

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Evaluation Criteria for Duplex Schemes (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 various Duplex Schemes.	
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Evaluation Criteria for Duplex Schemes

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Introduction:

The suggested Duplex Techniques by the Task Group in Session #8 were listed as; FDD, TDD, HFDD,... Comparisons of these types of duplex schemes have to be based on the applicability, lower complexity, flexibility to adapt to traffic characteristics, 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 duplex schemes, we propose to verify the following evaluation criteria on each of selected scheme:

- Synchronization complexity (in burst or in continuous transmission modes)
- Frequency agility in both directions; Upstream and Downstream
- Channel efficiency (overhead requirements)
- Spectral efficiency
- Tx/Rx implementation complexity on both SS and BS
- Capable to transport data/voice/video services
- System performance factors:
 - No. of channels per frame
 - Overall data rate
 - Radio channel BW
 - Total no. of users supported (max no. of simultaneous user access) per Base Station
 - System / network capacity
 - Inbound / outbound time delays
 - Jitter factors
- Applicability for the Sub 11 GHz band.
- Implementation complexity and its economical factor.

The above list of evaluation factors is important to assess for each duplex scheme 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 of these duplex schemes and will require the application 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 duplex technique shall be modeled and individually generate their system throughput and delay, and other performance factors for the evaluation purposes.

There shall be further analysis be done for the evaluation of the overall network capacity.

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In addition, based on past experiences on implementation complexity, synchronization difficulty of schemes, we shall compile all the pros and cons of each duplex scheme. Of course, each of above assessment criteria can have different weighting (to be determined) for a final conclusion on duplex techniques.

Note that different applications may call for different solutions and implementations.