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Title	**Effect of Channel Estimation Error on Assignment AMAP Power Boosting**	
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Re:	Category: P802.16m/D1 comments for LB30 Area: Chapter 15.3.12 (AMAP PHY structure)	
Abstract	This contribution presents simulation results that show the effect of channel estimation error on the strategy of power boosting as a means of improving the AMAP coverage performance.	
Purpose	Discussion	
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Effect of Channel Estimation Error on Power Boosting the Assignment AMAP

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1. Introduction

The Assignment A-Map is specified to be transmitted in MAP LRUs (MLRUs), which are DRUs with a time-first mapping. In the UMA channel scenario, for example, the required SNR for a 1% FER for the A-A-MAP is approximately -2dB. It is commonly thought that this rather high required SNR is not a serious problem because the A-A-MAP can be power boosted. However, the DRUs from which the MLRUs are chosen also may contain other data transmission and the pilots of all DRUs are shared. As a result, the control portion of the A-A-MAP DRUs can be boosted, but the pilots of the A-A-MAP cannot be boosted due to their shared nature. This contribution examines the channel estimation error on the strategy of boosting the data portion of the A-A-MAP while keeping the pilot power unchanged. It is shown that channel estimation error can significantly reduce the gains from boosting the control portion of the Assignment A-AMAP.

2. Simulation Results

A link level simulation showing the FER versus SNR performance for the A-AMAP for the various power boosting levels is shown in Figure 1. The parameters of the link simulation are shown in Table 1. The following values of the pilot-to-data boosting were simulated: -8, -6, -4, -2, 0 and +2 dB.

Channel type	UMA
Speed	30 km/h
Allocation type	MAP LRUs (DRUs with time-first mapping)
FEC Block size	56 bits
Modulation	QPSK
Coding	Rate 1/8 TBCC
MIMO TX format	OL-SFBC w/non-adaptive precoding
Number TX antennas	4
Number RX antennas	2
Receiver type	MMSE
Channel estimation	Non-ideal and ideal

Table 1. LLS parameters.

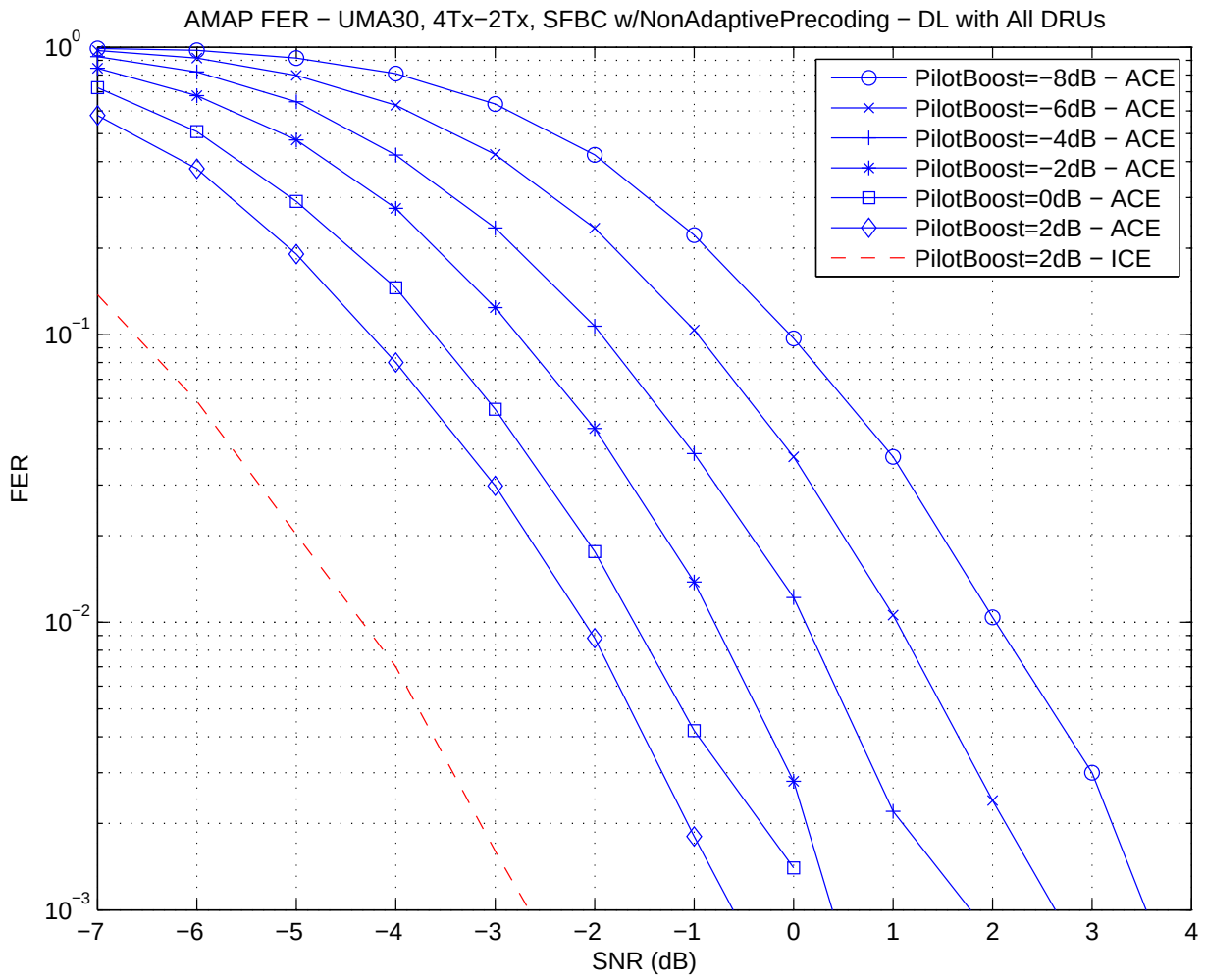

Figure 1. SE comparison of the DL and UL bit selection methods (ACE = actual 2D-MMSE channel estimation, ICE = ideal channel estimation)

3. Discussion

Consider the baseline situation where the pilot-to-data boosting level is +2dB (where boosting is simply the ratio of the pilot symbol power to the average data symbol power per transmit antenna). The link level simulation in the previous section shows how the FER performance is affected when the data power is boosted to be stronger than the pilot power (a negative pilot-to-data boost) while holding the total transmit power constant. For the same transmit power, a negative pilot boost value relative to the data causes additional losses from channel estimation for the same transmit power and path loss.

Now suppose we boost the data power by 10dB while holding constant the pilot power in order to permit the

AMAP to be received at a lower geometry. The 1% FER operating point for that situation is approximately 10dB to the left of the curve for a -8dB pilot-to-data boost, which is approximately -8dB (where this approximation makes use of the fact that the number of data symbols is much greater than the number of pilot symbols). However, note that this operating point of -8dB is only 6dB better than the operating point of the baseline situation of a +2dB pilot-to-data boost. The conclusion from this is that a 10dB boost in data power only achieved a 6dB improvement in the 1% FER operating point over the baseline case. Table 2 shows the improvement in the 1% operating FER for other values of the data boosting power. As can be seen from, the gains from boosting the data power while holding the pilot power constant are severely limited by the additional channel estimation error that results from a negative power-to-data boost value.

Boost in data power	Improvement in 1% Operating FER
0dB	0
2dB	1.5
4dB	2.7
6dB	3.8
8dB	4.9
10dB	5.9

Table 2. Improvement in the 1% operating FER for a given boost in the data power.