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Re:	Response to Sponsor Ballot call for comment
Abstract	Clarification on DL_MAP/ULMAP transmission
Purpose	To incorporate the changes here proposed into the 802.16e D6 draft
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Clarification on DL_MAP/UL_MAP Transmission

1 Introduction

According to the definition of the frame structure in 802.16e/D5, each frame in the downlink transmission begins with a preamble and the downlink transmissions period. The first four transmitted subchannels in the first data symbol of the downlink are used for FCH. Immediately following FCH is DL-MAP and UL-MAP. Although the OFDMA frame may include multiple zones, in which either PUSC or FUSC can be implemented, DL_MAP and UL_MAP are required to transmit in PUSC with CellID=0 in order for MSS to receive the control signal reliably. Moreover DL-MAP or UL-MAP allocation can not span over multiple zones. However, DL_MAP and UL_MAP are with variable length. For a BS has a shorter DL_MAP/UL_MAP, it needs to continue PUSC mode with CellID=0 in order to maintain PUSC SNR gain for other BS with longer DL_MAP/UL_MAP. In summary, to take advantage of PUSC permutation SRN gain, all BSs shall maintain PUSC transmission until all neighboring BSs finish the DL/MAP and UL/MAP transmission. However, due to the nature of variable length of DL_MAP/UL_MAP, there is no way for BS to know the proper time to switch to the other permutations. This effectively reduces usage of other permutation or zone usage.

The other related issues are that DL_MAP contains IE which is unicast to certain MSSs, who may have very high SNR. For these IE's transmission, there is no need to use PUSC scheme with low modulation and low coding rate.

In this contribution, we propose to relax the constraint that DL_MAP or UL_MAP allocations must be transmitted in the same zone and add a parameter N_SYMBOL_DL_MAP to allow smooth switching from PUSC to FUSC without negative impact on DL_MAP detection.

2 Proposed solution

Option 1: use the existing the existing H-ARQ MAP Pointer IE, which limits to one dimensional resource allocation as in HARQ. However, it provides a more unified solution as suggested by Yigal

Option 2: define a new DL_MAP_Pointer_IE(), which allows 2 dimensional allocation. It is more flexible, but needs a new IE.

~~In the previous version 16e/D4, if DIUC = 14, it refers to the end of DL IE. This can be used to solve this problem. IF we specify a maximum DL_MAP length to certain number of OFDMA symbols. If the DL_MAP requires can fit within the region, then the last IE will be end of MAP. If DL_MAP requires more resources than the specified region, the last IE will allocate a data region to transfer the remaining DL MAP. This region may be in different permutation zone. The remaining IE may be transmitted with different burst profile specified in this last DL_MAP_IE().~~

3 Proposed Text Change

~~Modify the text on page 502 in section 8.4.4.2 line 50.~~

~~--------- Start text ----------~~

~~The OFDMA frame may include multiple zones (such as PUSC, FUSC, PUSC with all subchannels, optional FUSC, AMC and optional FUSC with all subchannels), the transition between zones is indicated in the DL-Map by the Zone_switch IE (see 8.4.5.3.4). No DL-MAP or UL-MAP allocations can span over multiple zones. Figure 219 depict OFDMA frame with multiple zones. The length of DL_MAP shall not exceed N_SYMBOL_DL_MAP OFDMA symbols. If the DL_MAP requires more resources than N_SYMBOL_DL_MAP~~

OFDMA symbols, The last DL_MAP_IE() shall allocate a data region to carry the remaining DL_MAP message. The allocated region may be in different permutation zone. The remaining DL_MAP may be transmitted using the burst profile specified in this last DL_MAP_IE(). If the DL_MAP can be transmitted within the N_SYMBOL_DL_MAP OFDMA symbols, the last MAP_IE shall be the end of map IE. N_SYMBOL_DL_MAP can be one of these values: 2, 4, 6 or 8.

--------- End text ----------

Delete the changes in the section 8.4.5.3.1

Option 1: use the existing H-ARQ MAP Pointer IE, which limits to one dimensional resource allocation

[Modify the text on page 502 in section 8.4.4.2 line 50]

--------- *Start text* ----------

The OFDMA frame may include multiple zones (such as PUSC, FUSC, PUSC with all subchannels, optional FUSC, AMC and optional FUSC with all subchannels), the transition between zones is indicated in the DL-Map by the Zone_switch IE (see 8.4.5.3.4). No DL-MAP or UL-MAP allocations can span over multiple zones. Figure 219 depict OFDMA frame with multiple zones. BS may send more than one DL_MAP (or Compressed DL_MAP), these MAPs can be sent in different zone. In this case, HARQ_MAP_Pointer_IE () shall be used to point to next compressed DL_MAP message in the region specified in HARQ_MAP_Pointer_IE.

[modify the section 8.4.5.3.10 H-ARQ MAP Pointer IE]

This IE shall ~~only~~ be used by a BS supporting H-ARQ, for SS supporting H-ARQ or by a BS supporting multiple DL_MAPs.

Table 283—H-ARQ MAP pointer IE format

Syntax	Size	Notes
~~MIMO_DL_Enhanced_IE~~HARQ_MAP_Pointer_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 a H-ARQ MAP message or a Compressed_DL-MAP
No. Slots	8 bits	The number of slots allocated for the burst containing a H-ARQ MAP message or a Compressed_DL-MAP
Reserved	4 bits	
}		

Option 2: define a new DL_MAP_Pointer_IE(), which allows 2 dimensional allocation.
[Modify the text on page 502 in section 8.4.4.2 line 50]

--------- *Start text* ----------

The OFDMA frame may include multiple zones (such as PUSC, FUSC, PUSC with all subchannels, optional FUSC, AMC and optional FUSC with all subchannels), the transition between zones is indicated in

the DL-Map by the Zone_switch IE (see 8.4.5.3.4). No DL-MAP or UL-MAP allocations can span over multiple zones. Figure 219 depict OFDMA frame with multiple zones. BS may send more than one DL_MAP (or Compressed DL_MAP), these MAPs can be sent in different zone. In this case, DL_MAP_Pointer_IE() will be used to point to next compressed DL_MAP message in the region specified in DL_MAP_Pointer_IE.

[insert the following section]

8.4.5.3.19 DL MAP Pointer IE

This IE is sent by BS in DL-MAP/Compressed DL-MAP message as a broadcast type IE. The region indicated by this IE shall be processed by specific group of MSSs supporting the permutation specified in the region.

Table xxx DL_MAP_Pointer_IE Format

Syntax	Size	Notes
DL_MAP_Pointer_IE() {		
Extended DIUC	4 bits	S=0x0B
Length	4 bits	
DIUC	4 bits	
OFDMA symbol offset	8 bits	
Subchannel offset	6 bits	
Boosting 3 bits	3 bits	
No. OFDMA symbols	8 bits	
No. Subchannels	8 bits	
Repetition Coding Indication	2 bits	
Padding bits variable To align byte boundary		
}		

For both options, we make the following change in Compressed DL_MAP to avoid send duplicated information from the first DL-MAP.

[Modify the table 303a]

Table 303a—Compressed DL-MAP

Syntax	**Size**	**Notes**
Compressed_DL-MAP() {		
Compressed map indicator	2 bits	Set to binary 11 for compressed format
~~*Reserved*~~ Shorten MAP	1 bit	~~Shall be set to zero.~~ Indicate whether to shorten this MAP, used only if this is a second DL_MAP message
UL-MAP appended	1 bit	
Reserved	1 bit	Shall be set to 1
Map message length	11 bits	
If (Shorten MAP == 0) {		
PHY Synchronization Field	32 bits	
DCD Count	8 bits	
Operator ID	8 bits	
Sector ID	8 bits	
}		
DL IE count	8 bits	
for (i=1; i<= DL IE count; i++) {		
DL-MAP_IE()	Variable	

}		
if !(byte boundary) {		
Padding Nibble	4 bits	Padding to reach byte boundary.
}		
CRC		
}		

--------- End text ----------