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Re:	This is a response to a Call for Comments about IEEE 802.16e-D5	
Abstract	This document enhances the functionality of MBS zone to support dynamic MBS zone membership of BSs.	
Purpose	Discuss and adopt of proposed text change	
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Dynamic multicast and broadcast zone management

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1. Introduction

Multicast and broadcast service(MBS) requires that a cluster of BSs transmits multicast data simultaneously on the same CID. The synchronized transmission of BS cluster is benefit to an MSS which is moving to other BS since the MSS does not have to re-establish an MBS connection. Additionally, MBS enables an MSS that is in Idle mode to save power consumption.

BSs in a cluster are located in a certain region and geographically close to each other. The region in which a CID and SA(Security Association) for a multicast and broadcast service flow (MBSF) is valid is called "MBS zone" (see 6.3.13.1.4).

In this document, we propose the followings:

- 1) Clarify the word "MBS zone"

Through the text, the word "MBS zone" is used as a couple of meanings. The one is a geographic region as mentioned in the above paragraph and means the same as MBS_Zone which is defined at Section 6.3.13.1.4. The other is an allocation for a multicast and broadcast service. "MBS_ZONE" is multicast and broadcast zone identifier.

- 2) Support of dynamic multicast and broadcast zone

We propose that a BS dynamically joins or leaves an multicast and broadcast zone so as to save bandwidth waste. Each BS should be contained in one multicast and broadcast zone for an MBS content. In the next section, the dynamic multicast and broadcast zone management is described in brief.

- 3) Efficient TLV encoding at MBS zone identifier assignment

One byte is sufficient to contain an MBS Zone identifier, which is 7 bits.

2. Multicast and broadcast zone management

2.1 Dynamic multicast and broadcast zone

MBS can save power consumption of MSS and provides macro-diversity and, however, meaningless transmission of MAC PDUs of MBS contents may waste bandwidth if no MSS has registered to the MBS in a cell. Therefore, a BS should join and leave an MBS_Zone for an MBS content dynamically.

- 1) A BS that is not contained in any MBS_Zone for an MBS content shall join an MBS_Zone if
 - A. an MBS subscriber enters into a network.
 - B. a network entity (e.g. MBS controller) requests for it to participate in synchronized transmission for macro-diversity.
- 2) A BS that is contained in an MBS_Zone for an MBS content may leave the MBS_Zone if
 - A. no MSS that is registered to the MBS content exists in the cell.

2.2 Update of MBS_Zone

Joining/leaving of BS can be decided by either a centralized controller (in a centralized way) or each BS (in a distributed way). Regardless of which method is used, it is required that MBS subscriber information should be managed. A centralized controller or each BS should manage a list of active MBS subscribers, the serving BSs, and etc. From the list, a controller or BS shall make a decision of BS's joining/leaving and an MBS_Zone changes adaptively to the current MSS distribution status.

Explicit message initiated by MSS may update the MBS management lists. When an MBS subscriber initiates DSA procedure for receiving an MBS content, a BS that is not contained in one of MBS_Zones for the MBS content (i.e. no MBS subscriber is in the cell) shall join the MBS_Zone. The list of MBS subscribers whom a BS serves for an MBS content is managed by the BS or other network entities. When an MBS subscriber initiates DSD procedure, the subscriber shall be removed from the list.

When a MBS subscriber moves to other BS, a served BS removes the subscriber from the list and a target BS adds the subscriber to its own list. During the handover procedure, in an appropriate stage (e.g. when the served BS receives MOB_HO-IND with HO_IND_type = 0b00), the served BS removes the MBS subscriber from the list and exchanges MBS information with the target BS by means of backbone message. In receiving the backbone message, the target BS may add the MBS subscriber to its list. On the basis of the MBS subscriber lists, an MBS_Zone may change.

3. Remedies

1) Clarification of "MBS zone"

At section 6.3.13.1.4, "MBS_Zone" is defined as a multicast and broadcast zone and "MBS_ZONE" is defined as a multicast and broadcast zone identifier. We propose as follows to clarify :

- **MBS zone** : an allocation for a multicast and broadcast service
- **MBS_Zone** : a geographical region through which a CID and SA for a multicast and broadcast service flow is valid
- **MBS_ZONE** : a multicast and broadcast zone

The word "MBS zone" should be changed to "MBS_Zone" for consistency.

2) Addition of text about dynamic multicast and broadcast zone

Add the text about dynamic MBS_zone

3) Change the length of MBS zone identifier at TLV encoding.

4. Proposed text change

[Change the section 6.3.13.1.4]

6.3.13.1.4 Multicast and broadcast zone (MBS_Zone)

A multicast and broadcast service flow may be transmitted in only a certain region. Also, a different CID or a different SA(Security Association) may be used in a different region for the same multicast and broadcast service flow. A multicast and broadcast zone identifier (MBS_ZONE) is used to indicate a region through which a CID and SA for a broadcast and multicast service flow are valid. If a MSS moves into BSs in the same ~~MBS zone~~MBS_Zone, the MSS does not have to re-establish a connection or a virtual connection to monitor the multicast and broadcast service flow. However, if a MSS moves into a different zone, the MSS may need to re-establish a connection or a virtual connection for the multicast and broadcast service flow.

~~MBS zone~~MBS Zone may be associated with a CID for a multicast and broadcast service. One BS shall be contained in an MBS Zone for an MBS content at a time. To eliminate bandwidth waste, a BS can leave an MBS Zone if no MSS listens to MAC PDUs of the corresponding MBS content. The BS will join the MBS Zone or other MBS Zone for the MBS content if an MSS that is registered to the MBS content enters into a network or it is requested for the BS to participate in synchronized transmission for macro-diversity. ~~Therefore, one BS~~ A BS may have multiple MBS zone identifiers for MBS contents. (see 8.4.5.3.10)

[Change the text at page 147 in section 7.8.2.1.1]

The PDU payload shall be prepended with a 32-bit nonce. Each base station in the ~~MBS zone~~MBS Zone shall use the same nonce. The nonce shall be transmitted in little endian byte order. The nonce shall not be encrypted.

[Change a table at section 11.13.27]

The DSA-RSP message may contain the value of this parameter to specify a MBS Zone identifier. This parameter indicates a ~~MBS zone~~MBS Zone through which the connection or virtual connection for the associated service flow is valid.

Type	Length	Value	Scope
145/146].29	<u>8</u> 1	MBS zone identifier	DSA-REQ/RSP