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Re:	IEEE P802.16e/D5a-2004
Abstract	This contribution includes clarification on the current extended DL/UL IEs.
Purpose	Review and adopt suggested change into P802.16e/D5a-2004
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Clarifications on the Extended DIUC/UIUC

Seung Joo Maeng et al

1. Problem Statement

In IEEE P802.16e-D5a-2004, there are several problems related to Extended DIUC/UIUC usage for the OFDMA PHY mode:

- All 17 Extended DIUCs codes have been used. There are also more Extended DIUC IEs being defined in new contributions.
- The use of extended DL-MAPs is efficient for a number of uses and continued addition of extended DL-MAPs should not be curtailed simply because the current method suffers code constraints. Extension of the method to permit new contributions is warranted.
- Extended DIUC/UIUC usage needs to be clarified and corrected. There are a few Extended DL/UL IEs using the same DIUC/UIUC.

2. Proposed Solutions

This contribution proposes an Extended-2 format to increase the number of types of Extended IE for OFDMA PHY mode. This new Extended-2 format is defined for both DL MAP and UL MAP. The DIUC 14 and UIUC 11 are used to identify this new format. All Extended IEs defined in 802.16d remain unchanged and are identified by Extended DIUC/UIUC (0x00… 0x0F). This contribution redefines all Extended IE defined in 802.16e.

This contribution also adds allocation tables for Extended DIUC/Extended UIUC and Extended-2 Types. By adding these tables, duplicating usage can be avoided.

3. Specific Text Changes

[Add the following subsection title right after the subsection title 8.4.5.3.2:]

8.4.5.3.2 DL-MAP extended IE format

8.4.5.3.2.1 DL-MAP extended IE format

[Append the following to the end of section 8.4.5.3.2:]

Table 275a defines the encoding for Extended DIUC that shall be used by DL-MAP Extended IEs.

Table 275a—Extended DIUC Allocation

Extended DIUC	Usage
0x00	Channel_Measurement_IE
0x01	STC_Zone_IE
0x02	AAS_DL_IE
0x03	Data_location_in_another_BS_IE

0x04	CID_Switch_IE
0x05	MIMO_DL_Basic_IE
0x06	MIMO_DL_Enhanced_IE
0x07	H-ARQ_Map_Pointer_IE
0x08	PHYMOD_DL_IE
0x09	DL PUSC Burst Allocation in Other Segment
0x0A	UL_interference_and_noise_level_IE
0x0B … 0x0F	Reserved

[Insert the following section]

8.4.5.3.2.2 DL-MAP Extended-2 IE format

A DL-MAP IE entry with a DIUC value of 14, indicates that the IE carries special information and conforms to the structure shown in Table 275b. A station shall ignore an extended-2 IE entry with an extended-2 DIUC value for which the station has no knowledge. In the case of a known extended-2 DIUC value but with a length field longer than expected, the station shall process information up to the known length and ignore the remainder of the IE.

Table 275b—OFDMA DL-MAP extended-2 IE format

Syntex	Size	Note
DL_Extended-2_IE {		
Extended-2 DIUC	4 bits	0x00 … 0x0F
Length	8 bits	Length in bytes of Unspecified data field
Unspecified data	*variable*	
}		

Table 275c defines the encoding for Extended-2 DIUC that shall be used by DL-MAP Extended-2 IEs.

Table 275c—Extended-2 DIUC Allocation

Extended-2 DIUC	Usage
0x00	MBS_MAP_IE
0x01	HO_Anchor_Active_DL_MAP_IE
0x02	HO_Active_Anchor_DL_MAP_IE
0x03	HO_CID_Translation_MAP_IE
0x04	MIMO_in_another_BS_IE
0x05	Macro-MIMO_DL_Basic_IE
0x06 … 0x0F	Reserved

[Modify the following sections:]

8.4.5.3.11 Multicast and Broadcast Service MAP IE (MBS_MAP_IE)

……

Table 283b—Multicast and Broadcast Service MAP IE

Syntex	Size	Note
MBS_MAP_IE {		
Extended-2 DIUC	4 bits	MBS MAP_IE()=0x00
Length	4 8 bits	variable
…..		
}		

……

8.4.5.3.12 DL PUSC Burst Allocation in Other Segment IE

……

Table 284c—DL PUSC Burst Allocation in Other Segment IE

Syntex	Size	Note
DL PUSC Burst Allocation in Other Segment IE() {		
Extended DIUC	4 bits	DL PUSC Burst Allocation in Other Segment IE() =0x09
Length	4 bits	Length = 0x09
…..		
}		

……

8.4.5.3.13 HO Anchor Active DL MAP IE

……

Table 284d—HO Anchor Active DL MAP IE

Syntex	Size	Note
HO Anchor Active DL MAP IE() {		
Extended-2 DIUC	4 bits	HO Anchor Active MAP IE() = 0x01
Length	4 8 bits	variable
…..		
}		

……

8.4.5.3.14 HO Active Anchor DL MAP IE

……

Table 284e—HO Active Anchor MAP IE

Syntex	Size	Note
HO Active_Anchor DL MAP IE () {		
Extended-2 DIUC	4 bits	HO Active_Anchor MAP IE = 0x02
Length	4 8 bits	variable
…..		

}		

……

8.4.5.3.15 HO CID Translation MAP IE

……

Table 284f—HO CID Translation MAP IE

Syntex	Size	Note
HO CID Translation MAP IE() {		
Extended-2 DIUC	4 bits	CID Translation MAP IE = 0x03
Length	4 8 bits	variable
…..		
}		

……

8.4.5.3.16 MIMO in another BS IE

……

Table 284g—MIMO in another BS IE

Syntex	Size	Note
MIMO_in_another_BS_IE () {		
Extended-2 DIUC	4 bits	MIMO in another BS IE = 0x04
Length	4 8 bits	variable
…..		
}		

……

8.4.5.3.17 Macro-MIMO DL Basic IE format

……

Table 284h—Macro MIMO DL Basic IE()

Syntex	Size	Note
Macro_MIMO_DL_Basic_IE() {		
Extended-2 DIUC	4 bits	Macro MIMO DL Basic IE = 0x05
Length	4 8 bits	variable
…..		
}		

……

8.4.5.3.18 UL noise and interference level IE

……

Table 284i—UL interference and noise level extended IE

Syntex	Size	Note
UL interference and noise level_IE{		
Extended DIUC	4 bits	UL interference and noise level IE = 0x0A

Length	4 bits	variable
….		
}		

……

[Move section 8.4.5.3.19 to 8.4.5.4.23 and modify as follows:]

8.4.5.34.1923 Feedback polling IE

……

Table 28498j—Feedback Polling IE

Syntex	Size	Note
Feedback polling IE () {		
Extended-2 UIUC	4 bits	Feedback Polling IE()=0x05
Length	4 8 bits	Length in bytes of following fields
…..		
}		

……

[Add the following subsection title right after the subsection title 8.4.5.4.4:]

8.4.5.4.4 UL-MAP extended IE format

8.4.5.4.4.1 UL-MAP extended IE format

[Append the following to the end of section 8.4.5.4.4:]

Table 289a defined the encoding for Extended UIUC that shall be used by UL-MAP Extended IEs.

Table 289a—Extended UIUC Allocation

Extended UIUC	Usage
0x00	Power_control_IE
0x01	Mini-subchannel_allocation_IE
0x02	AAS_UL_IE
0x03	CQICH_Alloc_IE
0x04	UL Zone IE
0x05	PHYMOD_UL_IE
0x06	Fast_Ranging_IE
0x07	UL_MAP_Fast_Tracking_IE
0x08	UL_PUSC_Burst_Allocation_in_Other_Segment_IE
0x09	MIMO_UL_Basic_IE
0x0A … 0x0F	Reserved

[Insert the following sections:]

8.4.5.4. 4.2 UL-MAP Extended-2 IE Format

A UL-MAP IE entry with a UIUC value of 11, indicates that the IE carries special information and conforms to the structure shown in Table 289b. A station shall ignore an extended-2 IE entry with an extended-2 UIUC value for which the station has no knowledge. In the case of a known extended-2 UIUC value but with a length field longer than expected, the station shall process information up to the known length and ignore the remainder of the IE.

Table 289b—UL-MAP Extended-2 IE Format

Syntex	Size	Note
UL_Extended-2_IE() {		
Extended-2 UIUC	4 bits	0x00 … 0x0F
Length	8 bits	Length in bytes of Unspecified data field
Unspecific Data	Variable	
}		

Table 289c defines the encoding for Extended-2 UIUC that shall be used by UL-MAP Extended-2 IEs.

Table 289c—Extended-2 Type Allocation

Extended-2 Type	Usage
0x00	CQICH_Enhanced Allocation_IE
0x01	HO_Anchor_Active_UL_MAP_IE
0x02	HO_Active Anchor UL MAP
0x03	Anchor_BS_switch_IE
0x04	UL_sounding_command_IE
0x05	Feedback_polling_IE
0x06 … 0x0F	Reserved

[Modify the following sections:]

8.4.5.4.15 CQICH Enhanced Allocation IE format

Table 298a—CQICH Enhanced allocation IE format

Syntex	Size	Note
CQICH_Enhanced_Alloc_IE() {		
Extended-2 ~~D~~UIUC	4 bits	CQICH Enhance Alloc IE()=0x00
Length	~~4~~ 8 bits	Length in bytes of following fields
…..		
}		

……

8.4.5.4.16 UL PUSC Burst Allocation in Other Segment IE

……

Table 298b—UL PUSC Burst Allocation in Other Segment IE

Syntex	Size	Note
UL PUSC Burst Allocation in Other Segment IE () {		
Extended UIUC	4 bits	UL PUSC Burst Allocation in Other Segment IE () = 0x08
Length	4 bits	Length=0x08
…..		
}		

……

8.4.5.4.18 HO Anchor Active UL MAP IE

……

Table 298e—HO Anchor Active UL MAP IE

Syntex	Size	Note
HO Anchor Active UL MAP IE () {		
Extended-2 UIUC	4 bits	HO Anchor Active MAP IE() = 0x01
Length	4 8 bits	
…..		
}		

……

8.4.5.4.19 HO Active Anchor UL MAP IE

……

Table 298f—HO Active Anchor UL MAP IE

Syntex	Size	Note
HO Active_Anchor UL MAP IE () {		
Extended-2 UIUC	4 bits	HO Active_Anchor MAP IE() = 0x02
Length	4 8 bits	
…..		
}		

……

8.4.5.4.20 OFDMA Fast_Ranging_IE format

……

Table 298g—OFDMA Fast_Ranging_IE format

Syntex	Size	Note
Fast_Ranging_IE{		
Extended UIUC	4 bits	Fast_Ranging_IE() = 0x06
Length	4 bits	variable
…..		

}		

……

8.4.5.4.21 UL_MAP_Fast_Tracking_IE

……

Table 298h—UL_MAP_Fast_Tracking_IE

Syntex	Size	Note
UL_MAP_Fast_Tracking_IE() {		
Extended UIUC	4 bits	Fast Tracking_IE() = 0x07
Length	4 bits	Variable
…..		
}		

……

8.4.5.4.22 Anchor BS Switch IE

……

Table 298i—Anchor_BS_switch_IE format

Syntex	Size	Note
Anchor_BS_switch_IE() {		
Extended-2 ~~D~~UIUC	4 bits	Anchor_BS_switch_IE()=0x03
Length	4 8 bits	variable
…..		
}		

……

8.4.6.2.7.1 Channel sounding

……

Table 311—UL_sounding_command_IE()

Syntex	Size	Note
UL_sounding_command_IE() {		
Extended-2 UIUC	4 bits	UL_sounding_command_IE()=0x04
Length	4 8 bits	variable
…..		
}		

……

4. References

[1] IEEE 802.16-2004 IEEE Standards for local and metropolitan area networks part 16: Air interface for fixed broadband wireless access systems

[2] IEEE P802.16e-D5a-2004