

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >	
Title	<b>Clarification for Burst-based forwarding on transparent mode</b>	
Date Submitted	<b>2007-11-14</b>	
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Re:	IEEE 802.16j-07/043: "IEEE 802.16 Working Group Working Group Letter Ballot #28"	
Abstract	This contribution clarify the burst-based forwarding scheme on transparent mode	
Purpose	Text proposal for 802.16j Draft Document.	
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# Clarification for Burst-based forwarding on transparent mode

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## Problem Statement

In WG Letter Ballot # 28 on initial draft IEEE P802.16j/D1, there are comments commenting on the burst-based forwarding scheme on transparent mode. This contribution is proposed to clarify the burst-based forwarding scheme defined in IEEE P802.16j/D1 and proposed the associated modifications to accommodate the following comments.

Comment#	Subclauses	Authors		Type
		Last	First	
499	6.3.3.8.2	Visotsky	Eugene	Technical
501	6.3.3.8.2	Loa	Kanchei	Editorial
503	6.3.3.8.2	Jin	Sunggeun	Editorial
504	6.3.3.8.2	Nakamura	Michiharu	Editorial
923	8.4.5.3.2.2	Nakamura	Michiharu	Technical
928	8.4.5.3.28	Kim	Olszewski	Technical
929	8.4.5.3.28	Hart	Mke	Technical

## Introduction

In order to elaborate the proposed burst-based data forwarding scheme, a DL-MAP IE with “DL\_Burst\_Transmit\_IE” is first given in Table 1 for an RS to transmit data to its subordinated stations. Moreover, an UL-MAP IE with “UL\_Burst\_Receive\_IE” is given in Tables 2 for an RS to receive data from its subordinated stations. Examples of using the proposed MAP IE in DL-MAP and UL-MAP for data relaying with transparent RSs are given in Tables 3, 4, and 5. Examples of 4-hop data relaying is also given in Figures 1 & 2 to illustrate the burst-based data forwarding scheme. Finally, in order to facilitate the incorporation of this proposal into IEEE 802.16j standard, specific changes to the baseline working document IEEE P802.16j/D1 are listed below.

Table 1 DL-MAP IE with “DL\_Burst\_Transmit\_IE”

Syntax	Size	Notes
DL-MAP_IE(RS, Nr)	variable	RS is assign to relay Nr IE
{		
DIUC	4 bits	15 (Extended DIUC dependent IE)
DL_Burst_Transmit_IE() {		
Extended UIUC	4 bits	DL_Burst_Transmit_IE
Length	4 bits	Length = 2+2Nr or 3 + 2Nr
If(Length is even){		
RCID_IE	8 bits	Reduced RS basic CID;
}else{		
CID	16 bits	RS basic CID
}		
Nr	8 bits	Number of bursts forwarding by RS
for (n = 0; n < Nr; n++) {	=	=

Relay burst length	16 bits	Relay burst length (in unit of byte)
}		
}		
}		

Table 2 UL-MAP IE with “UL\_Burst\_Receive\_IE”

Syntax	Size	Notes
UL-MAP_IE(RS, Nr)	36 bits	
{		
CID	16 bits	RS basic CID
UIUC	4 bits	15 (Extended UIUC dependent IE)
UL_Burst_Receive_IE () {		
Extended UIUC	4 bits	UL_Burst_Receive_IE
Length	4 bits	Length = 1
Nr	8 bits	Number of UL-MAP IE following current IE for RS to receive data bursts from subordinated station(s)
}		
}		

Table 3: Format of DL-MAP

Syntax	Size	Notes
DL-MAP_Message_Format() {		
Management Message Type = 3	8 bits	
PHY Synchronization Field	variable	
DCD Count	8 bits	
Base Station ID	48bits	
Begin PHY Specific Section {		
if (WirelessMAN-OFDMA) {		
No. OFDMA symbols	8 bits	Number of OFDMA symbols in the DL subframe including all AAS/permutation zone.
}		
for ( $n = 0; n < N; n++$ ) {	-	For each DL-MAP element 1 to $N$ .
DL-MAP_IE()	Variable	(Table 5a as an example)
}		
}		

Table 4 Format of UL-MAP

Syntax	Size	Notes
UL-MAP_Message_Format() {		
Management Message Type = 3	8 bits	
Reserved	8 bits	Shall be set to zero.
UCD Count	8 bits	
Allocation Start Time	32 bits	
Begin PHY Specific Section {		
if (WirelessMAN-OFDMA) {		
No. OFDMA symbols	8 bits	Number of OFDMA symbols in the UL subframe

}		
for ( $n = 0; n < N; n++$ ) {	-	For each UL-MAP element 1 to $N$ .
UL-MAP_IE()	Variable	(Table 5b as an example)
}		
}		

Table 5a: Example of proposed DL-MAP IEs

MR Network Topology	Zone	MAP-IEs used to describe the zone(s)	Notes
	DL Access Zone (BS:Tx, MS:Rx, RS1:Rx, RS2:Rx)	DL-MAP_IE <sub>l</sub> ()	MAP IEs for MS receiving from MR-BS
		⋮	
		DL-MAP_IE <sub>i</sub> ()	Data burst for RS1 itself (with RS1 basic CID)
		DL-MAP_IE <sub>i+1</sub> ()	
		DL-MAP_IE <sub>i+2</sub> ()	Data burst for RS1 relaying (with RS1 primary CID)
		STC_Zone_IE	Indicate zone switch
	1 <sup>st</sup> DL Transparent Zone (RS1:Tx, MS:Rx, RS2:Rx)	DL-MAP_IE with DL_Burst_Transmit_IE (RS1, Nr = m+2)	RS1 is assigned to transmit the following $m$ legacy DL-MAP IEs for MSs and 2 DL-MAP IEs for RS2
		DL-MAP_IE <sub>j-1</sub> ()	MAP IEs for MS receiving from RS1
		⋮	
		DL-MAP_IE <sub>j+m</sub> ()	Data burst for RS2 itself (with RS2 basic CID)
		DL-MAP_IE <sub>j+m+1</sub> ()	Data burst for RS2 relaying (with RS2 primary CID)
		DL-MAP_IE <sub>j+m+2</sub> ()	
		STC_Zone_IE	Indicate zone switch
	2 <sup>nd</sup> DL Transparent Zone (RS2:Tx, MS: Rx)	DL-MAP_IE with DL_Burst_Transmit_IE (RS2, Nr = n)	RS2 is assigned to transmit the following $n$ legacy DL-MAP IEs
		DL-MAP_IE <sub>k-1</sub> ()	MAP IEs for MS receiving from RS2
⋮			
	DL-MAP_IE <sub>k+n</sub> ()		

Table 5b: Example of proposed UL-MAP IEs

MR Network Topology	Zone	MAP-IEs used to	Notes
---------------------	------	-----------------	-------

<pre> graph TD     MRBS((MR-BS)) --- RS1((RS1))     MRBS --- MS1((MS1))     MRBS --- MSi((MSi))     RS1 --- RS2((RS2))     RS1 --- MSi1((MSi+1))     RS1 --- MSim((MSi+m))     RS2 --- MSim1((MSi+m+1))     RS2 --- MSimn((MSi+m+n))         </pre>		describe the zone(s)	
	UL Access Zone (MS:Tx, RS1:Rx, RS2:Rx)	UL-MAP_IE <sub>1</sub> ()	MAP IEs for MS transmitting to MR-BS
		⋮	
		UL-MAP_IE <sub>i</sub> ()	
		UL-MAP_IE with UL Burst Receive IE (RS1, <i>m</i> )	RS1 is assigned to receive following <i>m</i> IEs
		UL-MAP_IE <sub><i>j-1</i></sub> ()	MAP IEs for MS transmitting to RS1
		⋮	
		UL-MAP_IE <sub><i>j+m</i></sub> ()	
		UL-MAP_IE <sub><i>j</i></sub> with UL Burst Receive IE (RS2, <i>n</i> )	RS2 is assigned to receive following <i>n</i> IEs
		UL-MAP_IE <sub><i>k-1</i></sub> ()	MAP IEs for MS transmitting to RS2
		⋮	
	UL-MAP_IE <sub><i>k+n</i></sub> ()		
		UL_Zone_IE()	Indicate zone switch
	1 <sup>st</sup> UL Relay Zone (RS1:Rx, RS2:Tx)	UL-MAP_IE with UL Burst Receive IE (RS1, <i>l</i> )	RS1 is assigned to receive following IE
		UL-MAP_IE()	MAP IE for RS2 transmitting to RS1
	UL_Zone_IE()	Indicate zone switch	
2 <sup>nd</sup> UL Relay Zone (RS1:Tx BS :Rx)	UL-MAP_IE()	MAP IE for RS1 transmitting to MR-BS	

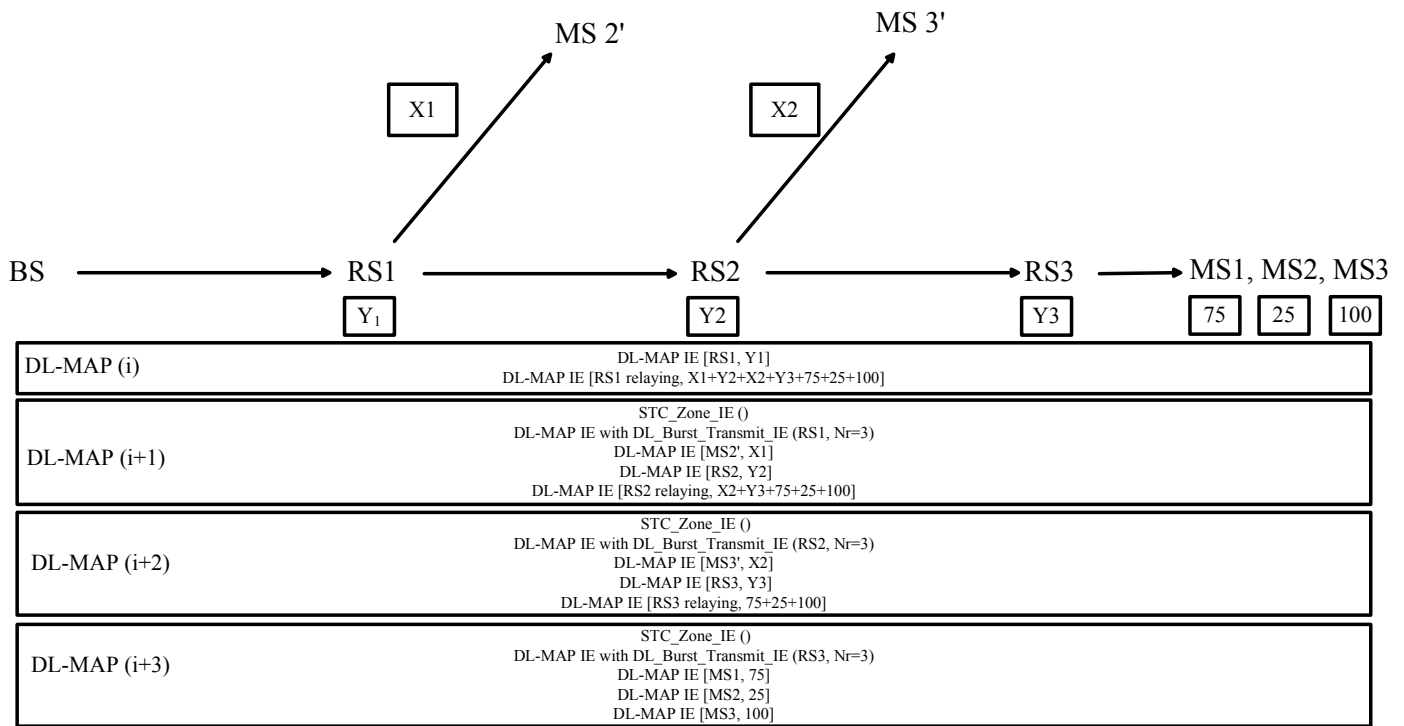


Figure 1a Example of proposed MAP-based scheme for unicast data relaying (one hop in one frame)

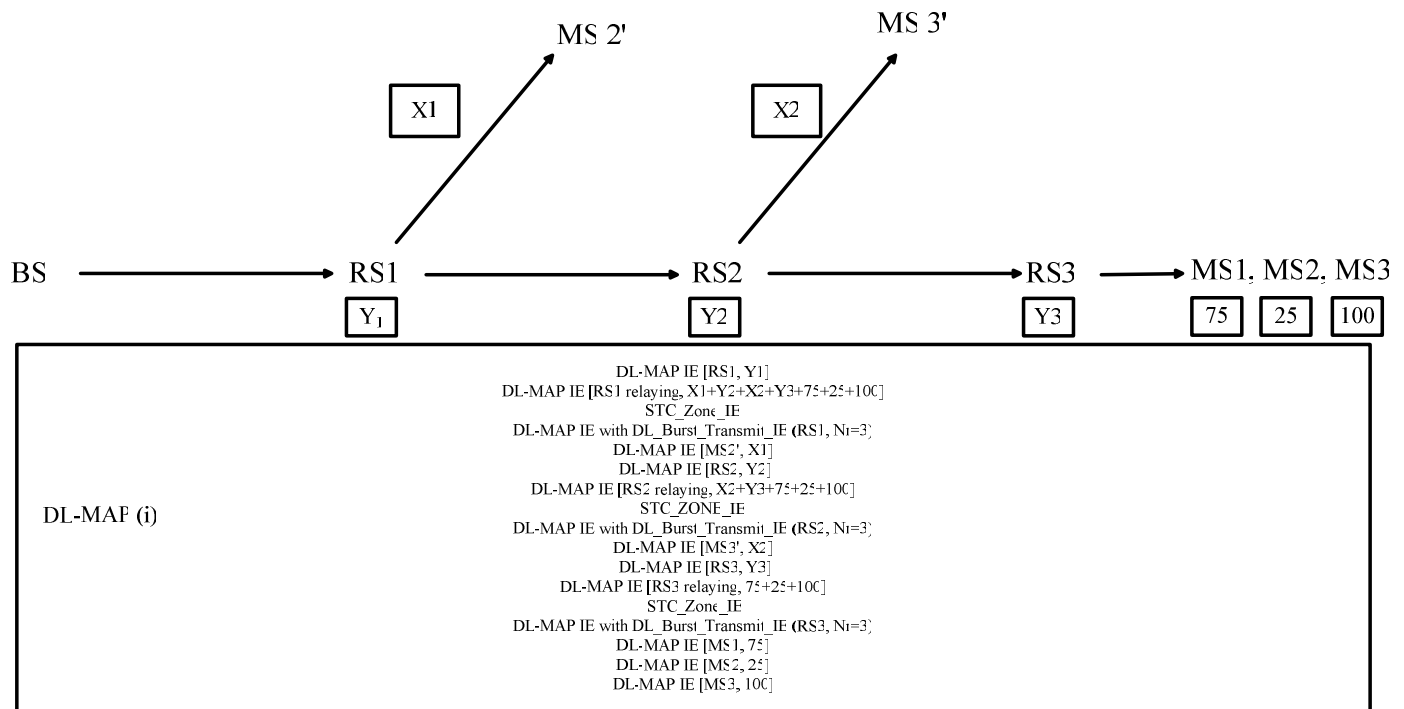


Figure 1b Example of proposed MAP-based scheme for unicast data relaying (all hops in one frame)

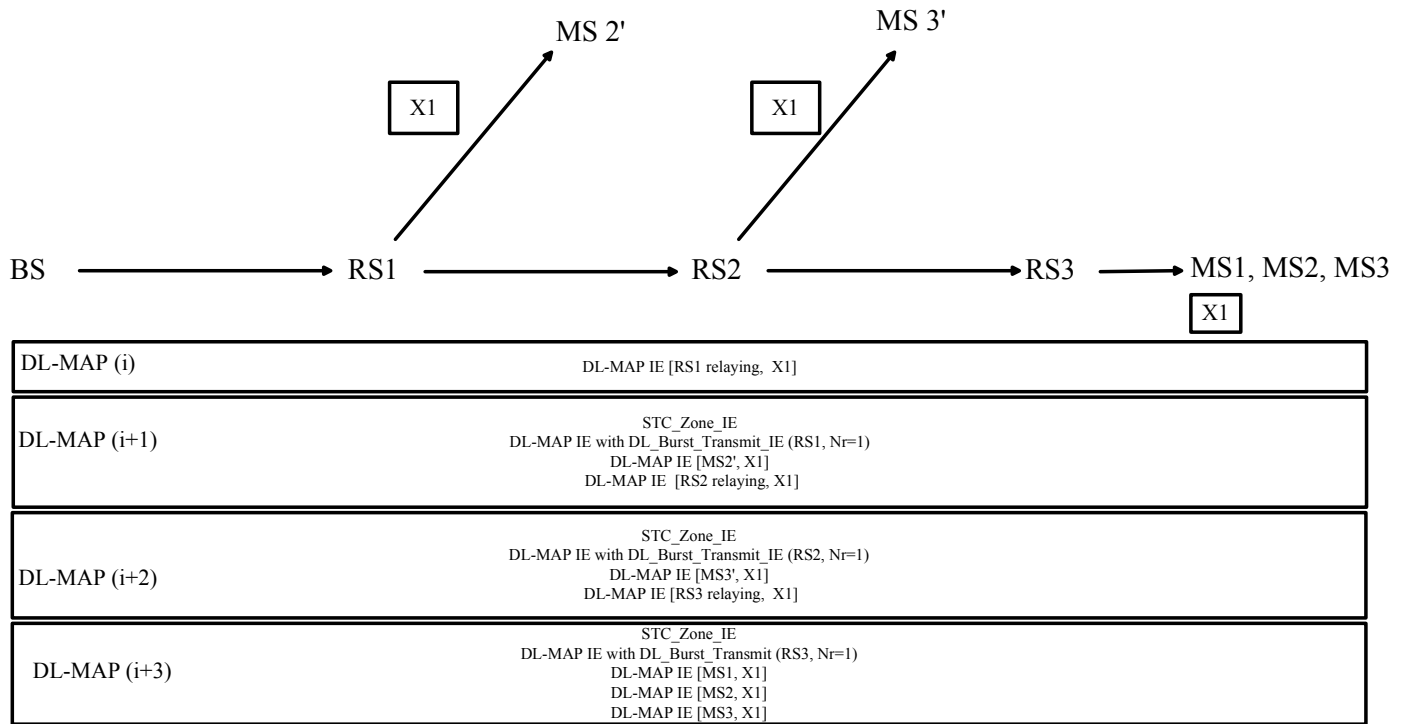


Figure 2a Example of proposed MAP-based scheme for multicast data relaying (one hop in one frame)

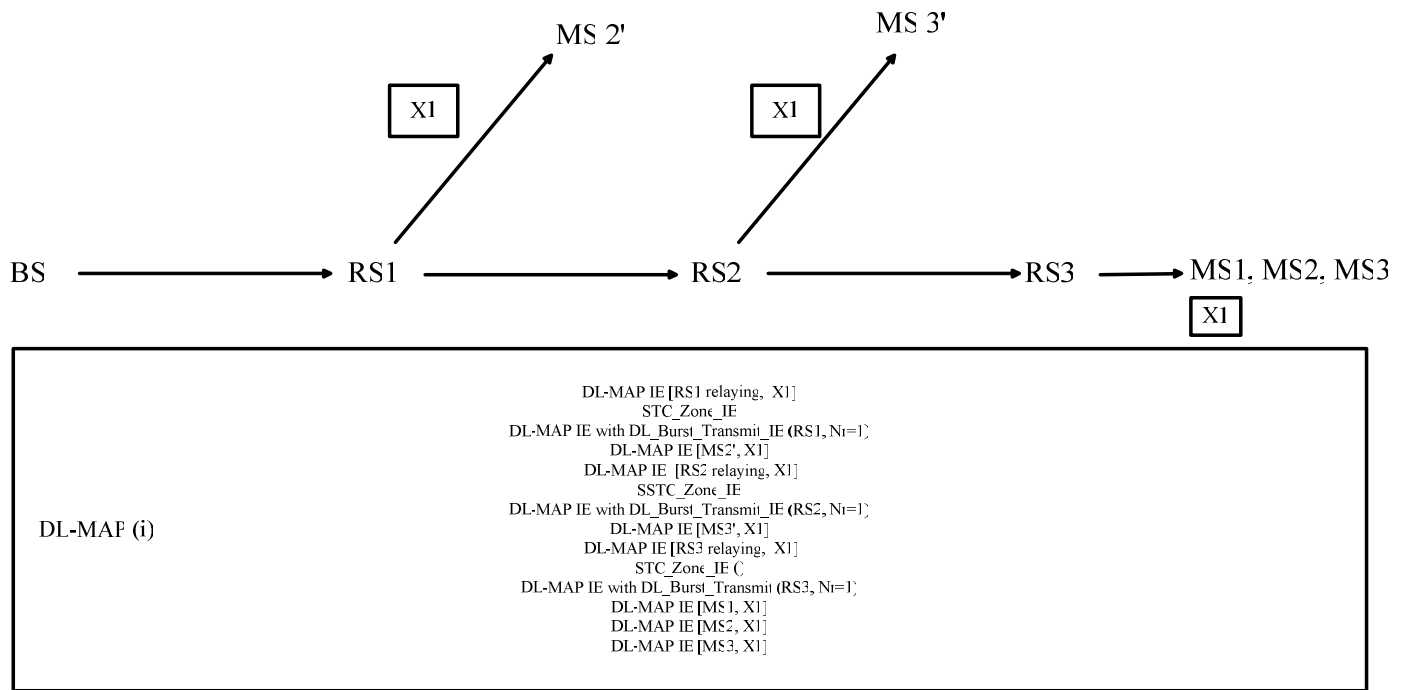


Figure 2b Example of proposed MAP-based scheme for multicast data relaying (all hops in one frame)

## Text Proposal

### 6.3.3.8.2 Transmission using station CID

*[Change the following text as indicated]*

There are two schemes for RS to forward received data. One is the MPDU-based forwarding and the other is burst-based forwarding. In MPDU-based forwarding scheme, the forwarding of MPDUs by each RS is performed based on the CID contained in the MPDU header. An RS is informed about the next hop station during the setup of the service flow. The inclusion of CID in the DL-MAP is optional.

~~Optionally, u~~Under centralized scheduling, forwarding of MPDUs by each RS is may be performed based on burst described in MAP IEs, namely burst-based forwarding. The burst-based forwarding scheme ~~works~~ utilizes ing forwarding rules encoded in MAPs. Data bursts that are scheduled to be relayed by the receiving RS, but are not destined for the same RS must rely on MAP IEs shall be sent with the RS primary management CID. For transparent RS, the DL\_Burst\_Transmit\_IE and UL\_Burst\_Receive\_IE, as described in 8.4.5.3.29~~28~~ and 8.4.5.4.29~~2~~, (respectively,) are the IEs that shall be used. The DL\_Burst\_Transmit\_IE is used to describes the DL data relaying information and the UL\_Burst\_Receive\_IE ~~is used to describes~~ describes UL data relaying information. For DL MAP IEs following the DL\_Burst\_Transmit\_IE, the RS shall forward the data in allocations defined by these IEs, where the forwarded data is received in the DL burst with the RS primary management CID. For UL MAP IEs following the UL\_Burst\_Receive\_IE, the RS shall receive the data in allocations defined by these IEs and forward to its superordinated station in the next available allocation, defined by legacy UL-MAP IE, in UL relay zone.

### 8.4.5.3.2 DL-MAP extended IE format

#### 8.4.5.3.2.2 DL-MAP extended-2 IE format

*[Change Table 277c(.16e)/Table 385(Rev2) as indicated:]*

Table 277c—Extended-2 DIUC code assignment for DIUC=14

Extended-2 DIUC	(hexadecimal) Usage
0B	<del>DL_Burst_Transmit_IE</del> <u>MIMO_DL_Basic_IE</u>
0F	<del>Reserved-DL_Burst_Transmit_IE</del>