

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Evaluation Criteria for FEC Coding and Interleaving Techniques (Contribution to IEEE802.16.3)	
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Re:	IEEE802.16.3-00/07r1 document. Response to “802.16.3 Invitation for Contribute” on Evaluation Criteria for the list of Key Characteristics of the Sub-11 Air interface for Session #9.	
Abstract	This document presents a list of evaluation criteria by which the Key characteristics that were established by the 802.16.3 Task Group by the end of Session #8.	
Purpose	This contribution will be presented and discussed within the Task Group in Session #9 for possible adoption for technical assessment of FEC Coding and Interleaving Techniques.	
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Evaluation Criteria for FEC Coding and Interleaving Techniques

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Introduction:

The suggested FEC Coding and Interleaving Techniques by the Task Group in Session #8. Comparisons of various Coding and Interleaving Techniques have to be based on the applicability, lower complexity, and reduced cost factors for the services and the market that is identified within the Functional Requirement Document (IEEE 802.16.3-00/02r3). In order to perform a thorough assessment of the above list of coding schemes, we propose to verify the following evaluation criteria on each of selected scheme:

The evaluation criteria for FEC coding and interleaving techniques should be based on the following factors:

- Coding rate and redundancy
- Type of coding: Convolutional codes or Block codes, or combinations
- Combined Coding and Modulation
- Burst and Random error correction capability
- Detection capability
- Applicability of the codes (code length, t-capability or coding distance)
- Bit rate performance:
 - BER vs E_b/N_o (dB) performance
 - Codec Bit rate
 - BER characteristics (the Sharpness of slope, Coding Gain,..)
- Encoder complexity
- Decoding complexity
- Coding delay and other implementation complexity (size of memory requirements)
- Interleaving depth level
- Interleaver delay factor
- Total FEC Coding with or without Interleaving techniques, implementation complexity and its economical factor.

The above list of evaluation factors is important to assess for each FEC Coding and Interleaving techniques in order to evaluate their applicability, technical effectiveness, performance, and their economical benefits of one against others.

How to apply the above evaluation Criteria:

Most of the factors mentioned above can be assessed by compiling what we know about each FEC Coding with or without Interleaving techniques and may require application of some sort of simulation methods to evaluate the performance related factors.

Based on list of services and types of traffic that are specified within the Functional Requirement Document, the input traffic can be modeled. An End-to-End network simulation can be implemented. Then, each of FEC Coding and Interleaving techniques shall be modeled and individually generate their coding BER vs E_b/N_o (dB) performance and delay, and other performance factors for the evaluation purposes.

In addition, based on past experiences on FEC coding implementation complexity and the performance requirements, we shall compile all the pros and cons of each FEC coding technique. Of course, each of above assessment criteria can have different weighting (to be determined) for a final conclusion on FEC Coding with or without Interleaving techniques.