__Project	IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>
Title	Feedback request subheader
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Re:	This is a response to a Call for Comments on IEEE P802.16e-D5a

Abstract	we propose the method of using Feedback header which can report large amount of Feedback values

Purpose	Adoption of proposed changes into P802.16e /D5a-2004. The added option 2 is in Pink color

Feedback request subheader

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1. Introduction

In the current spec, The BS requires several feedback values from MSS for optimizing DL channel state. The required several feedback values are decided by BS through the Feedback Type field. The Feedback types are described according to Table 7b. The BS uses Fast-feedback allocation subheader and CQICH_allocation IE to assign UL Fast feedback channel to MSS, it also uses Feedback Polling IE to assign UL resource to MSS.

As mentioned above, there are several methods for receiving Feedback values.

- First, the BS sends Fast-feedback allocation subheader that includes the requested Feedback type and the allocation offset in the UL Fast-feedback channel to MSS. An MSS reports the Feedback values through UL Fast-feedback channel at the UL sub-frame of two frames ahead of the current frame

- Second, the BS sends CQICH_allocation IE that contains requested Feedback type, reporting period, and the allocation offset in the UL Fast-feedback channel to MSS. An MSS reports the Feedback values through UL Fast-feedback channel periodically.

- Third, the BS sends Feedback Polling IE that contains requested Feedback type, reporting period, and the duration in UL slot. An MSS reports Feedback values through the single Feedback header.

However, when BS requests Feedback values through CQICH_allocation_IE or Fast feedback allocation subheader, it can develop several problems

- First, Using the CQICH_allocation_IE or the Feedback Polling IE, DL-MAP or UL-MAP may enlarge, respectively.
- Second, Using the Fast feedback allocation subheader, it is not enough to express all feedback types. Also, it is hard for MSS to report large amount of Feedback values through assigned Fast feedback channel.
- Third, the BS needs to control the polling time when an MSS start reporting Feedback values. Because MSS may need CINR measurement time more than fixed frame.

So, we propose to add another method for allocation UL resource and for indicating various Feedback contents with Feedback request subheader when there is data packet in MSS. Also, this subheader contains the frame offset to indicate where allocation should be applied in frame.
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2. Proposed Text Change

We propose the following,
   1. Option 1
     - Use reserved bit for indicating exist Feedback request subheader in the Generic MAC header

   2. Option 2
     - The suggestion here is to use the ESF (Extended Subheader Field) (defined in #comment 2020_C802.16e-05/028r1).

Option 1) Use reserved bit for indicating exist Feedback request subheader in the Generic MAC header

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[Modify 6.3.2.1.1, Figure 19a – Generic MAC header]

This Generic MAC header has MSF(1) bit that is only applicable to UL.

In the DL case, this bit indicates whether Feedback request subheader is present or absent.

HT=0 (1)	EC(1)	Type (6)	MSF (1) –only applicable to UL FRS (1) – Only applicable to DL	CI(1)	EKS(2)	Rsv(1)	LEN MSB (3)
LEN LSB (8)			CID MSB (8)				
CID LSB (8)			HCS (8)				

[Add the following entries to Table 5a;]

Table 5a – Generic MAC header fields

Name	Length(bits)	Description
FRS	1	Feedback request subheader, this field is used in the DL only. If FRS=0, the Feedback request subheader is absent. If FRS=1, the Feedback request subheader is present. A MSS that is capable of Feecback request Subheader indication shall only decode FRS field sent by the BS. Otherwise, MSS shall treat this as if set to 0, The BS shall set this bit and send the Feedback request subheader only if is successfully negotiated the support of Feedback request subheader with a MSS. The Feedback request subheader indication capability is specified as part of the capabilities exchange dialog (REG-REQ/RSP)

[Modify the following sentence in the Line 48, page 22]

~~Six~~ Seven types of subheaders may be present in a MAC PDU with generic MAC header. The per-PDU subheaders (i.e., Feedback Request, Mode Selection Feedback, Mesh, Fragmentation, Fast-feedback allocation and Grant Management) may be inserted in MAC PDUs immediately following the Generic MAC header. If both the Fragmentation subheader and Grant Management subheader are indicated, the Grant Management subheader shall come first. If the Mesh subheader is indicated, it shall precede all other subheaders. In the downlink, the ~~FAST-FEEDBACK~~ Fast-feedback Allocation subheader shall always appear as the last per-PDU subheader, while in the uplink the Mode Selection Feedback subheader shall always appear as the last per-PDU subheader. The feedback request subheader, if indicated in DL Generic MAC header, shall always appear as the last per-PDU subheader in a DL MAC PDU. The Mode selection Feedback subheader, if indicated in UL Generic MAC header, shall always appear as the last per-PDU subheader in a UL MAC PDU.

2005-01-26 *(left header)* IEEEC802.16e-05/041r2 *(right header)*

2.2. Introduce a new Feedback Subheader for MSS to use Feedback header.

[*Add the following sentence to Table 5a;*]
6.2.2.8 Feedback Request subheader

Feedback Request Extended subheader shall be only sent by BS to allocate dedicated UL resource for obtaining the feedback value from an MSS. This format of Feedback request subheader is specified in Table 14a. The Feedback Request subheader, when used, shall always be the last per-PDU subheader as specified in 6.3.2.2. The support of Feedback Request subheader is PHY specific.

Table 14a – Feedback Request subheader format

Syntex	Size(bits)	Notes
Feedback request subheader {		
UIUC	4	
Feedback type	4	Shall be set according to Table 7b
Allocation offset	6	
No.slot	1	
Frame offset(F)	1	Indicate to start reporting at the frame
}		

Allocation offset
Define the offset, in unit of slots, begin from the ending slot which occupies the highest numbered subchannel in the highest numbered OFDMA symbol of UL sub-frame.

No.slot
Define the allocation duration in OFDMA slots. The number of slot is 2*(No.slot+1)

Frame offset (F)
Indicate that The MSS starts reporting at the frame. If F == 0, the allocation applies to the UL subframe two frames ahead of the current frame. If F==1, four frames ahead of the current frame.

[*Modify the following section 11.7.17*]
11.7.17 MSS Mode Selection Feedback support
This field indicates the support of Mode Selection Feedback.

Type	Length	Value	Scope
20	1	Bit #0 : Mode Selection Feedback sub-header Supported Bit #1 : Mode Selection Feedback header Supported Bit #2 : Feedback request subheader Supported Bit #3-#7 : Reserved	REG-REQ REG-RSP

Option 2) The suggestion here is to use the ESF (Extended Subheader Field) (defined in # 2020 _C802.16e-05/028r1)

[Insert new field to Table 13b]

Table 13b – Description of Extended Subheaders (DL)

ESF Bit	Name	Length (Octets)	Description
Bit #0	Reserved		
Bit #1	Generic Sleep Header (DL)	3	See 6.3.2.2.7.2
Bit #2	**Feedback Request subheader**	**2**	**See 6.3.2.2.7.3**
Bit #3-Bit #10	*Reserved*		

[Insert new section 6.3.2.2.7.3]

6.3.2.2.7.3 Feedback Request Extended Subheader

Feedback Request Extended subheader shall be only sent by BS to allocate dedicated UL resource for obtaining the feedback value from an MSS. For each PDU in the DL, the BS shall indicate in the extended subheader (ESF) This field shall only be used if the MSS has successfully negotiated the support of Feedback request Extended Subheader with the BS through the capabilities exchange dialog (SBC-REQ/RSP)

Table- 13h. Feedback Request extended subheader format

Name	Length (bits)	Description
UIUC	4	
Feedback type	4	Shall be set according to Table 7b
Allocation offset	6	Define the offset, in unit of slots, begin from the ending slot which occupies the highest numbered subchannel in the highest numbered OFDMA symbol of UL sub-frame.
No.slot	1	Number of slot that is given 2*(No.slot+1)
Frame offset(F)	1	Indicate to start reporting at the frame. If F == 0, the allocation applies to the UL subframe two frames ahead of the current frame. If F==1, four frames ahead of the current frame.

11.8.2   Capabilities for Construction and Transmission of MAC PDUs

Type	Length	Value	Scope
4	1	**Bit #2**: Specifies support for ESF capability (see 6.3.2.2.7) **Bit #3**: Specifies support for Generic Sleep Extended subheader. (see 6.3.2.2.7.2) **Bit #4**: Specifies support for Feedback Request Extended subheader (see 6.3.2.2.7.3) **Bit #5--#7**: *Reserved,* shall be set to zero	SBC-REQ, SBC-RSP