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DCD/UCD and/or DIUC/UIUC mismatch problem during HO

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1. Introduction

In the current IEEE P802.16e/D5a, it defines HO process. To shorten handover process, some steps of the network re-entry and initiation process during HO can complete in advance, such as association process, and the Target BS may allocate Fast_Ranging_IE to the MSS for faster network re-entry network.

If Target BS transmits the new DCD/UCD message before the MSS performing ranging with the Target BS during HO, the MSS is not aware of the change of DCD/UCD message, and in this case the MSS will perceive the DCD/UCD change by analyzing DL-MAP, UL_MAP message. If the BS transmits/receives the data burst with the DIUC/UIUC defined in the new DCD/UCD message, and the MSS receives/transmits the data burst with the DIUC/UIUC defined in the old DCD/UCD message, the DIUC/UIUC mismatch can occur.

In order to avoid the above DIUC/UIUC mismatch between the BS and MSS, the RNG-REQ message should include DCD/UCD Change Indication during HO, and BS may optionally send a uni-cast DCD/UCD message to a MSS when the Target BS receives DCD/UCD Change Indication in RNG_REQ message.

In this contribution, we propose to enhance the message RNG-REQ and describe a scheme to avoid the DIUC/UIUC mismatch.

2. Proposed Text Changes

1¡¢Add the text of Page 29£¨Line8 in IEEE P802.16e/D5a in section 6.3.2.3.5 shown as following .

The following TLV parameter may be included in RNG_REQ message when a MSS is performing initial ranging to the selected target BS:

HO_ID
Optional ID assigned for use in initial ranging to the target BS during HO once the BS is selected as the target BS.

DCD Change Indication
This parameter is set to ‘1’ if the DCD Change Count stored at MSS is not equal to that in the received DL-MAP message. Otherwise, it is set to ‘0’. When the Target BS received this indication, the Target BS may unsolicited send a unicast DCD message to the MSS during HO.

UCD Change Indication
This parameter is set to ‘1’ if the UCD Change Count stored at MSS is not equal to that in the received UL-MAP message. Otherwise, it is set to ‘0’. When the Target BS received this indication, the Target BS may unsolicited send a unicast UCD message to the MSS during HO.

2¡¢Modify the Table14 of Page 44£¨Line18 in IEEE P802.16-REVd/D5 in section 6.3.2.3 shown as following

Type	Message name	Message description	Connection
0	***UCD***	Uplink Channel Descriptor	Broadcast/Basic
1	***DCD***	Down link Channel Descriptor	Broadcast/Basic

3° Modify the text of Page 276 Line44 in IEEE P802.16e/D5a in section 8.4.5.4.20 shown as following .

8.4.5.4.20 Fast_Ranging_IE Information Element OFDMA Fast_Ranging_IE format IE

A Fast_Ranging_IE may be placed in the UL-MAP message by a BS to provide a non-contention based initial-ranging opportunity. The Fast_Ranging_IE shall be placed in the extended UIUC within a UL-MAP IE.
The MSS will send RNG_REQ message used the known burst profile (BPSK-1/2) during Fast_Ranging_IE.

The format of the IE is PHY dependent as shown in Table 298g.
[Insert row and text in following table as indicated. Change text in table as indicated:]

Table 298g—OFDMA Fast_Ranging_IE format IE

Synax	Size	Notes
Fast_Ranging_IE {		
Extended UIUC		
Length		
HO Indicator		
padding		
if (HO ID indicator == 1) {		
HO ID		
} else {		
MAC address		
}		
~~UIUC~~		
Duration		
Repetition coding indication		
}		

4° Insert the following rows to Table 362a in the text of Page 395 Line2~34 in IEEE P802.16e/D5a in section 11.5 shown as following .

11.5 RNG-REQ message encodings

Name	Type(1 byte)	Length	Value(Variable-length)
DCD Change Indication	**10**	**1**	This parameter is set to '1' if the DCD Change Count stored at MSS is not equal to that in the received DL-MAP message. Otherwise, it is set to '0'. When the Target BS received this indication, the Target BS may unsolicited send a unicast DCD message to the MSS during HO

UCD Change Indication	**11**	**1**	This parameter is set to '1' if the UCD Change Count stored at MSS is not equal to that in the received UL-MAP message. Otherwise, it is set to '0'. When the Target BS received this indication, the Target BS may unsolicited send a unicast UCD message to the MSS during HO