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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) 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.