Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	Text Clarification and Clean-up for the MAC Header
Date Submitted	**2005-04-28**
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Re:	IEEE P802.16e/D7-2005
Abstract	This contribution provides text clarification and clean-up regarding the MAC header
Purpose	Review and Adopt the suggested changes into P802.16e/D7
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1 Introduction

This contribution provides clarification and clean up text related to the MAC header section 6.3.2. Also, it includes proposed text change/comments that were accepted during session #36, but not included properly in p802.16e/D7. Those comments are:

Comment #3070, contribution C802.16e-05/192r4
Comment #3059, contribution C802.16e-05/119r2
Comment #3066
Comment #3045, contribution C802.16e-05/193r2

2 Proposed Text Change

Notes to editor: In this section, the text in black is the original text in p802.16e/D7. Instruction to editor is in 'blue'. Proposed text change is in 'red'.

6.3.2.1 MAC header formats

[Change the existing text in the first paragraph of 6.3.2.1 as shown below:]

In the DL, there is one MAC header that is the generic MAC header that begins each MAC PDU containing either MAC management messages or CS data.

In the UL, ~~Two~~ ~~six~~two MAC header formats are defined. The first is the generic MAC header that begins each MAC PDU containing either MAC management messages or CS data, i.e. the format where HT = 0 and EC = 0 or 1 as shown in Table 4a. The second is the MAC header format with HT = 1 and EC = 0 or 1 as shown in Table 4a. For this format, there is no payload following the MAC header. ~~The second is the bandwidth request header used to request additional bandwidth.~~ ~~The single bit Header Type (HT) field distinguishes the generic MAC header and bandwidth request header formats. The HT field shall be set to zero for the Generic Header and to one for a bandwidth request header.~~ ~~The third is the PHY channel report header used for the MS to send a PHY channel report to the BS. The fourth is the feedback header used for the MS to provide its feedback. The fifth is the bandwidth request and UL TX power report header used for the MS to send a combined bandwidth request and UL Tx power report. The sixth is the SN report header used by the MS to feedback SDU SN during fast BS switching. The single bit header type (HT) field distinguishes the generic MAC header and the rest of the header formats. The HT field shall be set to zero for the generic header and to one for other MAC headers.~~

[Insert new table into 6.3.21 as follows:]

Table 4a—MAC Header HT and EC fields encoding

HT	EC	MAC PDU Type	Reference Figure	Reference Table
0	0	Generic MAC header for DL and UL. MAC PDU with data payload, no encryption, with a 6-bit type field, see Table 6 for its type field encodings.	19	5
0	1	Generic MAC header for DL and UL. MAC PDU with data payload, with encryption with a 6-bit type field, see Table 6 for its type field encodings.	19	5
1	0	DL: This encoding is not defined UL: MAC PDU without data payload, ~~(also called Bandwidth Request Header)~~, with a 3-bit type field, see Table ~~7e~~6a for type encoding	20, 20a - f	7, 7a - f

		definitions.		
1	1	DL ~~only~~: Compressed DL-MAP UL ~~only~~: Feedback MAC Header, without data payload, with 1-bit type field, see Table 7g for type encoding definitions.	~~22~~20g, 20h	~~22~~7h

6.3.2.1.1 Generic MAC hHeader

[Replace Figure 19 –Generic MAC header in 6.3.2.1.1 with the following figure:].

[Figure 19 drawing. No change]

Figure 19—Generic MAC header format

[Add the following entries to Table 5:]

Table 5—Generic MAC header fields

Name	Length (bits)	Description
ESF	1	Extended Subheader Field. If ESF = 0, the ESF is absent. If ESF=1, the ESF is present and will follow the GMH immediately (See 6.3.2.2.7). The ESF is applicable both in the DL and in the UL.

[Add the following to the end of 6.3.2.1.1:]
The ESF bit in the Generic MAC header indicates that the Extended Subheader field is present. Using this field, a number of additional subheaders can be used within a PDU. The ESF field shall always appear immediately after the Generic MAC header and before all other subheaders. The ESF field and all extended subheaders related to it are not encrypted (See 6.3.2.2.7).

[Add the following text before section 6.3.2.1.2]

6.3.2.1.2 MAC header without payload

6.3.2.1.2.1 MAC header with HT = 1 and EC = 0 for UL

For this MAC header format, there is no payload following the MAC header. Table 5a describes the encoding of the 3-bit type field following the EC field.

Table 5a—MAC Header Type Field Encodings with HT/EC=0b10

type field (3 bits)	MAC Header Type (with HT/EC=0b10)	Reference Figure	Reference Table

000	BR incremental	20	7
001	BR aggregate	20	7
010	PHY channel report ~~header~~	20~~e~~d	7~~e~~d
011	BR with UL Tx power report	20a	7a
100	BR with DL burst profile change request	20b	7b
101	BR with UL sleep control ~~header~~	~~n/a~~ 20e	~~??~~ 7e
110	SN Report	~~??~~ 20f	~~??~~ 7f
111	CQICH channel allocation request	~~??~~ 20c	~~??~~ 7c

[Change 6.3.2.1.2 as indicated:]

6.3.2.1.2.1.1 Bandwidth request header

~~***[Change 6.3.2.1.2 as indicated:]***~~

The Bandwidth Request PDU shall consist of bandwidth request header alone and shall not contain a payload. The bandwidth request header is illustrated in ~~Table 7e~~ Figure 20. An MS receiving a bandwidth request header on the downlink shall discard the PDU.

The 'Bandwidth Request' header shall have the following properties:

a) The length of the header shall always be 6 bytes.
b) The EC field shall be set to 0, indicating no encryption.
c) The CID shall indicate the connection for which uplink bandwidth is requested.
d) The Bandwidth Request (BR) field shall indicate the number of bytes requested.
~~The 'Bandwidth Request' field may be set to zero if Type is set to 0b111.~~
e) The allowed types of bandwidth requests are "000" for incremental and "001" for aggregate.

The fields of the bandwidth request header are defined in Table 7 ~~for types 0b000 and 0b001 and Table 7a for type 0b011. Every header is encoded, starting with the HT and EC fields. The coding of these fields is such that the first byte of a MAC header shall never have the value of 0xFX. This prevents false detection of the stuff byte.~~

[Insert new subclause 6.3.2.1.2.~~1~~1.2:]

6.3.2.1.2.1.2 Bandwidth request and UL Tx power report header

The Bandwidth Request and UL Tx power report PDU shall consist of bandwidth request and UL Tx power report header alone and shall not contain a payload. The bandwidth request and UL Tx power report header is illustrated in Figure 20a.

[Figure 20a drawing. No change]

Figure 20a—Bandwidth request with UL Tx power report header format

The bandwidth request with UL Tx power report header shall have the following properties:

a) The length of the header shall always be 6 bytes.
b) The EC field shall be set to 0, indicating no encryption.

c) The CID shall indicate the connection for which uplink bandwidth is requested.
d) The allowed type for bandwidth request with UL Tx transmit power report is 0b011. T~~t~~he requested bandwidth is incremental.

The fields of the Bandwidth request and UL Tx power report header are defined in Table 7a.

Table 7a—Description of fields BR and UL Tx power report header

Name	Size (bits)	Description
HT	1	Header Type = 1
EC	1	Always set to zero
Type	3	Type = 0b011
BR	11	Bandwidth Request: The number of bytes of uplink bandwidth requested by the MS. The bandwidth request is for the CID. The request shall not include any PHY overhead. It is aggregate BW request. In case of the Extended rtPS, if the MSB is 1, the BS changes its polling size into the size specified in the LSBs of the this field.
UL Tx power	8	UL Tx power level for the burst that carries this header (11.1.1). The maximum value shall be reported for the burst.
reserved	1	set to zero
CID	16	MS basic CID for which the BW is requested
HCS	8	Header Check Sequence (same usage as HCS entry in Table 5).

UL Tx Power

This parameter indicates the UL Tx power in dB, and it shall be interpreted as a single value from –16.0 dB to 47.5 dB in unit of 0.5 dB.

[Insert new subclause 6.3.2.1.2.~~2~~1.3:]

6.3.2.1.2.~~2~~1.3 Bandwidth request and downlink burst profile change request header

Bandwidth request and downlink burst profile change request (BR-DBPCR) PDU shall consist of bandwidth request and DL burst profile change request header alone, and shall not contain a payload. The bandwidth request and downlink burst profile change request header is illustrated in Figure 20b.

[Figure 20b drawing. No change]

Figure 20b—Bandwidth request and downlink burst profile change

Table 7b—Description of the fields of BR and DL burst profile change request header

Name	Length (bits)	Description
HT	1	Header Type = 1
EC	1	Always set to zero
Type	3	Type = 0b100
BR	11	Bandwidth Request: The number of bytes of uplink bandwidth requested by the MS. The bandwidth request is for the CID. The request shall not include any PHY overhead. It is aggregate BW request.
CINR	7	CINR for the burst that carries this header(11.1.1). When the CINR is different from slot to slot, the maximum value is reported.
DCD Change Indications	1	—
CID	16	MS Basic CID for which the BW is requested
HCS	8	Header Check Sequence (same usage as HCS entry in Table 5).

CINR

This parameter indicates the CINR in dB, and it shall be interpreted as a single value from -16.0 dB to 47.5 dB in unit of 0.5 dB.

DCD Change Indication

This parameter is set to 1 if the DCD change count stored at MS is not equal to that in the received DL-MAP message. Otherwise, it is set to 0.

[Insert new subclause 6.3.2.1.2.~~3~~1.4:]

6.3.2.1.2.~~3~~1.4 CQICH Allocation Request Header

The CQICH Allocation request PDU shall consist of CQICH Allocation request header alone and shall not contain a payload. The CQICH Allocation request header is illustrated in Figure 20c.

[Figure 20c drawing. No change]

Figure 20c— CQICH Allocation Bandwidth request

[Error in incorporation of contribution IEEE C802.16e-05/193r2 (resolution of comment #3045). Add missing field in Table below.]

Table 7c—Description of the fields of CQICH Allocation Request Header

Name	Length (bits)	Description
HT	1	Header Type = 1
EC	1	Always set to zero

Type	3	~~Set according to Table 7i~~ Set to 111
Feedback Type	4	Set according to Table 7i
CQICH_Num	4	The number of CQICH requested by MS
RSVD	11	Set to zero
CID	16	MS basic CID
HCS	8	Header Check Sequence (same usage as HCS entry in Table 5).

[Insert new subclause 6.3.2.1.~~3~~2.1.5:]

6.3.2.1.~~3~~ 2.1.5 PHY channel report header

The PHY channel report PDU shall consist of a PHY channel report header alone and shall not contain a payload. The PHY channel report header is illustrated in Figure 20d.

[Figure 20d drawing. No change]

Figure 20d—PHY channel report header

The PHY channel report shall have the following properties:

a~~e~~) The length of the header shall always be 6 bytes.
b~~f~~) The EC field shall be set to 0, indicating no encryption.
c~~g~~) The CID shall indicate the MS basic CID.
d~~h~~) The TYPE field shall be 0b010.

An MS receiving a PHY channel report header on the downlink shall discard the PDU.

The fields of the PHY channel report header are defined in Table 7d.

Table 7d—PHY channel report header fields

Name	Length (bits)	Description
HT	1	Header Type = 1
EC	1	Always set to zero
Type	3	Type = 0b010
PREFERRED-DIUC	4	Index of the DIUC preferred by the MS
UL-TX-POWER	7	UL Tx power level in dBm, for the burst that carries this Header, from +63 to -64 in dBm in 1 dB steps. The maximum value is shall be reported for the burst.
UL-HEADROOM	6	Headroom to UL maximum power level in dB, for the burst that carries this Header, from 0 to 63 in 1 dB steps. Should the headroom exceed 63 dB, the value 63 shall be used.The minimum value is shall be reported for the burst.
RSVD	2	Set to zero
CID	16	MS basic CID

HCS	8	Header Check Sequence (same usage as HCS entry in Table 5).

[Insert new subclause 6.3.2.1.~~4~~2.1.6:]

6.3.2.1.~~4~~2.1.6 Bandwidth request and uplink sleep control header

Bandwidth request and uplink ~~s~~Sleep ~~c~~Control ~~h~~Header is sent by the MS to request activation / deactivation of certain Power Saving Class. The ~~message~~header also indicates incremental transmission demand.

[Replace Table 7e by a new Figure and Table below, so as to be consistent with other header description]

~~Table 7e—Bandwidth control and uplink sleep control header~~

~~Syntax~~	~~Size (bits)~~	~~Notes~~
~~MOB_SLP-ULC_Message_Format () {~~	~~—~~	~~—~~
~~HT~~	~~1~~	~~Encoded as 0b1~~
~~EC~~	~~1~~	~~Encoded as 0b0~~
~~Type~~	~~3~~	~~Encoded as 0b000~~
~~BR~~	~~11~~	~~Total transmission demand at the MS in units of 256 bytes~~
~~Power_Saving_Class_ID~~	~~6~~	~~Power Saving Class ID~~
~~Operation~~	~~1~~	~~= 1 to activate Power Saving Class = 0 to deactivate Power Saving Class~~
~~*reserved*~~	~~1~~	~~—~~
~~Basic CID~~	~~16~~	~~Basic CID of the MS~~
~~HCS~~	~~8~~	~~—~~
~~}~~	~~—~~	~~—~~

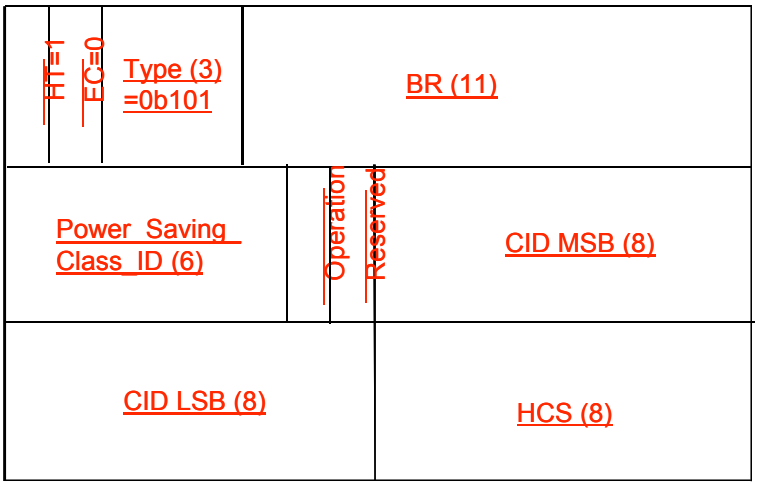

Figure 20e—Bandwidth request and uplink sleep control header

Table 7e—Description of the fields of Bandwidth request and uplink sleep control header

Name	Length (bits)	Description
HT	1	Header Type = 1
EC	1	Always set to zero
Type	3	Type = 0b101
BR	11	Bandwidth Request: The number of bytes of uplink bandwidth requested by the MS. The bandwidth request is for the CID. The request shall not include any PHY overhead. It is aggregate BW request.
Power_Saving_Class_ID	6	Power Saving Class ID
Operation	1	1: to activate Power Saving Class 0: to deactivate Power Saving Class
Reserved	1	—
CID	16	Basic CID of the MS for which the bandwidth request and uplink sleep control header is sent
HCS	8	Header Check Sequence (same usage as HCS entry in Table 5).

[Insert new subclause 6.3.2.1.~~5~~2.1.7:]

6.3.2.1.~~5~~2.1.7 SN report header

[Table 7f below is mis-placed. Move it to Section 6.3.2.1.3]

~~**Table 7f—MAC Header Type Field Encodings with HT/EC=0b10**~~

~~FHD/EHD~~	~~MMAC header Type with HT/EC=0b11~~	~~Reference Figure~~	~~Reference Table~~
~~0~~	~~UL only: Feedback header, with another 5-bit type field, see Table 7d for its type encodings.l~~	~~20a-d~~	~~??~~
~~1~~	~~Reserved~~	~~??~~	~~??~~

[Add the following text before Figure 21a]

The SN report header is sent by the MS to report the the LSB of the next ARQ BSN or the virtual MAC SDU Sequence number for the active connections with SN Feedback enabled.

[Figure 21a drawing. No change to the drawing but modify the caption below]

Figure ~~21a~~20f—SN report header format

The SN Report Header shall be of the form illustrated in Figure ~~21a~~20f. The SN Report header shall have the following properties:

a) The length of the header shall always be 6 bytes
b) The EC field shall be set to 0, indicating no encryption
c) The CID shall indicate the basic connection of the MSS for which the SN Report is being sent.
d) The SDU SN field shall indicate the LSB of the next ARQ BSN or the virtual MAC SDU Sequence number for the active connections with SN Feedback enabled. The LSB of the ARQ BSN or virtual MAC SDU sequence number for each connection is provided. At most, three SNs can be provided in each SN report header in numerical ascending order of the SFID values of the connections with SN feedback enabled.
e) The RqstID field may be used to indicate whether the SN Report header is the last header, thus accommodating up to 6 active connections. The fields of the SN Report header are defined in Table 7~~g~~f. Every header is encoded, starting with the HT and EC fields. The coding of these fields is such that the first byte of a MAC header shall never have the value of 0xFX. This prevents false detection of the stuff byte.

Table 7~~g~~f—SN report header fields

[Rearrange rows in Table below to make the format consistent with other headers]

Name	Length (bits)	Description
HT	1	Header Type = 1
EC	1	Encryption Control. Always set to 0
Type	3	Set to 0b110. Indicates that it is a SN Report header
RqstID	1	If set to 1, this is the last SN report header. Set to 0 to indicate that this is the first of the maximum of two consecutive SN report headers.

SDU SN 1	6	The ARQ BSN (LSB) or MAC SDU SN (LSB) for the first CID in this header. The order of reporting the sequence numbers, SNs, for the connections is predetermined as indicated in 6.3.20.2.6.2.3
SDU SN 2	6	The ARQ BSN (LSB) or MAC SDU SN (LSB) for the second CID in this header.
SDU SN 3	6	The ARQ BSN (LSB) or MAC SDU SN (LSB) for the third CID in this header.
CID	16	Basic Connection Identifier of the MS from which the SN report header is sent.
~~EC~~	~~1~~	~~Encryption Control. Always set to 0~~
HCS	8	Header Check Sequence
~~HT~~	~~1~~	~~Header Type = 1~~
~~Type~~	~~3~~	~~Set to 0b110. Indicates that it is a SN Report header~~
~~RqstID~~	~~1~~	~~If set to 1, this is the last SN report header. Set to 0 to indicate that this is the first of the maximum of two consecutive SN report headers.~~

[Insert a new subclause 6.3.2.1.3, 6.3.2.1.3.1]

6.3.2.1.2.2 MAC header with HT = 1 and EC = 1 for UL

Feedback MAC Header is an UL MAC header, there is no payload following the MAC header. Table ~~5a~~7g describes the encoding of the 1-bit type field following the EC field. The description of DL MAC header format with HT/EC = 0b11, defined as the Compressed DL-MAP, is not part of this section. The detailed description can be found in section 8.4.5.6.1.

Table 7g—MAC Header Type Field Encodings with HT/EC=0b11

Type field	MAC header Type with HT/EC=0b11	Reference Figure	Reference Table
0	Feedback header, with another 4-bit type field, see Table 7h for its type encodings.	20g, 20h	7h
1	Reserved	-	-

~~***[Insert new subclauses 6.3.2.1.6, 6.3.2.1.6.1, 6.3.2.1.6.2, 6.3.2.1.6.3:]***~~

[Apply proposed changes in IEEE C802.16e-05/119r2 to the Feedback header section. This was comment #3059 but the contribution accepted should be IEEE C802.16e-05/119r2 instead of IEEE C802.16e-05/119. A new feedback type is added for closed-loop MIMO feedback which was missing in the p802.16e/D7. Additional changes are applied to clean up the section and align with the definition in Table 7g above]

6.3.2.1.~~6~~2.2.1 Feedback header

The Feedback header is sent by a MS either as a response to Feedback Polling IE (see 8.4.5.3.20), or the Feedback request extended subheader (see 6.3.2.2.7.4) or as an unsolicited feedback. When sent as a response to the Feedback Polling IE or the Feedback request extended subheader, the MS shall send a Feedback header using the assigned resource indicated in the Feedback Polling IE or the Feedback request extended subheader. When sent as an unsolicited feedback, the MS can either send the Feedback header on currently allocated UL resource, or request additional UL resource by sending Indication flag on the Fast-feedback channel or the enhanced Fast-feedback channel (refer to 8.4.5.4.10.11) or sending BW request ranging code.

~~**6.3.2.1.6.1 Feedback header**~~

The Feedback PDU shall consist of the Feedback header alone and shall not contain a payload. The Feedback

header with and without CID field are illustrated in Figure 20d and Figure 20d. The Feedback header with CID field shall be used when the UL resource used to send the Feedback header is requested through BW request ranging. Otherwise, the Feedback header without CID field shall be used.

[Replace drawing in Figure 20b in p802.16e/D7 with the following drawing]

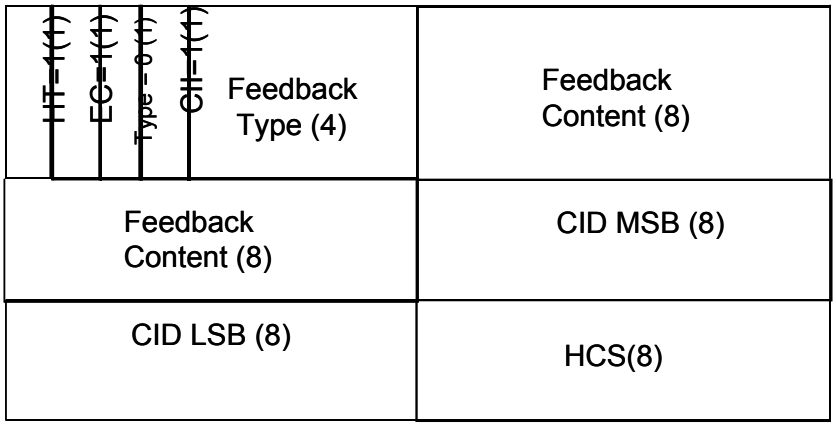

Figure 20~~b~~g— Feedback header with CID field

[Replace drawing in Figure 20c in p802.16e/D7 with the following drawing]

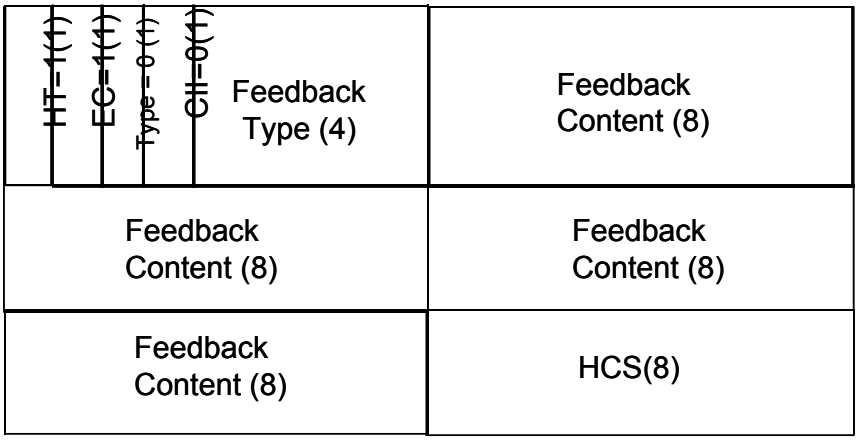

Figure 20~~c~~h—Feedback header without CID field

The Feedback header shall have the following properties:

a) The length of the header shall always be 6 bytes.
b) The HT field is set to 1, ~~and~~ the EC field is set to 1 and the Type field is set to 0, which indicates the feedback header type.
c) The Feedback type field shall be set according to Table 7i.
d) The CII field (CID Inclusion Indication) shall be set to 1 for the header with CID field and set to 0 for the header without CID field.
e) The Feedback Content field shall be set accordingly based on the value of the feedback type field.

The Feedback header shall be used by the MS to provide its feedback(s). An MS receiving a Feedback header on the downlink shall discard the PDU.

The support of Feedback header is OFDMA PHY specific and is specified as part of the capability exchange dialog (REG-REQ/RSP)

The fields of Feedback header are defined in Table 7h.

Table 7h—Description of the fields of Feedback header

Name	Length (bits)	Description
HT	1	Header Type = 1
EC	1	EC = 1
~~N/M flag~~ Type	1	~~Normal feedback header/mini feedback header indication. Shall be set to 0 to indicate that this is a normal size Feedback header.~~ Set to 0 to indicate that it is a Feedback header.
CII	1	CID Inclusion indication. Set to 1 for a Feedback header with CID field; set to 0 for a Feedback header without CID field.
Feedback Type	4	Set according to Table 7i
Feedback Content	16 or 32	Set according to Table 7i. Length of 16 bits for a Feedback header with CID field and length of 32 bits for a Feedback header without CID field.
HCS	8	Header Check Sequence (same usage as HCS entry in Table 5)

Table 7i—Feedback type and feedback content

Feedback Type	Feedback contents	Description
0000	~~Set as described in Table 296d~~ MIMO feedback type (3 bit) + feedback payload (6 bits)	~~MIMO mode and permutation feedback~~ CQI and MIMO feedback. The definition of MIMO feedback type (3 bit) and the corresponding feedback payload (6 bits) are the same as that defined in Table 302a and sections 8.4.5.4.10.4, 8.4.5.4.10.5, 8.4.5.4.10.6, 8.4.5.4.10.7, 8.4.5.4.10.8, 8.4.5.4.10.9, 8.4.5.4.10.10 for the Enhanced Fast-feedback channel.
0001	DL average CQI (5 bits)	5 bits DL average CQI ~~feedback~~ of the serving or anchor BS (for the case of FBSS).
0010	Number of index, *L* (2 bits) + *L* occurances of Antenna index (2 bits) + MIMO coefficients (5 bits, see definition in 8.4.5.4.10.6)	MIMO coefficients feedback for up to 4 antennas.
0011	Preferred-DIUC (4 bits)	Preferred DL channel DIUC feedback
0100	UL-TX-Power (~~7~~8 bits) (see Table 7a for definition)	UL transmission power
0101	PREFERRED~~referred~~-DIUC(4 bits) + UL-TX-POWER~~ower~~(7 bits) + UL-HEADROOM~~headroom~~ (6 bits) (see	PHY channel feedback

	Table 7~~a~~d for definitions)	
0110	~~Number of bands, *N* (2 bits) + *N*occurances of 'band index (6 bits) + CQI (5 bits)'~~ AMC band indication bitmap (12 bits, see 6.3.17.5) + *N* CQI (N x 5 bits) *N* is the number of '1's in the AMC band indication bitmap.	CQIs of up to 4 best reception DL ~~multiple~~ AMC bands
0111	Life span of short term precoding feedback (4 bits) according to Table Z2.	The recommended number of frames the short term precoding feedback can be used for.
1000~~0111~~	Number of feedback types, *0* (2 bits) + *0* occurances of 'feedback type (4 bits) + feedback content (variable)'	Multiple types of feedback
1001~~0~~	Feedback of index to long term precoding matrix in code book (6 bits), rank of precoding code book (2 bits) and FEC and QAM feedback (6 bits) according to Table Z.	Long term precoding feedback
~~1001~~	~~Life span of short term precoding feedback (4 bits) according to Table Z2.~~	~~The recommended number of frames the short term precoding feedback can be used for.~~
101~~0~~0	Combined DL average CQI of Active BSs (5 bits).	Combined DL average CQI value of all Active BSs within the Active Set.
1011	MIMO channel feedback (see Table 7~~e~~j for description of feedback content fields)	MIMO mode channel condition feedback
~~0b~~1~~011~~100	CINR Mean (8 bits) + CINR Standard Deviation (8 bits)	CINR Feedback (values and coding defined in 8.4.11.3)

1101	CL MIMO type (2 bits)
	If (CL MIMO type == 00 {
	Antenna grouping index (4 bits) + average CQI (5 bits) }
	Elseif (CL MIMO type == 01{
	Number of streams (2 bits) + Antenns selection option index (3 bits) + average CQI (5 bits) of the selected antennas}
	Elseif (CL MIMO type == 10) {
	Number of streams (2 bits)+Codebook index (6 bits) + average CQI (5 bits) }
		Closed-loop MIMO feedback
		CL MIMO type:
		0b00: antenna grouping
		0b01: antenna selection
		0b10: codebook
		0b11: indication of transition from closed-loop MIMO to open-loop MIMO
		
		Antenna grouping index: 0b0000~0b1001 = 101110 ~ 110110 in Table 298d
		
		Antenna selection option index: 0b000 ~0b010 = 110000 ~ 110010 in Table 317f for 3 Tx antenna
		0b000~0b101 = 110000~110101 in Table 317g for 4 Tx antenna
		
		Codebook index: (See 8.4.8.3.6)

0b11~~00~~10-0b1111	Reserved for future use	

The feedback payload shall be placed at the first available bits of the feedback content field. Any unused bit in the content field shall be set to zero.

[The accepted-modified resolution of comment #3066 should be to remove section 6.3.2.1.6.2. Delete section 6.3.2.1.6.2 below]

~~**6.3.2.1.6.2 Mini Feedback header**~~

~~The Mini Feedback PDU shall consist of Mini Feedback header alone and shall not contain a payload. The Mini Feedback header is illustrated in Figure 20d. When sent alone without any other UL MAC PDU, the Mini Feedback header shall be duplicated.~~

[Delete Figure 20d]

~~**Figure 20d—Mini feedback header**~~

~~The Mini Feedback header shall have the following properties:~~

~~a) The length of the header shall always be 3 bytes.~~
~~b) The HT field is set to 1 and the EC field is set to 1, which indicates the feedback header type.~~
~~c) The N/M field (Normal feedback header/Mini feedback header indication) shall be set to 1 to indicate that this is a half-sized Mini Feedback header.~~
~~d) The Feedback Type field shall be set according to Table 7i, except that the feedback types of 0b1000 to 0b1111 shall not be used, such that the first byte of a MAC header shall never have the value of 0xFX. This prevents false detection.~~
~~e) The Feedback Content field shall be set accordingly based on the value of the feedback type field.~~

~~The support of Mini Feedback header is OFDMA PHY specific and is specified as part of the capability exchange dialog (REG-REQ/RSP).~~

~~For the Mini feedback header, the feedback type of 0b1111 shall not be used.~~

~~The field of Mini Feedback header are defined in Table 7j.~~

~~**Table 7j—Description of the fields of Feedback header**~~

~~Name~~	~~Length (bits)~~	~~Description~~
~~HT~~	~~1~~	~~Header Type = 1~~
~~EC~~	~~1~~	~~EC = 1~~
~~N/M flag~~	~~1~~	~~Normal feedback header/mini feedback header indication. Set to 1 to indicate that this is a half-sized Mini Feedback header.~~
~~Feedback Type~~	~~4~~	~~Set according to Table 7i~~
~~Feedback Content~~	~~8~~	~~Set according to Table 7i. Length of 16 bits for a Feedback header with CID field and length of 32 bits for a Feedback header without CID field.~~
~~HCS~~	~~8~~	~~Header Check Sequence~~

[merge section 6.3.2.1.6.3 below into the Feedback header section since the MIMO Channel Feedback is one of the Feedback type of the Feedback header]

6.3.2.1.6.3 MIMO Channel Feedback header

The MIMO Channel Feedback header is used for MSS to provide DL MIMO channel quality feedback to the BS. The MIMO Channel Feedback header can be used to provide a single or composite channel feedback.

The MIMO Channel Feedback header with or without basic CID field is illustrated in Figure 20e and Figure 20f respectively.

[Delete Figure 20e]

Figure 20e—MIMO Channel Feedback header with CID field

[Delete Figure 20f]

Figure 20f—MIMO Channel Feedback header without CID field

The MIMO Channel Feedback header shall have the following properties:

f) The length of the header shall always be 6 bytes.
g) The TYPE field shall be 0b1000.
h) PREERRED_DIUC indicates the preferred DIUC suggested by the MSS.
i) PBWI provides the size of the preferred bandwidth, which can be used for DIUC transmission.
j) SLPB points to the starting preferred bandwidth location. Combining with PBWI field, BS knows the exact size and location of the preferred bandwidth in the channel
k) BPRI can be used to rank up to four preferred burst profiles within the DL channel.
l) CTI provides coherent time information.
m) AI can support up to four antennas.
n) MI suggests the preferred STC/MIMO Matrix for the MSS.
o) CT/CQI can support two types of CQI report.

The fields of MIMO Channel Feedback header are defined in Table 7k

Table 7k—Description of MIMO Channel Feedback content fields (Feedback type = 0b1011) header fields

Name	Length (bits)	Description
HT	1	Header Type = 1
EC	1	Always set to 1
N/M	1	Always set to zero
CII	1	The CII field (CID Inclusion Indication) shall be set to 1 for the header with CID field and set to 0 for the header without CID field.
Feedback Type	4	Type = 0b1011

PREFERRED-DIUC	4	Index of the DIUC preferred by the MSS.
PBWI	4	Preferred Bandwidth Index indicates the ratio of the preferred bandwidth over used channel bandwidth: 0b0000: 1 0b0001: 3/4 0b0010: 2/3 0b0011: 1/2 0b0100: 1/3 0b0101: 1/4 0b0110: 1/5 0b0111: 1/6 0b1000: 1/8 0b1001: 1/10 0b1010: 1/12 0b1011: 1/16 0b1100: 1/24 0b1101: 1/32 0b1110: 1/48 0b1111: 1/64 Where Ratio = $BW_{preferred}/BW_{used}$ $BW_{preferred}$: Preferred bandwidth for DIUC transmission BW_{used}: Actual used channel bandwidth (excluding guard bands)
SLPB	7	Starting Location of Preferred Bandwidth: 0-127 The effective bandwidth (used bandwidth) is divided into 1/128 interval, from 0 to 127 representing from lower to higher band. SLPB indicates the starting location of preferred bandwidth for the DIUC burst profile
BPRI	1/2	Burst Profile Ranking Indicator (without basic CID): BPRI indicates the ranking for DL channel condition of the preferred bandwidth as reported in the current header where 0 is the most preferred bandwidth) 0b00: 1st preferred burst profile 0b10: 2ndpreferred burst profile 0b01: 3rdpreferred burst profile 0b11: 4thpreferred burst profile Burst Profile Ranking Indicator (including basic CID): 0b0: 1st preferred burst profile 0b1: 2nd preferred burst profile. This field is 1 bit when CII is set to 1, otherwise this field is 2 bits.
CTI	3	Coherent Time Index: CTI indicates the estimated duration of the valid MIMO channel conditions 0b000: Infinite 0b001: 1 frame 0b010: 2 frames 0b011: 3 frames 0b100: 4 frames 0b101: 8 frames 0b110: 14 frames 0b111: 24 frames This field is only present when CII is set to 0.
AI	4	This report can be a composite channel condition report, each bit represents for each antenna; “1” is applicable, “0” is not applicable Antenna Index: Bit 0 (MSB)-Antenna 0 Bit 1 – Antenna 1 Bit 2 – Antenna 2 Bit 3 (LSB) – Antenna 3 This field is only present when CII is set to 0.
MI	2	Matrix Indicator: 0b00: No STC 0b01: Matrix A 0b10: Matrix B 0b11: Matrix C This field is only present when CII is set to 0.
CT	1	CQI Type: The type of CQI feedback in the CQI field 0: DL average CQI feedback 1: CQI feedback for the preferred bandwidth indicated in the current header This field is only present when CII is set to 0.
CQI	5	CQI feedback This field is only present when CII is set to 0.
CID	16	MS~~S~~ basic CID. This field is only present when CII is set to 1.

HCS	8	Header Check Sequence (same usage as HCS entry in Table 5).