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Title	Proposed Text of UL PHY Control Structure Section (15.9.2.2 HARQ Feedback Channel) for the IEEE 802.16m Amendment
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Re:	“802.16m amendment text”: IEEE 802.16m-08/053r1, “Call for Contributions on Project 802.16m Draft Amendment Content”. Target topic: “11.9 UL PHY control structure, especially mapping”.
Abstract	The contribution proposes the text of UL PHY control structure section to be included in the 802.16m amendment.
Purpose	To be discussed and adopted by TGM for the 802.16m amendment.
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Proposed Text of UL PHY Control Structure Section (15.9.2.2 HARQ Feedback Channel) for the IEEE 802.16m Amendment

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1. Introduction

The contribution proposes the text of UL PHY Control structure section to be included in the 802.16m amendment. The proposed text is developed so that it can be readily combined with IEEE P802.16 Rev2/D8 [1], it is compliant to the 802.16m SRD [2] and the 802.16m SDD [3], and it follows the style and format guidelines in [4].

2. Modifications to the SDD text

The text proposed in this contribution is based on subclauses 11.9.2.2 in the IEEE 802.16m SDD [3]. Details beyond the SDD are summarized in contribution [5].

3. References

- [1] IEEE P802.16 Rev2/D8, "Draft IEEE Standard for Local and Metropolitan Area Networks: Air Interface for Broadband Wireless Access," Oct. 2008.
- [2] IEEE 802.16m-07/002r7, "802.16m System Requirements"
- [3] IEEE 802.16m-08/003r6, "The Draft IEEE 802.16m System Description Document"
- [4] IEEE 802.16m-08/043, "Style guide for writing the IEEE 802.16m amendment"
- [5] IEEE 802.16m-09/066, "IEEE 802.16m Uplink Control Channel Design Details and Updates", Motorola

4. Text proposal for inclusion in the 802.16m amendment

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15. Advanced Air Interface

15.9.2 UL Control channel

15.9.2.2. UL HARQ Feedback Channel

This channel is used to carry HARQ feedback information. The HARQ feedback information contains one bit: 1 for ACK, and 0 for NACK.

15.9.2.2.1. Multiplexing with other control channels and data channels

The UL HARQ feedback channel starts at a pre-determined offset with respect to the corresponding DL transmission. The UL HARQ feedback for persistent allocation shall be allocated before UL HARQ feedback for other allocations. To support DL subframe bundling, one HARQ feedback is allocated corresponding to one DL allocation across multiple DL subframes that are bundled together.

The UL HARQ feedback channel is FDM with other control and data channels. Orthogonal signaling is used to multiplex multiple HARQ feedback channels as described in Section 15.9.2.2.2.

15.9.2.2.2. PHY structure

The minimum resource unit for UL fast feedback control channel is a UL feedback mini-tile (FMT) which contains 2 contiguous subcarriers by 6 OFDM symbols. Twelve UL HARQ feedback channels are multiplexed together using a mixture of FDM/TDM/CDM in each FMT, and repeat for three times in three UL DRU tiles. The PHY structure of a fast feedback channel for green field mode is shown in Figure 1, and for legacy mode in Figure 2. In allocating UL ACK/NACK channels, the twelve orthogonal sequences in Figure 3 are allocated to 6 HARQ feedback channels sequentially.

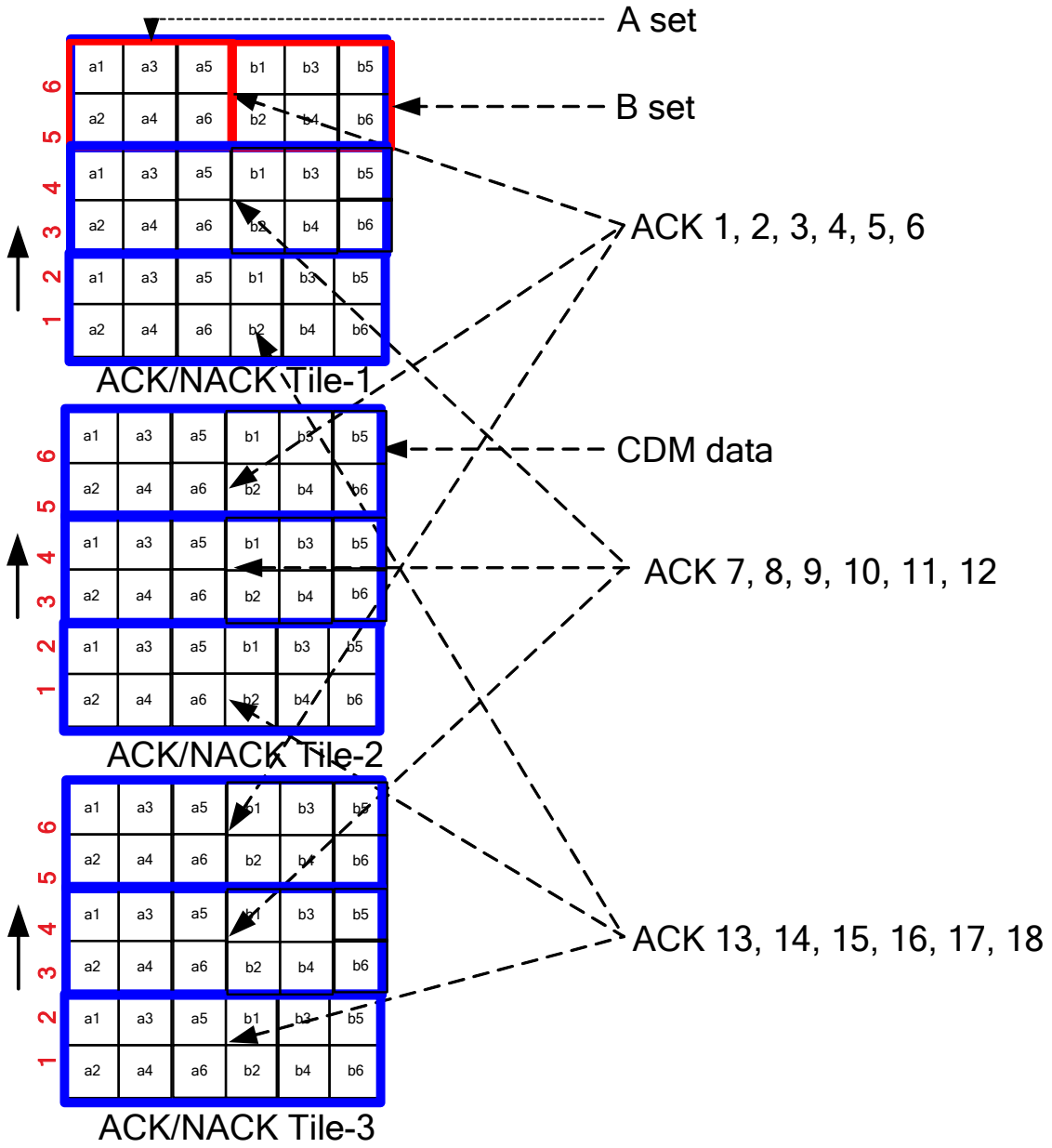


Figure 1. UL Fast Feedback Channel Data Tone Allocations (green field mode)

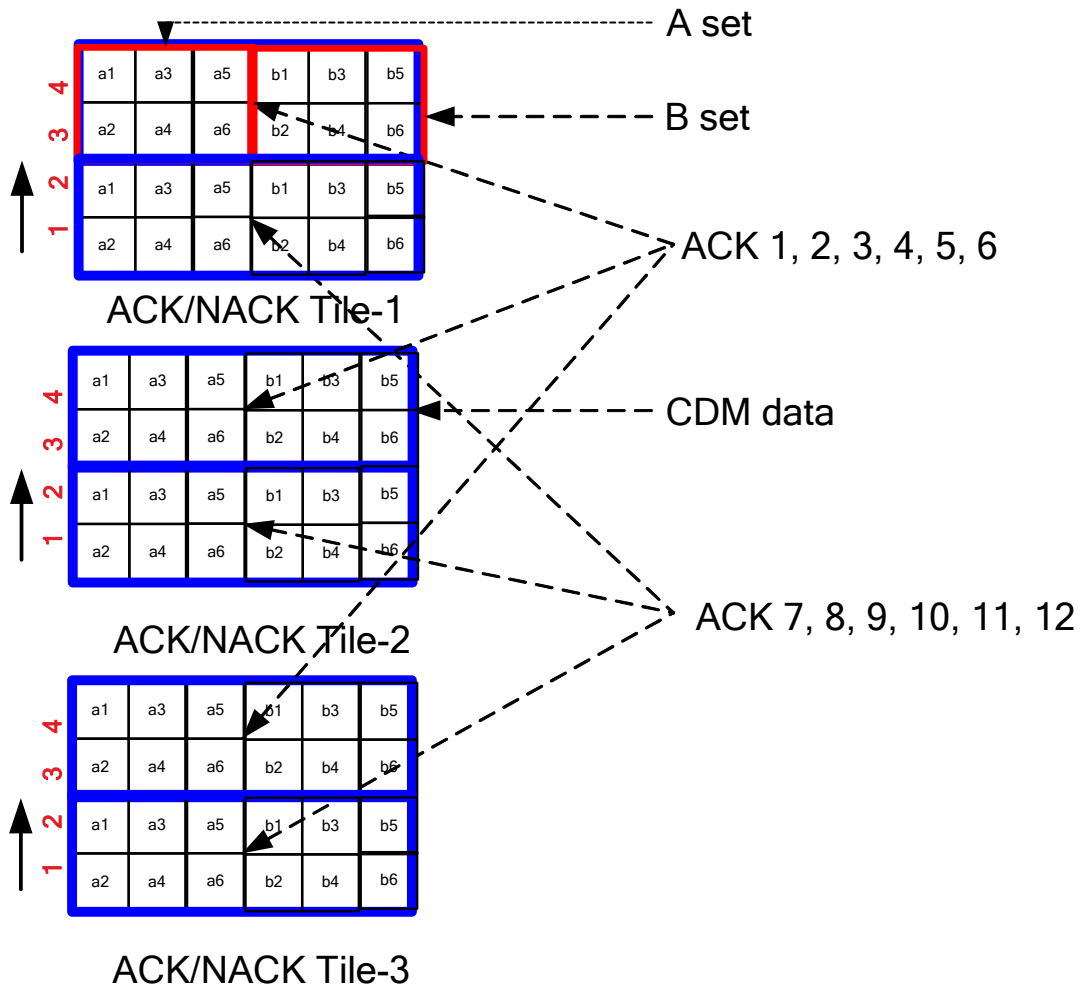


Figure 2. UL Fast Feedback Channel Data Tone Allocations (legacy mode)

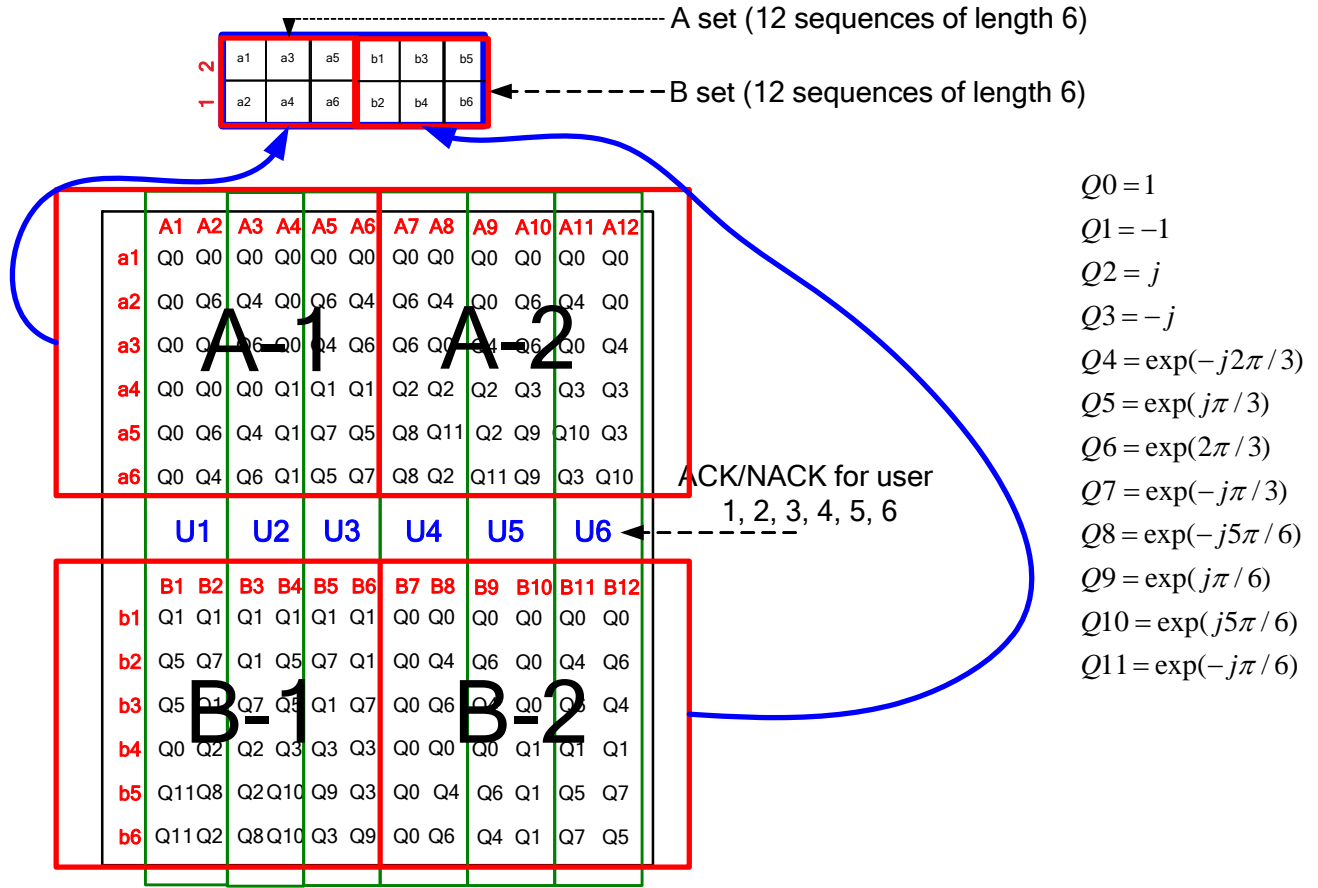


Figure 3. Twelve orthogonal complex sequences for 6 ACK/NACK channels

If there are multiple contiguous UL subframes within one frame, the UL HARQ feedback tiles are allocated in time dimension first in order to improve the coverage of HARQ feedback channel and to reduce the MS transmit power as shown in Figure 4. Further, subframe based frequency hopping of the tiles can be applied to improve the frequency diversity.

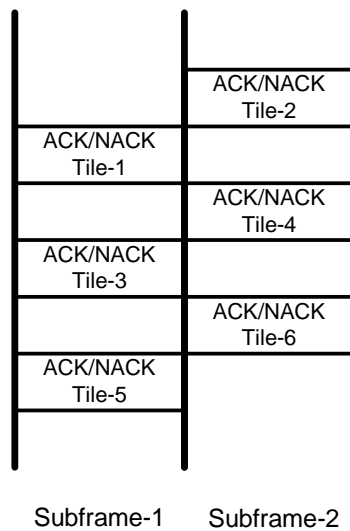


Figure 4. UL HARQ Feedback Channel tile allocations

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