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Title	**Clean up for Closed-Loop MIMO in H-ARQ MAP IE**
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Source(s)	Hang Zhang, Wen Tong, Mo-Han Fong, Peiying Zhu and Brian Johnson wentong@nortel.com **Nortel Networks**
Re:	IEEE P802.16e/D7
Abstract	Support for Closed-Loop MIMO in H-ARQ MAP IE
Purpose	Adoption of proposed changes into P802.16e, underlined green fonts indicate text change
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Clean up for Closed-Loop MIMO in H-ARQ MAP IE

1. Introduction

In contribution C802.16e-04/554r4, the closed loop MIMO support for antenna selection can operate in the multi-user mode. The corresponding the closed loop MIMO HARQ MAP IE can be adjusted to support this operation. In this contribution, we provide the text changes to clarify this aspect.

2. Specific Text Changes

[Add the following text after line 32 on page 279 in section 8.4.5.3.22]

---------- Start of Text Change ----------

Table 285q -- MIMO DL Chase H-ARQ Sub-Burst IE Format

MIMO DL Chase H-ARQ Sub-Burst IE {		
N sub burst	5	Number of sub-bursts in the 2D region
For (j=0; j< N sub burst; j++){		
MU Indicator	1 bit	Indicates whether this DL burst is intended for multiple SS
Dedicated MIMO DL Control Indicator	1 bit	
ACK Disable	1 bit	When this bit is "1" no ACK channel is allocated and the SS shall not reply with an ACK.
If (MU indicator == 0) {		
RCID IE()	Variable	
}		
else {		
N_MS	2 bits	Indicates the number of MSs. The number of MS = N_MS+1
}		
If (Dedicated MIMO DL Control Indicator ==1) {		
Dedicated MIMO DL Control IE ()	variable	
}		
Length	10 bits	
If (Closed MIMO Control Info == 1) {		
If (MIMO mode != 10) {		
N =1 }		
else {		
N = N_MS }		
Else { N = N_layer }		
For (i=0;i<N~~_layer~~;i++) {		

if (MU indicator == 1) {			
RCID IE()		Variable	
}			
If ((Closed_MIMO_Control_Info == 1)&(MIMO mode == 10)){			
N_stream		2 bits	Indicates the number fo streams in Table 317f fpr 3 Tx and Table 317g for 4Tx.
Antenna Selection Index		3 bits	Indicates the index of antenna selection See 8.4.8.3.4 and 8.4.8.3.5 000~010 = 0b110000~0b110010 in Table 317f 000~101 = 0b110000 ~ 0b 110101 in Table 317g
}			
DIUC		4 bits	
Repetition Coding Indication		2 bits	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 bits	
AI_SN		1 bit	
}			
}			
}			
}			

When MU Indicator = 1 for a particular loop index j in the MIMO DL Chase H-ARQ Sub-Burst IE, MIMO DL IR H-ARQ Sub-Burst IE, or the MIMO DL IR H-ARQ for CC Sub-Burst IE, each layer shall be allocated its associated ACK channel. In this case, the number of ACK channels associated with the sub-burst IE will be greater than N_sub_burst. We define the N_MS as the number of MS support on the same sub-burst and N_layer as the number of parallel stream support for a specific user.

Table 285s – MIMO DL IR H-ARQ for CC Sub-Burst IE Format

MIMO DL IR H-ARQ for CC Sub-Burst IE {			
N sub burst		5	Number of sub-bursts in the 2D region
For (j=0; j< N sub burst; j++){			
MU Indicator		1 bit	Indicates whether this DL burst is intended for multiple SS
Dedicated MIMO DL Control Indicator		1 bit	
ACK Disable		1 bit	When this bit is "1" no ACK channel is allocated and the SS shall not reply with an ACK.
If (MU indicator == 0) {			
RCID IE()		Variable	
}			
If (Dedicated MIMO DL Control Indicator ==1) {			

Dedicated MIMO DL Control IE ()	variable	
}		
Length	10 bits	
If (Closed MIMO Control Info == 1) {		
If (MIMO mode != 10) {		
N = 1 }		
else {		
N = N_MS }		
else { N = N_layer }		
For (i=0;i<N~~_layer~~;i++) {		
if (MU indicator == 1) {		
RCID IE()	Variable	
}		
If ((Closed_MIMO_Control_Info == 1)&(MIMO mode == 10)){		
N_stream	2 bits	Indicates the number fo streams in Table 317f fpr 3 Tx and Table 317g for 4Tx.
Antenna Selection Index	3 bits	Indicates the index of antenna selection See 8.4.8.3.4 and 8.4.8.3.5 000~010 = 0b110000~0b110010 in Table 317f 000~101 = 0b110000 ~ 0b 110101 in Table 317g
}		
DIUC	4 bits	
Repetition Coding Indication	2 bits	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 bits	
AI_SN	1 bit	
SPID	2 bits	
}		
}		
}		
}		

8.4.5.3.22.1 Dedicated MIMO DL Control IE Format

Dedicated DL Control IE for MIMO contains additional control information for each sub-burst. Because each sub-burst may have its own control information format dependent on the MSS capability, the length of the Dedicated DL Control IE for MIMO is variable.

Table 285u -- Dedicated MIMO DL Control IE Format

Syntax	size	Note
Dedicated MIMO DL Control IE() {		
Length	5 bits	Length of following control information in Nibble.
Control Header	3 bits	Bit #0 : MIMO Control Info Bit #1 : CQI Control Info Bit #2 : Closed MIMO Control Info
if(MIMO Control Info == 1){		
Matrix	2 bits	Indicates transmission matrix (See 8.4.8)
N_layer	2 bits	Number of coding/modulation layers 00 = 1 layer 01 = 2 layers 10 = 3 layers 11 = 4 layers
if (Dedicated Pilots == 1) {		Dedicated Pilots field in STC_Zone_IE()
Num_Beamformed_Streams	2 bits	Indicates the number of beamformed streams which is equal to the number of pilot patterns 00 = 1 stream 01 = 2 streams 10 = 3 streams 11 = 4 streams
}		
}		
If(CQICH Control Info == 1){		
Period	3 bits	Period (in frame) = 2^period
Frame offset	3 bits	
Duration	4 bits	A CQI feedback is transmitted on the CQI channels indexed by the CQICH_ID for 10 x 2^d frames.
For (j=0;N_layer+1;j++) {		
Allocation index[1]	6 bits	Index to CQICH assigned to this layer.
}		
CQICH_Num	2 bits	Number of additional CQICHs assigned to this SS (0-3)
for (i=0; i<CQICH_Num; i++) {		
Feedback type	3 bits	Type of feedback on this CQICH
Allocation index	6 bits	
}		
}		
if(Closed MIMO Control Info == 1){		

if(MIMO Control Info==1)
MIMO mode = Matrix
else
MIMO mode = Matrix in STC_Zone_IE()		

If (MIMO mode == 00 or 01) {		

Antenna Grouping Index }	3 bits	Indicates the index of antenna grouping
		See 8.4.8.3.4 and 8.4.8.3.5
		If((Matrix_indicator == 00)
		000~010 = 0b101110~0b110000 in Table 298c
		else
		000~101 = 0b110001~0b110110 in Table 298c

~~elseif (MIMO mode == 10) {~~		
~~Num_stream~~	~~2 bits~~	~~Indicates the number of streams in Table 316f for 3 Tx and Table 316g for 4 Tx.~~
~~Antenna Selection Index }~~	~~3 bits~~	~~Indicates the index of antenna selection~~

			~~See 8.4.8.3.4 and 8.4.8.3.5~~ ~~000~110 = 0b110000~0b110101 in Table 298d~~
elseif (MIMO mode == 11) {			
Num_stream		2 bits	Indicates number of streams
Codebook Precoding Index }		6 bits	Indicates the index of precoding matrix W in the codebook See 8.4.8.3.6
}			
Padding		Variable	Padding to Nibble; shall be set to 0
}			

Control Header
4 bits are used to indicate the following control information. If the first bit is set to 1, this means that MIMO Control information follows. If the second bit is set to 1, this IE shall contain CQI control information. Other bits are reserved for future extension.
N_layer
Specifies the number of layers contained in this burst. The layer is defined as a separate coding/modulation path.
Matrix Indicator
This field indicates MIMO matrix for the burst.
Period
Informs the SS of the period of CQI reports. A CQI feedback is transmitted on the CQICH every 2^p frames
Frame Offset
Informs the SS when to start transmitting reports. The SS starts reporting at the frame number which has the same 3 LSBs as the specified Frame Offset. If the current frame is specified, the SS shall start reporting in 8 frames.
Duration
Indicates when the SS should stop reporting unless the CQICH allocation is refreshed beforehand. If Duration is set to 0b0000, the BS shall de-allocate the CQICH. If Duration is set to 0b1111, the CQICH is allocated indefinitely and the SS should report until it receives another MAP_IE with Duration set to 0b0000.
Allocation Index[1]
Indicates position from the start of the CQICH region.
Feedback Type
Indicates the type of feedback content on the allocated CQICH from SS. Its mapping shall be
000 = Fast DL measurement/Default Feedback with antenna grouping
001 = Fast DL measurement/Default Feedback with antenna selection
010 = Fast DL measurement/Default Feedback with reduced code book
011 = Quantized precoding weight feedback
100 = Index to precoding matrix in code book
101 = Channel Matrix Information
110 = Per stream power control
111 = Reserved

---------- ***End of Text Change*** ----------

References

[1] IEEE P802.16e/D7 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