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**Baseline Document for Draft Standard for  
Local and Metropolitan Area Networks**

# **Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems**

## **Multihop Relay Specification**

Sponsor

~~LAN-MAN Standards Committee~~

~~of the~~

~~IEEE Computer Society~~

**Prepared by the Relay Task Group of IEEE 802.16**

**Abstract:** This document specifies OFDMA physical layer and medium access control layer enhancements to IEEE Std. 802.16 for licensed bands to enable the operation of relay stations.

**Keywords:**

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## Introduction

(This introduction is not part of the IEEE P802.16j, Draft amendment to IEEE Standard for Local and Metropolitan Networks Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems - Multihop Relay Specifications).

## Participants

~~This document was developed by the IEEE 802.16 Working Group on Broadband Wireless Access, which develops the WirelessMAN<sup>TM</sup> Standard for Wireless Metropolitan Area Networks.~~

IEEE 802.16 Working Group Officers

*[Editor's Note: Insert list of WG Officers]*

~~Primary development was carried out by the Working Group's Relay Task Group.~~

TG Officers

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26 NOTE-The editing instructions contained in this amendment define how to merge the material contained  
27 herein into the existing base standard and its amendments to form a comprehensive standard.  
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30 The editing instructions are shown ***bold italic***. Four editing instructions are used: ***change***, ***delete***, ***insert***, and  
31 ***replace***. ***Change*** is used to make small corrections in existing text or tables. The editing instruction specifies  
32 the location of the change and describes what is being changed by either by using ~~strike through~~ (to remove  
33 old material) or underscore (to add new material). ***Delete*** removes existing material. ***Insert*** adds new  
34 material without disturbing the existing material. Insertions may require renumbering. If so, renumbering  
35 instructions are given in the editing instruction. ***Replace*** is used to make large changes in existing text,  
36 subclauses, tables, or figures by removing existing material and replacing it with new material. Editorial  
37 notes will not be carried over into future editions because the changes will be incorporated into the base  
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# 1. Overview

## 1.1 Scope

This document specifies OFDMA physical layer and medium access control layer enhancements to IEEE Std 802.16 for licensed bands to enable the operation of relay stations. Subscriber station specifications are not changed.

## 1.2 Purpose

The purpose of this amendment is to enhance coverage, throughput and system capacity of 802.16 networks by specifying 802.16 multihop relay capabilities and functionalities of interoperable relay stations and base stations.

## 1.3 Frequency bands

### 1.3.4 Air interface nomenclature and PHY compliance

## 1.4 Reference model

*Insert new subclause 1.4.2:*

### 1.4.2 Relaying reference model

# 2. References

# 3. Definitions

# 4. Abbreviations and acronyms

# 6. MAC common part sublayer

## 6.1 PMP

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### 6.1.1 Relaying extension

## 6.3 Data/Control plane

### 6.3.1 Addressing and connections

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4	<b>6.3.2 MAC PDU formats</b>
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6	<b>6.3.2.1 MAC header formats</b>
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17	<b>6.3.4 ARQ mechanism</b>
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20	<b>6.3.4.6 ARQ operation</b>
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26	<b>6.3.4.6.4 ARQ modifications for relaying</b>
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29	<b>6.3.5 Scheduling services</b>
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31	<b>6.3.6 Bandwidth allocation and request mechanisms</b>
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34	<i>Insert new subclause 6.3.6.7:</i>
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37	<b>6.3.6.7 Relaying support for scheduling</b>
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40	<i>Insert new subclause 6.3.6.7.1:</i>
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43	<b>6.3.6.7.1 Distributed scheduling</b>
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46	<i>Insert new subclause 6.3.6.7.2:</i>
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49	<b>6.3.6.7.2 Centralized scheduling</b>
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51	<b>6.3.7 MAC support of PHY</b>
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54	<i>Insert new subclause 6.3.7.7:</i>
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57	<b>6.3.7.7 Optional MAC support of the PHY for relaying</b>
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59	<b>6.3.8 Contention resolution</b>
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62	<b>6.3.9 Network entry and initialization</b>
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65	<i>Insert new subclause 6.3.9.16:</i>

1 **6.3.9.16 Support for network entry and initialization in relay mode**

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3 **6.3.10 Ranging**

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6 **6.3.10.3 OFDMA based ranging**

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11 **6.3.10.3.4 Relaying support for OFDMA based ranging**

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14 **6.3.11 Update of channel descriptors**

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17 **6.3.12 Assigning SSs to multicast groups**

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20 **6.3.13 Establishment of multicast and broadcast transport connections**

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22 **6.3.14 QoS**

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25 **6.3.17 MAC support for HARQ**

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27 **6.3.18 DL CINR report operation**

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33 **6.3.18.3 Relay station DL CINR report operations**

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36 **6.3.19 optional Band AMC operations using 6-bit CQICH encoding**

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38 **6.3.21 Sleep mode for mobility-supporting MS**

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41 **6.3.22 MAC layer handover procedures**

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44 *Insert new subclause 6.3.22.4:*

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46 **6.3.22.4 Mobile relay station handover**

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49 **6.3.23 Multicast and broadcast services (MBS)**

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51 **6.3.23.1 Single-BS access**

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54 **6.3.23.2 Multi-BS access**

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57 **6.3.24 MS Idle Mode (optional)**

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60 *Insert new subclause 6.3.25:*

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62 **6.3.25 Relay path management and routing**

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65 *Insert new subclause 6.3.26:*

1 **6.3.26 Relay station neighborhood discovery**  
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4 **7. Security sublayer**  
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7 **7.1 Architecture**  
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10 **7.2 PKM protocol**  
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13 **7.3 Dynamic SA creation and mapping**  
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16 **7.4 Key usage**  
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19 **7.5 Cryptographic methods**  
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22 **7.6 Certification profile**  
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25 **7.7 Pre-Authentication**  
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28 **7.8 PKMv2**  
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31 **8. PHY**  
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34 **8.4 WirelessMAN-OFDMA PHY layer**  
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37 **8.4.1 Introduction**  
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40 **8.4.4 Frame structure**  
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1 **8.4.4.8 Relaying frame structure**  
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3 **8.4.5 Map message fields and IEs**  
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5 **8.4.7 OFDMA ranging**  
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7 **8.4.8 Space-Time Coding (optional)**  
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17 **8.4.13 Receiver requirements**  
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19 **8.4.14 Frequency control requirements**  
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21 **8.4.15 Optional HARQ support**  
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23 **9. Configuration**  
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27 **9.3 MR-BS configuration**  
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31 **9.4 RS configuration**  
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33 **10. Parameters and constants**  
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35 **10.1 Global values**  
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37 **10.2 PKM parameter values**  
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39 **10.3 PHY-specific values**  
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4 **10.4 Well-known addresses and identifiers**

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8 **11. TLV Encodings**

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