

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Format of R-MAP within RS-Zone	
Date Submitted	2007-03-05	
Source(s)	<p>Hang Zhang, Peiyong Zhu, Mo-Han Fong, Wen Tong, David Steer, Gamini Senarath, Derek Yu, Mark Naden, G.Q. Wang</p> <p>Nortel 3500 Carling Avenue Ottawa, Ontario K2H 8E9</p> <p>Kanchei (Ken) Loa, Yi-Hsueh Tsai, Shiann-Tsong Sheu, Hua-Chiang Yin, Chih-Chiang Hsieh, Yung-Ting Lee, Frank C.D. Tsai, Heng-Iang Hsu, Youn-Tai Lee</p> <p>Institute for Information Industry 8F, No. 218, Sec. 2, Dunhua S. Rd., Taipei City 106, Taiwan, ROC.</p>	<p>Voice: +1 613 7631315 [mailto:wentong@nortel.com]</p> <p>[mailto:pyzhu@nortel.com]</p> <p>loa@nmi.iii.org.tw</p>
Re:	A response to a Call for Technical Proposal, http://www.ieee802.org/16/relay/docs/80216j-07_007r2.pdf	
Abstract	R-MAP in RS_Zone is used for a parent station (MR-BS or RS) to signal the resource assignment in the RS_Zone. This contribution propose the format of R-MAP in RS_Zone.	
Purpose	To incorporate the proposed text into the P802.16j Baseline Document (IEEE 802.16j-06/026r2)	
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	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures < http://ieee802.org/16/ipr/patents/policy.html >, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or	

Procedures applicant with respect to patents essential for compliance with both mandatory and optional portions of 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:chair@wirelessman.org>> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <<http://ieee802.org/16/ipr/patents/notices>>.

R-MAP Within RS_Zone

Hang Zhang, Peiying Zhu, Mo-Han Fong, Wen Tong, David Steer, Gamini Senarath, Derek Yu, Mark Naden,
G.Q. Wang

Nortel

Kanchei (Ken) Loa, Yi-Hsueh Tsai, Shiann-Tsong Sheu, Hua-Chiang Yin, Chih-Chiang Hsieh, Yung-Ting Lee,
Frank C.D. Tsai, Heng-Iang Hsu, Youn-Tai Lee

Institute for Information Industry

1. Introduction

R-MAP in RS_Zone is used for a parent station (MR-BS or RS) to signal the resource assignment in the RS_Zone. This contribution is addressing the format of R-MAP in RS_Zone.

2. Proposal

As agreed in the session #46, resource assignment will be done by R-MAP. Theoretically, we can use the similar format of DL-MAP/UL-MAP as defined in IEEE802.16e-2005 for R-MAP. However, this is not very efficient resource assignment for relay station due to the following difference between the assignment to RS and to MS:

- In general, one MR-BS or parent BS serves small number of RS(s), therefore, it is not necessary to have a long CID for resource assignment. Each RS may be addressed by RSID (e.g., 8 bits) which is shorter id than CID used for MS to reduce MAC overhead.
- RS traffic is less burst and amount of traffic is larger than that of a MS due to the fact that the traffic of a RS is the aggregated traffic of multiple MS(s) – Resource granularity could be larger than a slot.
- The link between MR-BS and RS are usually more reliable, so adaptive Modulation/coding rate instead of fixed rate could be used for R-MAP. The coding/modulation could be signaled by R-FCH [1].
- The assignment to a RS could include both DL and UL assignments due to the same fact in bullet 2

Based on above, we propose the following design principles for R-MAP:

- R-MAP is used for the following purposes
 - Unicast resource assignment (unicast RSID)
 - Broadcast resource assignment (broadcast RSID)
- Resource assigned by using basic resource unit BRU (combining multiple slots) or region
 - BRU definition can be broadcast using a R-MAP IE – RS_Zone BAU config IE
 - Region definition can be broadcast using R-MAP IE- RS_Zone region config IE

- Resource assignment is on BRU level or region level
- For most frequently used unicast resource assignment IE a format as concise as possible shall be defined to reduce unnecessary overhead – we propose a fixed length IE for this.
- Variable R-MAP length
- Adaptive coding/modulation for R-MAP
- Only define R-MAP without distinguishing DL R-MAP and UL R-MAP

3. Proposed text change

+++++ Start Text +++++

3.1 R-MAP message

[Modify the last row in Table 14 in page 4 as follows]

Type	Message name	Message description	Connection
<u>68-255-68</u>	<u>RS_MAP</u>	<u>Resource assignment message transmitted in RS_Zone</u>	<u>Broadcast</u>
<u>69-255</u>		<u>Reserved</u>	

[Add new subclause 6.3.2.3.65]

6.3.2.3.65 R-MAP message

This message is used for a parent station (MR-BS or RS) to signal the resource assignments to its child RS(s). This message shall be sent within DL RS_Zone. The length and modulation and coding rate are indicated in R-FCH. The message format is shown in Table xxx

Table XXX. R-MAP Message Format.

Syntax	Size	Notes
<u>R-MAP format {</u>		
<u> Management message type = 67</u>	<u>8 bits</u>	
<u> Number of IEs</u>	<u>4 bits</u>	<u>Indicates the number of IEs included</u>
<u> For (i = 0; i < Number of IEs; i++) {</u>		
<u> R-MAP_IE</u>	<u>Variable</u>	
<u> }</u>		
<u>}</u>		

[Add new subclause 8.4.5.9]

8.4.5.9 R-MAP IE

In this section, various R-MAP IE formats are described.

8.4.5.9.1 RS Zone BAU configuration IE

This IE is used for a parent RS to broadcast to its child RS the RS Zone related configurations valid from Nth frame count from the current frame. These configurations include the locations of DL RS Zone and UL RS Zone and the BRU definition within each of DL and UL RS Zone. The corresponding BAU assignment IE uses BAU as basic RS resource assignment unit.

Table XXX. RS Zone BAU Configuration IE format.

Syntax	Size	Notes
<u>RS Zone BAU Configuration IE {</u>		
<u>Type</u>	<u>4 bits</u>	<u>0x00</u>
<u>Length</u>	<u>4 bits</u>	<u>Length in byte</u>
<u>OFDM symbol index for DL RS Zone</u>	<u>8 bits</u>	<u>Indicate the OFDM symbol index starting a DL RS Zone</u>
<u>Number of OFDM symbols</u>	<u>4 bits</u>	<u>Indicate the number of OFDM symbols a DL RS Zone occupies</u>
<u>DL BAU</u>	<u>4 bits</u>	<u>Indicate the number of subchannels a DL BRU includes</u>
<u>OFDM symbol index for UL RS Zone</u>	<u>8 bits</u>	<u>Indicate the OFDM symbol index starting a UL RS Zone</u>
<u>Number of OFDM symbols</u>	<u>4 bits</u>	<u>Indicate the number of OFDM symbols a UL RS Zone occupies</u>
<u>UL BRU</u>	<u>4 bits</u>	<u>Indicate the number of slots a UL BRU includes</u>
<u>Number of frames before effective</u>	<u>4 bits</u>	<u>Indicates the number of frames before the configuration takes effect (starting from the current frame)</u>
<u>}</u>		

8.4.5.9.2 RS Zone region configuration IE

This IE is used for a parent RS to broadcast to its child RS the RS Zone related configurations valid from Nth frame count from the current frame. These configurations include the locations of DL RS Zone and UL RS Zone and the region definition within each of DL and UL RS Zone.

Table XXX. RS Zone region Configuration IE format.

Syntax	Size	Notes
<u>RS Zone region Configuration IE {</u>		
<u>Type</u>	<u>4 bits</u>	<u>0x00</u>
<u>Length</u>	<u>4 bits</u>	<u>Length in byte</u>
<u>OFDM symbol index for DL RS Zone</u>	<u>8 bits</u>	<u>Indicate the OFDM symbol index starting a DL RS Zone</u>
<u>Number of OFDM symbols</u>	<u>4 bits</u>	<u>Indicate the number of OFDM symbols a DL RS Zone occupies</u>
<u>Number of DL region</u>	<u>6 bits</u>	<u>Indicates the number of regions defined in DL</u>

		<u>RS_zone</u>
<u>For (i =0;i<Number of region;i++) {</u>		
<u> Number of subchannels }</u>	<u>4 bits</u>	<u>Indicate the number of subchannels the region includes</u>
<u> OFDM symbol index for UL RS_Zone</u>	<u>8 bits</u>	<u>Indicate the OFDM symbol index starting a UL RS_Zone</u>
<u> Number of OFDM symbols</u>	<u>4 bits</u>	<u>Indicate the number of OFDM symbols a UL RS_Zone occupys</u>
<u> Number of UL region</u>	<u>6 bits</u>	
<u> For (i =0;i<Number of region;i++) {</u>		
<u> Number of slots }</u>	<u>4 bits</u>	<u>Indicate the number of slots the region includes</u>
<u> Number of frames before effective</u>	<u>4 bits</u>	<u>Indicates the number of frames before the configuration takes effect (starting from the current frame)</u>
<u>}</u>		

8.4.5.9.3 BAU Resource assignment IE

This IE is used for resource assignment to a RS or multiple RS using BAU as RS resource assignment unit.

Table XXX. RS_assignment IE format.

<u>Syntax</u>	<u>Size</u>	<u>Notes</u>
<u>RS BAU assignment IE {</u>		
<u> Type</u>	<u>4 bits</u>	<u>0x01</u>
<u> RSID</u>	<u>8 bits</u>	
<u> Number of DL BRU</u>	<u>6 bits</u>	
<u> DL MCS</u>	<u>4 bits</u>	
<u> Number of UL BRU</u>	<u>6 bits</u>	
<u> UL MCS</u>	<u>4 bits</u>	
<u>}</u>		

The BAU size referred in this IE is a system parameter broadcast in RS zone BAU configuration IE.
This IE is length of 4 bytes and no length field is needed.

8.4.5.9.4 Region resource assignment IE

This IE is used for resource assignment to a RS or multiple RS using region as RS resource assignment unit.

Table XXX. RS_Assignment IE Format.

<u>Syntax</u>	<u>Size</u>	<u>Notes</u>
<u>RS assignment IE {</u>		
<u> Type</u>	<u>4 bits</u>	<u>0x01</u>
<u> RSID</u>	<u>8 bits</u>	
<u> DL region ID</u>	<u>6 bits</u>	
<u> DL MCS</u>	<u>4 bits</u>	

<u>UL region ID</u>	<u>6 bits</u>	
<u>UL MCS</u>	<u>4 bits</u>	
<u>↓</u>		

The region referred by this IE is defined and broadcast in RS zone region configuration IE.
This IE is length of 4 bytes and no length field is needed.

Reference

[1] IEEE C80216j-06/233: “Frame Structure to Support Relay Node Operations”,