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Title	Improving HARQ Map Decoding Efficiency and Some Error Fixes in MIMO STC HARQ Sub-burst IEs	
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Re:	IEEE P802.16e/D10	
Abstract	This contribution proposes a method for improving HARQ map decoding efficiency by inserting some fields in HARQ DL/UL MAP IE that enable omission of decoding some parts of the IE that belong to the HARQ modes the MS does not support.	
Purpose	Review and Adopt the suggested changes into P802.16e/D10	
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1 Introduction

The contribution (IEEE C80.16e-05/371/r2) helps MS improve the Map decoding efficiency by enabling the omission of decoding sub-burst IEs that MS does not support. However, to find MS has to know the number of ACK enabled sub-bursts in the sub-burst IE before omitting it. To solve this problem without further additional Map overhead (except MIMO related), we propose to insert the Number of ACK channels in sub-burst IEs.

The contribution also fixes errors in the MIMO DL STC HARQ Sub-Burst IE and MIMO UL STC HARQ Sub-Burst IE.

2 Proposed text changes

[Modify Table 286i, in section 8.4.5.3.21, page 314]

Table 286l—HARQ DL MAP IE format

Syntax	Size (bits)	Notes
HARQ DL MAP IE {	—	—
Extended-2 DIUC	4	HARQ_DL_MAP_IE() = 0x07
Length	8	Length in bytes
RCID_Type	2	0b00 = Normal CID 0b01 = RCID11 0b10 = RCID7 0b11 = RCID3
…..	…	…..
Sub-burst IE Length	8	Length, in nibbles, to indicate the size of the subburst IE in this HARQ mode. The MS may skip DL HARQ sub-burst IE if it does not support the HARQ Mode. However, the MS shall decode NACK Channel field from each DL HARQ sub-burst IE to determine the UL ACK channel it shall use for its DL HARQ burst.
If (Mode == 0b0000) {	—	—
DL HARQ Chase sub-burst IE()	variable	—
} else if (Mode == 0b0001) {	—	—
…..		

[In 8.4.5.3.21 DL HARQ Chase sub-burst IE, Page 315, Table 286m, modify as:]

Table 286m—DL HARQ Chase sub-burst IE format

Syntax	Size (bits)	Notes
DL HARQ Chase sub-burst IE() {	—	—
N sub burst[ISI]	4~~5~~	Number of sub-bursts in the 2D region
~~*Reserved*~~	~~3~~	~~Shall be set to zero.~~

N ACK channel	4	Number of HARQ ACK enabled sub-bursts in the 2D region
For (j=0; j< N sub burst; j++){	—	—
RCID_IE()	*variable*	—
Duration	10	Duration in slots
……	……	……
}		

[In 8.4.5.3.21 DL HARQ IR CTC sub-burst IE, Page 317, Table 286n, modify as:]

Table 286n—DL HARQ IR CTC sub-burst IE format

Syntax	Size (bits)	Notes
DL HARQ IR CTC sub-burst IE() {	—	—
N sub burst	4~~5~~	—
~~*Reserved*~~	~~3~~	~~—~~
N ACK channel	4	Number of HARQ ACK enabled sub-bursts in the 2D region
For (j=0; j< N sub burst; j++){	—	—
RCID_IE()	*variable*	—
……	……	……
}		

[In 8.4.5.3.21 DL HARQ IR CC sub-burst IE, Page 318, Table 286o, modify as:]

Table 286o—DL HARQ IR CC sub-burst IE format

Syntax	Size (bits)	Notes
DL HARQ IR CC sub-burst IE() {	—	—
N sub burst	4~~5~~	—
~~*Reserved*~~	~~3~~	~~—~~
N ACK channel	4	Number of HARQ ACK enabled sub-bursts in the 2D region
For (j=0; j< N sub burst; j++) {	—	—
RCID_IE()	*variable*	—
……	……	……
}		

[In 8.4.5.3.21 MIMO_DL_Chase_HARQ_Sub-Burst_IE, Page 321, Table 286p, modify as:]

Table 286p—MIMO DL Chase HARQ sub-burst IE format

Syntax	Size (bits)	Notes
MIMO_DL_Chase_HARQ_Sub-Burst_IE() {	—	—
N sub burst	4~~5~~	Number of sub-bursts in the 2D region
N ACK channel	6	Number of HARQ ACK enabled sub-bursts in the 2D region
For (j=0; j< N sub burst; j++){	—	—
MU Indicator	1	Indicates whether this DL burst is intended for multiple SS
Dedicated MIMO DL Control Indicator	1	—
……	……	……
}		

[In 8.4.5.3.21 MIMO DL IR HARQ Sub-Burst IE, Page 323, Table 286q, modify as:]

Table 286q—MIMO DL IR HARQ Sub-Burst IE format

Syntax	Size (bits)	Notes
MIMO DL IR HARQ Sub-Burst IE {	—	—
N sub burst	4~~5~~	Number of sub-bursts in the 2D region
N ACK channel	6	Number of HARQ ACK enabled sub-bursts in the 2D region
For (j=0; j< N sub burst; j++){	—	—
MU Indicator	1	Indicates whether this DL burst is intended for multiple SS
Dedicated MIMO DL Control Indicator	1	—
……	……	……
}		

[In 8.4.5.3.21 MIMO DL IR HARQ for CC Sub-Burst IE, Page 325, Table 286r, modify as:]

Table 286r—MIMO DL IR HARQ for CC Sub-Burst IE format

Syntax	Size (bits)	Notes
MIMO DL IR HARQ for CC Sub-Burst IE {	—	—

N sub burst	4~~5~~	Number of sub-bursts in the 2D region
N ACK channel	6	Number of HARQ ACK enabled sub-bursts in the 2D region
For (j=0; j< N sub burst; j++){	—	—
MU Indicator	1	Indicates whether this DL burst is intended for multiple SS
Dedicated MIMO DL Control Indicator	1	—
……	……	……
}		

[Modify Table 286s, page 327. In the MIMO DL STC HARQ sub-burst IE, the ACK disable bit should be outside of the 'if (Tx count == 0)' loop. Otherwise, other MS whom this sub-burst is not designated to will have no way of knowing how to decode the remainder of the IE.]

Table 286s—MIMO DL STC HARQ Sub-Burst IE format

Syntax	Size (bits)	Notes
MIMO DL STC HARQ Sub-Burst IE {	—	—
N sub burst	4~~5~~	Number of sub-bursts in the 2D region
N ACK channel	6	Number of HARQ ACK enabled sub-bursts in the 2D region
For (j=0; j< N sub burst; j++){	—	—
Tx count	2	0b00: initial transmission 0b01: odd retransmission 0b10: even retransmission 0b11: reserved
Duration	10	—
Sub-burst offset indication	1	Indicates the inclusion of sub-burst offset
Reserved	3	—
If (Sub-burst offset indication == 1) {	—	—
Sub-burst offset	8	Offset in slots with respect to the previous sub-burst defined in this data region. If this is the first sub-burst within the data region, this offset is with respect to slot 0 of the data region.
}	—	—
RCID IE()	*variable*	—

ACK Disable	1	When 'ACK Disable' == 1, the allocated sub-burst does not require an ACK to be transmitted by the SS in the ACKCH Region (see 8.4.5.4.24). In this case, no ACK channel is allocated for the sub-burst in the ACKCH Region. For the burst, BS shall not perform HARQ retransmission and MS shall ignore ACID, AI_SN, and SPID which shall be set to '0' by BS if they exist.
if (Tx count ==00) {	—	—
Dedicated MIMO DL Control Indicator	1	
~~**ACK Disable**~~	~~1~~	~~When 'ACK Disable' == 1, the allocated sub-burst does not require an ACK to be transmitted by the SS in the ACKCH Region (see 8.4.5.4.24). In this case, no ACK channel is allocated for the sub-burst in the ACKCH Region. For the burst, BS shall not perform HARQ retransmission and MS shall ignore ACID, AI_SN, and SPID which shall be set to '0' by BS if they exist.~~
If (Dedicated MIMO DL Control Indicator ==1) {	—	—
Dedicated MIMO DL Control IE ()	*variable*	—
}	—	—
DIUC	4	—
Repetition Coding Indication	2	0b00 – No repetition coding 0b01 – Repetition coding of 2 used 0b10 – Repetition coding of 4 used 0b11 – Repetition coding of 6 used
}	—	—
If (ACK Disable ==0) {	—	—
ACID	4	—
}	—	—
}	—	—
}	—	—

[Modify Table 302p, page 392, as follows. There is error in the MIMO UL STC HARQ sub-burst IE. The structure of the IE should follow that of the MIMO DL STC HARQ sub-burst IE, where there is no need to introduce fields related to MU indicator since STC HARQ (refer to Section 8.4.8.9) does not support multi-user burst.]

Table 302p—MIMO UL STC HARQ sub-burst IE format

Syntax	Size (bits)	Notes
MIMO UL STC HARQ Sub-Burst IE{	—	—

Tx count	2	0b00: initial transmission 0b01: odd retransmission 0b10: even retransmission 0b11: reserved
Duration	10	—
Sub-burst offset indication	1	Indicates the inclusion of sub-burst offset
Reserved	3	—
If (Sub-burst offset indication == 1) {	—	—
Sub-burst offset	8	Offset in slots with respect to the previous sub-burst defined in this data region. If this is the first sub-burst within the data region, this off-set is with respect to slot 0 of the data region.
}	—	—
RCID IE()	*variable*	—
ACK Disable	1	When 'ACK Disable' == 1, the allo-cated sub-burst does not require an ACK to be transmitted by the BS in the HARQ ACK BITMAP (see 8.4.5.3.22). In this case, no bit posi-tion is allocated for the sub-burst in the HARQ ACK BITMAP. For the burst, MS shall not perform HARQ retransmission and ignore ACID, AI_SN, and SPID which shall be set to '0' by BS if they exist.
if (Tx count ==00) {	—	—
UIUC	4	—
Repetition Coding Indication	2	0b00 – No repetition coding 0b01 – Repetition coding of 2 used 0b10 – Repetition coding of 4 used 0b11 – Repetition coding of 6 used
}	—	—
If (ACK Disable ==0) {	—	—
ACID	4	—
}	—	—
}	—	—
~~**Dedicated MIMO DL Control Indicator**~~	~~1~~	—
~~If (Tx count ==0) {~~	—	—
~~if (MU indicator == 0) {~~	—	—
~~RCID IE()~~	~~*variable*~~	—
~~If (Dedicated MIMO UL Control Indicator ==1) {~~	—	—
~~**Dedicated MIMO UL Control IE ()**~~	~~*variable*~~	—
~~}~~	—	—

} else {	—	—
Matrix	1	Indicates transmission matrix (See 8.4.8) for MS with dual Tx antennas 0 = Matrix A 1 = Matrix B Ignored by MS with single Tx antenna
}	—	—
For (i=0;i<N_layer;i++) {	—	—
If (MU indicator == 1) {	—	—
RCID IE()	*variable*	—
}	—	—
UIUC	4	—
Repetition Coding Indication	2	0b00 – No repetition coding 0b01 – Repetition coding of 2 used 0b10 – Repetition coding of 4 used 0b11 – Repetition coding of 6 used
}	—	—
If (ACK Disable ==0) {	—	—
ACID	4	
}	—	—
}	—	—
}	—	—