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Re:	This is a response to a Call for Comments on IEEE P802.16e-D7
Abstract	Provision of more DIUC rooms for supporting the multiple advanced FEC types. **Revised text is pink.**
Purpose	This document is submitted for review by 802.16e Working Group members
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DIUC/UIUC provision for supporting multiple advanced FEC types

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1. Introduction

1.1 Problem statement

The current specification includes several FEC types such as CC(mandatory), BTC(optional), CTC(optional), ZT CC(optional) and LDPC(optional), and defines 41 burst profiles e.g., QPSK(CC) 1/2, 16QAM(CTC) 2/3 and so on (see Table 361) where each FEC type has about 6~15 burst profiles. BS selects and allocates 13 burst profiles among 41 burst profiles onto DIUC0 through DIUC12 and 10 burst profiles onto UIUC1~UIUC10, and announce it through the DCD/UCD messages. When the cell includes MS's having different FEC types, DIUC0~DIUC12 should support these FEC types and it makes one FEC type get small room of MCS levels. For example, when three MS's within a cell have CC+CTC, CC+LDPC and CC+BTC respectively, each FEC type (CC, CTC, LDPC and BTC) should have only 3~4 DIUC's and 2~3 UIUC's as shown in Figure1. These numbers of DIUC/UIUC's are too small for fine link adaptation.

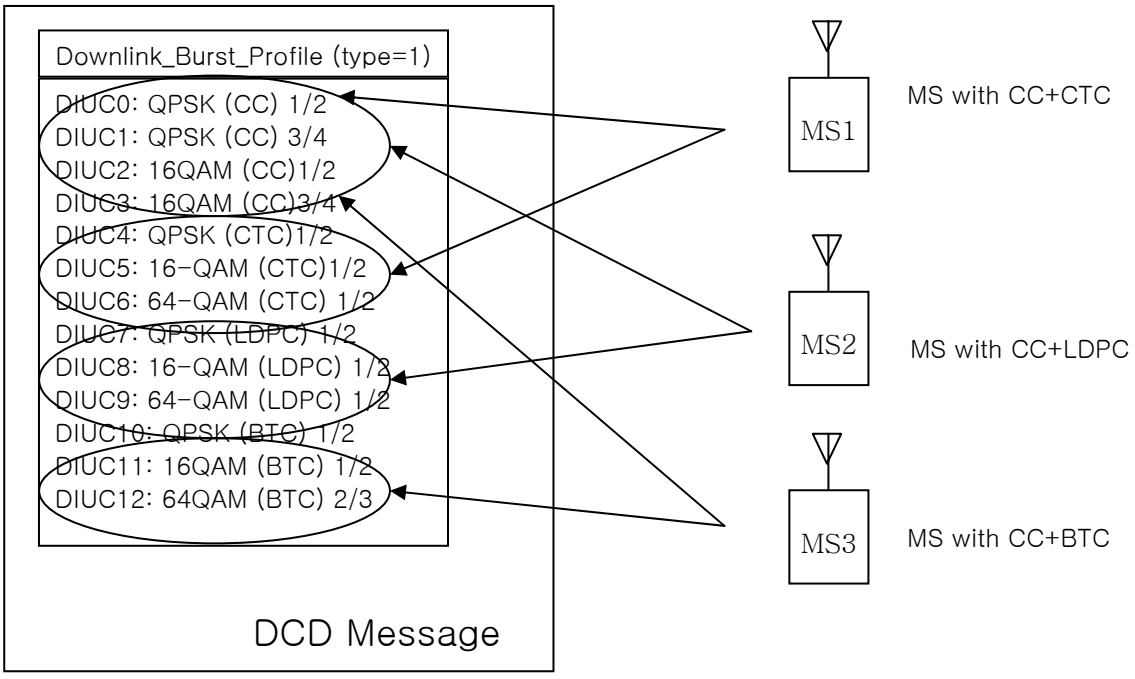


Figure 1. DIUC division for supporting several FEC types

1.2 Proposed solutions

To provide more rooms for DIUC(UIUC) per each FEC type, we propose the extended DIUC(UIUC) which are dedicated to each FEC type as shown in Figure 2. 802.16-2004 version MS refers its DIUC(UIUC) set from downlink(uplink)_burst_profile and the later version MS can refer its DIUC(UIUC) set from each extended downlink(uplink)_burst_profile and downlink(uplink)_burst_profile for CC. In Figure 2, DIUC10 can be interpreted as one of three meanings of QPSK (BTC) 2/3, 64-QAM (CTC) 3/4 or 64-QAM (LDPC) 1/2 according to FEC type of MS. When there is no extended downlink(uplink)_burst_profile, the later version MS shall refer its DIUC(UIUC) set from the current downlink(uplink)_burst_profile.

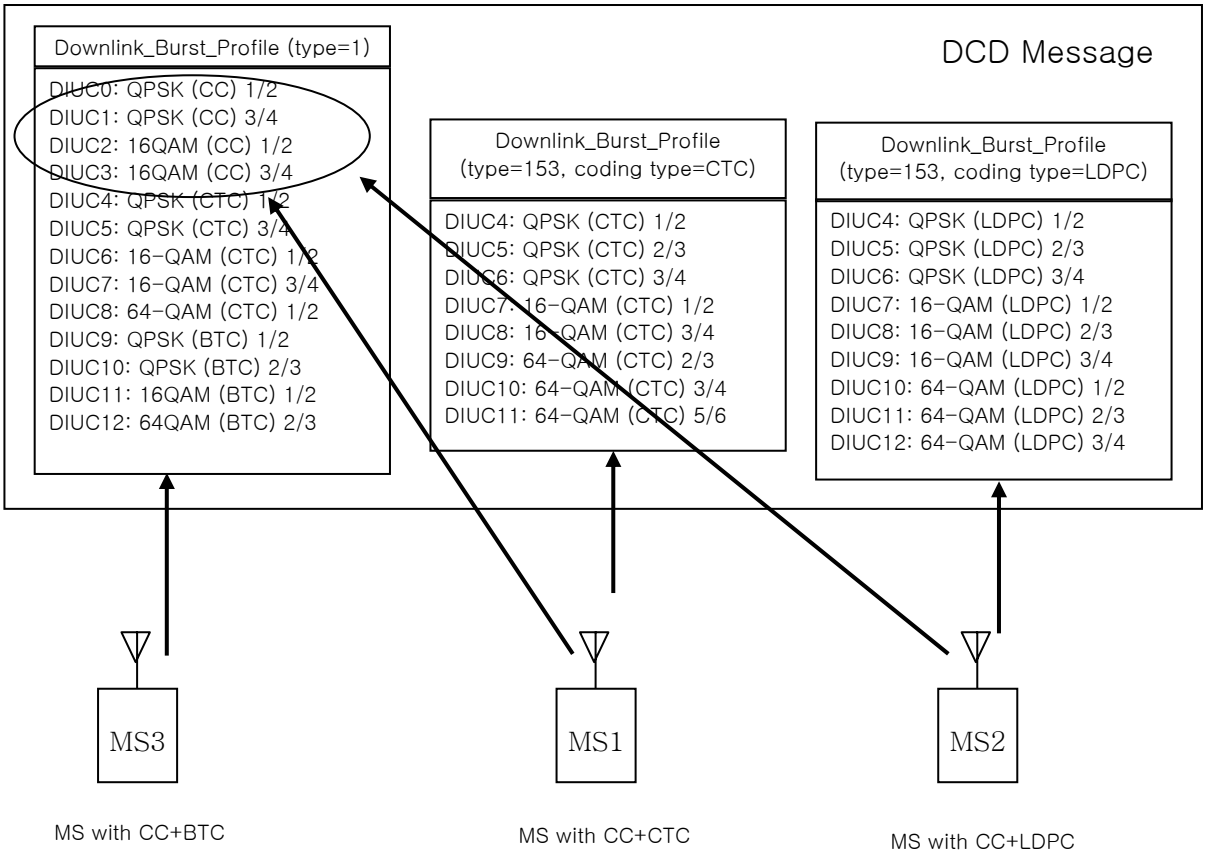
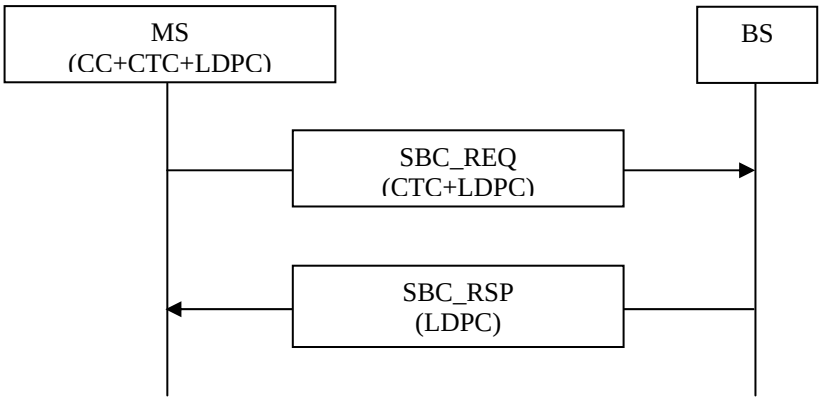


Figure 2. Proposed scheme for providing enough MCS levels i.e., DIUC/UIUC's for each FEC type

1.3 Considerations

For example, when a MS was equipped two optional FEC such as CTC+LDPC, the proposed scheme results in confusion of DIUC(UIUC) definition. In this case, BS should restrict just one of two optional FEC types on the MS available after reception of SBC_REQ indicating that MS has CTC+LDPC capability. This restriction can be delivered to the MS through SBC_RSP message.



MS refers to DIUC/UIUC related to CC+ LDPC

Figure 3. SBC_RSP message to restrict MS to use just one optional FEC type

2. Proposed text changes

[Add the followings at the end of section 8.4.5.5]

Table xxx defines the format of the Downlink_Burst_Profile with type=153, which is used in the DCD message (6.3.2.3.1). The DIUC field is associated with the Downlink Burst Profile and Thresholds. The DIUC value is used in the DL-MAP message to specify the Burst Profile to be used for a specific downlink burst.

Table xxx- OFDMA Downlink_Burst_Profile TLV format for multiple FEC types

Syntax	Size	Notes
Downlink burst profile{		
Type =153	8 bits	
Length	8 bits	
Reserved	2 bits	Shall be set to zero
Coding Type	2 bits	00: BTC 01: CTC 10: ZT CC 11: LDPC
DIUC	4 bits	
TLV encoded information	Variable	
}		

Table yyy defines the format of the Uplink_Burst_Profile with type=13, which is used in the UCD message (6.3.2.3.3). The UIUC field is associated with the Uplink Burst Profile and Thresholds. The UIUC value is used in the UL-MAP message to specify the Burst Profile to be used for a specific uplink burst.

Table yyy- OFDMA Uplink_Burst_Profile TLV format for multiple FEC types

Syntax	Size	Notes
Uplink burst profile{		
Type =13	8 bits	
Length	8 bits	
Reserved	2 bits	Shall be set to zero
Coding Type	2 bits	00: BTC 01: CTC 10: ZT CC 11: LDPC
UIUC	4 bits	
TLV encoded information	Variable	
}		

DIUC/UIUC for mandatory CC shall be referred to Downlink/Uplink_burst_profile with type=1. **The burst transmitted without CID in the DL-MAP IE shall be encoded using DIUC specified in the downlink burst profile with type=1.**

[Modify table 349a in page 505 as following]

Table 349a-UCD channel encodings

Name	Type (1 byte)	Length (1 byte)	Value (variable-length)	PHY scope
…	…	…	…	…
Bandwidth_request_backoff b_start	11	1	Initial backoff window size for contention BW requests, expressed as a power of 2. Values of n range 0-15 (the highest order bits shall be unused and set to 0).	OFDMA
Bandwidth_request_backoff _end	12	1	Final backoff window size for contention BW requests, expressed as a power of 2. Values of n range 0-15 (the highest order bits shall be unused and set to 0).	OFDMA
Uplink_burst_profile	13	1	May appear more than once (see 6.3.2.3.3 and 8.4.5.5). The length is the number of bytes in the overall object, including embedded TLV items.	OFDMA

[Modify table 358a in page 511 as following]

Table 358a-DCD channel encodings

Name	Type (1 byte)	Length (1 byte)	Value (variable-length)	PHY scope
…	…	…	…	…
Time-to-Trigger duration	52	1	Time-to-Trigger duration is the time duration for MS decides to select a neighbor BS as a possible target BS. It is the unit of ms and applicable only for HHO.	ALL
MAC version	148	1	See 11.1.3	ALL
Downlink_burst_profile	153	1	May appear more than once (see 6.3.2.3.1 and 8.4.5.5). The length is the number of bytes in the overall object, including embedded TLV items.	OFDMA