
IEEE 802.16 Broadband Wireless Access Working Group <<http://ieee802.org/16>>

Title **Harmonization base document in HARQ Ad-hoc**

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Re:

Abstract This document describes the harmonization status in HARQ Ad-hoc, which includes Harmonization scope table, contribution harmonization table of each contribution

Purpose For reporting Ad-hoc group activity to Relay TG task group

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Harmonization base document in HARQ Ad-hoc

1. Introduction

This document is for HARQ ad-hoc group harmonization. The contribution grouping table includes the relationship of each contribution and harmonization type. The contributions harmonization table include that what is the problem, what is the technical benefits, what is the technical concern and the comment resolution.

2. Harmonization Table

2.1. Harmonization scope table

(**Replacement**: Modify the text in reference document, **Optional functionality**: add the text in reference document, **Standalone**: Contribution text is not related with reference document)

4 HARQ modes		Non-Transparent		Transparent		Harmonization Type
Contributions		DL	UL	DL	UL	
185r3	CQI ACK/NAK	O	O	O	O	Replacement
	Error Burst handling (Dummy Transmission)	O	O	O	O	Replacement
	Fast Retransmission for DL HARQ (Dedicated ACK/NAK)	O	O	O	O	Optional functionality
	ACK Recovery	O	O	O	O	Optional functionality
	Multicast RS			O	O	Replacement??
196r1 (IR LDPC)		O	O	O	O	Standalone
197 (Tunneling CID)		O	O	O	O	Standalone
203r1 (Non-TR-DL)		O				Reference
204r2 (Non-TR-UL)			O			Reference
226r1 (Pre-scheduling)		O	O			Optional functionality
232r2 (TR-DL)				O		Reference
233r2 (TR-UL)					O	Reference

252r1 (Passive HARQ) (Only Error burst handling part is different)	O	O	O	O	Optional functionality
253 (Active HARQ)	O	O	O	O	Replacement??
290 (CQI ACK support)	O	O			Simulation result
297 (Fast retransmission for DL HARQ) (Asynch NAK)	O				Optional functionality
298 (Error indication)	O	O	O	O	Merged into 252r1

2.2. Contribution Harmonization Table

Contributions	problem statement (Authors)	Technical Benefits (Authors)	Comments (HARQ members)	Comment resolution (Authors & HARQ members)	Harmonization Results (Chair)
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<p>185r5</p>	<p>CQI ACK/NAK</p>	<p>In multi-hop MR system with centralized scheduling, each RS shall report the reception status to MR-BS. MR-BS checks reports and schedules the retransmission on affected links. Reference documents introduce new coding scheme for UL HARQ report channel.</p>	<p>To avoid introducing new UL HARQ report channel, the existing 6-bit CQICH is used as the HARQ report channel. It has the feature of flexible configuration to provide multiple HARQ report channels according to numbers of hops.</p>	<p>(1) To allocate the bursts, BS needs CQI. To obtain the CQI from MS/RS, the BS allocates CQICH. The CQICH information is transmitted by the RS/MS in next frame. If CQICH is used for HARQ ACK/NAK, how/when can RS transmit the “real” CQI?</p> <p>(2) 185r3 has the following statement “A HARQ status report is created by an RS only when the RS fails in decoding the packet.” The BS has no idea whether particular burst will fail or not. So, does the BS have to allocate the CQICH region every frame?</p> <p>(3) Each frame can contain up to 16 HARQ bursts. If one of these bursts fails, Could you please explain how to use the CQICH scheme?</p> <p>(4) We actually prefer the current mapping because it is a straightforward extension of the current ACK/NAK. When a relay is not used or transparent, the proposed ACK/NAK channel defaults to that used in 16e.</p>	<p>Add new message to figure CQICH as ACK/NACK is required</p> <p>See update of 185r5</p> <p>See Table aaa in 185r5</p> <p>No to resolve further, Adrian and Wen to verify the performance results</p>	
<p>Dummy Transmission</p>		<p>In multi-hop MR system with centralized end-to-end scheduling, if RS fails to receive data correctly, it should not forward erroneous data.</p>	<p>For the RS incurs the error reception on UL/DL data, instead of sending erroneous data or none, RS will send a specific dummy pattern to the next hop. Dummy patter is a specific pattern that</p>	<p>(1) In DL, PUSC pilots help the channel estimation at the next-hop node. If a burst is erroneous and no data is transmitted on the next hop on UL, what is the purpose of transmitting "dummy pattern" or UL pilots for this burst on the next hop? 4</p>	<p>Agreement: Pilot should be transmitted for both DL and UL even the packet receive is erroneous</p>	

196r1	IEEE802.16e LDPC code does not have Incremental Redundancy function.	Low cost, low latency FEC implementation with HARQ-IR and HARQ-CC by LDPC codes	<p>- The benefit of LDPC with IR is unclear compared to CTC with IR. Could the authors compare the performance of LDPC with CTC for various block sizes?</p> <p>- It is unclear in the proposed text section whether IR for LDPC can be used in DL/UL for relay and access links. Could the authors elaborate?</p>		Not accepted
197	<p>1. Out-of-order data delivery problem may arise, when tunnel MPDUs constructed using packet mode are transported using multiple HARQ channels.</p> <p>2. It is not specified what value the RCID field in the HARQ-related IE should be.</p>	<p>1. Address the problem by reusing the related 802.16e solution (i.e., extended sequence number subheader).</p> <p>2. Provide clarification related to the value of RCID field in the HARQ-related IE.</p>		Consensus 2 ad-hoc meeting back	Accepted
226r1 (Motorola)			(1) It is not necessary to highlight that how the MR-BS schedules the DL/UL HARQ MAPs. It is the implementation issue. The implicit retransmission scheme has disadvantage that it restricts the scheduling flexibility. (III)	Need to add specific message design	
252r1 (Alcatel)			(1) There are two questions. What is the definition of 'combined packet' that will be sent by RS in case of failed reception? When RS receives data and its successor does not have correct data yet, the RS will invert the NACK sent from successor and then send an ACK to destination. If so, how the MR-BS to schedule retransmission by receiving such ACK? (III)	Not discussed	

			<p>(2) I understand that when erroneous burst is forwarded from an RS to the next-hop node, CRC is perturbed on-purpose so that it would result in an error indication at the next-hop node. Now, if on the next transmission attempt, the RS correctly decodes the burst, it will transmit the correct (non-perturbed CRC) toward the next node. For chase combining, how will this new CRC be combined with the old CRC? My understanding is that CRC bits are part of the packet and hence will be combined prior to the decoding attempt at the next node.</p> <p>(3) When CRC is altered (how?), it is possible that the MS or subordinate RS may not be able to decode the message at all. In general, the benefit of erroneous forwarding is unclear.</p>		
253 (Alcatel)			<p>(1) For statement “packets which are possibly correct after HARQ combining or whose maximum number of retransmission attempts is reached will be forwarded”, what is the data to be sent when the maximum number of retransmission attempts is reached? (III)</p>	Not discussed	
290r2 (Nortel)	Performance comparison for ACK/NACK and dummy pattern	Need to avoid introduce new PHY channel for ACK/NACK and need to justify the dummy re-transmission pattern options	The simulation results on ACK/NACK channel shows the existing 802.16e 3-bit feedback channel has superior performance than the NEW ACK/NACK channel introduced in 203/204/232/234	Need further review	
297 (Samsung)	In 203r1, When intermediate RS does not receive the data successfully, ACK/NAK transmission has a latency problem in synchronous manner.	When data is error, RS can send the NAK message immediately in UL data region.	<p>(1) In multi-hop MR system with centralized end-to-end scheduling, how can we guarantee there is UL bandwidth for RS to send ACK/NAK message (RS can only steal the UL bandwidth pre-allocated for its own management messages)?</p> <p>(2) The ACK/NAK message may</p>	Not discussed	

			<p>incur additional buffering delay comparing with using PHY ACK</p> <p>(3) Channel. Robustness issue associated with ACK/NACK messages needs be resolved.(III)</p> <p>(4) Instead of specifying explicit ACID/SPID/CID, it may be bandwidth efficient if bitmap is sent when there is need to send ASYNC ACK.</p>	
298 (SAIT)				Merged into 252r1