Project	***IEEE 802.16j Mobile Multihop Relay Task Group***	
Title	***MAC PDU Construction on relay links***	
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Re:	*Response to the call for technical proposal regarding IEEE Project 802.16j (i.e., IEEE 802.16j-06/034, "Call for Technical Proposals regarding IEEE Project P802.16j", December 12, 2006).*	
Abstract	*This contribution describes the MAC PDU construction mechanisms for relay links.*	
Purpose	*To adopt the MAC PDU construction mechanisms proposed herein into IEEE 802.16j.*	
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MAC PDU Construction on Relay Links

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1. Introduction

As illustrated in Figure 1, the new mobile multi-hop relay-based (MMR) network architecture imposes a demanding performance requirement on relay stations. These relays will functionally serve as an aggregating point on behalf of the BS for traffic collection from and distribution to the multiple MSs associated with them, thus naturally incorporating a notion of "traffic aggregation". Hereby, we propose two simple yet efficient MAC PDU (MPDU) construction mechanisms to support "aggregation", and improve the protocol efficiency on relay links

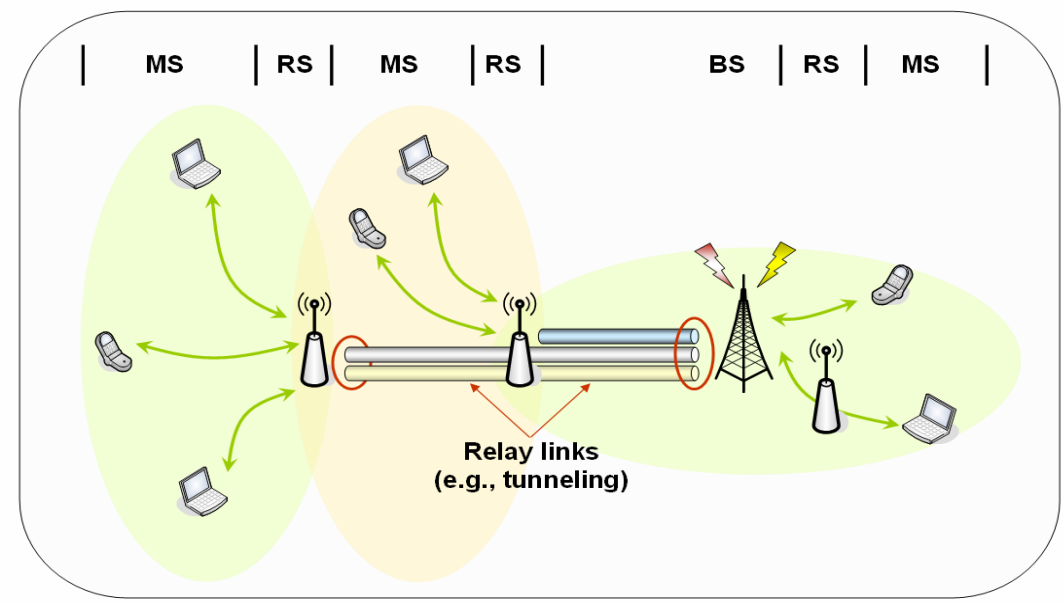

Figure 1: An illustration of "traffic aggregation" in an MMR network.

2. Summary of Proposal

2.1 Concatenation on Relay Links

IEEE 802.16 [1] has defined a concatenation operation, whereby multiple MPDUs can be concatenated into a single transmission burst in either uplink or downlink direction, regardless of whether these MPDUs are belonging to the same connection or not. In essence, IEEE 802.16 concatenation is equivalent to an aggregation at MPDU level.

2.2 Extended MAC PDU Construction on Relay Links

To support the notion of aggregation on the relay links, we also propose an extended MAC PDU construction scheme. As illustrated in Figure 2, a set of MPDUs can be aggregated together to form a new MPDU. At the beginning of the aggregated MPDU, a new generic MAC header will be appended. The CID field of that generic MAC header contains the value of the corresponding aggregate connection (e.g., tunnel). A RS will be able to recognize whether it is the intended receiver or not based upon this CID in the generic MAC header.

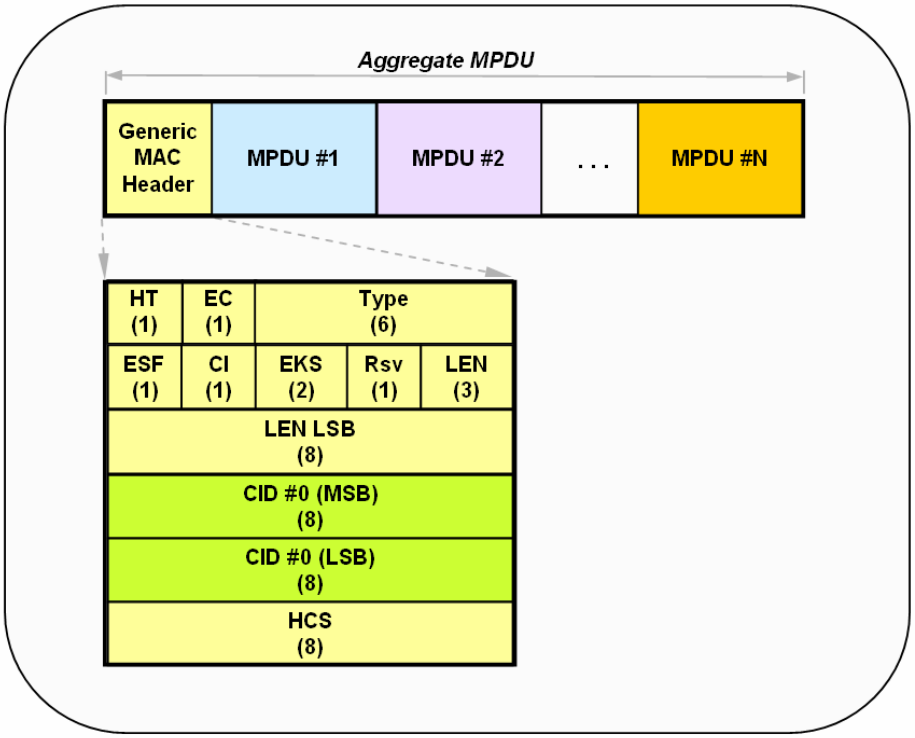

Figure 2: Extended MPDU Construction

3. Proposed Text Changes

6. MAC common part sublayer

6.3.2 MAC PDU formats

Insert the following sentence after the last paragraph:
A relay MAC PDU, which is the MAC PDU on a relay link, can be of the form illustrated in Figure 18a. Each PDU shall start with a fixed-length generic MAC header. The header is followed by a concatenation of multiple MAC PDUs of the legacy format.

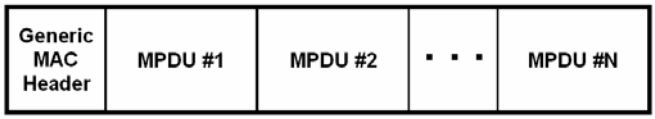

Figure 18a – Format of MAC PDU on relay link

6.3.2.1 MAC header formats

Change Table 5 as indicated:

Table 5 – Generic MAC header fields

Name	Length	Description
CID	*16 bits*	*If this is the generic MAC header that immediately precedes the concatenated MPDUs that belong to the same aggregate connection (e.g., tunnel), this field should be set to the CID of the aggregate (tunnel) connection.*

6.3.3.2 Concatenation

Insert the following sentence after the last paragraph:

On a relay link, MAC PDUs can be concatenated in UL and/or DL for transmission. But MAC PDUs on relay links and MAC PDUs on access links cannot be concatenated into a burst.

4. References

[1] "IEEE Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed Broadband Wireless Access Systems," IEEE Computer Society and the IEEE Microwave Theory and Techniques Society, October 2004.

[2] "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.

[3] "Harmonized definitions and terminology for 802.16j Mobile Multihop Relay," IEEE 802.16j-06/014r1 *http://www.ieee802.org/16/relay/index.html*, October 2006.