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Source(s)	Meng Zhao Dongyan Bi ZTE Corporation Address Voice: Fax: E-mail:
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Abstract	Because the HARQ data transmission is relatively independent to other data transmissions, it is need to set clear position of HARQ data region. At the same time to obtain consistence to the addition of HARQ in MIMO mode some HARQ-IE must be revised to adapt these changes.
Purpose	To incorporate the text changes proposed in this contribution into the 802.16e/D6 draft.
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Clarification of HARQ data region and consistence of protocol in HARQ format configuration

Meng Zhao Dongyan Bi
ZTE, Inc.

1. Introduction

Because the HARQ data transmission is relatively independent to other data transmissions, it needs to set clearly position of HARQ data region while in current protocol there is no clear position description. There are two ways to set the HARQ data region, one is to set independent sub-frame in downlink subframe and uplink subframe, and it means a HARQ sub-frame which is specially used to transmit HARQ data consists of many symbol regions, such as AMC, MIMO etc. The other is to set data HARQ region in each zone of the frame. In figure 24 of 802.16eD5,it seems to comply with the first one. Considering the structure of HARQ in protocol we will use the first one and it wouldn't need to be revised so much to satisfy this clarification. Meanwhile, to obtain the support of HARQ in MIMO mode, some HARQ-IE must be revised to adapt these changes.
In protocol figure 24 indicate one instance of DL HARQ sub-frame. But in the compact DL-MAP IE --Format configuration IE, which only provide the position of broadcast and band AMC. So we must set the position for MIMO.

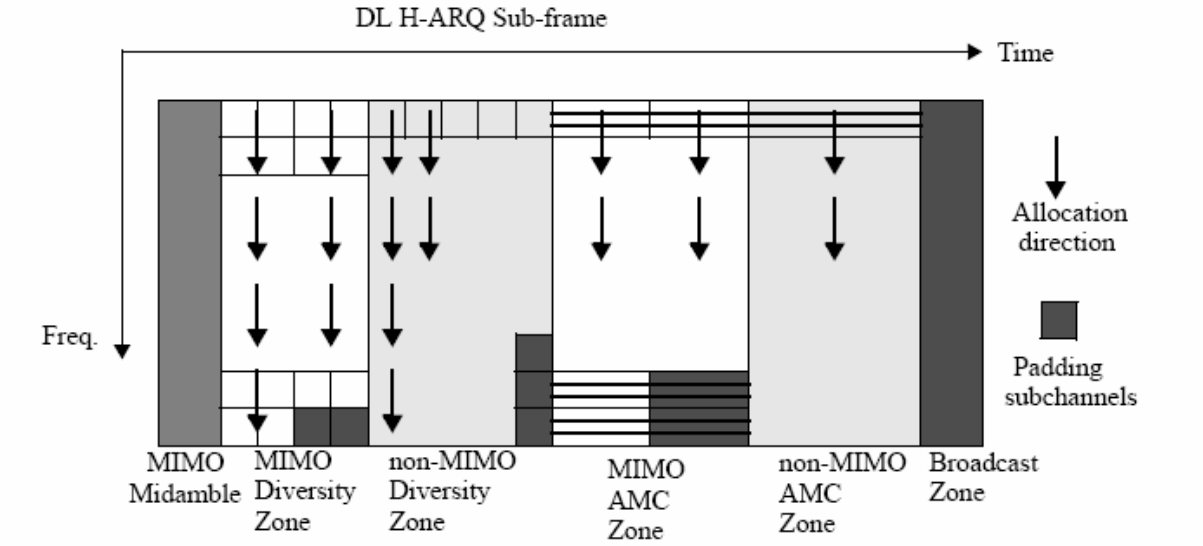


Figure 24—Downlink H-ARQ Sub-frame Structure

2. The Solution

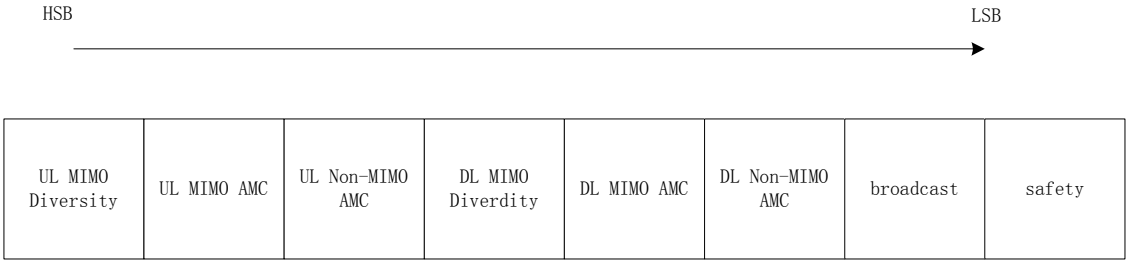
In normal DL-MAP there is no clear definition of HARQ data region. We add the description of HARQ data sub-frame in H-ARQ MAP pointer IE. Because the whole band allocated to the BS could be used, we only need "**No. OFDM Symbols**" and "**OFDMA Symbol offset** "to describe the HARQ data sub-frame. In normal UL-MAP there is also no clear definition of

UL HARQ data sub-frame. We add H-ARQ UL-Data Region IE in extended UIUC to describe the location of H-ARQ UL-Data sub-frame. Because the whole band allocated to the BS could be used, we only need "**No. OFDM Symbols**" and "**OFDMA Symbol offset** " to describe the HARQ data sub-frame.

Then we allocate some region of the whole HARQ data sub-frame to each mode supported in Format configuration IE. But in Format configuration IE of HARQ compact DL-MAP IE there are only OFDM numbers of AMC mode. It is necessary to add the number of symbols of MIMO mode in this IE. Because there are several modes supported, we introduce Mode Support Index to denote which modes must be supported in the current frame or following frames. The index would save the spending if some modes are not supported, that is, if some modes are not supported we won't set the OFDM numbers for this mode. In general, the normal mode (non-MIMO diversity zone) should be included, which we won't indicate it's existing in Mode Support Index. So there are about eight modes to be indicated:

Mode Support Index:

Each bit stands for a mode. A bit value of 1 indicates "supported" while 0 indicats "not supported".



Then we can configure the number of OFDM symbols of each mode according to actual allocation of each mode.

3. Proposed Text

[Modify Table 89 of 6.3.2.3.43.2]

Table 89-Format configuration IE

Syntax	Size	Notes
Compact_DL-MAP_IE(){		
DL-MAP Type = 4	3 bits	Format_Configuration_IE
New Format Indication	1 bits	0 = Use the format configured by the latest Format_Configuration_IE 1 = New format
if (New Format Indication == 1) {		
CID Type	2bits	00 = Normal CID 01 = RCID11 (default) 10 = RCID7 11 = RCID3
~~**Safety Pattern**~~	~~10 bits~~	
~~**Subchannel type for Band AMC**~~		~~See Band AMC specification (8.4.6.3).~~ ~~00 = Default type (default)~~ ~~01 = 1x6 type~~ ~~10 = 2x3 type~~ ~~11 = 3x2 type~~

~~**Max Logical Bands**~~	~~2 bits~~	~~0 = 3 bands,~~ ~~1 = 6 bands,~~ ~~2 = 12 bands (default)~~ ~~3 = 24 bands~~
~~**No. Symbols for Broadcast**~~	~~4 bits~~	~~No. Symbol, (default = 0)~~
~~**No. Symbols for DL Band AMC**~~	~~4 bits~~	~~No. Symbol, (default = 0)~~
~~**No. Symbols for UL Band AMC**~~	~~4 bits~~	~~No. Symbol, (default = 0)~~
~~}~~		
~~}~~		
Mode support Index	8bits	Every bit stand for one mode 1:support the mode 0: not support the mode
If (Safety Mode supported)		
Safety Pattern	10 bits	
If (Broadcast mode supported)		
No. Symbols for Broadcast	4 bits	No. Symbol, (default = 0)
If (non-MIMO DL Band AMC supported or non-MIMO UL Band AMC supported){		If any of 4 AMC mode bits is 1.
Subchannel type for Band AMC	2 bits	See Band AMC specification (8.4.6.3). 00 = Default type (default) 01 = 1x6 type 10 = 2x3 type 11 = 3x2 type
Max Logical Bands	2 bits	0 = 3 bands, 1 = 6 bands, 2 = 12 bands (default) 3 = 24 bands
}		
If (non-MIMO DL Band AMC supported)		
No. Symbols for non-MIMO DL Band AMC	4 bits	No. Symbol, (default = 0)
If (MIMO DL Band AMC supported)		
No. Symbols for MIMO DL Band AMC	4 bits	No. Symbol, (default = 0)
If (MIMO DL Diversity supported){		
No. Symbols for MIMO DL Diversity	4 bits	No. Symbol, (default = 0)
}		
If (non-MIMO UL Band AMC supported)		
No. Symbols for non-MIMO UL Band AMC	4 bits	No. Symbol, (default = 0)
If (MIMO UL Band AMC supported)		
No. Symbols for MIMO UL Band	4 bits	No. Symbol, (default = 0)

AMC		
If (MIMO UL Diversity supported){		
No. Symbols for MIMO UL Diversity	4 bits	No. Symbol, (default = 0)
}		
}		

Change the description of the 'No. Symbols for Broadcast', delete the description of the 'No. Symbols for DL Band AMC' and 'No. Symbols for UL Band AMC' fields below Table 89 and add the description of the "Mode Support Index" and "No. Symbols for non-MIMO DL Band AMC" and "No. Symbols for MIMO DL Band AMC" and "No. Symbols for MIMO DL Diversity" and "No. Symbols for non-MIMO UL Band AMC" and "No. Symbols for MIMO UL Band AMC" and "No. Symbols for MIMO UL Diversity" as indicated:

Mode Support Index
Each bit stands for a mode. A bit value of 1 indicates "supported" while 0 indicats "not supported".

UL MIMO Diversity	UL MIMO AMC	UL Non-MIMO AMC	DL MIMO Diverdity	DL MIMO AMC	DL Non-MIMO AMC	broadcast	safety

No. Symbols for Broadcast
This field specifies the number of symbols allocated for Broadcast symbol region. The Broadcast symbols shall be allocated at the end of the DL HARQ sub-frame. The number of symbols is counted from the last symbol of the DL HARQ sub-frame.

No. Symbols for non-MIMO DL Band AMC
This specifies the number of symbols allocated for non-MIMO DL Band AMC symbol region. The symbols for non-MIMO DL Band AMC shall be allocated before the broadcast symbol region.

No. Symbols for MIMO DL Band AMC
This specifies the number of symbols allocated for MIMO DL Band AMC symbol region. If the region exists, the symbols for MIMO Band AMC shall be allocated before the non-MIMO DL Band AMC symbol region.

No. Symbols for MIMO DL Diversity
This specifies the number of symbols allocated for MIMO DL Diversity. If the MIMO mode is supported and MIMO midamble exists, the position of the MIMO DL Diversity zone should be right after the midamble. The other DL symbols are allocated for the non-MIMO DL Diversity.

No. Symbols for non-MIMO UL Band AMC
This specifies the number of symbols allocated for non-MIMO UL Band AMC symbol region. If the region exists, the non-MIMO UL Band AMC symbols shall be allocated at the end of the UL HARQ sub-frame.

No. Symbols for MIMO UL Band AMC
This specifies the number of symbols allocated for MIMO UL Band AMC symbol region. If the region exists, the symbols for MIMO UL Band AMC shall be allocated before the non-MIMO UL Band AMC symbol region.

No. Symbols for MIMO UL Diversity
This specifies the number of symbols allocated for MIMO UL Diversity. If the MIMO mode is supported, the position of the MIMO UL Diversity zone should be at the start of UL HARQ sub-frame. The other UL symbols are allocated for the MIMO UL Diversity.

[Replace Table 283a of 8.4.5.3.10 with the following table]

Table 283a-H-ARQ MAP pointer and region IE format

Syntax	Size	Notes
H-ARQ MAP pointer and region IE{		
Extended DIUC	4 bits	HARQ_P=0x07
Length	4 bits	Length = 0x02
AMC DIUC	4 bits	Indicates the AMC level of the burst containing an H-ARQ MAP message
No. Slots	8bits	
Repetition Coding Indication	2 bits	0b00 - No repetition coding 0b01 - Repetition coding of 2 used 0b10 - Repetition coding of 4 used 0b10 - Repetition coding of 6 used
MAP version	2 bits	0b00 - H-ARQ MAPv1 0b01-0b11 - *reserved*
OFDMA Symbol offset	8 bits	The offset of the OFDMA symbol in which the HARQ data sub-frame starts, measured in OFDMA symbols from the beginning of the downlink frame in which the DL-MAP is transmitted.
No. OFDM Symbols	8 bits	
}		

H-ARQ region allocation:
OFDMA Symbol offset
No. OFDM Symbol

[Add the following table and text in section 8.4.5.4.x]

This IE indicates the position of UL HARQ sub-frame.

Table xxx H-ARQ UL-Data Region IE

Syntax	Size	Notes
H-ARQ UL-Data Region IE {		
Extended UIUC	4 bits	=0xxx
Length	4 bits	Length = 0x02
OFDMA Symbol offset	8 bits	
No. OFDM Symbols	8 bits	
}		

OFDMA Symbol offset
The offset of the OFDMA symbol in which the UL HARQ sub-frame starts, the offset value is defined in units of OFDMA symbols and is relevant to the Allocation Start Time field given in the UL-MAP message.
No. OFDMA Symbols
The number of OFDMA symbols that are used to carry the **UL HARQ sub-frame**.