

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Fix for Problems in UL Allocation	
Date Submitted	2005-06-12	
	Mary Chion Sean Cai Yunsong Yang Irving Wang	mchion@ztesandiego.com scai@ztesandiego.com yyang@ztesandiego.com
	ZTE San Diego Inc. 10105 Pacific Heights Blvd. San Diego, CA 92121	Voice: 858-554-0387 Fax: 858-554-0894
	Mo-Han Fong Nortel Networks	mhfong@nortelnetworks.com
Re:	Response to Sponsor Ballot on IEEE802.16e/D8 document	
Abstract	The current UL allocation has many ambiguities. Since there are many optional extended IEs that are used to allocation UL resources, a MS/SS that doesn't support all features will not be able to correctly determine the position of its UL allocation. Propose to use UL Allocation Start in normal UL MAP to address this problem.	
Purpose	To incorporate the text changes proposed in this contribution into the 802.16e/D8 draft.	
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.	
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.	
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures (Version 1.0) < http://ieee802.org/16/ipr/patents/policy.html >, including the statement "IEEE standards may include the known use of patent(s), including patent applications, if there is technical justification in the opinion of the standards-developing committee and provided the IEEE receives assurance from the patent holder that it will license applicants under reasonable terms and conditions for the purpose of implementing the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair < mailto:r.b.marks@ieee.org > as early as possible, in written or electronic form, of any patents (granted or under application) that may cover technology that is under consideration by or has been approved by IEEE 802.16. The Chair will disclose this notification via the IEEE 802.16 web site < http://ieee802.org/16/ipr/patents/notices >.	

Fix for Problems in UL Allocation

Mary Chion , Sean Cai , Yunsong Yang, Irving Wang

ZTE San Diego Inc. USA

Mo-Han Fong

Nortel Netowrks

1. Problem Statement

There are many optional features included in the current standard document. Associated with the optional features, there are many extended/extend-2 UL MAP IEs and several types of MAP messages. In the current standard, it is not clearly stated that the MSs/SSs support of these IE and MAP message are mandatory. However, from optional nature of the features, and following text from the standard, we conclude that MS/SS support of these IEs/MAP messages can be optional. The standard text regarding extended IE is as the following:

“ A UL-MAP IE entry with a UIUC value of 15, indicates that the IE carries special information and conforms to the structure shown in Table 291. A station shall ignore an extended IE entry with an extended UIUC value for which the station has no knowledge. In the case of a known extended 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.” Which allows the MS to not read any UL-MAP extended IE that it does not support”.

UL allocations are included in many of the optional extended/extended-2 UL IEs and optional MAP messages. We have identified the following IEs, MAP messages and MAC headers included in IEEE P802.16e-D8-2005 which contain UL allocations:

- Extended IE allocation
 - Feedback Polling IE
 - UL PUSC Burst Allocation in Other Segment IE
 - HO Anchor Active UL MAP IE
 - HO Active Anchor UL MAP IE
 - MIMO UL Enhanced IE format
 - OFDMA Fast_Ranging_IE format IE
 - HARQ UL MAP IE
 - HARQ ACK Region Allocation IE
- HARQ MAP
- SUB DL UL MAP
- Feedback Request Extended Subheader

Since most of the UL allocation is defined as sequential slot allocation with duration and the understanding that the new bursts starts from where the previous burst ends is used, a MS will not be able to correctly compute the slot offset for its UL allocation when its UL allocation is after an allocation included in an IEs or MAP message it does not support. This problem already exists in IEEE802.16- 2004. However, with the number of optional extended IEs and messages added in the current 16e standard, this problem becomes much worse and is impossible to avoid by any BS scheduling implementation. Also, a comment and contribution will be submitted to 16d/Cor1/D3 to correct this problem in 16d.

2. Proposed Solutions

We propose the following changes to resolve the UL allocation problem:

- Modify the existing UL Allocation Start IE to be included by normal UL-MAP as well as SUB-DL-UL-MAP. This IE specifies a start offset that is to be used by all subsequent UL allocations (including allocations defined by UL-MAP_IE and extended UL-MAP_IE).
- Change the type of UL Allocation Start IE from Extended-2 UIUC to Extended UIUC since this IE should be supported by not only 16e MSs but also 16d SSs.
- This extended UL-MAP-IE is supported by all MSs.
- The BS may include this UL Allocation Start IE to help MSs that do not support HARQ MAP, SUB-DL-UL-MAP or an extended IE with allocation to skip the UL allocation that defined by those optional messages.
- The BS only needs to include this new IE when necessary, i.e. where there are MSs don't not support all features supported by the system.

3. Specific Text Changes

[Modify the following section:]

8.4.5.4.4.1 UL-MAP extended IE format

.....

Table 289a—Extended UIUC Code Assignment for UIUC=15

Extended UIUC	Usage
.....
0x08	UL_PUSC_Burst_Allocation_in_Other_Segment_IE
0x09	Fast_Ranging_IE
<u>0x0A</u>	<u>UL Allocation Start IE</u>
0x0A ... 0x0F	Reserved

[Modify the following section:]

8.4.5.4.4.2 UL-MAP Extended-2 IE Format

.....

Table 289c—Extended-2 UIUC Code Assignment for UIUC=11

Extended-2 UIUC	Usage
.....
0x08	HARQ ACKCH Region Allocation IE
0x09	UL Allocation start IE
0x0A 9 ... 0x0D	Reserved
0x0E	AAS_SDMA_UL_IE

0x0F	Feedback_polling_IE
------	---------------------

[Modify the following section:]

8.4.5.4.26 UL Allocation start IE

The UL Allocation Start IE indicates the start offset of all subsequent UL allocation including allocation done by UL-MAP IE and extended UL-MAP IE. When this IE is included in UL-MAP or SUB-DL-UL-MAP, a MS shall determine all subsequent UL allocations based on the start offset defined in this IE except when the UL allocation already specified a start offset. This IE shall be supported by all MS.

This IE can be used in UL-MAP and SUB-DL-UL-MAP

Table 302v—UL Allocation start IE

Syntax	Size	Notes
UL Allocation start IE () {	—	—
Extended-2 UIUC	4	UL_Allocation_start_IE () = 0x09A
Length	84	Length in bytes
OFDMA Symbol offset	8	This value indicates start Symbol offset of all subsequent sub-bursts in this UL Allocation start IE-UL allocations in this MAP message (UL-MAP or SUB-UL-DL-MAP)
Subchannel offset	7	This value indicates start Subchannel offset of all subsequent sub-bursts in this UL Allocation start IE-UL allocations in this MAP message (UL-MAP or SUB-UL-DL-MAP)
reserved	1	Shall be set to 0
}	—	—

~~This IE shall not be used in UL-MAP; it may be used in SUB-DL-UL-MAP.~~

~~This MAP IE can be used to indicate the start position UL burst in SUB-DL-UL-MAP.~~

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-D8-2005