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Re:	The document supports a comment at Sponsor Ballot on 802.16e/D9 document	
Abstract	The documents suggests the method for an BS to allocate ranging interval to MSs using UCD message.	
Purpose	The document is for consideration during Sponsor Ballot comments resolution	
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Ranging region allocation using UCD message

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Introduction

The reduction of broadcast message size is important for the usage of bandwidth more efficiently. In general, UL-MAP IEs with UIUC 12 for initial ranging and BW-REQ/periodic ranging should be frequently included in ULMAP message regardless of rarely changed that information. If a BS omits UL-MAP IE with UIUC 12 in ULMAP and MS is informed of allocated ranging region, it can reduce the broadcast message overhead. MS shall obtain UCD message associated with the BS before performing initial ranging during network entry or HO. If a BS provides MSs with the information of allocated ranging region through UCD message, BS can omit UL-MAP IE with UIUC 12, and MS can perform initial ranging and BW-REQ/periodic ranging without receiving UL-MAP IE with UIUC 12.

So, we propose the TLV parameter of UCD for allocating UL ranging region.

We have modified the text for a BS to allocate not only contention based ranging region but dedicated ranging region via Ranging Region TLV in UCD message. And capability negotiation has been removed from the text to support this feature for all 802.16e MS after receiving the comments from ZTE and Nortel. The text related to the location of UCD ranging region has been added not to break the backward compatibility for 802.16-2004 SS.

Proposed text change

[Add the text in 11.3.1 UCD channel encodings in table 353a at page 513, as follows :]

Name	Type (1 byte)	Length	Value
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Tx power report	196	3	<p>Bit#0~3: Tx_Power_Report_Threshold, It is unsigned integer and shall be read in dB scale. When “0b111” it means infinite.</p> <p>Bit#4~7: It is unsigned integer whose value is d. Its value ‘d’ shall be interpreted as Tx_Power_Report_Interval =2^d. When “0b111” it means infinite.</p> <p>Bit#8~11: <u>p_avg</u> in multiples of 1/16 (range [1/16,16/16]) Bit#12~15: Tx_Power_Report_Threshold, It is unsigned integer and shall be read in dB scale. When “0b111” it means infinite. It shall be used when CQICH is allocated to the SS.</p> <p>Bit#16~19: It is unsigned integer whose value is d. Its value ‘d’ shall be interpreted as Tx_Power_Report_Interval =2^d. When “0b111” it means infinite. It shall be used when CQICH is allocated to the SS.</p> <p>Bit#20~24: <u>p_avg</u> in multiples of 1/16 (range [1/16,16/16]), It shall be used when CQICH is allocated to the SS.</p>
Ranging Region	197	4 (one region) / 8 (two regions) / 12 (three regions)	<p>Bit #0-7 : OFDMA Symbol offset Bit #8-14 : Subchannel offset Bit #15-21 : No. OFDMA Symbols Bit #22-28 : No. Subchannels Bit #29-30 : Ranging Method (0b00: Initial Ranging/Handover Ranging over two symbols. 0b01: Initial Ranging/Handover Ranging over four symbols. 0b10: BW Request/Periodic Ranging over one symbol. 0b11: BW Request/Periodic Ranging over three symbols) Bit #31 : Dedicated ranging indicator (0: the OFDMA region and Ranging Method defined are used for the purpose of normal ranging 1: the OFDMA region and Ranging Method defined are used for the purpose of ranging using dedicated CDMA code and transmission opportunities assigned in the MOB-PAG-ADV message or in the MOB_SCN-RSP message.) (If length is 8 bytes, first 4 bytes indicates first ranging region and the following 4 bytes indicates another ranging region. If length is 12 bytes, there are three ranging regions allocated via Ranging Region TLV.)</p>

[Modify the Table268 in 8.4.4.3 DL Frame Prefix at page 265:]

Table 268—OFDMA downlink Frame Prefix format for all FFT sizes except 128

Syntax	Size (bits)	Notes
DL_Frame_Prefix_Format() {	—	—
Used subchannel bitmap	6	Bit #0: Subchannel group 0 Bit #1: Subchannel group 1 Bit #2: Subchannel group 2 Bit #3: Subchannel group 3 Bit #4: Subchannel group 4 Bit #5: Subchannel group 5
Ranging_Change_Indication	1	—

Repetition_Coding_Indication	2	0b00 - No repetition coding on DL-MAP 0b01 - Repetition coding of 2 used on DL-MAP 0b10 - Repetition coding of 4 used on DL-MAP 0b11 - Repetition coding of 6 used on DL-MAP
Coding_Indication	3	0b000: CC encoding used on DL-MAP 0b001: BTC encoding used on DL-MAP 0b010: CTC encoding used on DL-MAP 0b011: ZT CC used on DL-MAP 0b100: LDPC encoding used on DL-MAP 0b101 to 0b111 - <i>Reserved</i>
DL-MAP_Length	8	—
<u>Ranging_Region_Allocation_Indication</u>	3	<u>Bit #0: When set to 1, Initial Ranging/Handover Ranging Region is allocated as defined by UCD message</u> <u>Bit #1: When set to 1, BW Request/Periodic Ranging Region is allocated as defined by UCD message</u> <u>Bit #2: When set to 1, dedicated initial ranging region is allocated as defined by UCD message.</u>
<i>reserved</i>	4-1	Shall be set to zero.
}	—	—

[Insert the following text before the last sentence in 8.4.4.3:]

Ranging_Region_Allocation_Indication

Indicates whether ranging region defined by UCD message is allocated or not. When the indication bit is set to “1”, ranging region is allocated in the relevant UL subframe, which the UL-MAP refers to, as defined by the ranging region in UCD message. When the indication bit is set to “0”, UL ranging region defined in UCD message is not allocated. In this case, BS may allocate ranging region by using UL-MAP-IE with UIUC=12 in UL-MAP.

Bit #0: Indicates whether Initial Ranging/Handover Ranging Region defined in UCD message is allocated or not.

Bit #1: Indicates whether BW Request/Periodic Ranging Region defined in UCD message is allocated or not.

Bit #2: Indicates whether dedicated initial ranging region defined in UCD message is allocated or not.

[Add the following text in 6.3.10.3 OFDMA-based ranging, page 151, line 59 :]

6.3.10.3 OFDMA-based ranging

[Insert at the end of 6.3.10.3]

The BS may inform MSs of attributes of ranging regions with Ranging Region TLV in UCD (see 11.3.1). The UCD message may include contention based ranging region for initial ranging/handover ranging and/or BW-Request/Periodic ranging region, and non-contention based ranging region for dedicated initial ranging region. The ranging region allocated via UCD message shall be placed at the last subchannels.

When Ranging Region TLV has been included in UCD message, the BS may allocate the ranging region using Ranging_Region_Allocation_Indications in FCH, without including ranging region allocations in the UL-MAP message. The BS shall set the Ranging_Region_Allocation_Indication bit to “1” if the BS is allocating a ranging region defined by UCD message (see 8.4.4.3). When the ranging region allocated by UCD message is changed, UCD Count in UL-MAP shall be incremented.

A BS may include UL-MAP IE with UIUC 12 in the UL-MAP message for ranging region allocation, regardless of UCD definitions.

When Ranging_Region_Allocation_Indication bit is set to “0”, the BS may provide ranging region allocations via UL-MAP IE with UIUC 12.

When Ranging_Region_Allocation_Indication bit is set to “1”, the BS may provide ranging region allocations by both UCD and

UL-MAP_IE with UIUC 12. In this case, SSs (compliant only with 802.16-2004) shall use ranging region allocated via UL-MAP_IE and MSs supporting UCD ranging region allocation shall use ranging region allocated via UCD. Furthermore, UL-MAP_IE and UCD ranging region TLV attributes shall be identical.

A BS shall include UL-MAP IE with UIUC 12 in UL-MAP message when it assigns uplink transmission opportunity to any SS (compliant only with 802.16-2004).