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Title	<b>RS Downlink HARQ on Dedicated Channel</b>	
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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 DL 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. This contribution propose to allocate DL dedicated channel for DL HARQ burst transmission. As DL 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 also proposes the required mechanism to enable HARQ control signaling and ACK/NACK exchange to support DL HARQ on the dedicated channel.	
Purpose	To incorporate the proposed text into the P802.16j Baseline Document (IEEE 802.16j-06/026r4)	
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## RS Uplink HARQ on Dedicated Channel

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### Introduction

The current DL 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. This contribution propose to allocate DL dedicated channel for DL HARQ burst transmission. As DL 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 also proposes the required mechanism to enable HARQ control signaling and ACK/NACK exchange to support DL HARQ on the dedicated channel.

### Text Proposal

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*[Add the following subclause]*

#### 6.3.17.6 Downlink HARQ on Dedicated Channel

Under centralized control, when MR-BS needs to send DL HARQ burst to the MS, it may allocation DL DCH resource to the each RS along the path using RS\_DL\_DCH assignment IE for HARQ burst transmission as well as HARQ control signaling.

HARQ sub-bursts for multiple MSs/RSs are multiplexed and transmitted through the DL 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 DL MAC 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. The ACK/NACK bitmap is sent by the child RS using UL DCH 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		
<u>4</u>	<u>UL DCH control header</u>		
<del>4</del> <u>5-7</u>	Reserved		

*[Add the following subclause]*

6.3.2.1.2.2.5 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:

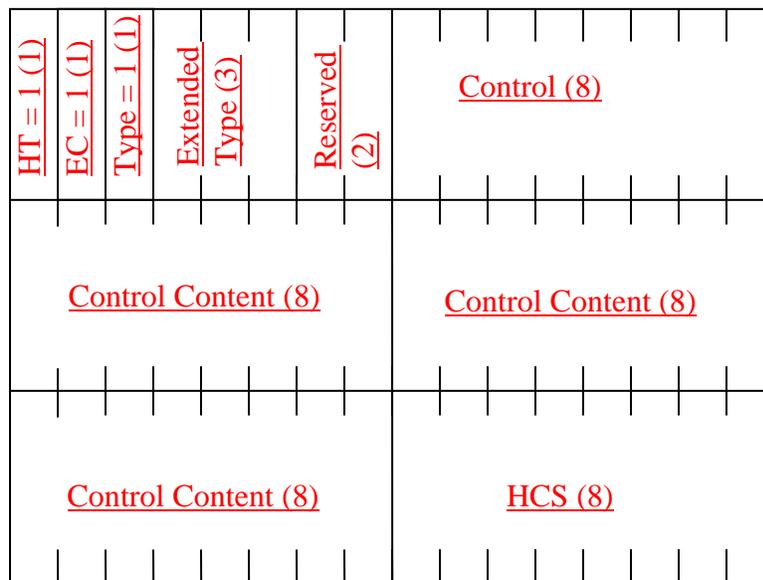


Figure XXX – UL DCH control header

<u>Syntax</u>	<u>Size</u>	<u>Notes</u>
<u>MAC Header()</u> {		
<u>HT</u>	<u>1 bit</u>	<u>Shall be set to 1</u>
<u>EC</u>	<u>1 bit</u>	<u>Shall be set to 1</u>
<u>Type</u>	<u>1 bit</u>	<u>Shall be set to 1</u>
<u>Extended TYPE</u>	<u>3 bits</u>	<u>Shall be set to 0100 for UL DCH control header</u>
<u>Reserved</u>	<u>2 bits</u>	
<u>Control</u>	<u>8 bits</u>	<u>Bit #0, if set to 1: HARQ ACK/NACK Bitmap</u>
<u>Control Content</u>	<u>24 bits</u>	<u>If Bit #0 of Control field is set to 1{</u> <u>The first 6 bits of control content form the</u> <u>corresponding HARQ ACK/NACK bitmap for the DL</u> <u>HARQ bursts specified by the DL MAC control</u>

		<u>header.</u> }
<u>HCS</u>	<u>8 bits</u>	<u>Header check sequence</u>
}		

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.

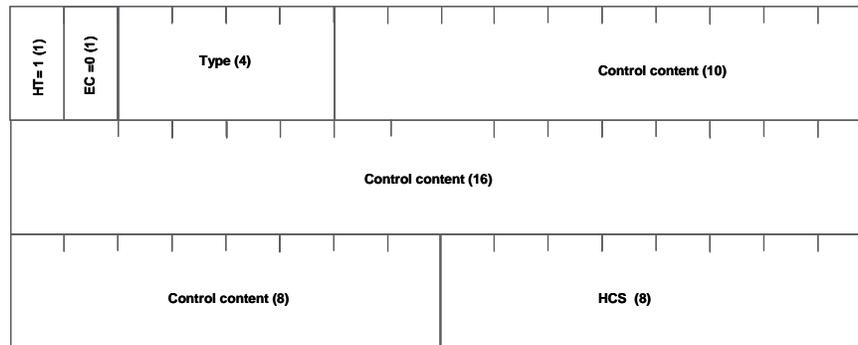


Figure XXX. Format of DL MAC control header.

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

Table xxx. DL MAC control header field encoding.

<u>Name</u>	<u>Length (bits)</u>	<u>Description</u>
<u>HT</u>	<u>1</u>	<u>Header type. Should be set to 1</u>
<u>EC</u>	<u>1</u>	<u>Encryption control. Shall be set to 0</u>
<u>Type</u>	<u>4</u>	<u>Type of control</u> <u>Bit #0, if set to 1: HARQ control signaling</u>
<u>Control content</u>	<u>34</u>	<u>If Bit #0 of Type field is set to 1 {</u> <u>The first 24 bits control content is sub-divided into 6</u> <u>groups of 4 bits which allow up to 6 DL DCH regions</u> <u>for HARQ burst transmission. The first group of 4 bits</u> <u>corresponding to the first allocated DCH region and so</u> <u>on. The first bit of the 4 bits when set to 1 indicate</u> <u>HARQ enabled. The next 2 bits indicate ACID within</u> <u>the specific region. The last bit indicate AI SN.</u>

		}
<u>HCS</u>	<u>8</u>	<u>Header check sequence</u>

*[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.

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

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