

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >	
Title	<b>Evaluation Criteria for Multiple Access Techniques</b>	
Date Submitted	<b>2000-08-30</b>	
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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 Multiple Access Schemes.	
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# Evaluation Criteria for Multiple Access Techniques

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## Introduction:

The suggested Multiple Access Techniques by the Task Group in Session #8 were listed as; TDMA, FDMA, CDMA, or Hybrid Schemes. Comparisons of these types of multiple access schemes 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 access schemes, we propose to verify the following evaluation criteria on each of selected access schemes:

- Synchronization complexity (in burst or in continuous transmission modes)
- Frequency agility in both directions; Upstream and Downstream
- Channel efficiency (overhead requirements)
- Bandwidth utilization factor (narrow band or wide band channel requirements)
- Tx/Rx implementation complexity on both SS and BS
- Power efficiency
- Simplicity in expanding and scalable system
- Capable to transport data/voice/video services
- System performance factors:
  - No. of duplex channels per frame
  - Overall data rate
  - Radio channel BW
  - No. of Carriers used
  - 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 channels; for example, there are scenarios within < 10 GHz that should work for NLOS and on contrary, for 10.5 GHz shall require LOS.
- Implementation complexity and its economical factor. Note at 10.5 GHz, lack of LOS shall cause considerable implementation complexity and consequently shall increase the cost significantly.

The above list of evaluation factors is important to assess for each multiple access 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 access schemes and will require application of simulation methods to evaluate the performance related factors.

Based on list services and type traffic specified within the Functional Requirement Document, the input traffic can be modeled. An End-to-End network simulation can be implemented. Then, each of access techniques shall be simulated and individually generate their system throughput and delay, and other performance factors for the evaluation purposes.

There shall further analysis be done for the evaluation of the overall network capacity and power control complexity.

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