Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**An Efficient AMC Zone Allocation within H-ARQ for MIMO OFDMA**
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Re:	
Abstract	An Efficient AMC Zone Allocation within H-ARQ for MIMO OFDMA
Purpose	Adoption of proposed changes into P802.16e ~~Crossed-out indicates deleted text,~~ underlined blue indicates new text change to the Standard
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An Efficient AMC Zone Allocation within H-ARQ for MIMO OFDMA

1. Introduction

In section 6.3.2.3.43.6.7 of the draft standard [1], the configuration of MIMO zones within H-ARQ region is shown and the related extension MAP IEs for DL and UL are specified thereafter. According to the standard, MIMO and SISO regions for both diversity permutation zone and AMC permutation zone are shown to be separated in different symbols. While this causes little problem with the diversity permutation zone, it may increase overall overhead for the AMC permutation zone due to the unused resources at the symbol boundaries. This is especially true when the newly added chase combining regions for SISO and MIMO are also present within the same frame.
In this contribution, this issue is addressed and a dynamic switch between two methods of band AMC allocation is suggested.

2. Methods of Band AMC Zone Allocation within H-ARQ Region

Figure aaa and Figure bbb represent two methods of MIMO zone allocation within AMC band region, time zone allocation in Figure aaa and frequency band allocation in Figure bbb. Each scheme has its own pros and cons. The time zone allocation method has better channel estimation performance due to continuous pilot subcarriers along the entire frequency domain, improving decoder performance and frequency scanning for better choice of an AMC band. On the other hand, frequency band allocation method reduces overhead which otherwise is inevitable at symbol boundaries of different zones. Furthermore, in terms of granularity this method is better because a MIMO or SISO zone can be allocated to one or more bands of the total available bands (12 for the case of 1K FFT and 8 bins per band configuration), whereas 3 (for SISO) and 6 (for MIMO) symbols are the basic unit to be allocated within the available DL sub-frame (24 symbols for the case of 1K FFT with 2:1 DL:UL ratio).

The switch between these two methods is made by a new extension IE called MIMO Zone Indication IE and its format is also proposed. It serves as an indicator which instructs all SS on whether or not they can utilize all the pilot subcarriers along the entire bandwidth.

[Add a new section 6.3.2.3.43.6.9 as follows]

6.3.2.3.43.6.9 H-ARQ Compact DL-MAP IE format for MIMO Zone Indication

Figure aaa and Figure bbb represent two methods of MIMO zone allocation within AMC band region, time zone allocation in Figure aaa and frequency band allocation in Figure bbb, where 1K FFT size, 12 AMC bands and 2x3 basic AMC type are assumed for illustration purpose.

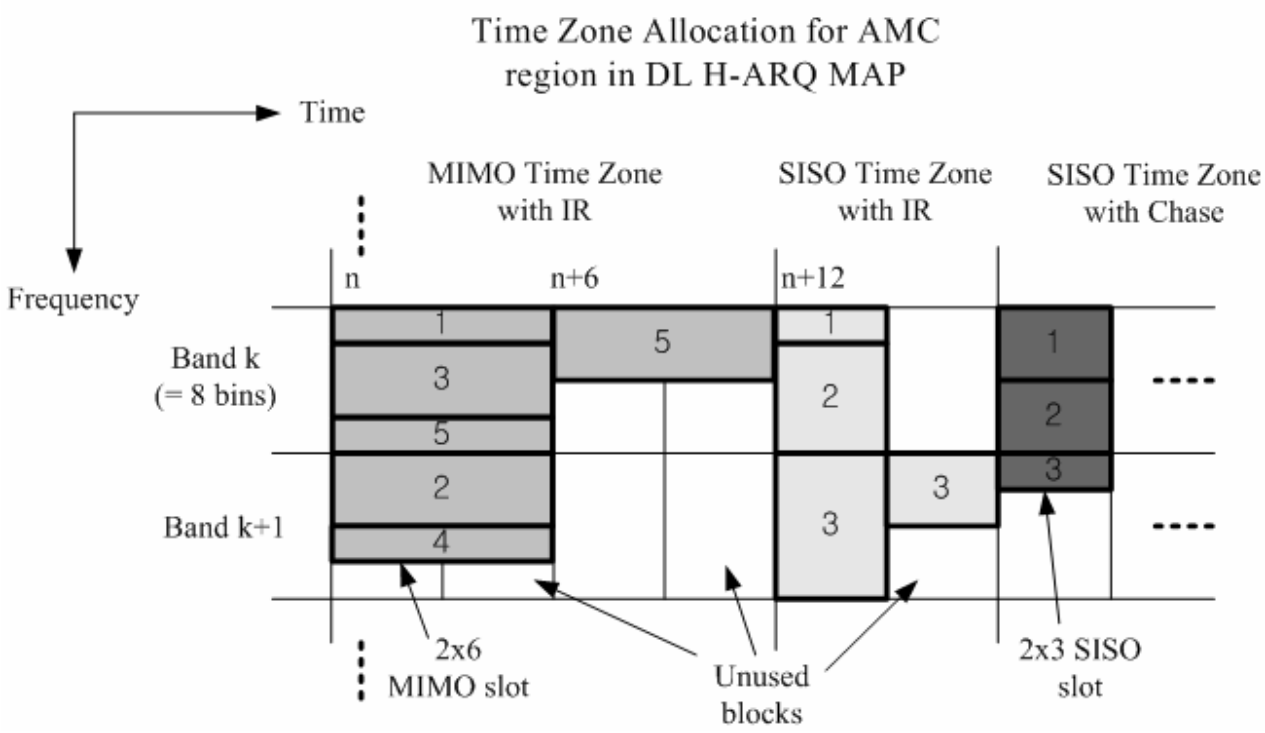

Figure aaa An Example of Time Zone Allocation for AMC Region in DL H-ARQ MAP (Method 1)

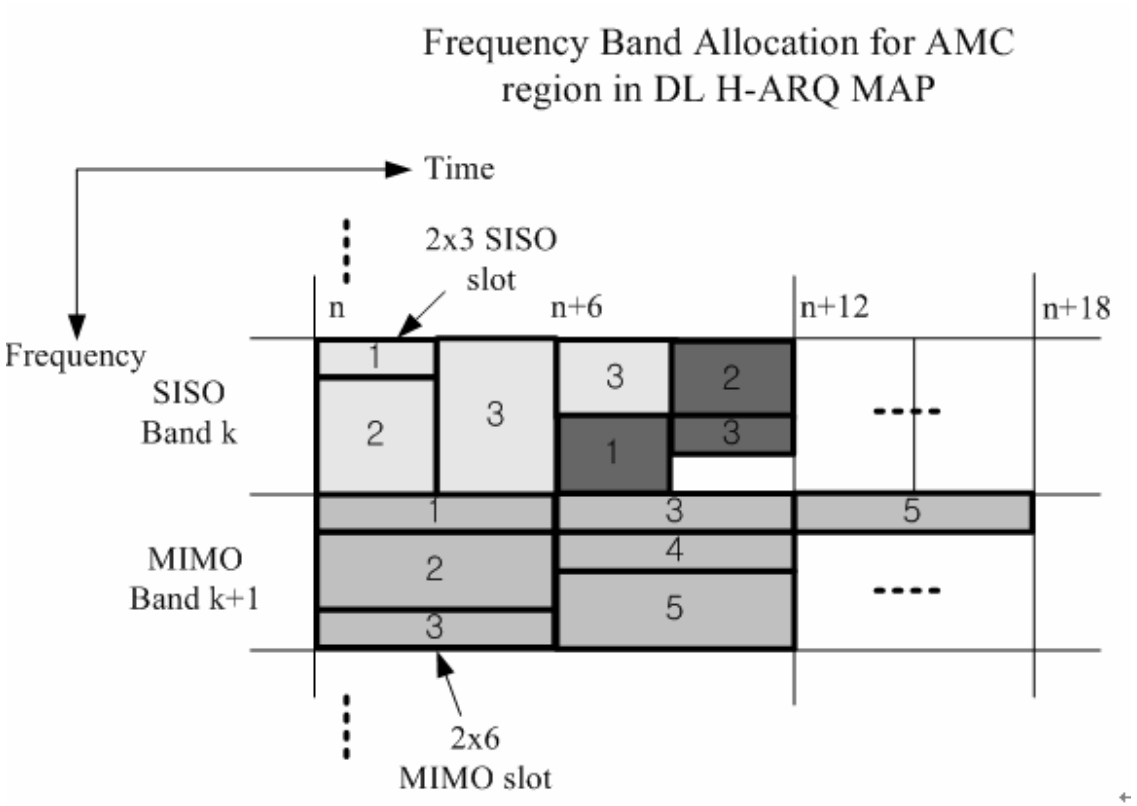

Figure bbb An Example of Frequency Band Allocation for AMC Region in DL H-ARQ MAP (Method 2)

The switch between these two methods shall be indicated by H-ARQ Compact DL-MAP IE for MIMO Zone Indication.

Table 106a—H-ARQ Compact DL-MAP IE format for MIMO Zone Indication

Syntax	Size (bits)	Notes
Compact_DL-MAP_IE() {		
DL-MAP Type=7	3	
DL-MAP sub-type	5	Extension sub type = 0x02
Length	4	Length of the IE in Bytes
AMC Region Allocation Type	1	Indicates the type of AMC region allocation 0 = Time zone allocation 1 = Frequency band allocation
Pilot precoding	1	Indicates precoding on pilots till the end of the frame 0 = No precoding on pilots 1 = precoding on pilots
Reserved	2	
}		

References:

[1] IEEE P802.16-REVd/D5-2004 Draft IEEE Standards for local and metropolitan area networks part 16: Air interface for fixed broadband wireless access systems

[2] IEEE P802.16e/D5 Air Interface for Fixed and Mobile Broadband Wireless Access Systems – Amendment for Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands

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