Project	**IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>**
Title	**Proposed Changes related to the UL HARQ Procedure for Anonymous UL Allocations (16.2.14.2.1.2)**
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Re:	IEEE 802.16 Working Group Letter Ballot #30b on P802.16m/D3
Abstract	The contribution proposes changes related to the UL HARQ Procedure for Anonymous UL Allocations (16.2.14.2.1.2)
Purpose	To be discussed and adopted by TGm for the 802.16m DRAFT amendment.
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Proposed Changes related to the UL HARQ Procedure for Anonymous UL Allocations   (16.2.14.2.1.2)

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1   Introduction

In the 802.16m/D3, there are two types of UL unicast allocations: non-anonymous and anonymous, depending on whether or not the AMS's STID information is provided in the allocation IE. With a non-anonymous UL allocation, the AMS's STID information is provided by the allocation IE, e.g, UL Basic Assignment A-MAP IE. With an anonymous UL allocation, the STID of the AMS is not given in the allocation IE, instead, the contention-based access signal that the AMS sent in previous UL frame is used to identify the AMS, e.g., the RA-ID in the CDMA allocation IE, and the BR opportunity and BR sequence in the BR-ACK IE.

This contribution identifies a problem with the UL HARQ retransmission procedure for the anonymous UL allocations and also provides a remedy to the identified problem.

2   Problem Discussion

The 802.16m UL unicast data transmission uses a synchronous HARQ retransmission procedure, in which the HARQ retransmissions are implicitly allocated at the predefined interval and locations until the HARQ data transmission is successful or it reaches the max allowed HARQ retransmissions. As specified in the 16m/D3, before reaching the max number of HARQ retransmissions but still not successful, the ABS can change or stop the UL allocations for the synchronous UL HARQ retransmissions, e.g.

➢ the ABS can change the HARQ retransmission allocation by sending a basic UL allocation IE with the same ACID and AI_SN, based on paragraph in line 13 to 21, on page 229, in 16m/D3;

➢ The ABS can stop the synchronous UL HARQ retransmissions before reaching the max retransmissions by sending a basic UL allocation IE with the same ACID by with AI_SN toggled, based on the paragraph in line 32 to 36, on page 228, in 16m/D3.

However, the above mentioned mechanisms do not apply to the anonymous UL allocations, because the CDMA allocation IE and BR-ACK IE do not have ACID and AI_SN fields.

In addition, it is important for the ABS to be able to stop the HARQ retransmissions for an anonymous UL allocation, because of the non-zero probability of collision in an anonymous UL allocation, i.e., when more than one AMS transmitted the same preamble sequence in the same random access channel in the random access procedures, e.g., initial ranging, periodic ranging, contention-based bandwidth request.

3 Proposed Solution

When the ABS needs to stop / change the HARQ retransmission allocations for an anonymous UL allocation, it sends a CDMA allocation IE with the corresponding RA-ID. If the CDMA allocation IE has zero resource allocation, it indicates to stop the HARQ retransmissions for an anonymous UL allocation.

4 Suggested changes in the 802.16m/D3

Based on the above discussion, we propose the following changes in the 802.16m/D3. Note that the new text is marked with blue and underline; the deleted text are marked with red and strikethrough.

Suggested change #1: on page 229, line 22

Insert the following paragraph in line 22 on page 229:

For an anonymous unicast UL allocation, i.e., an UL allocation without the AMS's STID information provided in the allocation A-MAP IE, e.g., the UL allocations given by CDMA allocation A-MAP IE or BR ACK A-MAP IE, the HARQ procedure is the same as the UL allocation allocated by a UL Basic Assignment A-MAP IE, except that the ABS sends a CDMA allocation A-MAP IE with the corresponding RA_ID to stop or change the HARQ retransmission allocations, where a CDMA allocation IE with zero resource allocation indicates to stop the HARQ retransmissions..

Suggested change #3: on page 206, line 20

Change the paragraph in line 20 on page 206 as follows:

During the 3-step BR procedure of Figure 424, if the ABS is unable to decode the quick access message, the ABS falls back to the 5-step BR procedure illustrated in Figure 425. In that case, in Step 2, the ABS shall provide an UL grant to the AMS using a BR ACK A-MAP IE or CDMA Allocation A-MAP IE ~~The ABS shall limit the maximum HARQ retransmission of the BR header to TBD through the BR ACK A-MAP IE or CDMA Allocation A-MAP IE.~~ In Step 3, the AMS transmits a standalone BR header or use the given UL resource for its uplink data transmission. The UL HARQ function as specified in Section 16.2.14 shall be used in the UL data transmission in Step 3. Before reaching the maximum HARQ retransmissions (i.e., N_MAX_ReTx), the ABS can send a CDMA allocation A-MAP IE with the corresponding RA_ID to stop or change the HARQ retransmission allocations for the UL grant given by Step 3, where a CDMA allocation IE with zero resource allocation indicates a stop of the HARQ retransmissions. The AMS may restart the BR procedure if it receives a CDMA allocation IE with zero resource allocation.

Suggested change #3: on page 209, line 27

Delete the sentence in line 27 on page 209

~~The maximum number of the HARQ retransmission is TBD.~~

Suggested change #4: on page 441, line 44

Delete the sentence in line 44 on page 441

~~The maximum number of the HARQ retransmission is TBD.~~

5   References

[1] IEEE Std 802.16-2009

[2] IEEE P802.16m/D3, "DRAFT Amendment to IEEE Standard for Local and metropolitan area networks"