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| 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 on Multicast Indication Cycle over IEEE 802.16.1a</b>   |  |
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| Re:                          | “IEEE 802.16n-11/0029,” in response to Call for Comments on GRIDMAN AWD  |  |
| Abstract                     | Multicast indication cycle on GRIDMAN Amendment Draft Standard   |  |
| Purpose                      | To discuss and adopt the proposed text in the draft amendment document on GRIDMAN  |  |
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# Clarification on Multicast Indication Cycle over IEEE 802.16.1a

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## 1. Introduction

In IEEE 802.16.1a[3], multicast indication cycle is defined in 6.12.9.1.3. The Multicast Indication cycle is unique to HR multicast group zone. Thus, to support the mobility of HR-MS, the MR-MS receiving multicast service needs the multicast indication cycle as a part of handover and location update. In addition, the multicast indication cycle of neighbor HR-BS, which belongs to other multicast group zone, shall be included in NBR-ADV message to support seamless mobility.

Thus, this contribution provides the clarification on multicast indication cycle.

## 2. References

- [1] IEEE 802.16n-10/0048r3, 802.16n System Requirement Document including SARM annex, November 2011.
- [2] IEEE 802.16n-11/0032, P802.16n Draft AWD, November 2011.
- [3] IEEE 802.16n-11/0033, P802.16.1a Draft AWD, November 2011.
- [4] IEEE P802.16Rev3/D3, IEEE Draft Standard for Local and metropolitan area networks; Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems," November 2011.
- [5] IEEE P802.16.1<sup>TM</sup>/D3, IEEE Draft for WirelessMAN-Advanced Air Interface for Broadband Wireless Access Systems, November 2011.

## 3. Proposed Text on the IEEE 802.16.1a Amendment Draft Standard

[-----Start of Text Proposal-----]

**[Remedy1: Change 6.2.3.13 AAI-NBR-ADV in line#3, page 35 on 802.16.1a AWD as follows:]**

### 6.2.3.13 AAI-NBR-ADV

*[Change the last paragraph in page 142 as indicated:]*

Within each cell type, if S-ABS chooses to broadcast configuration information for each individual ABS instead of specifying SA-Preamble Index range and Physical carrier range, a list of ABSs are provided and the following parameters are carried for each ABS:

- 48-bit BS-ID
- ABS SA-Preamble Index
- Indication whether full system information or partial information is carried for this ABS, which includes the following:
  - SFH information
  - Physical carrier index (6 bits, refer to the “physical carrier index” defined in AAI-Global-CFG)
  - MAC protocol versions (8 bits)
  - Paging carrier indication (1 bit, refer to specify if a carrier is a paging carrier or not)
- Multicast service flow mapping list (for HR-Network)
  - Neighbor Multicast Group Zone ID
  - Neighbor Multicast Indication Cycle
  - Mapping of Multicast Group ID + FID and neighbor Multicast Group ID + FID
- Indication whether the neighbor infrastructure station is HR multimode station (i.e., acting as BS or RS) for HR-Network.

where for ABS of macrocell type, all the necessary system information shall be included, and the format may only carry delta information fields with respect to the reference ABS (e.g., the S-ABS or the preceding neighbor BS/ABS of this cell type); and for Wireless-MAN-OFDMA reference system, only 48-bit BS-ID and Preamble index are included in AAI-NBR-ADV.

...

*[Change Table 39 in section 6.2.3.13 as indicated:]*

**Table 39—AAI-NBR-ADV message field description**

| Field | Size (bits) | Value/Description | Condition |
|-------|-------------|-------------------|-----------|
| ..... | .....       | .....             | .....     |

|  |           |  |                                       |
|--|-----------|--|---------------------------------------|
| For ( $i=0; i<N-NBR-ABSs; i++$ ) {         |           | N-NBR-ABSs is the number of neighbor ABSs included in this message, and has the range of [1..64].  |                                       |
| BSID                                       | 48        | Neighbor ABS ID  |                                       |
| MAC protocol version                       | 8         | MAC protocol version of the BS<br>Consistent with IEEE Std 802.16-2009 definition, with new MAC protocol version 10 defined for AAI.   |                                       |
| CP time                                    | 2         | CP time of the BS<br><br>0b00: 1/8<br><br>0b01: 1/16<br><br>0b10: 1/4  |                                       |
| <u>HR Multimode indication</u>             | <u>2</u>  | <u>Indicates whether neighbor BR/RS is HR-MS acting as BS/RS or HR-BS acting as RS</u><br><u>0b00: neighbor BS is neither HR-MS acting as BS/RS nor HR-BS acting as RS</u><br><u>0b01: neighbor BS is HR-MS acting as BS/RS</u><br><u>0b10: neighbor BS is HR-BS acting as RS</u><br><u>0b11: reserved</u> | <u>Shall be present in HR-Network</u> |
| <u>Neighbor Multicast Group Zone ID</u>    | <u>12</u> | <u>Indicates a Multicast Group Zone ID provided by neighbor BS.</u>  | <u>Present in HR-Network</u>          |
| <u>Neighbor Multicast Indication cycle</u> | <u>8</u>  | <u>Indicates the start of multicast indication cycle provided by neighbor BS.</u><br><br><u>The first superframe is the multicast available interval and rest superframes are the multicast unavailable interval.</u><br><br><u>8 LSB of superframe number</u>   | <u>Present in HR-Networks</u>         |
| <u>For(j=1;j&lt;=M;j++){</u>               |           | <u>Number of Multicast Group ID and FID (M) mapping between serving BS and neighbor BS[1..16]</u>  | <u>Present if needed</u>              |
| <u>  Multicast Group ID</u>                | <u>12</u> |  |                                       |
| <u>  FID</u>                               | <u>4</u>  |  |                                       |
| <u>  Neighbor Multicast Group ID</u>       | <u>12</u> |  |                                       |
| <u>  Neighbor FID</u>                      | <u>4</u>  |  |                                       |
| <u>}</u>                                   |           |  |                                       |

|  |       |   |       |
|--|-------|---|-------|
| For( $j=0; j<N$ -Carrier-Info; $j++$ ) |       | N-Carrier-Info is the number of carrier information listed here for the $ABS_i$ |       |
| {                                      |       |   |       |
| .....                                  | ..... | .....   | ..... |

**[Remedy2: Change from line #20, page 200 to line #3, page 201 on 802.16.1a AWD as follows:]**

In response to the request for multicast location update with action code bit0 set to 1, the HR-BS shall transmit AAI-RNG-RSP message which may include the Multicast Group Zone identifier, [Multicast Indication Cycle](#), Multicast Group ID, and FID and feedback parameters if used to provide update service flow management encodings for any affected multicast flow(s).

**[Remedy3: Change from line #19, page 201 to line #4, page 202 on 802.16.1a AWD as follows:]**

In response to the request for multicast location update with action code bit0 set to 1, the HR-BS shall transmit AAI-RNG-RSP message which may include the Multicast Group Zone identifier, [Multicast Indication Cycle](#), Multicast Group ID, and FID and feedback parameters if used to provide update service flow management encodings for any affected multicast flow(s).

If the action code bit1 set to 1, the HR-MS shall perform location update as described in 6.2.18.4. In response to the multicast location update with action code bit1 set to 1, the HR-BS shall transmit AAI-RNG-RSP message to the HR-MS and may notify multicast server and paging controller of the HR-MS' context information, but how to notify is outside of this specification.

In response to the request for multicast security key update with action code bit2 set to 1, multicast security key update procedure is performed as described in 6.2.10.2.

HR-BS providing multicast service transmits multicast indication cycle using AAI-SCD and AAI-DSA/AAI-DSC messages. The multicast indication cycle is unique to HR multicast group zone and it consists of multicast available interval and multicast unavailable interval. Multicast available interval is the first superframe of each multicast indication cycle. In the multicast available interval, the HR-BS providing multicast service transmits AAI-HR-MG-IND message described in ~~6.2.3.65.49~~[6.2.3.65.65](#) and AAI-HR-MT-IND message described in ~~6.2.3.65.50~~[6.2.3.65.66](#) during multicast available interval of [the multicast indication cycle in an HR multicast group zone](#). AAI-HR-MG-IND and AAI-HR-MT-IND message are used to indicate

- multicast service establishment/change/release
- whether the multicast traffic is transmitted after those messages are transmitted
- to perform network entry or exit sleep mode to transmit multicast related message to

change/release multicast service and update multicast security key.

- to perform multicast service flow update using ranging procedure

Multicast indication cycle included in AAI-SCD message is used for multicast service establishment.

During multicast service establishment/change using AAI-DSA/DSC message, new multicast indication cycle may be transmitted.

[-----End of Text Proposal-----]