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Re:	Call for technical Comments and Contributions regarding IEEE project P802.16j
Abstract	This contribution proposes a signaling method that provides the OFDMA symbol offset of the relay zone.
Purpose	Discussion and Adoption in IEEE 802.16j
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Relay zone indicator

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1. Introduction

This contribution proposes a signaling method for indicting the start of relay zone. The proposed signaling method, which was discussed in the March meeting, makes use of the Gap/PAPR reduction IE (DIUC=13) in the DL-MAP. This method uses the boosting field as relay zone indicator for the RS. This signaling takes place in the access zone, at the time of the network entry in such a way that the RS is able to read the start of the relay zone, while the MS continues to process DIUC=13 as Gap/PAPR reduction IE in accordance with the existing specification.

2. Problem Statement

On initialization, it is assumed that a RS performs initial network entry with an access station, i.e., an MR-BS or RS in the same way that an MS does. In the beginning, RS detects a preamble in the MR-BS frame or an RS frame and establishes synchronization with the access station. RS continues to perform the remaining initial network entry procedure in the access zone.

After the RS completes its network entry, to continue communicating with the access station in the relay zone, the RS needs to be informed about the location of the start of the relay zone. This signaling needs to take place

in the access zone. So the goal is to design the signaling in such a way that the RS is able to extract the start of t he relay zone while the operation of the MS should remain unaffected.

3. Suggested Remedy

In March meeting, the use of Gap/PAPR reduction IE (DIUC=13) was discussed. The main idea is to indicate the start of the DL relay zone through the use of "OFDMA Symbol offset" field in the GAP/PAPR reduction IE (DIUC=13) and utilize the unused power boosting field (3 bits) as an indicator to the RS that the IE contains information about the start of the Relay zone. The method works as follows: The MR-BS or RS will transmit DIUC=13 to indicate the start of the relay zone using the "OFDMA symbol offset" field. Since DIUC=13 is also transmitted by the MR-BS or RS for Gap/PAPR reduction purposes, it is important to add information which clearly tells the RS when the IE is indicating start of the relay zone. The proposal is to use the bits in the boosting field to signal to the RS that the OFDMA symbol offset field is indicating the location of the start of the DL relay zone.

Similarly, the MR-BS or RS transmits Safety zone IE (UIUC=13) in the access zone and in the relay zone, so that the MS recognizes the existence of another zone in UL-subframe while the RS can read the location of the start of the UL Relay zone.

In summary, this contribution proposes the following:

- Clarify the operation that indicate Relay zone
  - Use GAP/PAPR reduction IE (DIUC=13) with relay zone indicator set to '1' to indicate that GAP IE (DIUC=13) is being transmitted to indicate the DL Relay zoneOne of boosting field is used as relay zone indicator
  - Use Safety zone IE (UIUC=13) to indicate the uplink of Relay zone.

4. Proposed Text Change

[Insert the following at the end of ~~section~~ 8.4.5.3~~.4~~:]

MR-BS or RS shall transmit DIUC=13 in the DL-MAP in the access zone to indicate the location of a~~start of the~~ DL r~~R~~elay zone in the same frame. The boosting field in DIUC=13 is used to indicate to the receiving RSs that the IE defines ~~as~~ a relay zone ~~indicator~~. ~~Upon receipt of the DIUC=13 with relay zone indicator in the DL-MAP, the RS shall recognize that the OFDMA symbol offset field is the location of the start of the DL-Relay zone. The MS shall recognize DIUC=13 as Gap/PAPR reduction IE. After the RS moves to the relay zone, the transceiver mode of the relay zone shall be Rx, so that the RS can receive the R-FCH and R-DL-MAP and Relay_Frame_configuration message.~~

~~[~~Change Table 275 as indicated~~following:]~~

Syntax	Size	Notes
DL_MAP_IE() {	—	—
DIUC	4bits	—
if (DIUC == 14) {	—	—
Extended-2 DIUC dependent IE	—	—
} Else if (DIUC == 15) {	—	—
Extended DIUC dependent IE	*variable*	See subclauses following 8.4.5.3.1.
} else {	—	—

~~Syntax~~	~~Size~~	~~Notes~~
if (INC_CID == 1) {	—	The DL-MAP starts with INC_CID =0. INC_CID is toggled between 0 and 1 by the CID-SWITCH_IE() (8.4.5.3.7)
N_CID	8 bits	Number of CIDs assigned for this IE
for (*n*=0; *n*< N_CID;*n*++) {	—	—
If (included in SUB-DL-UL-MAP) {	—	—
RCID_IE()	—	For SUB-DL-UL-MAP, reduced CID format is used
} else {	—	—
CID	16 bits	—
}	—	—
}		
OFDMA Symbol offset	8 bits	
if (Permutation = 0b11 and AMC type is 2x3 or 1x6)) {		
Subchannel offset	8 bits	
Boosting	3 bits	000: normal (not boosted); 001: +6dB; 010: -6dB; 011: +9dB; 100: +3dB; 101: -3dB; 110: -9dB; 111: -12dB; 100: Relay zone indicator

No. OFDMA triple symbol	5 bits	Number of OFDMA symbols is given in multiples of 3 symbols
No. Subchannels	6 bits	
} else {		
Subchannel offset	6 bits	
Boosting	3 bits	000: normal (not boosted); 001: +6dB; 010: -6dB; 011: +9dB; 100: +3dB; 101: -3dB; 110: -9dB; 111: -12dB; 100: Relay zone indicator
No. OFDMA Symbols	7 bits	
No. Subchannels	6 bits	
}		
Repetition Coding Indication	2 bits	0b00 – No repetition coding 0b01 – Repetition coding of 2 used 0b10 – Repetition coding of 4 used 0b11 – Repetition coding of 6 used
}		
}		

[Insert the followings at the end of section 8.4.5.4.72:]

To indicate the start of the UL-Relay zone, the MR-BS or RS shall transmit a PAPR reduction/safety zone/sounding zone allocation IE (UIUC=13)with PAPR Reduction/Safety Zone indicator set to 1 in the UL-MAP in the access zone to indicate the location of a UL relay zone in the same frame.

Change the "Reserved" field in Table 289 as indicated:

ReservedRelay Zone Indicator	1 bit	Shall be set to zero 0 = PAPR/Safety/Sounding Zone 1 = Relay Zone

References

[1] IEEE 802.16j-07/236, "MAC message for configuring the multi-hop relay frame structure", Samsung Electronics, March 2007.

[2] IEEE 802.16-2005, "IEEE Standard for Local and metropolitan area networks-Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems: Amendment 2: Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands and Corrigendum 1.