Project	IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>
Title	Deriving a packet error rate from block error rates
Date Submitted	2007-05-04
Sources	Seung Joon Lee, Dong-Seung Kwon ETRI 161 Gajeong-dong Yuseong-gu Daejeon, 305-700, Korea Voice: +82-42-860-5207 Fax: +82-42-861-1966 mailto:s.j.lee@etri.re.kr
Re:	Call for Comments on Draft 80.216m Evaluation Methodology Document (IEEE 802.16m-07/014r1)
Abstract	Proposes to allocate a dedicated control channel and rate-based bandwidth to RSs for the purpose of transporting control messages from the RS to the MR-BS and BRs originated from MSs. By periodically allocating uplink bandwidth to an RS, the RS can transmit control messages necessary for the management of an MR network to the MR-BS without having to request bandwidth whenever there is a control message to transmit. Rate-based bandwidth request minimizes the overhead and relay latency involved in relaying BRs from MSs.
Purpose	Improvement in the IEEE 802.16m evaluation methodology document
Notice	
Release	
Patent Policy and Procedures	

Deriving a Packet Error Rate from Block Error Rates

Seung Joon Lee, Dong-Seung Kwon
ETRI, Korea

The equation (16) together with the relevant texts in Section 5.3 of the original draft does not seem to be correct. Let a burst (let it be called 'packet') be comprised of several coded FEC blocks. Then, if conditioned on the block error rates (BLERs) for the coded FEC blocks (they will be predicted by one of the PHY abstraction methods), then the block error events are independent since additive noises for the different blocks are independent. Therefore, the original text should be updated. One example for update is suggested as follows:

Text Proposal

5.3. ~~Effect of Different Block Sizes~~ Deriving a Packet Error Rate from Block Error Rates

[A packet is comprised of several blocks. The packet error rate (PER) is the probability that an error occurs in at least one of blocks comprising the packet. The PHY abstraction predicts the link performance, in terms of ~~PER~~ BLER, for a coded FEC block. ~~Often it is required to predict the PER of a burst of data comprising several code blocks.~~ Here we need to extrapolate the ~~overall~~ PER ~~of the burst~~ as a function of the predicted ~~PER~~ BLERs ~~across the code blocks~~. ~~We note that if the channel is varying slowly, packet errors across code blocks will be correlated for the blocks that are contiguously allocated along time. However, due to sub-carrier permutation, packet errors across code blocks allocated along the frequency axis will appear independent. The overall PER of the code blocks that are correlated may be computed as the maximum of the individual PER. Whereas, the PER for code blocks that are independent, may be computed via the independence assumption. Therefore the overall predicted PER across the burst shall be modeled as~~

~~$$P_{burst} \quad 1 \quad \prod_{i \ \ independent \ \ blocks} (1 \quad \max_{j \ \ correlated \ \ blocks} PER_{i,j}) \qquad (16)$$~~

~~The exact procedure for determining the number of correlated blocks in a burst is dependent on the Doppler and delay spread of the channel, and the exact specification is FFS.~~] If a packet is comprised of J blocks and the predicted BLERs are given by $BLER_1$, $BLER_2$, …, $BLER_J$, then the PER is derived as

$$PER \quad 1 \quad \prod_{j \ 1}^{J} (1 \quad BLER_j) .$$