

Agenda item: AH01
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Title: Implementation margins for UL
Document for: Discussion

1.Introduction

At the previous TSG-RAN WG4 AH01 meeting, Nokia summarized the manufactures' assumption about the implementation margins for DL: 2 dB for the static case, 3 dB for Multipath case 1 and 2 (slow fading), 3.5 dB for case 3 (fast fading). TSG-RAN WG4 AH01 has agreed to deciding on a requirement value for the static AWGN case only, and to making further study on the implementation margins and interpretation of simulation results until next WG4 meeting [1]. The values for DL can not be applied directly for UL because of some differences between DL and UL, such as pilot power ratio or the number of diversity branches. This paper will show the simulation results of degradation due to imperfect channel estimation as well as proposing implementation margins for DL.

2.Factors of implementation margins

The factors of implementation margins are considered as follows:

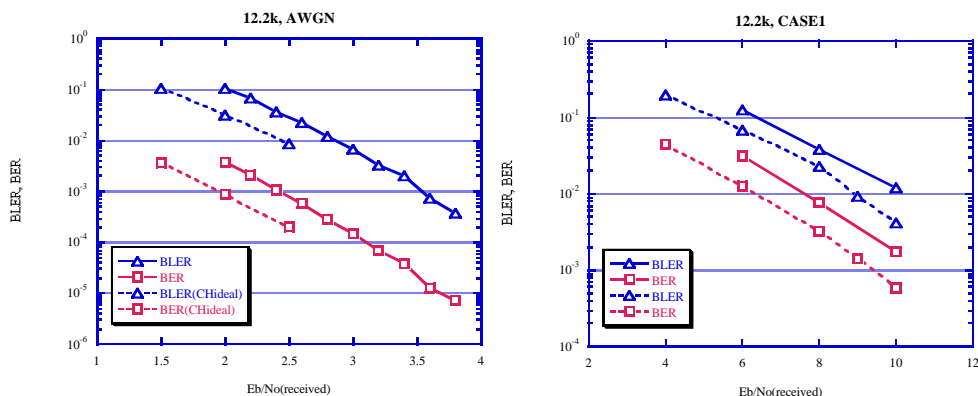
- imperfect channel estimation
- imperfect path search
- other factors (over sampling, the number of floating point, and all hardware margin)

The degradation of required E_b/N_0 for BER= 10^{-3} due to imperfect path search is lower than 0.5 dB [2]. Other factors can be considered to be approximately 1 dB, based on several Japanese vendors' views. To clarify the first factor, simulation results are shown in the following section.

3.Simulation results

Figure 1 shows the impact of channel estimation error to link level performance (UL).

The degradation of required E_b/N_0 for BLER= 10^{-2} due to imperfect channel estimation is 0.5 dB for the static case, 1 dB for case 1 and 2, 2 dB for case 3. As 3 slots simple averaging is used for channel estimation in this simulation, some improvement can be expected.



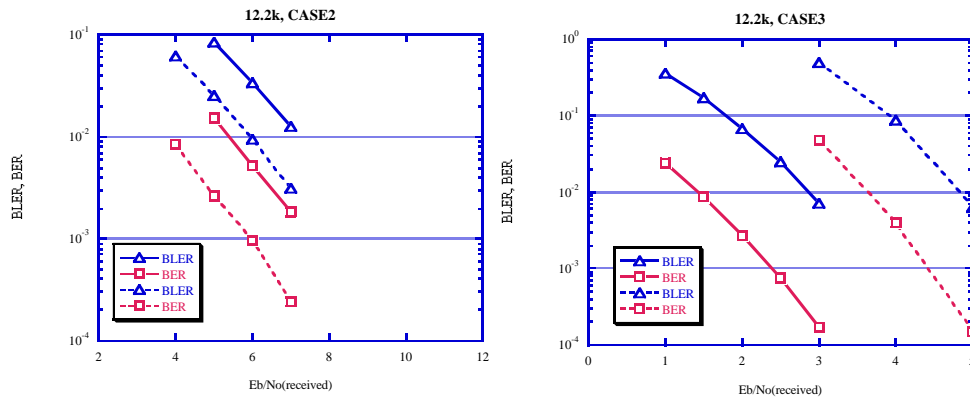


Fig. 1 Impact of channel estimation error to link level performance (UL)

4. Conclusion

Table 1 shows the implementation margins based on the simulation results.

Table 1 Impementation margins for UL

	static	CASE 1	CASE 2	CASE 3
Imperfect channel estimation	0.5 dB	1 dB	1 dB	2 dB
Imperfect path search	0.5 dB			
Other factors	1 dB			
Total margin	2 dB	2.5 dB	2.5 dB	3.5 dB

References

- [1] AH01 secretary, " Report AH01 meeting ", TSGR4#7(99)595
- [2] S. Fukumoto, M. Sawahashi and F. Adachi, " Matched Filter-Based RAKE Combiner for Wideband DS-CDMA Mobile Radio ", IEICE Trans. Commun., vol.E81-B, no.7, pp.1384-1391, July 1998.