Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>	
Title	**RS Uplink HARQ on Dedicated Channel**	
Date Submitted	**2007-07-05**	
Source(s)	Derek Yu, Hang Zhang, Peiying Zhu, Wen Tong, David Steer, Gamini Senarath, Mark Naden, G.Q. Wang Nortel 3500 Carling Avenue Ottawa, Ontario K2H 8E9	Voice: +1 613 763-1315 E-mail: [mailto:wentong@nortel.com] [mailto:pyzhu@nortel.com]
Re:	This document is in response to call for technical comments and contributions IEEE 802.16j-07/019 dated 2007-06-07.	
Abstract	The current UL HARQ support defined in the current baseline is for centralized control. It involves substantial efforts to identify failure link and perform subsequent retransmission allocation. Whenever a failure occurs, all resources allocated beyond the failure link are wasted as well. As UL dedicated channel is a persistence allocation, there is no need for the MR-BS to reschedule retransmission. Hence, there is no needed to identify the failure link as well. This contribution proposes the required mechanism to enable HARQ control signaling and ACK/NACK exchange to support UL HARQ on the dedicated channel.	
Purpose	To incorporate the proposed text into the P802.16j Baseline Document (IEEE 802.16j-06/026r4)	
Notice	*This document does not represent the agreed views of the IEEE 802.16 Working Group or any of its subgroups*. It represents only the views of the participants listed in the "Source(s)" field above. It is offered as a basis for discussion. It is not binding on the contributor(s), who reserve(s) the right to add, amend or withdraw material contained herein.	
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.	
Patent Policy	The contributor is familiar with the IEEE-SA Patent Policy and Procedures: <http://standards.ieee.org/guides/bylaws/sect6-7.html#6> and <http://standards.ieee.org/guides/opman/sect6.html#6.3>. Further information is located at <http://standards.ieee.org/board/pat/pat-material.html> and <http://standards.ieee.org/board/pat>.	

RS Uplink HARQ on Dedicated Channel

Derek Yu, Hang Zhang, Peiying Zhu, Wen Tong, David Steer, Gamini Senarath, Mark Naden, G.Q. Wang

Nortel

Introduction

The current UL HARQ support defined in the current baseline is for centralized control. It involves substantial efforts to identify failure link and perform subsequent retransmission allocation. Whenever a failure occurs, all resources allocated beyond the failure link are wasted as well. As UL dedicated channel is a persistence allocation, there is no need for the MR-BS to reschedule retransmission. Hence, there is no needed to identify the failure link as well. This contribution proposes the required mechanism to enable HARQ control signaling and ACK/NACK exchange to support UL HARQ on the dedicated channel.

Text Proposal

++++++++++++++++ Start Text Proposal ++

[Add the following subclause]

6.3.17.6 Uplink HARQ on Dedicated Channel

HARQ sub-bursts from multiple MSs/RSs are multiplexed and transmitted through the UL DCH. Each DCH region can transmit a single HARQ burst at a time. The corresponding HARQ control signaling are sent along side with all HARQ burst with a frame. The HARQ control signaling are sent using the UL DCH control header. It is recommended that the control signaling are sent using the most robust DCH region amongst all the allocated DCH regions managed by the RS. The DCH region used to send the control header cannot be used for HARQ burst. Non HARQ burst can be sent together with the control header.

Under centralized control, the MR-BS, upon detecting UL HARQ transmission can allocation DL DCH resource to the each RS along the path using RS_DL_DCH assignment IE for HARQ ACK/NACK bitmap signaling. The ACK/NACK bitmap is sent by the MR-BS or parent RS using DL MAC control header.

[Change Table 19a in Subclause 6.3.2.1.2.2.2 as indicated]

Table <X1>—Extended Type field encodings for Extended MAC signaling header type II

Extended Type field	MAC header Type	Reference figure	Reference table
0	RS BR header		
1	RS UL_DCH request header		
2	Acknowledgement header		

3	HARQ RS error report header		
4	UL DCH control header		
~~4~~5-7	Reserved		

[Add the following subclause]

6.3.2.1.2.2.2.5 UL DCH control header

The UL DCH control header is used by the RS to send control signaling to MR-BS or parent RS. The header format is as follows:

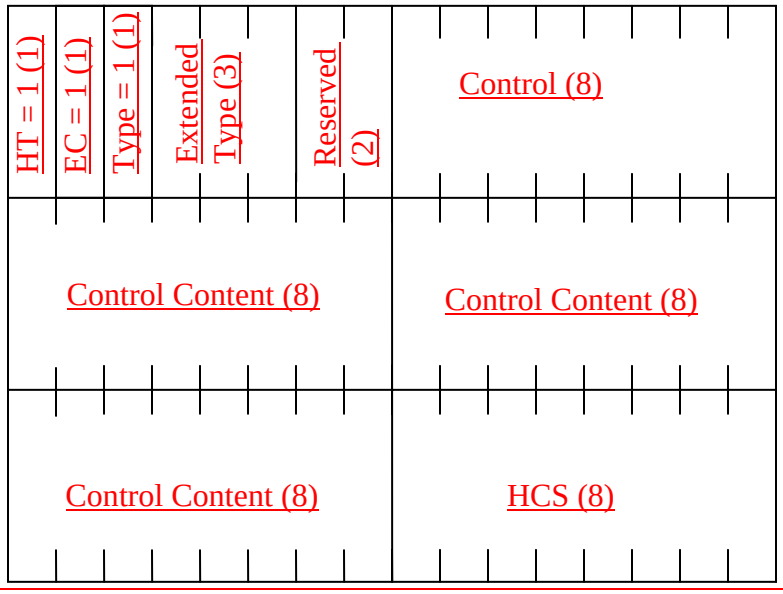

Figure XXX – UL DCH control header

Syntax	Size	Notes
MAC Header(){		
HT	1 bit	Shall be set to 1
EC	1 bit	Shall be set to 1
Type	1 bit	Shall be set to 1
Extended TYPE	3 bits	Shall be set to 0100 for UL DCH control header
Reserved	2 bits	
Control	8 bits	Bit #0, if set to 1: HARQ control signaling
Control Content	24 bits	If Bit #0 of Control field is set to 1{ The control content is sub-divided into 6 groups of 4 bits which allow up to 6 UL DCH regions for HARQ burst transmission. The first group of 4 bits

		corresponding to the first allocated DCH region and so on. The first bit of the 4 bits when set to 1 indicate HARQ enabled. The next 2 bits indicate ACID within the specific region. The last bit indicate AI_SN. }
HCS	8 bits	Header check sequence
}		

Table XXX - UL DCH control header

[Add the following subclause]

6.3.2.1.3 DL MAC Header without payload (DL MAC control header)

This DL MAC header without payload (control MAC header) is sent on DL only. The DL MAC control header is used for MR-BS or RS(s) to send control signaling to its child RS(s). The format of DL control MAC header is shown in Figure XXX.

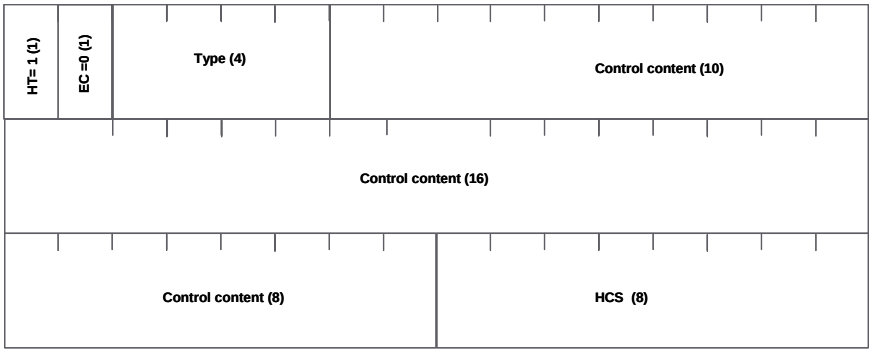

Figure XXX. Format of DL MAC control header.

The DL MAC control header field encoding is show in Table xxx.

Table xxx. DL MAC control header field encoding.

Name	**Length (bits)**	**Description**
HT	1	Header type. Should be set to 1
EC	1	Encryption control. Shall be set to 0
Type	4	Type of control Bit #0, if set to 1: HARQ ACK/NACK Bitmap

Control content	34	If Bit #0 of Type field is set to 1{
		The first 6 bits of control content form the corresponding HARQ ACK/NACK bitmap for the UL HARQ bursts specified by the UL DCH control header.
		}

HCS	8	Header check sequence

[Add the following subclause]

8.4.5.9.2 RS DL DCH assignment IE

This IE is used for the initial allocation and subsequent updates of the downlink dedicated channel on the R-link.

Table XXX. RS_DL_DCH assignment IE format.

Syntax	Size	Notes
RS_DL_DCH assignment IE {		
Type	5 bits	
Length	4 bits	
RSCID	8 bits	Reduced basic CID of the RS
Update type	2 bits	00 = Normal 01 = Service flow based 10 = Access zone 11 = Reserved
If (Update type == 01) {		**If service flow based update**
Throughput size	24 bits	Amount of throughput update in byte/s
Access RSCID	8 bits	Reduced basic CID of the access RS of the MS that completed the service flow event
}		
Assignment type	2 bits	00 = Incremental (Add the specified resource to DL DCH) 01 = Removal (Remove the specified resource from DL DCH) 10 = Aggregate (An aggregate assignment with no resource means DL DCH removal) 11 = Reserved
DIUC	4 bits	
Boosting	3 bits	
Repetition coding indication	2 bits	
Num_region_id	4 bits	Number of region IDs in the assignment list of resources allocated to DCH
For (i=0; i<Num_region_id; i++) {		
Region_ID	6 bits	Index to the DL region defined in DL region definition TLV in DCD
}		
Frequency (N)	4 bits	Allocation repeats once every N frames
}		

++++++++++++++++ End Text Proposal ++