Project	***IEEE 802.16j Mobile Multihop Relay Task Group***
Title	***Proposal for Relay MAC PDU Format***
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Re:	*Response to the call for technical proposal regarding IEEE Project 802.16j (i.e., IEEE 802.16j-07/007r2, "Call for Technical Comments and Contributions regarding IEEE Project P802.16j").*
Abstract	*This contribution describes a general format for MAC PDU on relay links.*
Purpose	*To adopt the relay MAC PDU format proposed herein into IEEE 802.16j.*
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1. Introduction

Many proposals want some bit in the GMH for new need.
   a. One bit is needed to indicate CID encapsulation by 07/126r4
   b. One bit would be needed to indicate whether the intermediate RS should read the shared management message or not by 07/188 and 07/189
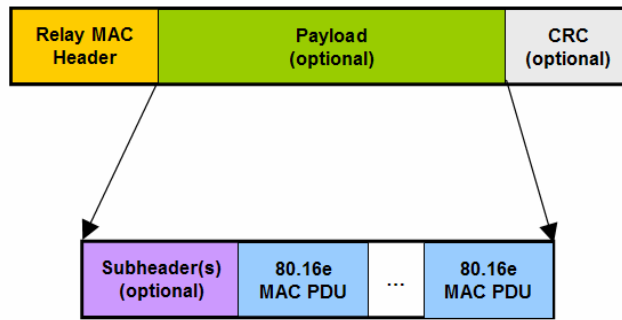   c. One bit is needed to indicate MPDU encapsulation by 07/267

This list may go on and on…

Unfortunately, there is only 1 RSV bit left in the GMH. On the other hand, some of the current fields in GMH may not be needed on relay link.

As a solution, we propose a new *relay MAC PDU header format*.

2. Summary of Proposal

Relay MAC PDU shall be of the form illustrated below in Figure 1.

Figure 1: An illustration of relay MAC PDU format.

The *relay MAC subheader* are optional, and are introduced to convey information needed by a wide variety of signaling and management function (e.g., QoS, security, routing).

The detailed format for *relay MAC subheader* is subject to further discussion.

The proposed relay MAC PDU header format is shown below in Figure 2: Proposed relay MAC PDU header format.Figure 2.

Figure 2: Proposed relay MAC PDU header format.

The RMI (relay mode indicator) bit is used to indicate whether this is a relay MAC header or a legacy MAC header.

The contents of the reserved bits are subject to further discussion. For example, a ownership bit (OT) can be used to indicate whether the intermediate RS should read the payload of this MPDU or not, as shown in Figure 3.
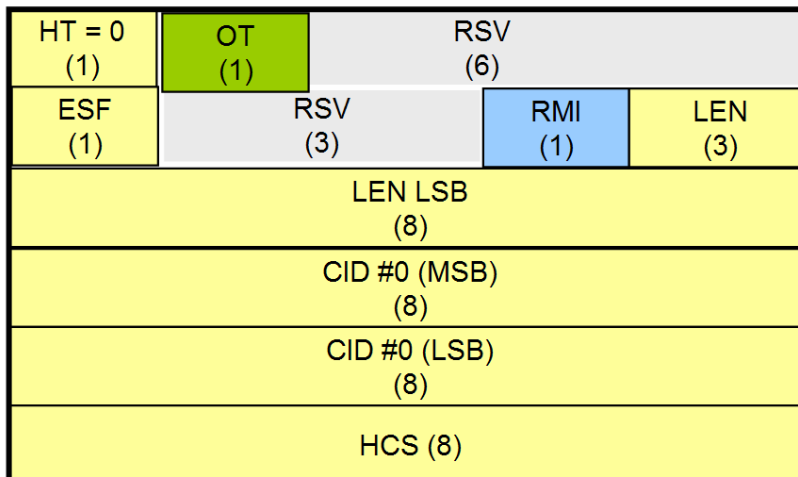
HT = 0 (1)	OT (1)	RSV (6)		
ESF (1)	RSV (3)		RMI (1)	LEN (3)
LEN LSB (8)				
CID #0 (MSB) (8)				
CID #0 (LSB) (8)				
HCS (8)				

Figure 3: An example of the usage of relay MAC PDU header.

3. Proposed Text Changes

6. MAC Common Part Sublayer

6.3.2 MAC PDU formats

[Insert the following paragraph at the end of this subclause]

For MAC PDUs sent on relay link, they can be of the form illustrated in Figure 18a.   Each PDU can begin with a fixed length relay MAC PDU header. The relay MAC header may be followed by the Payload. If Payload is present after the relay MAC PDU header, the Payload shall consist of zero or more extended subheader, zero or more subheader, zero or more IEEE 802.16e MAC PDUs and zero or more relay MAC PDUs. A relay MAC PDU may contain a CRC.
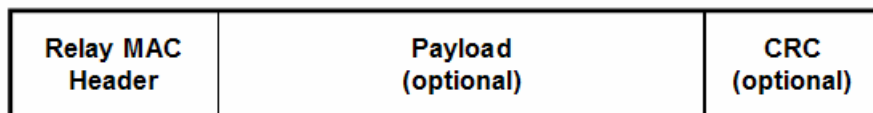
Relay MAC Header	Payload (optional)	CRC (optional)

Figure 18a – Relay MAC PDU format

6.3.2.1 MAC header format

[Insert following subclause]

6.3.2.1.1.1 Relay MAC PDU header format
Relay MAC PDU shall be of the format defined in Table 6a and further illustrated in Figure 19b and 19c, respectively.

Syntax	Size	Notes
MAC Header() {		
HT	1 bit	
if (HT == 0) {		
Reserved	*7 bit*	*Currently reserved. Actual content is subject to further discussion*
ESF	1 bit	
Reserved	*3 bit*	*Currently reserved. Actual content is subject to further discussion*
RMI	*1 bit*	*Indicate whether this is a relay MAC header or a legacy MAC header.*
LEN	11 bits	
CID	16 bits	*Tunnel CID or basic CID of the RS, depending on the range in which the CID value falls into.*
HCS	8 bits	Header check sequence
}		
else if (HT == 1) {		If **no payload** is attached
Use legacy 802.16e or 802.16j Format	*39 bits*	
HCS	8 bits	
}		
}		

Table 6a ─ Relay MAC PDU header

HT = 0 (1)	RSV (7)		
ESF (1)	RSV (3)	RMI (1)	LEN (3)
LEN LSB (8)			
CID #0 (MSB) (8)			
CID #0 (LSB) (8)			
HCS (8)			

Figure 19b ─ Header format of relay MAC PDU with payload

4. References

[1] "IEEE Standard for Local and Metropolitan Area Networks − Part 16: Air Interface for Fixed Broadband Wireless Access Systems, Amendment 2: Physical and Medium Access Control Layers for Combined Fixed

and Mobile Operation in Licensed Bands," IEEE Computer Society and the IEEE Microwave Theory and Techniques Society, February 2006.nh