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Title	MR_Code-REP header	
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Re:	IEEE 802.16j-07/013: "Call for Technical Comments Regarding IEEE Project 802.16j"	
Abstract	This contribution proposes a RNG-REP header	
Purpose	Text proposal for 802.16j Baseline Document	
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MR_Code-REP header

Introduction

In IEEE 802.16j-026r3 section 6.3.6.8. “Upon receiving an RS CMDA ranging code, the MR-BS shall respond by allocating uplink bandwidth to each RS along the relay path from the RS specified by the code for the purpose of forwarding an MR_Code-REP message containing information about the CDMA ranging code received from the SS. The MR-BS shall use the CMDA ranging code and transmit region information in the MR_Code-REP to create a CDMA_allocation_IE that allocates bandwidth on which the SS can forward a BW request header to the MR-BS.”

MS CDMA BR ranging is expected to be used frequently in MR system. However, it takes 17 bytes (= 6-byte GMH + 7-byte MR_Code-REP message + 4-byte CRC) in the relay path to send one MR Code-REP message. We propose 6-byte MR_Code-REP header to replace the 17-byte MR_Code-REP message, and utilizing the same ranging code for forwarding the BW request header and the MR_Code-REP header since the size of both headers is the same (6 bytes).

The benefits of proposed MR_Code-REP header are as follows,

1. to conserve the bandwidth in the relay path,
2. to reduce the number of dedicated BR ranging codes from four to three.

The MR_Code-REP header (see Table 1) provides ranging attributes for MR-BS to generate CDMA Allocation IE (see Table 2).

Table 1 Description of fields in RNG-REP header

Name	Length	Description
HT	1 bit	= 1
EC	1 bit	= 1
Type	1 bit	= 1
Extended Type	3 bits	= 3
Frame Number Index	4 bits	LSBs of relevant frame number
Ranging Code	8 bits	Indicates the CDMA Code sent by the RS/MS.
Ranging Symbol	7 bits	Indicates the OFDMA symbol used by the RS/MS.
Ranging subchannel	7 bits	Identifies the Ranging subchannel used by the RS/MS.
RS CID	8 bits	Reduced basic CID of RS
HCS	8 bits	Header Check Sequence (same usage as HCS entry in Table 5).

Table 2 CDMA_Allocation_IE()

Syntax	Size	Note
CDMA_Allocation_IE () {		
Duration	6 bits	
UIUC	4 bits	UIUC for transmission
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

Frame Number Index	4 bits	LSBs of relevant frame number
Ranging Code	8 bits	
Ranging Symbol	8 bits	
Ranging subchannel	7 bits	
BW request mandatory	1 bits	1: Yes; 0: No
}		

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.

Text Proposal

6.3.2.1.2.2.2 Extended MAC Signaling Header Type II

[Change the following table as indicated]

Table X-1 Extended Type field encodings for Extended MAC signaling header type II

Extended Type field	MAC header Type	Reference figure	Reference table
0	Relay Bandwidth Request Header		
1	RS UL_DCH Request Header		
<u>2</u>	<u>MR Code-REP Header</u>	<u>Figure xxx</u>	<u>Table xxx</u>
<u>32-7</u>	Reserved		

[Insert the following subclause 6.3.2.1.2.2.2.3:]

6.3.2.1.2.2.2.3 MR Code-REP Header

MR Code-REP header is used by RS to notify the MR-BS that it has successfully received CDMA ranging codes. The MR Code-REP header is illustrated in Figure xxx and Table xxx.

Figure xxx MR Code-REP Header Format

HT = 1 (1)	EC = 1 (1)	Type = 1 (1)	Extended Type = 2 (3)	Frame Number Index (4)	Ranging Code MSB (6)
Ranging Code LSB (2)	Ranging Subchannel (7)			Ranging Symbol (7)	
RS CID (8)				HCS (8)	

Table xxx Description of fields in MR_Code-REP header

<u>Name</u>	<u>Length</u>	<u>Description</u>
<u>Frame Number Index</u>	<u>4 bits</u>	<u>LSBs of relevant frame number</u>
<u>Ranging Code</u>	<u>8 bits</u>	<u>Indicates the CDMA Code sent by the RS/MS.</u>
<u>Ranging Symbol</u>	<u>7 bits</u>	<u>Indicates the OFDMA symbol used by the RS/MS.</u>
<u>Ranging subchannel</u>	<u>7 bits</u>	<u>Identifies the Ranging subchannel used by the RS/MS.</u>
<u>RS CID</u>	<u>8 bits</u>	<u>Reduced basic CID of RS</u>
<u>HCS</u>	<u>8 bits</u>	<u>Header Check Sequence (same usage as HCS entry in Table 5).</u>

6.3.6.8 Bandwidth request and allocation mechanisms for MR

[Change the following text as indicated]

Upon receiving an RS CMDA ranging code, the MR-BS shall respond by allocating uplink bandwidth to each RS along the relay path from the RS specified by the code for the purpose of forwarding an MR_Code- REP ~~message~~ header containing information about the CDMA ranging code received from the SS. The MR-BS shall use the CMDA ranging code and transmit region information in the MR_Code-REP header to create a CDMA_allocation_IE that allocates bandwidth on which the SS can forward a BW request header to the MR-BS. Please see the figure <XXX>.

6.3.10.3.5 Ranging in relay networks with centralized bandwidth allocation

[Change the following text as indicated:]

~~2) Indicate that the RS needs a BW allocation on the relay uplinks along the path to the MR-BS on which to transmit a BW request message.~~

~~4~~2) Indicate that the RS needs BW allocations on the relay uplinks along the path to the MR-BS on which to forward a ~~BW request~~ 6-byte header.