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| Title | **WirelessMAN-OFDMA RS Functional Categories** | |
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| Re: | Call for Technical Comments Regarding IEEE Project (IEEE 802.16j-07/019). | |
| Abstract | This contribution describes the PHY, MAC and RF OFDMA RS SYS Functional Categories | |
| Purpose | To incorporate the proposed change into the P802.16j Baseline Document (IEEE 802.16j-06/026r4) | |
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# *WirelessMAN-OFDMA RS Functional Categories*

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## Introduction

This contribution provides an informative summary of a set of minimal requirements for different functional categories of relay stations. This summary is intended to assist readers in their understanding of the application of the standard to these functional categories. Being informative, these summaries do not make any binding requirements upon the overall 802.16j standard

## Statement of the Problem

The 802.16j standard draft outlines a wide set of mandatory and optional features designed to optimize the performance of WIMAX OFDMA networks that are utilizing relay stations. Considering the significant number of new features introduced, it is considered important to summarize these features against a set of functional categories.

## Proposed Remedy

It is proposed to add an informative Appendix “Relay Station Functional Categories” to the 802.16j draft standard to inform readers of the minimal requirements that characterize certain functional categories. As an informative appendix, this information does not make any binding requirements.

## Proposed Text Change

[Insert Appendix Section: Appendix 1: Relay Station Functional Categories]
Appendix 1 Relay Station Functional Categories

A1.1 Introduction
This Appendix provides an informative summary of a set of minimal requirements for different functional categories of relay stations. This summary is intended to assist readers in their understanding of the application of the standard to these functional categories.
These summary tables outline the minimal Relay Station features needed to support certain functional categories. The Relay Station features are summarized for a set of Relay Station categories. This appendix does

not contain any binding specifications for the standard. The sets of requirements presented here are not to be considered exhaustive. Other sets of requirements could also be defined for other applications.

## A1.2 OFDMA_MR_Centralized Non-Transparent 1

This sub-section summarizes the minimal set of requirements for a fixed Relay Station intended to operate under the following configuration:

MAC

- Centralized scheduler (C)
- Centralized security model (C)
- Topology Path Management

PHY

- Non-transparent Relay (NT)
- Multi-hop link (N>2)
- HARQ

Table xxx.1 lists the minimal capability requirements for the OFDMA MR CC_NT1 category.
(MR-CC-NT1: Mobile Relay Centralized Scheduler Centralized Security Non-Transparent 1)

| Feature | Minimal Requirement | Conditions/Notes |
|---|---|---|
| **MAC** | | |
| R-MAC header | No | |
| Tunnel support | No | |
| BW Request/Allocation:<br>Centralized<br>Distributed<br>Dedicated Channel | Yes<br>Yes<br>No<br>No | |
| MS network entry support | Yes | |
| RS Network entry<br>Path Selection<br>Parameter Configuration<br>RS grouping | Yes<br>Yes<br>Yes<br>No | |
| Security Features<br>Centralized security model<br>Distributed security model<br>Security Zone Key | <br>Yes<br>No<br>No | Note#1 |
| HARQ support for relay | Yes | |
| Mobility support for relay<br>MS sleep mode<br>MS idle mode<br>MS handover<br>Mobile RS handover | No<br>Yes<br>Yes<br>Yes<br>No | |
| MBS | No | |
| Topology/Path management<br>Topology discovery<br>Embedded Path Management<br>Explicit Path Management | Yes<br>Yes<br>No<br>No | |
| RS Neighbor Discovery | Yes | |

| | | |
|---|---|---|
| Interference Measurement | Yes | |
| Location Report | Yes | |
| **PHY** | | |
| Frame Structure | | |
| Non-transparent Multi-frame | Yes | Recommended for frame code duration {4, 6} |
| Non-transparent Partitioned frame structure | Yes | Recommended for frame code durations (8) |
| Transparent Frame Structure | No | Optional mode |
| Relay Ambles | | |
| SYNC Amble max repetition rate duration | 40 ms | |
| SYNC amble repetition rate | N | Configurable |
| Network synchronized frame number | Yes | |
| SYNC amble sequence A | Yes | |
| SYNC amble sequence B | Yes | Recommended only for number of hops >2 |
| SCAN amble repetition rate L | L>=N | Configurable |
| Relay amble subcarrier modulation | Yes (#8.4.9.4.3.1.1) | Different modulations applied for 128, 512, 1k and 2k FFT |
| Relay amble PN sequence | Yes #8.4.6.1.1.3 | The relay PN sequences for 128 and 512 are different than 1k and 2k FFT |
| Gaps | | |
| RSRTG | >=50 µs | If existent |
| RSTTG | >= 1 symbol | If existent |
| Network Synchronization | | |
| Network Synchronization | Yes | Sub-ordinated RS is synchronized on the starting symbol of the DL and UL sub-frames |

Note#1: RS shares MS security context in a distributed security model, while RS does not share this context a in centralized security model.

A1.2 OFDMA_MR_Distributed Non-Transparent 1

This sub-section summarizes the minimal requirements for a fixed Relay Station intended to operate under the following configuration:

MAC

- Distributed scheduler
- Centralized security model
- Topology Path Management

PHY

- Non-transparent Relay
- Multi-hop link (N>2)
- HARQ
- SISO

The following table presents only the features that are different than those presented in Table xxx.1. The other

features for this category are identical with those presented in Table xxx.1 and its associated notes.

Table xxx.2 lists the minimal capability requirements for the OFDMA MR DC_NT1 category.

| Feature | Minimal Requirement | Conditions/Notes |
|---|---|---|
| **MAC** | | |
| BW Request/Allocation:<br>  Centralized<br>  Distributed<br>  Dedicated Channel | Yes<br>No<br>Yes<br>No | |

A1.3 OFDMA_MR_Distributed Non-Transparent 2

This sub-section summarizes the minimal requirements for a fixed Relay Station intended to operate under the following configuration:

MAC

- Distributed scheduler
- Distributed security model
- Topology Path Management

PHY

- Non-transparent Relay
- Multi-hop link (N>2)
- HARQ
- SISO

In the following table are presented only the features that are different than those presented in Table xxx.1. The other features for this category are identical with those presented in Table xxx.1 and its associated notes.

Table xxx.3 lists the minimal capability requirements for the OFDMA MR DD_NT1 category

| Feature | Minimal Requirement | Conditions/Notes |
|---|---|---|
| **MAC** | | |
| BW Request/Allocation:<br>  Centralized<br>  Distributed<br>  Dedicated Channel | Yes<br>No<br>Yes<br>No | <br>RS does not share MS security context.<br>RS shares MS security context. |
| Security Features<br>  Centralized security model<br>  Distributed security model<br>  Security Zone Key | <br>No<br>Yes<br>No | Note#2<br>Distributed Security is only applicable to distributed BW request/allocation method. |

Note#2: RS shares MS security context in distributed security model, while RS does not in centralized security model.