| Project | **IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>** |
|---|---|
| Title | **Ranging region allocation using UCD message** |
| Date Submitted | **2005-04-27** |
| Source(s) | Kiseon Ryu, Bin-chul Ihm, Beomjoon Kim LG Electronics 533,Hogye-1dong,Dongan-gu, Anyang-shi,Kyongki-do,Korea | Voice: 82-31-450-4387 Fax:    82-31-450-7912 [mailto:ksryu@lge.com] [mailto:bcihm@lge.com] [mailto:beom@lge.com] |
| Re: | The document supports a comment at Sponsor Ballot on 802.16e/D7 document |
| Abstract | The documents suggests the method for an BS to allocate initial ranging interval to MSs using UCD message. |
| Purpose | The document is for consideration during Sponsor Ballot comments resolution |
| Notice | |
| Release | |
| Patent Policy and Procedures | |

# Ranging region allocation using UCD message

*Kiseon Ryu, Bin-chul Ihm, Beomjoon Kim*
*LG Electronics*

## 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 UL-MAP message regardless of rarely changed that information. If a BS omits UL-MAP IE with UIUC 12 in UL-MAP 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.

## Proposed text change

*[Add the text in 11.3.1 UCD channel encodings, page 508, line 58, as follows :]*

| Name | Type (1 byte) | Length | Value |
|---|---|---|---|
| Tx power report | 185 | 3 | Bit#0~3: Tx_Power_Report_Threshold, It is unsigned integer and shall be read in dB scale. When "0b111" it means infinite. 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. Bit#8~11: α p_avg 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. 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. Bit#20~24: α p_avg in multiples of 1/16 (range [1/16,16/16]), It shall be used when CQICH is allocated to the SS. |
| Initial Ranging Region Allocation | 186 | 4 | Bit 7:0 – **OFDMA Symbol offset** Bit 14:8 – **Subchannel offset** Bit 21:15 – **No. OFDMA Symbols** Bit 28:22 – **No. Subchannels** Bit #29 – **Ranging Method** (0: Initial Ranging over two symbols, 1: Initial Ranging over four symbols) Bit #30 -#31 : *reserved* |

| BW Request/Periodic Ranging Region Allocation | 187 | 4 | Bit 7:0 – **OFDMA Symbol offset**<br>Bit 14:8 – **Subchannel offset**<br>Bit 21:15 – **No. OFDMA Symbols**<br>Bit 28:22 – **No. Subchannels**<br>Bit #29 – **Ranging Method**<br>(0: BW Request/Periodic Ranging over one symbol, 1: BW Request/Periodic Ranging over three symbols)<br>Bit #30 -#31 : *reserved* |

*[Modify the Table268 in 8.4.4.3 DL Frame Prefix at page 242:]*

**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: ~~Subchannels 0-11 are used~~ Subchannel group 0<br>Bit #1: ~~Subchannels 12-19 are used~~ Subchannel group 1<br>Bit #2: ~~Subchannels 20-31 are used~~ Subchannel group 2<br>Bit #3: ~~Subchannels 32-39 are used~~ Subchannel group 3<br>Bit #4: ~~Subchannels 40-51 are used~~ Subchannel group 4<br>Bit #5: ~~Subchannels 52-59 are used~~ Subchannel group 5 |
| **Ranging_Change_Indication** | 1 | — |
| **Repetition_Coding_Indication** | 2 | 0b00 - No repetition coding on DL-MAP<br>0b01 - Repetition coding of 2 used on DL-MAP<br>0b10 - Repetition coding of 4 used on DL-MAP<br>0b11 - Repetition coding of 6 used on DL-MAP |
| **Coding_Indication** | 3 | 0b000: CC encoding used on DL-MAP<br>0b001: BTC encoding used on DL-MAP<br>0b010: CTC encoding used on DL-MAP<br>0b011: ZT CC used on DL-MAP<br>0b100: LDPC encoding used on DL-MAP<br>0b101 to 0b111 -*Reserved* |
| **DL-MAP_Length** | 8 | — |
| **Ranging_Region_Allocation_Indication** | 2 | Bit #0: Initial Ranging Region is allocated<br>Bit #1: BW Request/Periodic Ranging Region is allocated |
| *reserved* | ~~4~~ 2 | Shall be set to zero. |
| } | — | — |

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

**Ranging_Region_Allocation_Indication**
Indicates whether UL Ranging region is allocated. The value of '0' means that the BS does not allocate UL resource for ranging.
Bit #0: Initial Ranging Region is allocated
Bit #1: BW Request/Periodic Ranging Region is allocated

*[Modify the Table268b in 8.4.4.3 DL Frame Prefix at page 244:]*

**Table 268b—OFDMA downlink frame prefix format for 128 FFT**

| Syntax | Size (bits) | Notes |
|---|---|---|
| DL_Frame_Prefix_Format() { | — | — |
| **Used subchannel indicator** | 1 | 0: Subchannel 0 is used for segment 0, Subchannel 1 is used for segment 1, Subchannel 2 is used for segment 2, 1: Use all subchannels |
| **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 encoding used on DL-MAP 0b100 - LDPC encoding used on DL-MAP 0b 101 ~ 111 - *reserved* |
| **DL-Map_Length** | 5 | — |
| **Ranging_Region_Allocation_Indication** | 2 | Bit #0: Initial Ranging Region is allocated Bit #1: BW Request/Periodic Ranging Region is allocated |
| *reserved* | 2 | Shall be set to zero. |
| } | — | — |

[Add the following text in 6.3.10.3 OFDMA-based ranging, page 133, line 43 :]

**6.3.10.3 OFDMA-based ranging**

*[Insert at the end of 6.3.10.3]*

A BS may inform MSs of allocation of UL ranging region with Initial Ranging Region Allocation TLV and BW Request/Periodic Ranging Region Allocation TLV in UCD. In this case, a BS may omit UL-MAP IE with UIUC 12 from UL-MAP. If the MS attempting ranging or BW request does not receive UL-MAP IE with UIUC 12 in UL-MAP, it may refer TLV parameters for ranging region allocation in UCD. A BS may include UL-MAP IE with UIUC 12 for ranging region allocation in UL-MAP even if it informs MSs of ranging region allocation with TLV parameters in UCD. When the MS attempting ranging or BW request receives UL-MAP IE with UIUC 12 after receiving TLV parameters for ranging region allocation in UCD, it shall transmit ranging code in ranging slot indicated by UL-MAP IE with UIUC 12.