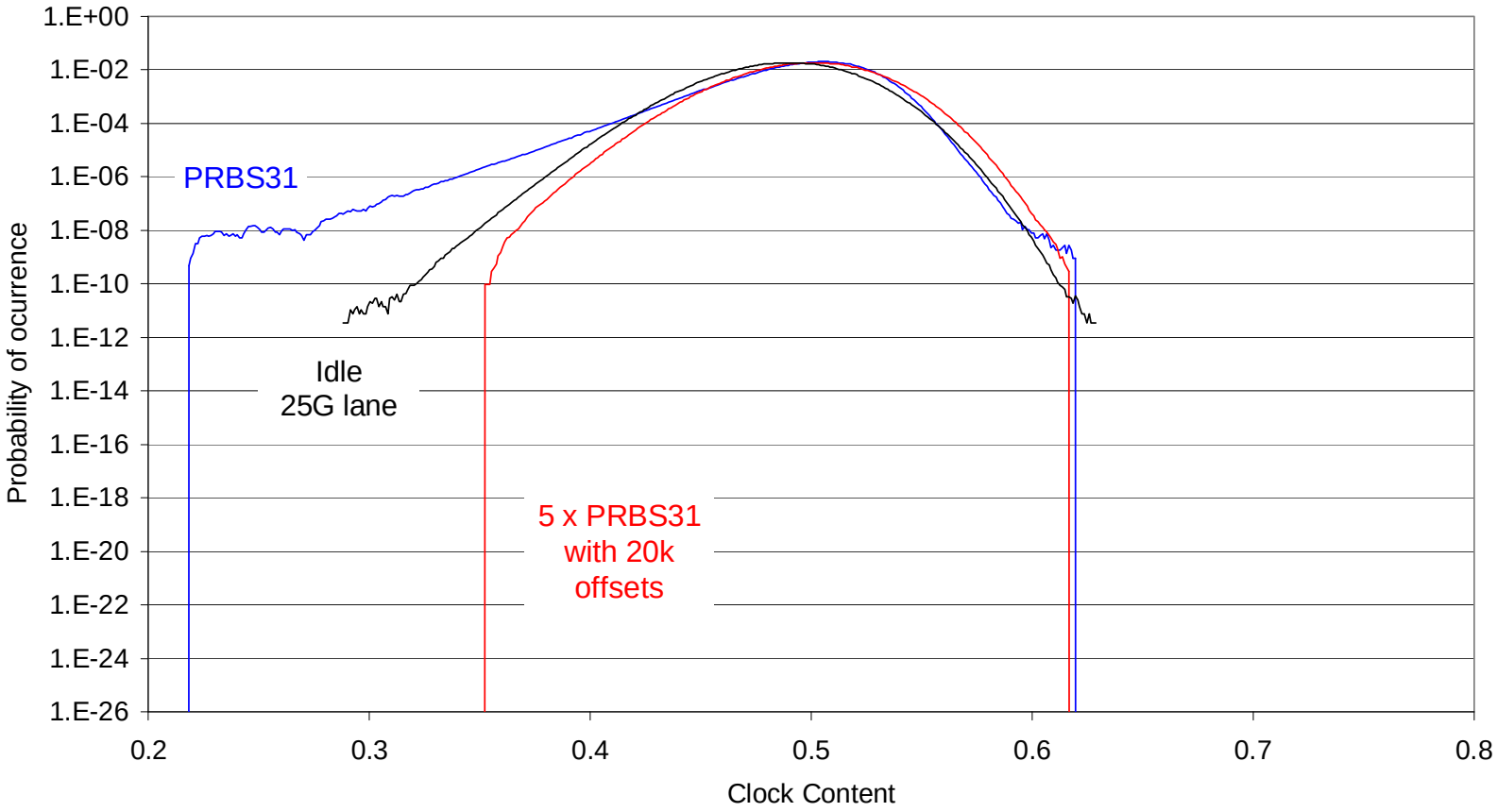
Equivalent to mux structure below:



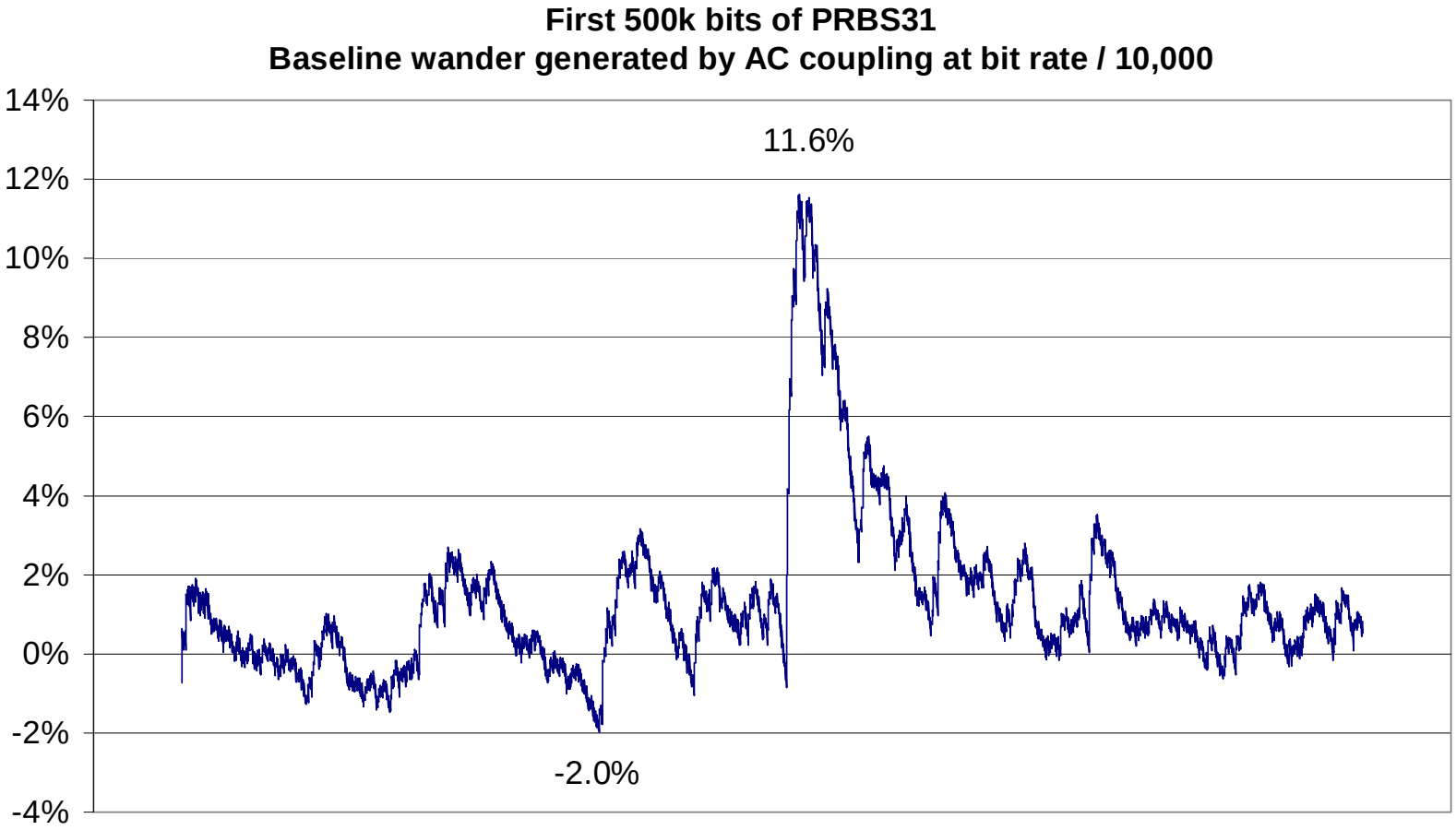
Baseline wander



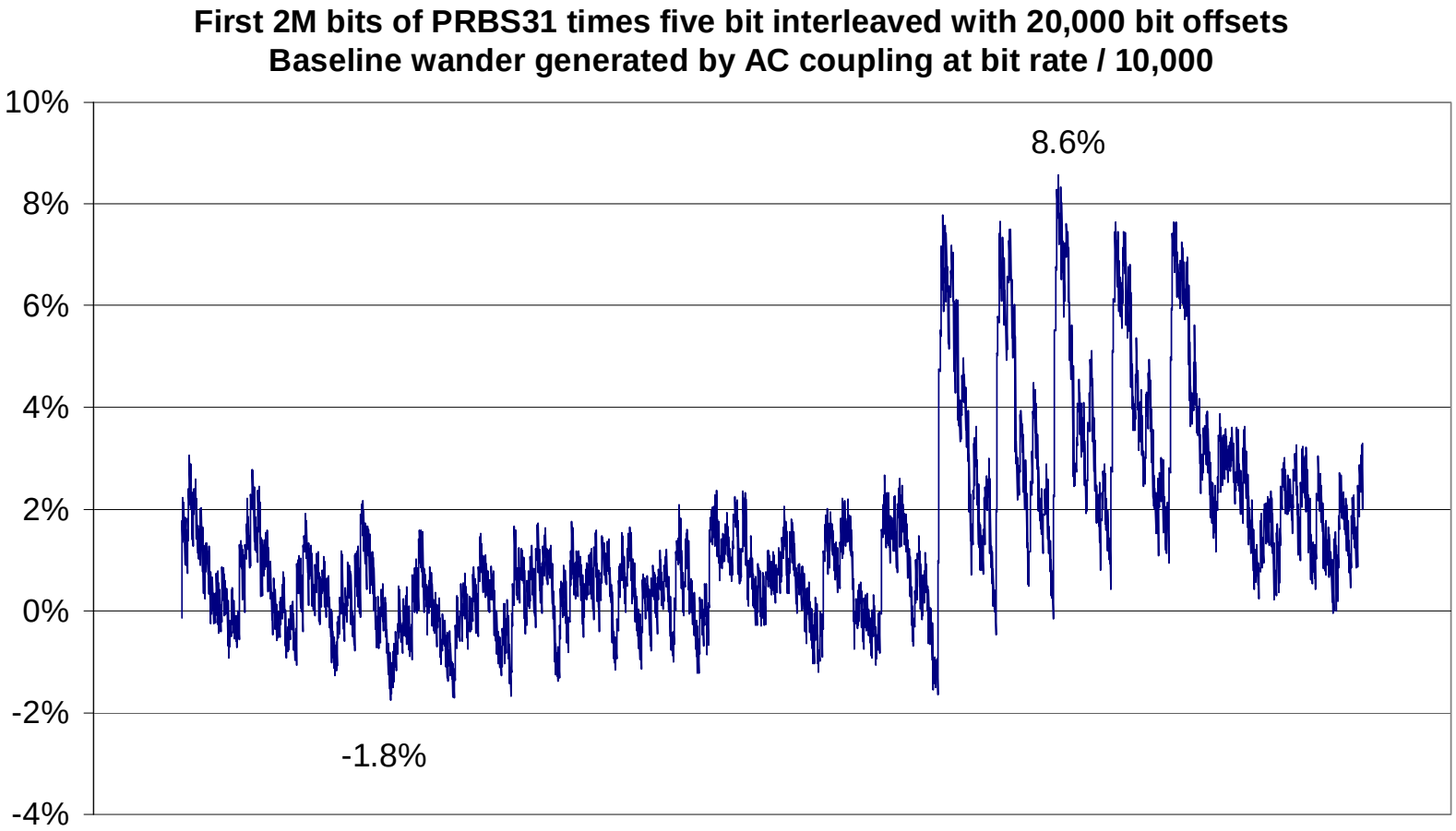
Clock content



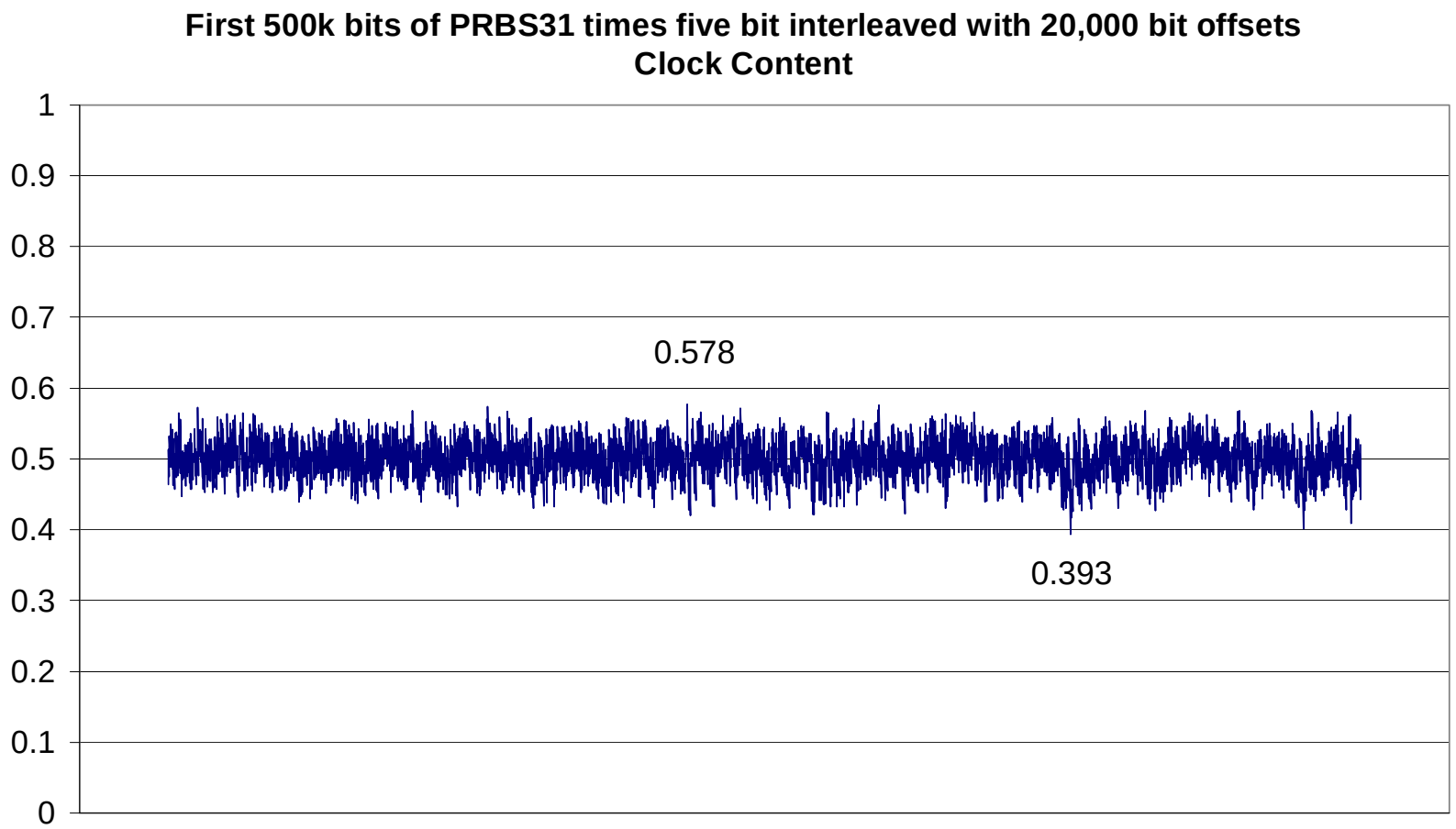
Baseline wander of PRBS31



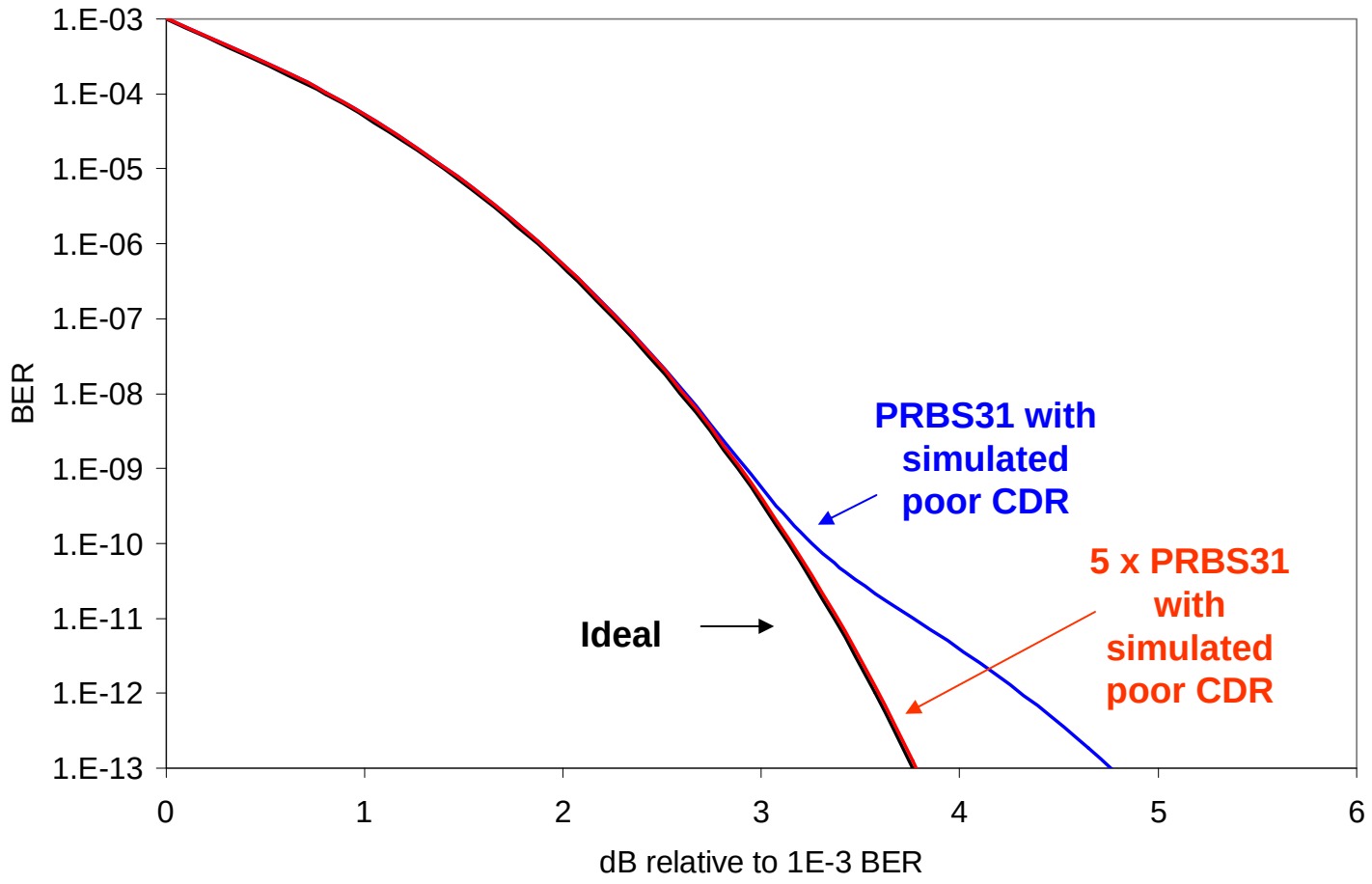
Baseline wander of interleaved PRBS31



Clock content of interleaved PRBS31



BER curves for PRBS31 and 5 x PRBS31



Conclusion

The baseline wander of five PRBS31 bit streams separated by 20,000 bits after they have been bit interleaved by a 10:4 gearbox is somewhat less stressful than the baseline wander of a serial PRBS31 but is still more stressful than a 25G lane of scrambled idle.

The clock content of five PRBS31 bit streams separated by 20,000 bits after they have been bit interleaved by a 10:4 gearbox is much less stressful than either the clock content of a serial PRBS31 or a 25G lane of scrambled idle. It is also less stressful than a long period of random binary (see slide 7 of anslow_01_1108).

Thanks!