Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Feedback Control with HARQ Operation**
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Re:	Proposes a resolution to inefficient feedback control
Abstract	The normal map extension for HARQ has enabled CQICH control (which is fact fast feedback control) as optional dedicated control within each DL HARQ sub-burst IE. The control is inefficient and requires modification.
Purpose	Adoption
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Introduction

Contributions IEEE C802.16e-05/23r5 introduced CQICH control as optional dedicated control within each DL HARQ sub-burst IE. However, this control field can be inefficient in a number of ways.

In general, a system employing adaptive modulation and coding should assign feedback prior to the first packet transmission and discontinue feedback once the final packet in the queue has been successfully received. The CQI report is used to select the appropriate DIUC prior for the HARQ sub-burst transmission. However, the CQICH control is the DL HARQ sub-burst IE does serve either purpose. The CQICH control can not be used to assign resource prior to the first transmission or deallocate resources after the last successful transmission. The CQI Alloc IE must be used for this purpose.

The issues with the CQICH control summarized as follows:

1) The CQICH control in the DL HARQ sub-burst assigns a fast feedback channel for CQI feedback only after first data packet transmitted.
2) The CQICH control de-allocates CQI feedback with what may be the first attempt of multi-attempt HARQ transmission. A base station can never certain which HARQ attempt is in fact the last attempt. .
3) The CQICH control must be employed twice to re-configure the CQICH in the middle of a packet call. The CQICH control must be employed once to de-allocate the old CQICH and again to re-allocate a new CQICH.

The CQI control could be made more efficient in two ways

1) The de-allocation of CQI feedback could be tied to completion of the current hybrid ARQ attempt. This de-allocation message would serve as a last packet queued message instructing the SS to stop CQI feedback with the final positive acknowledgement. This last packet indication provides a robust mechanism for de-allocating CQI feedback as it relies on the highly robust HARQ signaling.
2) The re-allocation of CQI feedback could implicitly de-allocate the previous CQI feedback. As a result, the CQI feedback allocation sent as part of HARQ sub burst IE would be used to signal a allocation or re-allocation of CQICH skipping one step.

Editorial Instructions

On page 260, section 8.4.5.3.22 HARQ DL MAP IE make the following edits to Tables 285n, 285o, and 285p

Table 285m DL H-ARQ Chase Sub-Burst IE Format

DL H-ARQ Chase Sub-Burst IE {		
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
N sub burst[ISI]	5 bits	Number of sub-bursts in 2D region
For (j=0; j< N sub burst; j++){		
RCID_IE()	Variable	
Duration	10 bits	Duration in slots
ACID	4 bits	
AI_SN	1 bit	
~~CQICH~~ Dedicated Control Indicator	2 bits	00 equals no dedicated control 01 indicates to deallocate all CQI feedback one the current ACID is completed successfully 10 indicates to allocate or re-allocate CQI feedback, With a new allocation, all previous CQI assignments are discontinued 11 Extended Dedicated Conrol IE
If(~~CQICH~~ Dedicated Control Indicator == 10~~1~~){		
Allocation Index	6 bits	Index to the channel in a frame the CQI report should be transmitted by the SS
Period (p)	3 bits	A CQI feedback is transmitted on the CQI channels indexed by the (CQI Channel Index) by the SS in every 2^p frames.
Frame offset	3 bits	The MSS starts reporting at the frame of which the number has the same 3 LSB as the specified frame offset. If the current frame is specified, the MSS should start reporting in 8 frames.
Duration (d)	4 bits	A CQI feedback is transmitted on the CQI channels indexed by the (CQI Channel Index) by the SS for $2^{(d-1)}$ frames. If d is 0b0000, the CQICH is de-allocated. If d is 0b1111, the MSS should report until the BS command for the MSS to stop
}		
~~Dedicated DL Control Indicator~~	~~1 bit~~	
Elseif~~If~~ (Dedicated DL Control Indicator ==11) {		
Extended Dedicated DL Control IE ()	Variable	
}		
}		

}					