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Title	MAP IEs for Non-transparent RS Systems	
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Re:	IEEE 802.16j-07/013:“Call for Technical Comments regarding IEEE Project P802.16j”	
Abstract	This contribution proposes MAP IEs in non-transparent RS systems	
Purpose	Text proposal for 802.16j Baseline Document	
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## MAP IEs for Non-transparent RS Systems

### Introduction

In C80216j-07/255r1, a burst-based data forwarding scheme for transparent RS systems is proposed by defining new MAP IEs, namely DL-MAP IE with “DL\_Burst\_Transmit\_IE” and UL-MAP IE with “UL\_Burst\_Receive\_IE” in DL-MAP and UL-MAP sent by MR-BS. For a non-transparent RS, the RS broadcasts legacy MAPs (namely, DL-MAP and UL-MAP) in the first DL Access Zone and R-MAP if presented in the first DL Relay Zone that is in Tx mode. Under centralized scheduling, the legacy MAPs and R-MAPs are sent from MR-BS to the RS in the corresponding DL Relay Zone. The relaying scheme of legacy MAPs has been proposed in C80216j-07/257. Consequently, the same relaying scheme can also be applied to relay the R-MAP to the destining RS. Based on the relayed legacy MAPs and R-MAP received from MR-BS, the non-transparent RS is able to extract the information of downstream transmissions in the corresponding DL Access/Relay Zone and the information of upstream receptions in the corresponding UL Access/Relay Zone. From the viewpoint of burst-based data forwarding, the upstream bursts, a non-transparent RS received from its subordinated MS/RS(s) in the UL Access/Relay Zone within a frame, shall be transmitted by the RS in the corresponding UL Relay Zone to its superordinated station altogether. Therefore, the burst-based data forwarding can be easily achieved by only providing a non-transparent RS linkages between its downstream receptions and its downstream transmissions. Since the R-MAP must be decoded by a non-transparent RS in order to obtain the information of downstream receptions, the linkage information shall be included in the same R-MAP.

In order to elaborate that the burst-based data forwarding scheme proposed in C80216j-07/255 can be applied to non-transparent RS systems, the R-MAP IE with “RS-DL\_Burst\_Transmit\_IE” proposed in C80216j-07/255 is first described in Tables 1 for the corresponding non-transparent RS to transmit data burst it received to its subordinated stations. Then an example of using the proposed MAP IE in R-MAP is given in Table 2. Moreover, two examples are given in Figures 1 & 2 to illustrate the proposed burst-based scheme for unicast and multicast data forwarding in non-transparent RS systems. Finally, in order to facilitate the incorporation of this proposal into IEEE 802.16j standard, specific changes to the baseline working document IEEE 802.16j-06/026r3 are listed below.

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

Syntax	Size	Notes
R-MAP_IE()	variable	
{		
DIUC	4 bits	15 (Extended DIUC dependent IE)
<b>RS_DL_Burst_Transmit_IE() {</b>		
Extended DIUC-2	4 bits	<b>RS_DL_Burst_Transmit_IE = 0x0F</b>
Length	8 bits	<b>Length = 3 + 2Nr1 or 5+2Nr1+2Nr2</b>
RCID	8 bits	Reduced RS basic CID
<b>Ns1</b>	<b>8 bits</b>	<b>The first IE number in associated DL-MAP the</b>

		RS shall relay in DL Access Zone
Nr1	8 bits	Number of IEs following the Ns1-th IE for RS transmitting to subordinated MSs
for (n = 0; n < Nr1; n++) {	_	_
Relay burst length	16 bits	Relay burst length (in unit of byte)
}		
If (Length > 3 + 2Nr1) {		
Ns2	8 bits	The first IE number in associated R-MAP the RS shall relay in the DL Relay Zone
Nr2	8 bits	Number of IEs following the Ns2-th IE for RS transmitting to subordinated RSs
for (n = 0; n < Nr2; n++) {	_	_
Relay burst length	16 bits	Relay burst length (in unit of byte)
}		
}		

Table 2a : Example of proposed scheme for RS1 in DL

	Zone	MAP/ data region	MAP-IEs used to describe the zone(s)	Notes	
	DL Access Zone (BS :Tx, RS1 :Tx, RS2 :Tx, MS :Rx)	DL-MAP	DL-MAP_IE <sub>1</sub> ()	MAP IEs for MS receiving from RS1 in DL access zone	
			⋮		
			DL-MAP_IE <sub>i</sub> ()	Indicate zone switch	
			STC_Zone_IE		
			DL-MAP_IE ()		Describe 1 <sup>st</sup> DL relay zone
			STC_Zone_IE		Indicate zone switch
DL-MAP_IE ()	Describe 2 <sup>nd</sup> DL relay zone				
	1 <sup>st</sup> DL Relay Zone (BS :Tx, RS1 :Rx)	R-MAP (DL Part)	R-MAP_IE()	Data burst for RS1 itself, similar to legacy DL-MAP_IE(), with RS1 basic CID	
			R-MAP_IE() with RS DL Burst Transmit IE for RS1	RS1 is assigned to transmit data as indicated by (condensed) DL-MAP and (condensed) DL-R-MAP sent in regular DL data burst. The relaying data is described in following R-MAP_IE	
		R-MAP_IE()	Data burst for RS1 relaying, similar to legacy DL-MAP_IE(), with RS1 primary management CID		
		Regular DL data	(Condensed) DL-MAP	DL-MAP for RS1 sending to its subordinated MSs in first DL access zone of next frame	

burst for

		RS1	(Condensed) R-MAP (DL Part)	R-MAP for RS1 sending to RS2 in next DL relay zone
	2 <sup>nd</sup> DL Relay Zone (RS1 :Tx, RS2 :Rx)	R-MAP (DL Part)	R-MAP_IE()	Data burst for RS2 itself with RS2 basic CID, similar to legacy DL-MAP_IE()
			R-MAP_IE() with RS DL Burst Transmit IE for RS2	RS2 is assigned to transmit data as indicated by (condensed) DL-MAP sent in regular DL data burst. The relaying data is described in following R-MAP_IE
			R-MAP_IE()	Data burst for RS2 relaying with RS2 primary management CID, similar to legacy DL-MAP_IE()
	Regular DL data burst for RS2	(Condensed) DL-MAP	DL-MAP for RS2 sending to its subordinated MSs in DL access zone of next frame	

Table 2b: Example of proposed scheme for RS1 in UL

	Zone	MAP/ data region	MAP-IEs used to describe the zone(s)	Notes
	UL Access Zone (RS1 :Rx, MS :Tx)	UL-MAP	UL-MAP_IE <sub>1</sub> ()	MAP IEs for MS transmitting
			⋮	
			UL-MAP_IE <sub>j</sub> ()	
			UL_Zone_IE	Indicate zone switch
			UL-MAP_IE ()	Describe the UL relay zone(s)
			UL_Zone_IE	Indicate zone switch
	UL-MAP_IE ()	Describe the UL relay zone(s)		
1 <sup>st</sup> UL Relay Zone (RS1 :Rx, RS2 :Tx)	R-MAP (UL Part)	R-MAP_IE()	MAP IE for RS2 transmitting to RS1, similar to legacy UL-MAP_IE	
2 <sup>nd</sup> UL Relay Zone (BS :Rx, RS1 :Tx)	R-MAP (UL Part)	UR-MAP_IE()	MAP IE for RS1 transmitting to MR-BS, similar to legacy UL-MAP IE	

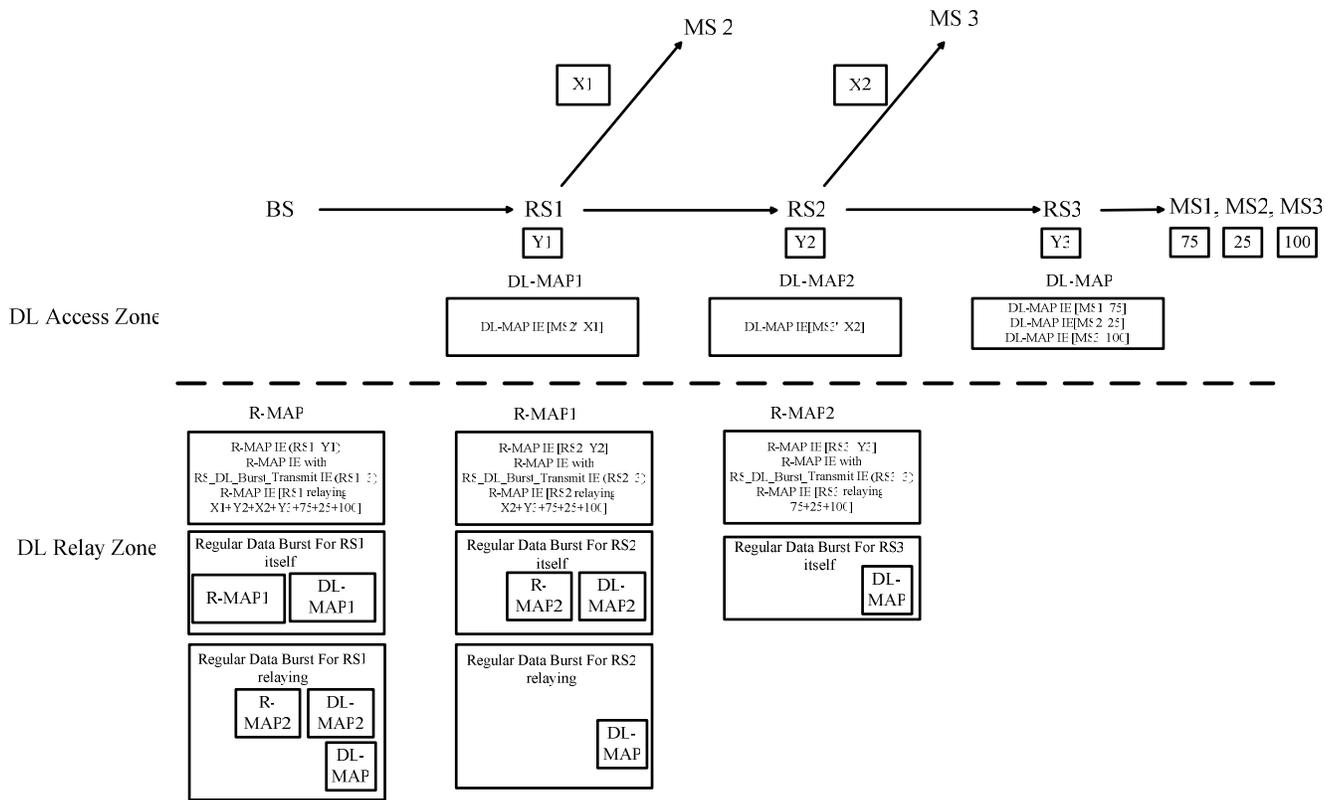


Figure 1 Example of proposed burst-based scheme for unicast data relaying

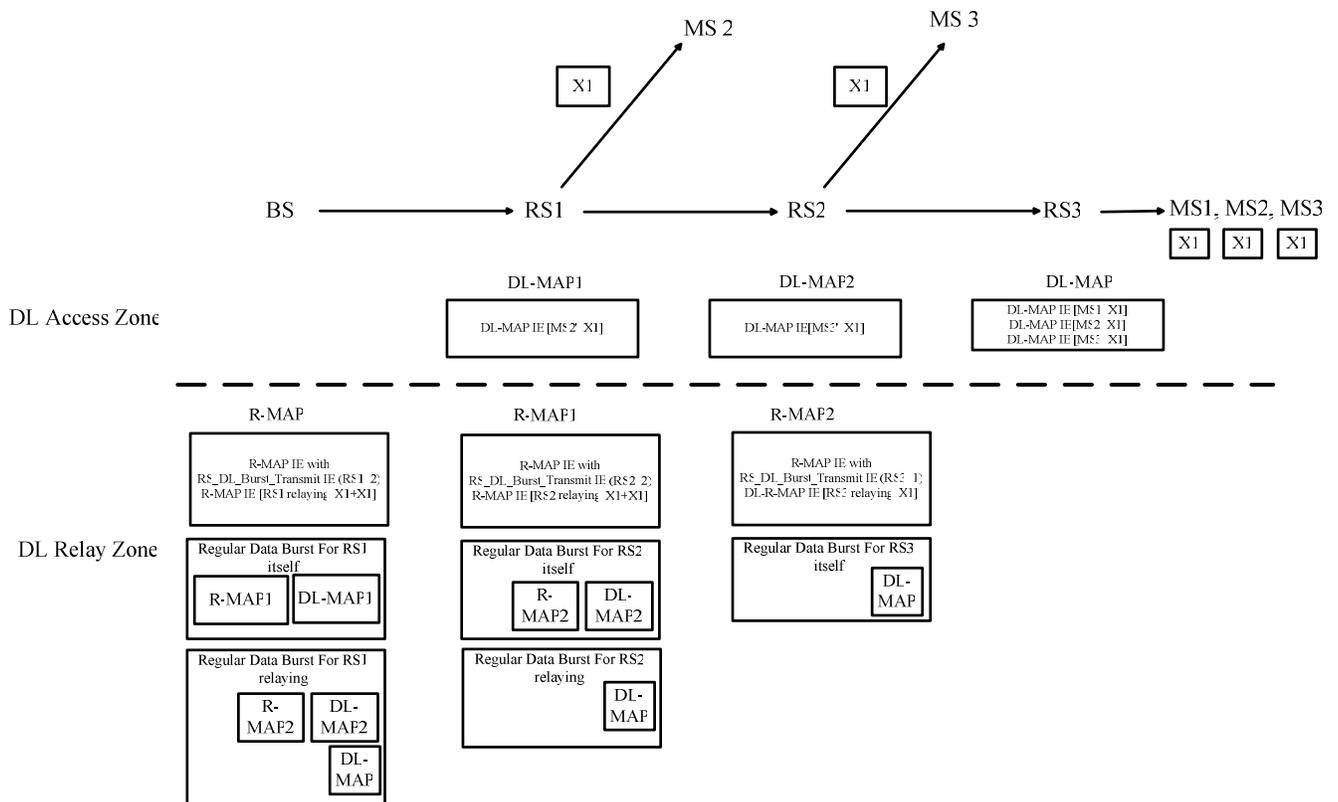


Figure 2 Example of proposed burst-based scheme for multicast data relaying

## Text Proposal

### 6.3.3.8.2 Transmission using station CID

*[Change the following text as indicated:]*

*[Author's Note: the difference from C80216j-07/255r1 is marked in red as indicated:]*

The construction of MPDUs is the same as without relay. 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 of MPDUs. An RS is informed apriori about the next hop station during SF setup for a station CID. The inclusion of CID in DL\_MAP is optional as it is without relay.

Optionally, under centralized scheduling, forwarding of MPDUs by each RS is performed based on burst described in MAP IEs, namely burst-based forwarding. The burst-based forwarding rules are encoded in the MAPs sent by MR-BS. Data bursts that are scheduled to be relayed by burst-based forwarding mechanism and destined to stations other than the receiving RS are described by MAP IEs with RS primary management CID. If burst-based forwarding is used for transparent RS, DL Burst Transmit IE and UL Burst Receive IE defined in 8.4.5.3.29, and 8.4.5.4.29, respectively, shall be used, where DL Burst Transmit IE is used to describe DL data relaying information and UL Burst Receive IE is used to describe UL data relaying information. If burst-based forwarding is used for non-transparent RS, RS-DL Burst Transmit IE defined in 8.4.5.3.30 shall be used, which is used to describe DL data relaying information.

### 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 as indicated:]*

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

Extended-2 DIUC	(hexadecimal) Usage
00	MBS_MAP_IE
01	HO_Anchor_Active_DL_MAP_IE
02	HO_Active_Anchor_DL_MAP_IE
03	HO_CID_Translation_MAP_IE
04	MIMO_in_another_BS_IE
05	Macro-MIMO_DL_Basic_IE
06	Skip_IE
07	HARQ DL MAP IE
08	HARQ ACK IE
09	Enhanced DL MAP IE
0A	Closed-loop MIMO DL Enhanced IE

0B-0D	Reserved
0E	AAS_SDMA_DL_IE
0F	<del>Reserved</del> <u>RS-DL Burst Transmit IE</u>

*[Insert the following new subclause]*

#### 8.4.5.3.30 RS DL Burst Transmit IE format

Table xxx — RS DL Burst Transmit IE format

<u>Syntax</u>	<u>Size</u>	<u>Note</u>
<u>RS DL Burst Transmit IE() {</u>		
<u>Extended DIUC-2</u>	<u>4 bits</u>	<u>RS DL Burst Transmit IE = 0x0F</u>
<u>Length</u>	<u>8 bits</u>	<u>Length = 3 + 2Nr1 or 5+2Nr1+2Nr2</u>
<u>RCID</u>	<u>8 bits</u>	<u>Reduced RS basic CID</u>
<u>Ns1</u>	<u>8 bits</u>	<u>The first IE number in associated DL-MAP the RS shall relay in DL Access Zone</u>
<u>Nr1</u>	<u>8 bits</u>	<u>Number of IEs following the Ns1-th IE for RS transmitting to subordinated MSs</u>
<u>for (n = 0; n &lt; Nr1; n++) {</u>	<u>-</u>	<u>-</u>
<u>Relay burst length</u>	<u>16 bits</u>	<u>Relay burst length (in unit of byte)</u>
<u>}</u>		
<u>If (Length &gt; 3 + 2Nr1) {</u>		
<u>Ns2</u>	<u>8 bits</u>	<u>The first IE number in associated R-MAP the RS shall relay in the DL Relay Zone</u>
<u>Nr2</u>	<u>8 bits</u>	<u>Number of IEs following the Ns2-th IE for RS transmitting to subordinated RSs</u>
<u>for (n = 0; n &lt; Nr2; n++) {</u>	<u>-</u>	<u>-</u>
<u>Relay burst length</u>	<u>16 bits</u>	<u>Relay burst length (in unit of byte)</u>
<u>}</u>		
<u>}</u>		