

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >	
Title	<b>Input text to the PAR and five criteria</b>	
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Re:	IEEE 802.16mmr-05/021 (Call for contributions issued on 2005-10-18).	
Abstract	This document provides some input text for the Scope, Purpose and Reason sections of the PAR and also for the five criteria based on discussions at the previous meetings of the MMR study group.	
Purpose	Review and discussion within the 802.16 MMR study group and to assist in the drafting process of the PAR and five criteria	
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# Input text to the PAR and five criteria

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## 1. Introduction

This contribution contains some proposed text which is intended to be used in the process of drafting the key sections of the PAR and 5 criteria by the MMR study group based on discussions in previous study group meetings regarding the scope, purpose and motivation for the proposed project.

## 2. Text for the PAR

### Scope:

This document provides enhancements to the MAC, OFDM PHY and OFDMA PHY of the IEEE Std 802.16 such that a fixed, nomadic and mobile relay station (RS) are defined and their operation enabled in a manner such that they are interoperable with existing IEEE Std 802.16 systems.

### Purpose:

The purpose of this project is to define the various RS types and the required amendment to the IEEE802.16 standard to enable the RS operation such that they will enable coverage augmentation, throughput enhancement and/or increase in system capacity of an existing deployment.

### Reason for the project:

It is well known that the use of an RS in an existing network can improve coverage; simple RS are in use today that achieve such an objective. However, it is also known, through considerable research, that an RS can also provide a cost effective method for improving throughput and system capacity in an existing deployment as well as reducing transmit powers and consequently the level of interference. This project aims to enable exploitation of such advantages by adding appropriate relaying functionality to the existing IEEE Std 802.16 through the proposed amendment.

## 3. Text for the five criteria

### 1. Broad Market Potential

#### a) Broad sets of applicability

The amendment will be applicable to the already existing IEEE Std 802.16 which itself already has a broad set of applicability, and through this amendment the applications of this standard will be further broadened due to the amendment enabling lower cost deployments and improved performance. This is because the amendment will provide a cost effective way to either improve throughput in a non-coverage limited scenario or considerable increase in range in a coverage limited scenario, thus increasing the performance and reach of the existing standard.

#### b) Multiple vendors, numerous users

Refer to cosignatories.

#### c) Balanced costs

The relay station (RS) which will be introduced through the amendment will be of reduced complexity when compared to the basestation (BS). It is well known that it is possible to use cheaper RS's to improve coverage,

throughput and system capacity as an alternative to using more costly BS's.

## 2. Compatibility

Compatible with the IEEE Std 802.16.

## 3. Distinct identity

a) Substantially different from other IEEE 802 standards

The only similar standards are the amendment being developed by TGs of the IEEE 802.11 Working Group and the already existing Mesh mode in the IEEE Std 802.16. However, these are limited only to mesh architecture and this amendment will develop a distinctly different, yet cost and performance-effective extension for the point to multi-point mode of the IEEE Std 802.16.

b) One unique solution per problem

The amendment will provide a unique solution to the problem of increasing coverage and improving throughput in an easy to manage and cost effective manner.

c) Easy for the document reader to select the relevant specification

## 4. Technical feasibility

a) Demonstrated system feasibility

The use of very basic relaying is already employed in many current deployments in order to provide coverage in areas that are otherwise uncovered. The fundamental theoretical benefits of relaying are well known and researched. Moreover, coverage-capacity performance of advanced relay systems, such as those proposed in this project, have been verified by means of system level computer simulation. Consequently, the feasibility of potential improvements that are offered by the use of relaying has been clearly demonstrated.

b) Proven technology, reasonable testing

The existing standard itself is already a proven and tested technology. The technology associated with the amendment is in use in a very basic and limited way today. This provides a practical foundation for the defining the proposed relay functionality.

c) Confidence in reliability

See above.

d) Coexistence of 802 wireless standards specifying devices for unlicensed operation

## 5. Economic feasibility

a) Known costs, reliable data

b) Reasonable cost for performance

RS stations will be of lower cost than a BS due to their lower complexity, however it is known that they will provide improved system performance and consequently can provide a more cost effective solution to improving system performance compared with deploying more basestations.

c) Consideration of installation costs

RS stations will be much simpler to install than BS due to their smaller size, power consumption and the fact that they do not require separate backhauling. As they can incorporate intelligent algorithms such that once deployed they self-configure, the cost associated with planning a deployment of BS and/or RS is significantly

reduced compared to an all BS deployment.