Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	UL Control Region Clarification_Finals
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Source(s)	InSeok Hwang, Geunhwi Lim **Samsung Electronics Co.** Vladimir Yanover **Alvarion.**
	is91.hwang@samsung.com geunhwi.lim@samsung.com vladimir.yanover@alvarion.com
Re:	Call for Maintenance Change Requests on IEEE Std 802.16
Abstract	This document clarifies the UL control region operation
Purpose	Adopt changes
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UL Control Region Clarification

1. Background

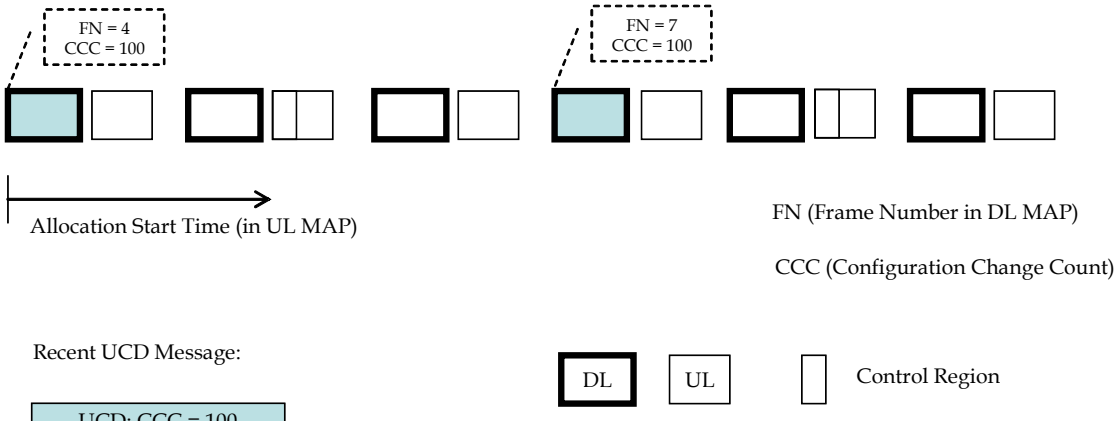
In the current published standards [1] [2], there is no specific text for a situation where the semi static UL 2D control region IEs are not included in UL MAP, thus some ambiguity exists for MS behavior when the allocation information of UL control regions is not present in the frame. These region IEs include Initial/Periodic Ranging (UIUC = 12), FastFeedback (UIUC = 0), DL HARQ ACK (UIUC = 11 (Extended 2 UIUC) with Type = 8) and UL Sounding Region (UIUC = 13).

2. Proposed Clarification

The proposed remedy is to clarify the quasi static UL control region allocation more explicitly. In this clarification, the BS transmits the control region information through an UCD TLV, which also includes allocation periodicity and phase. Like as other UCD TLV, the activation of change in these UCD TLVs is also controlled by synchronization mechanism of configuration change counter. The MS utilizes the information in UCD unless the corresponding region is signaled by the UL MAP.

The figure 1 shows an example where control region TLV has allocation periodicity = 3 and phase = 1. This TLV specifies UL MAP frame number, which is same as frame number in DL MAP, in terms of "3m+1." The actual UL transmission is further delayed by "Allocation Start Time" of UL MAP, which is 1 frame in this example. The figure 2 shows a change of TLV setting from "3m+1" to "4m+2".

Example of UCD TLV when Periodicity = 3, Phase = 1



Example of UCD TLV Change:

(Periodicity = 3, Phase = 1) → (Periodicity = 4, Phase = 2)

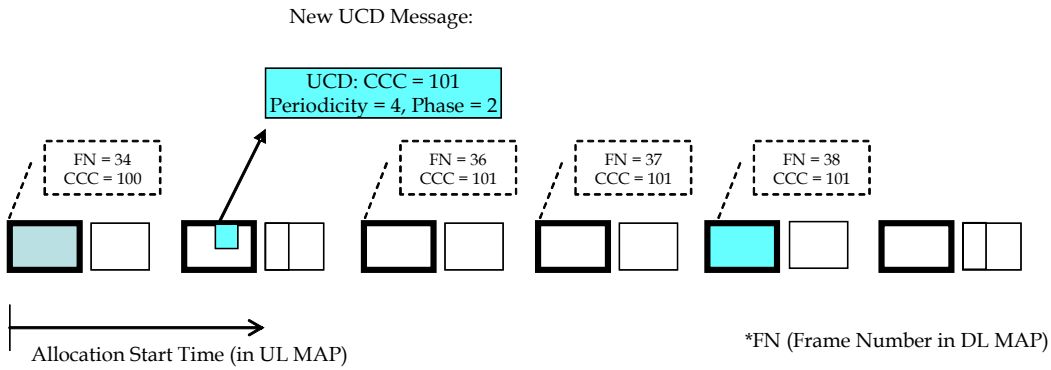


Fig. 2.

Fig. 2. UCD TLV Update with Configuration Change Count

3. Proposed Text Changes

[Insert the following text just before 8.4.5.4.1 on page 430 of IEEE 802.16e-2005]

Some control regions may be defined in UCD via FastFeedback Region TLV, HARQ ACK Region TLV, Ranging Region TLV and Sounding Region TLV. These control regions include

- Initial/HO ranging region, Periodic Ranging/BW request region (UIUC = 12),
- FastFeedback region (UIUC = 0),
- DL HARQ ACK region (UIUC = 11 (Extended 2 UIUC with Type = 8) and
- UL Sounding region (UIUC = 13 with Sounding Zone bit = 1).

These UCD TLVs specify a data region within UL subframe and frame numbers of UL MAP where the corresponding control region IE appears. The frame numbers of UL MAP are described by periodicity and phase so that MS can identify the numbers as sum of phase and integer multiples of periodicity. The actual UL subframes where MS transmit UL signals are further delayed by UL Allocation Start Time of UL MAP.

If certain TLV is present in UCD messages with certain value of the Configuration Change Count, the corresponding allocation will be valid in all UL subframes specified by UL MAP messages with the same value of Configuration Change Count.

If UL MAP allocates one or more of the regions defined via UIUC=0, UIUC=11 (extended 2 UIUC with type=8), UIUC=12 or UIUC=13, these allocations override the allocation of the periodic regions defined by UCD in the specific frame.

[Insert the following entry in Table 353 on page 670 of IEEE 802.16e-2005]

Name	***Type (1 Byte)***	***Length***	***Value***

Ranging Region	*212*	*5/10/15 /20*	*The value of TLV consists of up to 4 concatenated sections (one section per Ranging method), each having the following structure, Bit #0~31, Contains same fields as in the section for UIUC = 12 in Table 287: OFDMA symbol offset (8 bits), Subchannel offset (7 bits), No. OFDMA symbols (7 bits), No. subchannels (7 bits), Ranging method (2 bits), Dedicated ranging indicator = '0'*
FastFeedback Region	*210*	*5*	*Bit #32~34, Parameter d that defines periodicity of 2^d frames Bit #35~39, Allocation phase expressed in frames Bit #0~31, Contains same fields as in the FAST FEEDBACK Allocation IE in Table 295a: OFDMA symbol offset (8 bits), Subchannel offset (7 bits), No. OFDMA symbols (7 bits), No subchannels (7 bits), Reserved (3 bits)*
HARQ AckRegion	*211*	*4*	*Bit #32~34, Parameter d that defines periodicity of 2^d frames Bit #35~39, Allocation phase expressed in frames Bit #0~23, Contains the following fields as in the HARQ ACKCH region allocation IE in Table 302t OFDMA Symbol offset (8 bits), Subchannel offset (7 bits), No. OFDMA symbols (5 bits), No. subchannels (4 bits)*
Sounding Region	*213*	*5/10*	*Bit #24~26, Parameter d that defines periodicity of 2^d frames Bit #27~31, Allocation phase expressed in frames For 5 bytes per each sounding region Bit #0~31, Contains the following fields as in the PAPR reduction/Safety zone/Sounding zone allocation IE in Table 289: OFDMA symbol offset (8 bits), Subchannel offset (7 bits), No. OFDMA symbols (7 bits), No. subchannels (7 bits), PAPR Reduction/Safety Zone (1 bit), Sounding Zone bit = '1', Reserved (1 bit)*
			Bit #32~34, Parameter d that defines periodicity of 2^d frames Bit #35~39, Allocation phase expressed in frames

Note for IEEE editor: For "Type" holding, "Type" number starts from 210 although 202 is the largest number in OFDMA UCD TLV [2]

4. References

[1] IEEE 802.16 2004: "IEEE Standard for Local and Metropolitan Area Networks Part 16: Air Interface for Fixed Broadband Wireless Access Systems".

[2] IEEE Std 802.16e 2005 and IEEE Std 802.16 2004/Cor1 2005 (Amendment and Corrigendum to IEEE Std 802.16 2004)