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Title	<b>Consistent MAC Header Extendibility Mechanisms</b>	
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Re:	This contribution proposes additional capabilities for 802.16e	
Abstract	[Description of document contents.]	
Purpose	The purpose of this contribution is to define flexible extension mechanism for MAC sub header	
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# Consistent MAC Header Extendibility Mechanisms

## *Session#36 MAC Header Drafting Group*

### **1. Introduction**

The bandwidth request header defined in section 6.3.2.1.2 of IEEE Std 802.16 – 2004 defines a three bit type field allowing for up to 8 different types of Bandwidth Request headers. Only two code points are defined in the 2004 version of the standard. These are: incremental and aggregate bandwidth request modes.

The current draft of 802.16e (reference a) further defines all remaining code points of the Bandwidth Request header. In fact, some of the information now allowed in the Bandwidth Request has nothing to do with bandwidth request (e.g. PHY channel report header).

The various types of Feedback headers defined in the current draft are also indication that we are desperately running out of code space and that a consistent and flexible header extension mechanism is required. This contribution proposes such a mechanism.

We propose using HT=1, EC=0, Type = 110 to indicate extended MAC header.

Note that SN report header, previously using type code 110, will now be sent using the new extended MAC header mechanism.

### **2. References**

- a) IEEE-Std 802.16 – 2004
- b) IEEE P802.16e/D February, 2005

### **3. Motivations**

The MAC Header extensibility mechanism allows for future-proofing of the MAC protocol.

### **4. Suggested Changes**

1. *Page 26, line 40, insert the following:*

#### 6.3.2.1.7 Extended MAC Header

The format of Extended MAC Header is shown in figure x1.

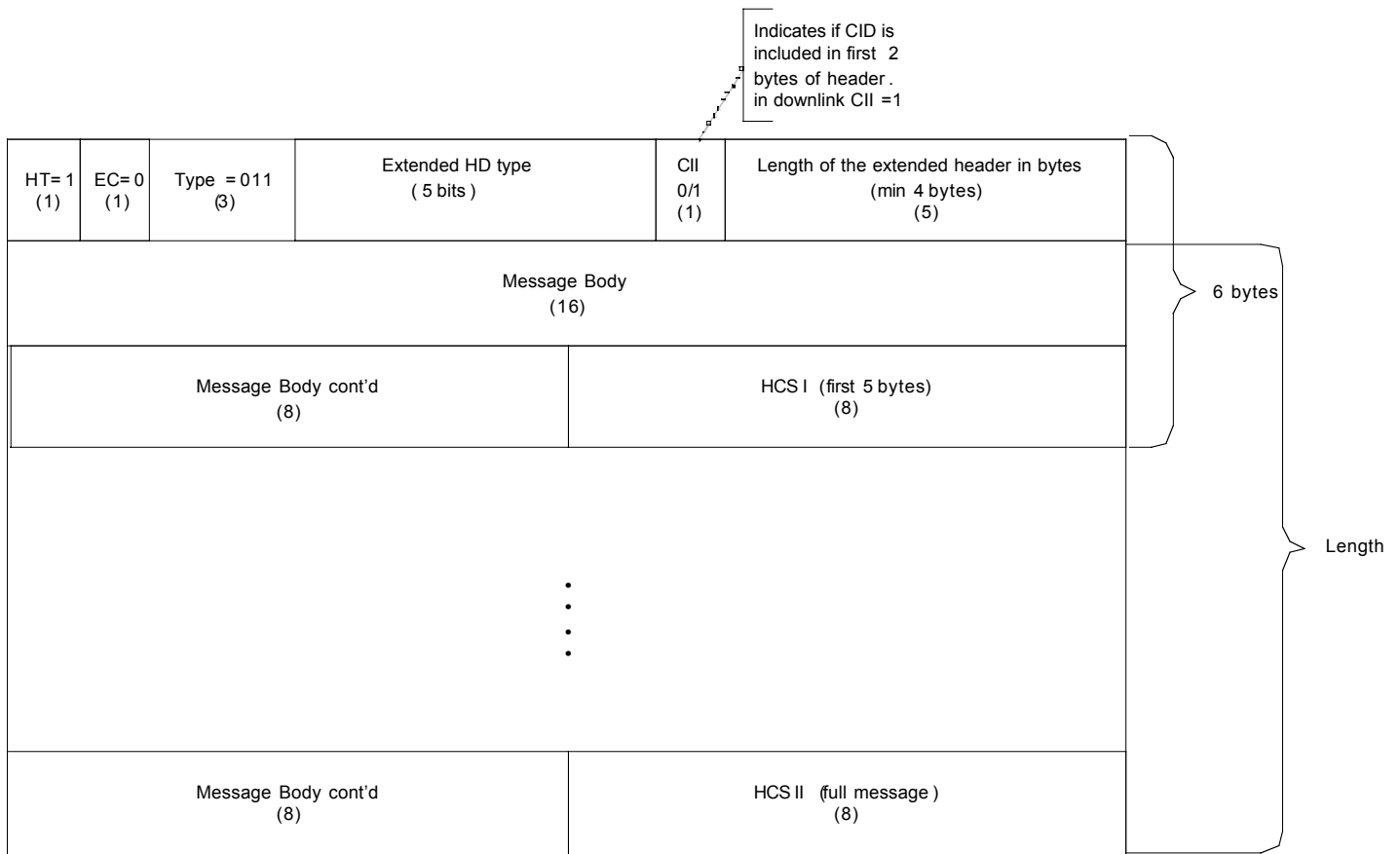


Figure XXa: Format of Extended header

The Extended MAC header shall have the following properties:

- a) The size of the Extended MAC header message shall be defined by the field of Length of the extended header.
- b) The EC field shall be set to 0, indicating no encryption.
- c) 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.

The fields of the extended header are described in Table Xa

Name	Length (bits)	Description
HT (Header type)	1	HT=1
EC	1	EC=0
Type	3	0b110
Extended Header Type	5	Indicating the type of extended header.
CII	1	Indicates if CID is present in message body. In downlink, CII must be 1.

Length	5	Indicates the length of the Extended MAC header (minimum 4 bytes). The length applies to the message body, which starts immediately following the length field, and includes HCS fields and CID if present.
Message body – first part	24	As defined by Extended MAC header Type Table x2
HCS I	8	Header checksum sequence that applies to first 5 bytes
Message body – second part	Variable	Continuation of message body.
HCS II	8	Header checksum sequence that applies to the entire extended header

Note: HCS as defined by xxxx

Table Xb: Extended MAC header Type

Type Value	Name	CII	Length	Description
0	SN report	1	Variable	See section 6.3.2.1.6. SN report header
1-31	available for new types			

2. Replace Section 6.3.2.1.6 (SN report header) with the following:

### [6.3.2.16 SN report header](#)

SN report is sent as an extended MAC header.

The format of the SN report is shown in table X3. The complete description of an SN report as an Extended MAC header is illustrated in figure

Table Xc: SN report message [body](#)

Syntax	Size (bits)	Note
SN_report_extended_header{		
CID	16	SS basic CID
For ( i=1; i< <a href="#">Number of SDU SN</a> ; i++ ){		<a href="#">Number of SDU SN is implied from the Length field of the extended MAC header.</a>
SDU SN <sub>i</sub>	6	The ARQ BSN (LSB) or MAC SDU SN (LSB) for a specific connection. The order of reporting of the SDU SN's for the connections is predetermined as indicated in 6.3.20.2.6.2.2
}		
}		

HT= 1 (1)	EC= 0 (1)	Type = 011 (3)	Extended HD type = 0b00000 ( 5 bits)	CII = 1 (1)	Length of the extended header in bytes (min 4 bytes) (5)
CID (16)					
Number of SN reports (8)			HCS I (first 5 bytes) (8)		
SN report 1 (6)		SN report 2 (6)		SN report 3 (4)	
SN report 3 cont'd (2)	• • •				
SN report last (6)			HCS II (full message ) (8)		

Figure XXb: SN report in an Extended MAC header

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 SDU-SNs shall be in numerical ascending order of the SFID values of the connections with SN Feedback enabled.