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Re:	Call for comment on IEEE802.16e/D6
Abstract	This contribution proposes a method to enable an Idle Mode MS to receive DCD/UCD message efficiently.
Purpose	Discussion and adoption in IEEE802.16e.
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DCD/UCD Changes in Idle Mode

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Introduction

Idle Mode MSS can waste substantial frames decoding the beginning of each and every frame looking for the updated DCD/UCD to regain burst mode synch, upon detecting a change in the Configuration Change Counter of the DL-MAP. Increasing the spacing between DCD/UCD changes and/or transmission is hardly helpful as it only increases the duration of this constant decoding period. Decreasing the spacing between DCD/UCD changes and/or transmissions beyond what is desirable for optimal system performance unnecessarily increases overhead. A method to remove MSS obligation to search each frame for updated DCD/UCD is to include the frame number of the next DCD/UCD transmission.

With the frame number in hand, MSS could continue their mode operation without the burden of unnecessarily decoding the beginning of frames outside of their listening interval, awakening when the proscribed DCD/UCD transmission frame time arrives, decoding the transmission, and becoming again immediately available to return to normal operation with minimal synchronization; minimized call setup latency. With this method, MSS in Idle remain constantly updated to DCD/UCD changes with the minimum of frame decoding requirements.

Proposed Text Change

Remedy 1:

[In 6.3.21.4 MS Paging Listening Interval, modify paragraph as:]

The MS shall scan, decode the DCD and DL-MAP, and synchronize on the DL for the Preferred BS in time for the MS to begin decoding any BS Broadcast Paging message during the entire BS Paging Interval. At the end of MS Paging Listening Interval, providing that the MS does not elect to terminate the MS Idle Mode, the MS may return to MS Paging Unavailable Interval.

If BS transmits the DCD/UCD Transmission Notification IE during a Paging Interval, MS shall read and react to this message, interrupting regular Idle Mode operation. Even if scheduled to be in a paging unavailable interval, the MS shall awaken at DCD and UCD Transmission offsets in time to synchronize to the DL and decode the DCD and UCD message in the frame, if present. If the MSS fails to decode one or both of DCD and UCD, or no DCD or UCD was transmitted by the BS, the MSS shall continue decoding all subsequent frames until it has acquired both updated DCD and UCD. Upon successful completion of DCD and UCD decoding, the MSS shall immediately return to regular Idle Mode operation. Idle Mode operation is not affected by DCD/UCD Transmission Notification IE in any other way.

Remedy 2:

[In 8.4.5.3 DL-MAP IE format, below line 6, page 269, add the following sub-clause:]

8.4.5.3.26 DCD/UCD Transmission Notification IE

DCD/UCD Transmission Notification IE may be sent during Paging Interval to facilitate Idle Mode MS to receive and decode DCD and UCD transmitted by Preferred BS while preserving maximum utility of MS Idle Mode Operation. MS in Idle Mode operation shall examine whether or not DCD/UCD Transmission Notification IE is included in DL-MAP during Paging Interval. Presence of the IE with the included DCD and UCD transmission offsets shall inform MS of pending DCD and/or UCD transmission during the next Paging Unavailable Interval. Idle Mode MS notified by this IE shall awaken at DCD and UCD Transmission offsets in time to synchronize to the DL and decode the DCD and UCD message in the frame, if present. If the MSS fails to decode one or both of DCD and UCD, or no DCD or UCD was transmitted by the BS, the MSS shall continue decoding all subsequent frames until it has acquired both updated DCD and UCD. Upon successful completion of DCD and UCD decoding, the MSS shall immediately return to regular Idle Mode operation. Idle Mode operation is not affected by DCD/UCD Transmission Notification IE in any other way.

Table 285t – DCD/UCD transmission notification IE format

Syntax	Size	Notes
DCD/UCD transmission notification IE () {		
Extended DIUC	4 bits	
Length	4 bits	Length of IE in Bytes
DCD/UCD transmission indication flag	2 bits	For each bit location, a value of '1' indicates that DCD and UCD transmission is scheduled during next Paging Unavailable Interval. Bit #0: DCD transmission during next Paging Unavailable Interval. Bit #1: UCD transmission during next Paging Unavailable Interval.
Reserved	6 bits	
DCD transmission offset	16 bits	This value indicates the number of frames left for the next DCD transmission and included if Bit #0 of DCD/UCD transmission indication flag is set to 1.
UCD transmission offset	16 bits	This value indicates the number of frames left for the next UCD transmission and included if Bit #1 of DCD/UCD transmission indication flag is set to 1
}		

Remedy 3:

[Change Table 244, page 219, as follows:]

8.3.6.2.8 DL-MAP dummy IE format

Table 244 – OFDM DL-MAP dummy IE format

Syntax	Size	Notes
Dummy_IE () {		

Extended DIUC	4 bits	~~0x06~~0x07…0x0F
Length	4 bits	0..15
Unspecified data	variable	The 'Length' field specifies the size of the field in bytes.
}		

[Insert new sub-clause 8.3.6.2.10 as follows:]

8.3.6.2.10 DCD/UCD Transmission Notification IE

DCD/UCD Transmission Notification IE may be sent during Paging Interval to facilitate Idle Mode MS to receive and decode DCD and UCD transmitted by Preferred BS while preserving maximum utility of MS Idle Mode Operation. MS in Idle Mode operation shall examine whether or not DCD/UCD Transmission Notification IE is included in DL-MAP during Paging Interval. Presence of the IE with the included DCD and UCD transmission offsets shall inform MS of pending DCD and/or UCD transmission during the next Paging Unavailable Interval. Idle Mode MS notified by this IE shall awaken at DCD and UCD Transmission offsets in time to synchronize to the DL and decode the DCD and UCD message in the frame, if present. If the MSS fails to decode one or both of DCD and UCD, or no DCD or UCD was transmitted by the BS, the MSS shall continue decoding all subsequent frames until it has acquired both updated DCD and UCD. Upon successful completion of DCD and UCD decoding, the MSS shall immediately return to regular Idle Mode operation. Idle Mode operation is not affected by DCD/UCD Transmission Notification IE in any other way.

Table 242b – DCD/UCD transmission notification IE format

Syntax	Size	Notes
DCD/UCD transmission notification IE () {		
Extended DIUC	4 bits	0x06
Length	4 bits	Length of IE in Bytes
DCD/UCD transmission indication flag	2 bits	For each bit location, a value of '1' indicates that DCD and UCD transmission is scheduled during next Paging Unavailable Interval. Bit #0: DCD transmission during next Paging Unavailable Interval. Bit #1: UCD transmission during next Paging Unavailable Interval.
Reserved	6 bits	
DCD transmission offset	16 bits	This value indicates the number of frames left for the next DCD transmission and included if Bit #0 of DCD/UCD transmission indication flag is set to 1.
UCD transmission offset	16 bits	This value indicates the number of frames left for the next UCD transmission and included if Bit #1 of DCD/UCD transmission indication flag is set to 1
}		