TSGR1#7(99)d82

Agenda Item:

Source: **NTT DoCoMo**

Title: **Simulation results of 2nd interleaving performance**

Document for: **Information**

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1. Introduction

In the previous WG1 #6 meeting, the optimised 2nd interleaving pattern fit for 15-slot frame [1] was agreed as a working assumption of 2nd interleaving pattern in TS 25.212 V2.0.1 (the reasonable performance and the hardware implementation complexity for this pattern were also shown in [2] and [3] respectively). In the WG1 #7 meeting, the different pattern (Nortel's 2nd version pattern) [4] was proposed. This document shows the computer simulations results of the BER/FER performances for the above two kind of 2nd interleaving patterns.

2. Simulation Conditions

The simulations were performed based on the agreed simulation conditions for the channel interleaver evaluation [5] and the other common simulation conditions to be used in the simulations are shown below:

- Simulated physical channel format: dedicated uplink physical channel with 15-slot per a frame (DPDCH with 60 kbps, DPCCH with 15 kbps), no repetition/puncturing
- Interleaving span: 10 ms
- Data block size to be transmitted: 200-bit uncoded data per a frame with including 8-bit tail
- Diversity: 2-branch antenna space diversity and 2-finger/branch Rake combining
- Channel estimation: 2-slot pilot block averaging
- Channel coding: convolutional coding (rate = 1/3, constraint length = 9) and soft-decision Viterbi decoding
- Transmit Power Control: off
- Channel model: 2-path Rayleigh fading channels with having equal average power per each path

3. Simulation Results

- Average BER/FER curves at vehicular speeds: 100 km/h and 200 km/h are shown in Figure 1 and 2 respectively.
- Simulation accuracy (number of error frames): more than 100 error frames for lowest BER/FER sample.

4. Conclusion

There are possibilities that for the some high vehicular speed cases, Nortel's 2nd version pattern for 2nd interleaving will have BER/FER performance degradations compared to the agreed pattern as working assumption of the current channel interleaver specification.

References

[1] NTT DoCoMo, "Modified Multistage InterLeaver (MIL) fit for 15-slot frame", TSGR1#6(99)929
[2] NTT DoCoMo, "Performance evaluations on modified MIL fit for 15-slot frame", TSGR1#6(99)930
[3] NTT DoCoMo, "Complexity analysis on modified MIL fit for 15-slot frame", TSGR1#6(99)931
[4] Nortel, "Optimized 2nd Interleaver for High Speed Fading", TSGR1#7(99)c29
[5] Ad Hoc 4 Drafting Group, "Simulation Conditions for Channel Interleaver Evaluations" distributed via WG1 reflector, April 13, 1999
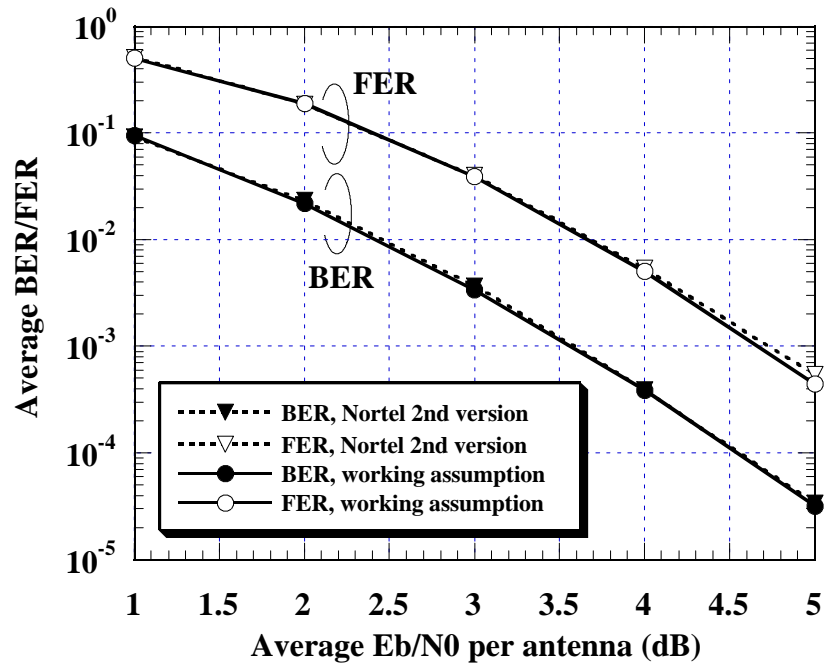
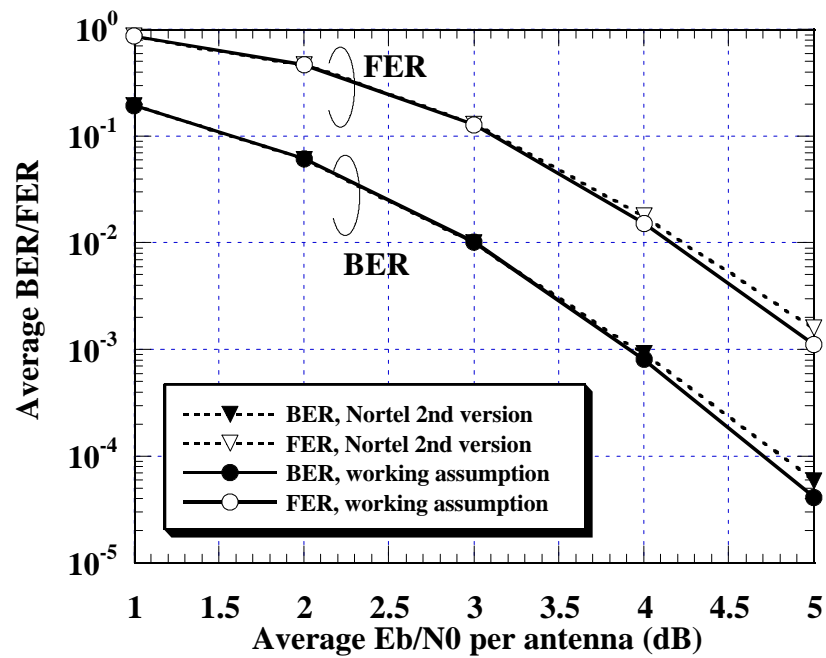Figure 1 Average BER/FER performance comparison
(Vehicular speeds = 100 km/h)

Figure 2 Average BER/FER performance comparison
(Vehicular speeds = 200 km/h)