Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Additions to 802.16 Packing Function**
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Re:	This document is submitted in response to 802.16 Letter Ballot #3
Abstract	Two additions for the 802.16 MAC packing function are proposed
Purpose	The author wants 802.16 to consider this document within a process of comments resolution for the document IEEE 802.16 / D2-2001
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Additions to 802.16 Packing Function

1. General

This document contains the definitions of two additional functions proposed for employment as a part of Packing functionality: Partial Payload Type field and Partial Payload Addressing function.

2. Addition of the Partial Payload Type

2.1. Background

An invocation of the ARQ includes the definition of ARQ feedback (ACK, NACK) format(s). The packing functionality might be used for piggybacking ARQ related information (as well as another types of MAC signaling in the future) onto the data messages transmitted over the 802.16 wireless connection. So an indication needed for the type of partial payload that appears in the packed MPDU.

The proposed approach includes the decision to decrease the Length field of the Fragmentation sub-header to 8 bits. From the point of view of decreasing of the MAC header overhead a payload of the length over 255 is large enough to survive addition of MAC header of its own.

2.2. Changes in IEEE 802.16/D2-2001 Document

2.2.1. Page 104, Line 21, Section 6.2.3.3.2

Change the name of the section 6.2.3.3.2 Packing Variable Length Packets to 6.2.3.3.2 Packing Variable Length Partial Payloads

2.2.2. Page 104, Line 23, Section 6.2.3.3.2

Change the text

When packing variable length SDU connections, such as Ethernet, the k*n relationship between the MAC header s length field and the higher layer SDUs no longer holds. This necessitates indication of where one SDU ends and another begins. In the variable length SDU case, the MAC attaches a packing sub-header (PSH) to each SDU. This header is shown in Figure 61.

To the following text

When packing the such MSDUs as Ethernet frames, the k*n relationship between the MAC header s length field and the higher layer SDUs no longer holds. This necessitates indication of where one SDU ends and another begins. Another option is the transmission of MAC signaling, such as ARQ feedbacks, as partial payloads. In the case of variable length payloads, the MAC attaches a packing sub-header (PSH) to each partial payload. This header is shown in Figure 61.

2.2.3. Page 104, Line 28, Section 6.2.3.3.2

Change the Figure 61, including the caption, to the following

FC(2)	FSN(3)	PPT(3)	Partial Payload Length (8)

Figure 61 Packing Sub-header for Variable Length Partial Payloads

2.2.4. Page 104, Line 45, Section 6.2.3.3.2

Change the text

The packing sub-header starts with fragmentation control (FC) and fragmentation sequence number (FSN) bits that are used as they would be in the MAC header in the unpacked case. The FC and FSN bits in the MAC header itself are set to 0 by the sender and interpreted as do not care by the receiver. These are followed by an 11 bit length field expressing the length of the SDU or SDU fragment following the packing subheader.

to the following text

The packing sub-header starts with fragmentation control (FC) and fragmentation sequence number (FSN) bits that are used as they would be in the MAC header in the unpacked case. The FC and FSN bits in the MAC header itself are set to 0 by the sender and interpreted as do not care by the receiver. These are followed by an 3 bits PPT (Partial Payload Type) field expressing the type of the partial payload and 11 bit length field expressing the length of the SDU or SDU fragment following the packing sub-header. For the case when the partial payload is an MSDU or MSDU fragment, PPT = 000

2.2.5. Page 104, Line 55, Section 6.2.3.3.2

From this line and down to Page 105, line 41, including the Figures 62, 63, replace all the text strings SDU , Variable Length SDU and Variable Length PDU to Partial Payload

3. Partial Payload Addressing Function

3.1. Background

The VoIP applications over 802.16 wireless network face a specific problem of the high MAC header overhead. Having VoIP packets (IP datagrams) transmitted over 802.16 wireless channel to different SSs, we have to add to each one 6 bytes MAC header simply because we have only one function of addressing located in the MAC Header.

For example, the H.323 payload of 20 bytes (G.729 with CS-ACELP coding) coming from the Ethernet network might be, using headers compression, translated into, let s say 22 bytes MAC payloads. Each payload should be encapsulated into a separated MAC messages to provided different CIDs resulting in 28 bytes MAC messages (without CRC). The MAC overhead involved at this step is 6/28 = 33%.

Now, suppose we apply the packing function to a number of VoIP channels payloads with the change that we add the CID to each partial payload. Then effectively (for several tens of connections) the overhead entered by MAC will be of order

4 (Packing Header + CID) / 26 = 15%.

That still is high but twice less

This example shows that for a large number of small payloads addressed to different stations may be better handled if we (optionally) add CID to the Packing Header.

3.2. Changes in IEEE 802.16/D2-2001 Document

3.2.1. Page 40, Line 65, Section 6.1.1.1.2

Add the following line
Partial Payload Addressing Indicator

3.2.2. Page 41, Line 30, Section 6.1.1.1.2

Add the following text
Partial Payload Addressing Indicator ON means that the partial payload in the packed MPDU has to have the CID preceding the payload

3.2.3. Page 104, Line 51, Section 6.2.3.3.2

Add the following text and the picture
If the Partial Payload Addressing Indicator (see 6.1.1.1.2) is ON then the address field should be added to the partial payload. The address field contains Connection ID

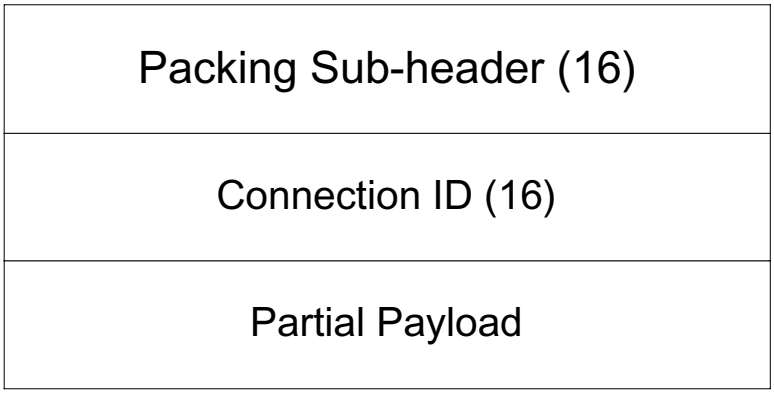

Figure XX. The Partial Payload with Packing Header and Address Field