

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Enhanced mode selection feedback initiated by MSS through Mode Selection Feedback MAC Header	
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Re:	IEEE P802.16e/D3-2004	
Abstract	In this contribution, the method for MSS to initiate mode selection feedback using Mode Selection Feedback MAC header is proposed. This is revision 1 of the contribution. The additional texts are highlighted in 'green'. Deleted texts are crossed-out.	
Purpose	Review and Adopt the suggested changes into P802.16e/D3	
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1 Introduction

In IEEE802.16e/D3 text, mode selection feedback is sent on the fast feedback channel by the MSS, to select different MIMO and permutation modes. The mode selection feedback is either sent periodically on the CQICH as defined by the CQICH_Alloc_IE() or sent when polled by the BS using the FAST-FEEDBACK allocation subheader.

In the case of periodic mode selection feedback, the MSS has to send the mode selection information even though the information has not changed from the one previously reported **or a MSS has to wait until the next mode selection feedback opportunity to send the mode selection information.** In the case of polling by the BS, the BS has no information on when the mode selection at the MSS has changed, and therefore the polling is typically done periodically. In both cases, the UL resource is unnecessarily used. In the latter case, the DL resource is also unnecessarily used.

Typically, the mode selection at the MSS does not change frequently. However, when the mode selection does change, the information needs to be fed back with minimum delay so that the newly selected can take effect quickly. Both the periodic feedback and the BS-polling-based feedback in the existing IEEE802.16e/D3 are not efficient in supporting the mode selection feedback.

Here, we propose that the MSS initiates the mode selection feedback whenever there is a change in the selected mode. This proposal is for the case when the MSS does not have UL traffic to transmit. This proposal is complementary to the proposal in “Enhanced mode selection feedback initiated by MSS through MAC subheader” which is used for the case when the MSS has UL traffic to transmit when a mode change occurs.

There are two possible scenarios.

- Scenario 1: the MSS has been assigned a CQICH. In this case, the MSS will use an ‘indication flag’ (reserved one out of sixteen of the 4-bit CQICH value, e.g. ‘1111’) to indicate to the BS that it has an intention to change the mode selection or has an intention to send a bandwidth request header. As a response, the BS will assign UL resource to the MSS to allow the MSS to send a Mode Selection Feedback MAC header or a Bandwidth request header. The Mode Selection Feedback MAC header contains the Feedback type (MIMO mode and permutation feedback; ~~or Anchor BS selection feedback~~), and the Feedback content (i.e. content of the MIMO mode and permutation feedback; ~~or the Anchor BS selection feedback~~). Note that the reserved values in the Feedback type and Feedback content can be used to support future types of feedback. To ensure backward compatibility with REVd MSS, the BS broadcast a new UCD TLV to indicate **which encoding of payload of CQICH is reserved as the indication flag. The support of the indication flag feature shall be exchanged at the registration of a MSS through REG-REQ/RSP messages. to the MSS on whether to use the CQICH indication flag to initiate mode selection feedback.** After receiving ‘indication flag’ from a MSS, the BS may also send DL FAST-FEEDBACK Allocation subheader to poll the MSS if only MIMO mode and permutation feedback is expected, i.e. in the case where other types of feedback are not supported.
- Scenario 2: the MSS does not have an assigned CQICH, and does not have UL traffic resource assigned. In this case, the existing bandwidth request method, i.e. BS polling or BW ranging method (refer to Fig. 2) can be used by the MSS to obtain UL resource. The MSS can then use the assigned UL resource to send the Mode Selection Feedback MAC header.

The advantage of the above proposal is that the mode selection feedback is sent by the MSS on an as needed basis, rather than periodically or polled by the BS.

2 Summary of proposal

2.1 Procedure

In this proposal, the following procedures are defined:

- Scenario 1: A MSS has a CQICH assigned

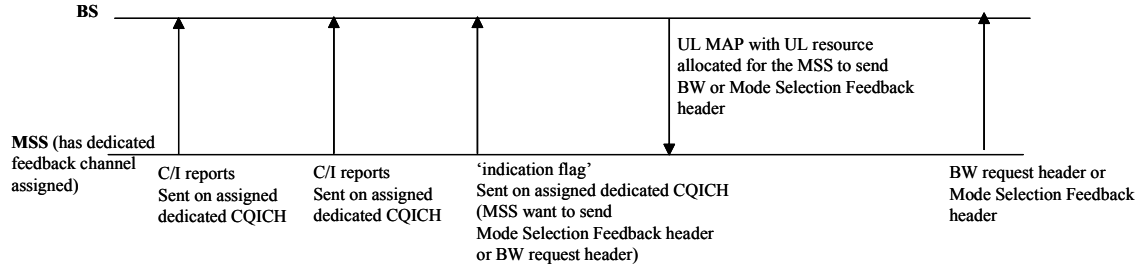


Fig. 1. Method for MSS to signal its intention for mode selection feedback or bandwidth request by using CQICH indication and Mode Selection Feedback MAC header

- Scenario 2: MSS does not have a CQICH assigned

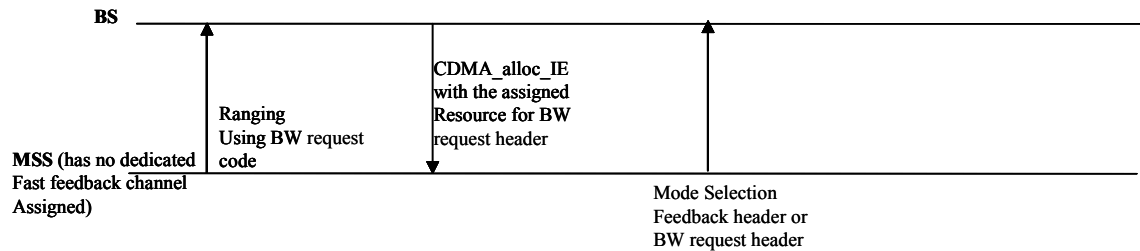


Fig. 2. Method for MSS to send mode selection feedback by using BW request ranging and Mode Selection Feedback MAC header.

Note that BS polling procedure is not shown here, which shall be the same as the normal Bandwidth Request polling with one exception that a MSS shall use the assigned UL resource to send Mode Selection Feedback MAC header

3 Proposed Text Change

The proposed text change is based on p802.16e/D3.

[Insert a new section 6.3.2.1.4 to introduce a new Mode Selection Feedback header based on the current bandwidth request header format]

6.3.2.1.4 Mode Selection Feedback header

The Mode Selection Feedback PDU shall consist of Mode Selection Feedback header alone and shall not contain a payload. The Mode Selection Feedback header is illustrated in Figure XX.

<u>HT=1 (1)</u>	<u>EC=1 (1)</u>	<u>Type (6)</u>	<u>Feedback Type (4)</u>	<u>Feedback Content (4)</u>
<u>Reserved (8)</u>			Basic CID (8)	
Basic CID (8)			HCS (8)	

Figure. XX – Mode Selection Feedback header.

The Mode Selection Feedback shall have the following properties:

- a) the length of the header shall always be 6 bytes
- b) ~~the EC field is set to 0, indicating no encryption~~
- c) the HT field is set to 1 and the EC field is set to 1
- d) the Type field shall be set to 001000000, indicating Mode Selection Feedback header type
- e) the feedback type field shall be set according to Table XX
- f) the feedback content field shall be set accordingly based on the value of the ~~indication~~ feedback type field (refer to Table XX)

The Mode Selection Feedback header shall be used by MSS to provide its mode selection feedback. An MSS receiving a Mode Selection feedback header on the ~~uplink~~ downlink shall discard the PDU.

The Feedback type is defined in Table XX.

Table XX. Feedback type

<u>Feedback type</u>	<u>Description</u>
<u>0b0000</u>	<u>MIMO mode and permutation. When feedback type is set to this, the feedback content is as described in table 296a</u>
0b0001	Anchor BS selection. When feedback type is set to this, the MSB of the feedback content is set to ‘0’. The 3 LSBs of the feedback content is set to the TEMP_BS_ID of the new Anchor BS.
0b0010 <u>0b0001-0b1111</u>	<u>Reserved</u>

[modify Table 351 to add a new UCD TLV to indicate to the MSS whether to use the CQICH indication flag to initiate mode selection feedback]

Table 351 – UCD PHY-specific channel encodings – WirelessMAN-OFDMA

<u>Name</u>	<u>Type (1 byte)</u>	<u>Length</u>	<u>Value</u>
UL allocated subchannel bitmap for optimal AMC permutation	173	6	
Allow AAS Beam Select messages	xxx	1	
<u>Use CQICH indication flag</u>	<u>xxx</u>	<u>1</u>	<u>4-bit payload value on the CQICH reserved as indication</u>

			<u>flag for MSS to initiate mode selection feedback. The value shall not be set to '0000'.</u>
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[Insert the following sentence at the end of section 6.3.2.3.7 Registration request (REG-REQ) message]

The REG_REQ may contain the following TLV:

SS Mode Selection Feedback support (see 11.7.11)

[Insert the following sentence at the end of section 6.3.2.3.8 Registration response (REG-RSP) message]

The REG_RSP may contain the following TLV:

SS Mode Selection Feedback support (see 11.7.11)

[Insert section 11.7.11]

11.7.11 SS Mode Selection Feedback support

This field indicates the support of Mode Selection Feedback subheader.

<u>Type</u>	<u>Length</u>	<u>Value</u>	<u>Scope</u>
<u>20</u>	<u>1</u>	<u>Bit #0: Mode Selection Feedback subheader Supported</u> <u>Bit #1: Mode Selection Feedback Header Supported</u> <u>Bit #2 - #7: reserved, shall be set to zero</u>	<u>SBC_REQREG-REQ</u> <u>SBC_RSPREG-RSP</u>

[Insert the following to the end of Section 8.4.5.4.10.1 Fast DL measurement feedback]

For a MSS which supports the feedback method by using Mode Selection Feedback Header, if M is defined as the indication flag in UCD, the MSS shall set the payload bits nibble as $M-1$, instead of M , if the outcome of payload bits nibble calculation based on Eq. 103. is M