

300 meters on installed MMF

Part IV: Coding Gain

Jaime E. Kardontchik

Stefan Wurster

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email: kardontchik.jaime@microlinear.com

Coding Gain Estimation

Long simulations were run to estimate the actual coding gain using the present implementation.

The results shown below are only preliminary. More work must be done.

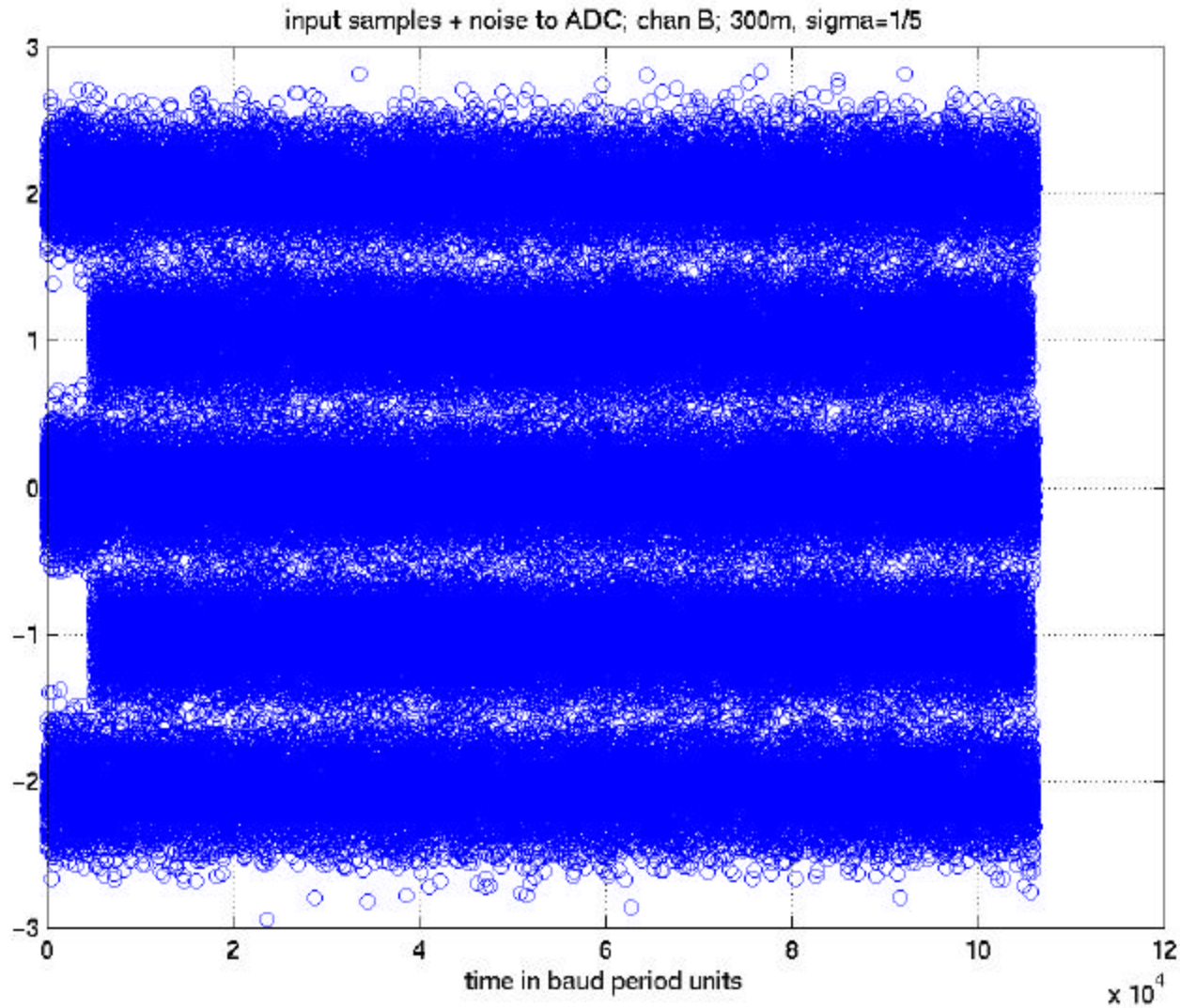
Long BER simulations at 300m

☞ Simulation conditions:

- laser risetime = 0.26 psec
- fiber bandwidth = 400 MHz * km
- added Gaussian noise: $I_s/I_n = 5, 6, 7$
- two successive frames: 100,400 and 14 octets, respectively (803,312 bits of data, total)

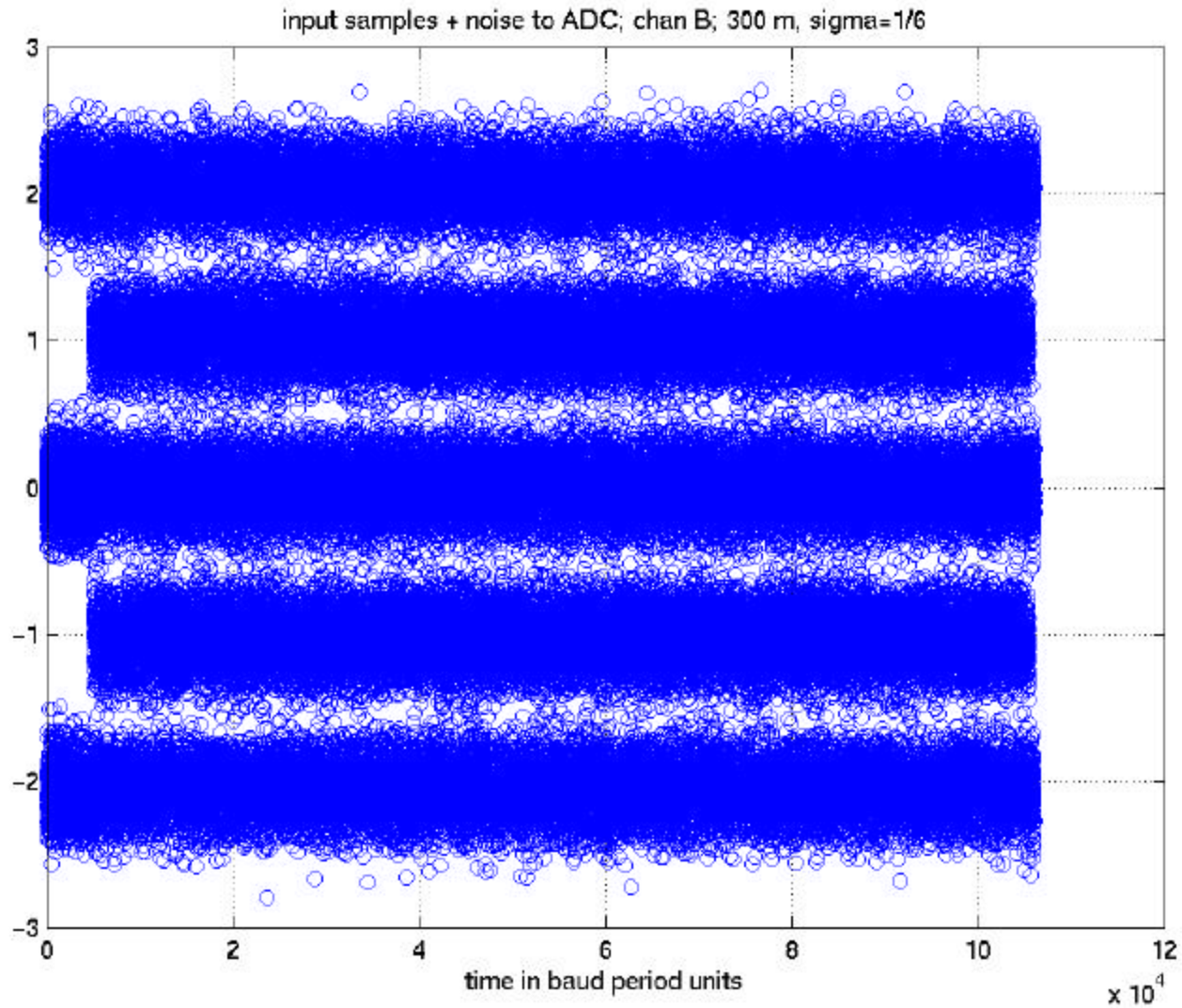
The following three Figures show the samples at the input of the soft slicer (ADC) as a function of time at selected I_s/I_n ratios and the measured BERs

Samples at soft-slicer input (one channel) 300m - $I_s/I_n=5$



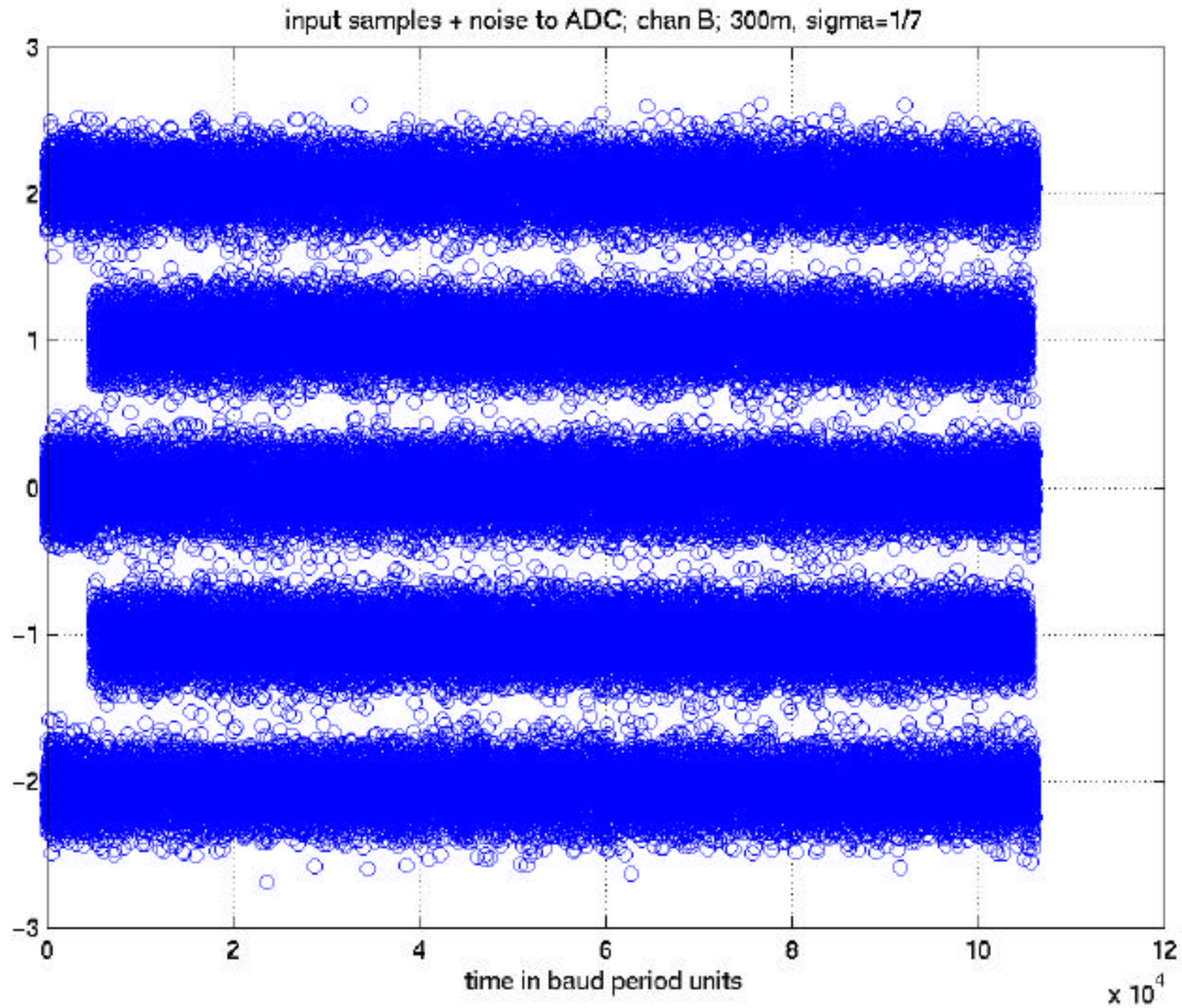
29 incorrect symbols: SER=2.9e-4, BER=1.0e-4

Samples at soft-slicer input (one channel) 300m - $I_s/I_n=6$



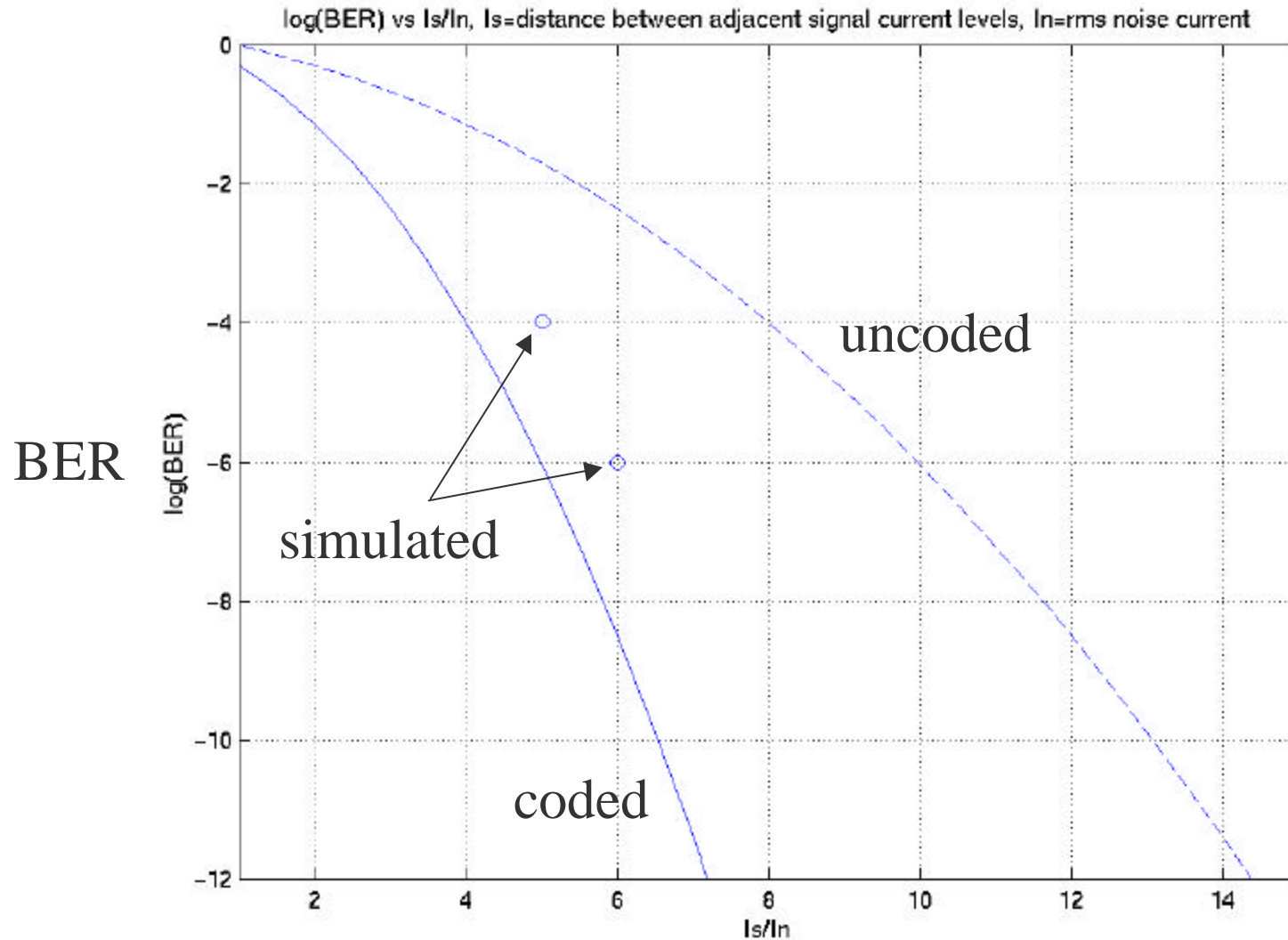
SER = 0, BER = 0

Samples at soft-slicer input (one channel) 300m - $I_s/I_n=7$



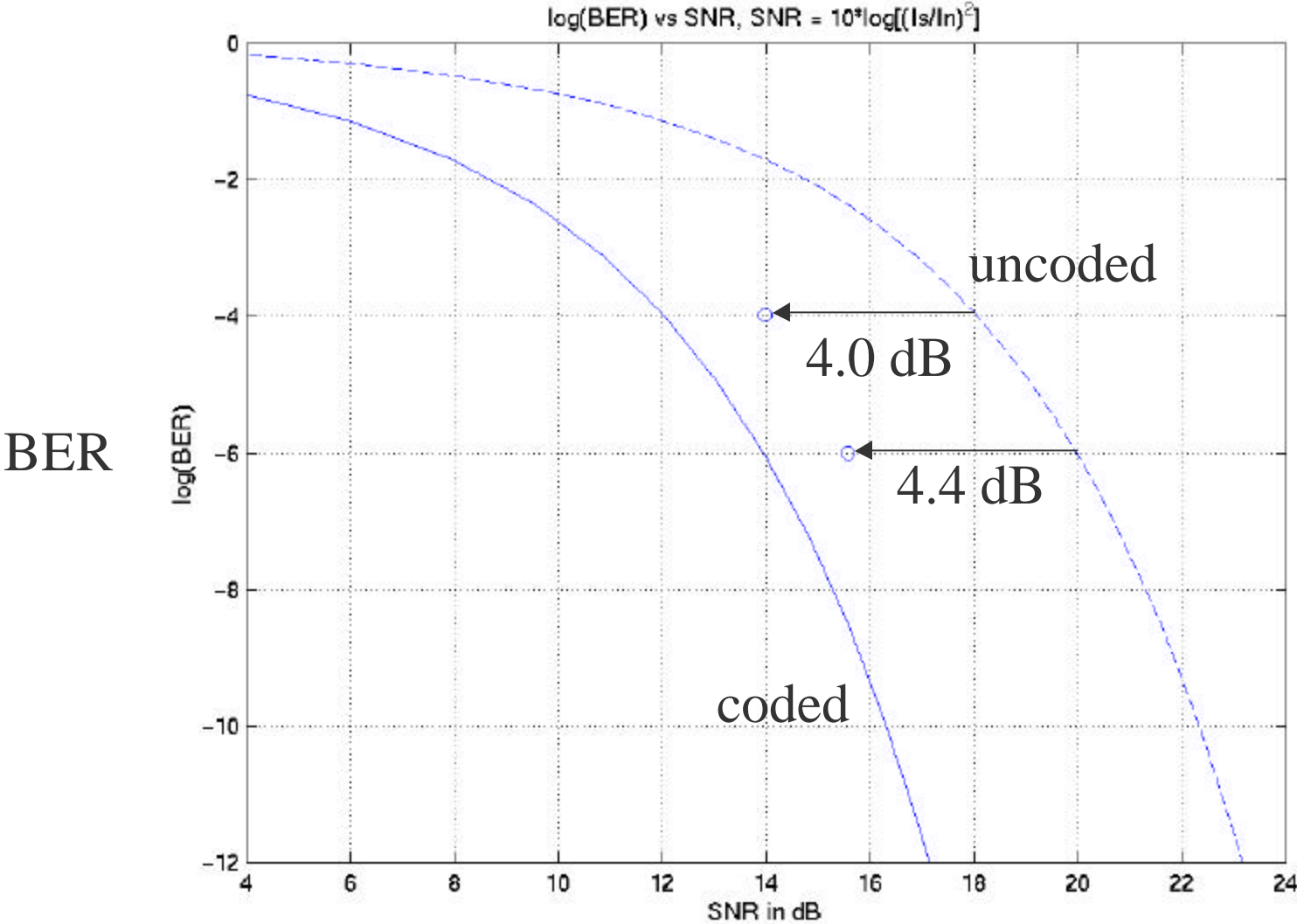
SER = 0, BER = 0

BER vs I_s/I_n : theory vs simulation



(actual point @ $I_s/I_n=6$ might be lower)

BER vs electrical SNR: theory vs simulation



$$\text{SNR} = 10 * \log[(I_s/I_n)^2]$$



Conclusion

The actual coding gain of the present implementation is larger than 4.5 dB at the BERs of interest [10^{-12}].