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Project	<b>IEEE 802.16 Broadband Wireless Access Working Group &lt;<a href="http://ieee802.org/16">http://ieee802.org/16</a>&gt;</b>	
Title	<b>Fragmented Transmission of the MOB-NBR-ADV Message</b>	
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Re:		
Abstract	<b>Propose a mechanism to transmit fragmented MOB-NBR-ADV Message</b>	
Purpose	Adoption of proposed changes into P802.16e /D4-2004	
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## 1 Introduction

### 1.1 Problem

Current definition of primary management message does not allow fragmentation of the management message. But the MOB-NBR-ADV message is too long to be transmitted in a single frame.

The maximum size of a message which can be transmitted in a single frame is about 128 bytes when we assume 1024 FFT, 8 symbols for DL, 1/12 coding and QPSK modulation without MAP message overhead. However, the maximum size of MOB-NBR-ADV message is 3061 bytes.

Figure 1 shows the size of MOB-NBR-ADV message depending on the deployment of neighbor cells. Table 1 is the definition of the simulation case. We assume that 6 neighbors exist in 1 tier, 18 neighbors exist in 2 tier. The table shows the distribution of the DCD/UCD message difference. Hence, the DCD/UCD messages of the all neighbors are same in the case 1 and all different in the case 11.

As shown in the Figure 1, the maximum size of the MOB-NBR-ADV message is over 3000 bytes and the minimum size is 600 bytes considering neighbors in two tier.

**Table 1 Case Definition**

case	1 tier	2 tier
Difference	(0,20,40,60,80,100) %	(0,20,40,60,80,100) %
1	(6,0,0,0,0,0)	(18,0,0,0,0,0)
2	(5,1,0,0,0,0)	(15,3,0,0,0,0)
3	(4,1,1,0,0,0)	(12,3,3,0,0,0)
4	(3,1,1,1,0,0)	(9,3,3,3,0,0)
5	(2,1,1,1,1,0)	(6,3,3,3,3,0)
6	(1,1,1,1,1,1)	(3,3,3,3,3,3)
7	(0,2,1,1,1,1)	(0,6,3,3,3,3)
8	(0,0,3,1,1,1)	(0,0,9,3,3,3)
9	(0,0,0,4,1,1)	(0,0,0,12,3,3)
10	(0,0,0,0,5,1)	(0,0,0,0,15,3)
11	(0,0,0,0,0,6)	(0,0,0,0,0,18)

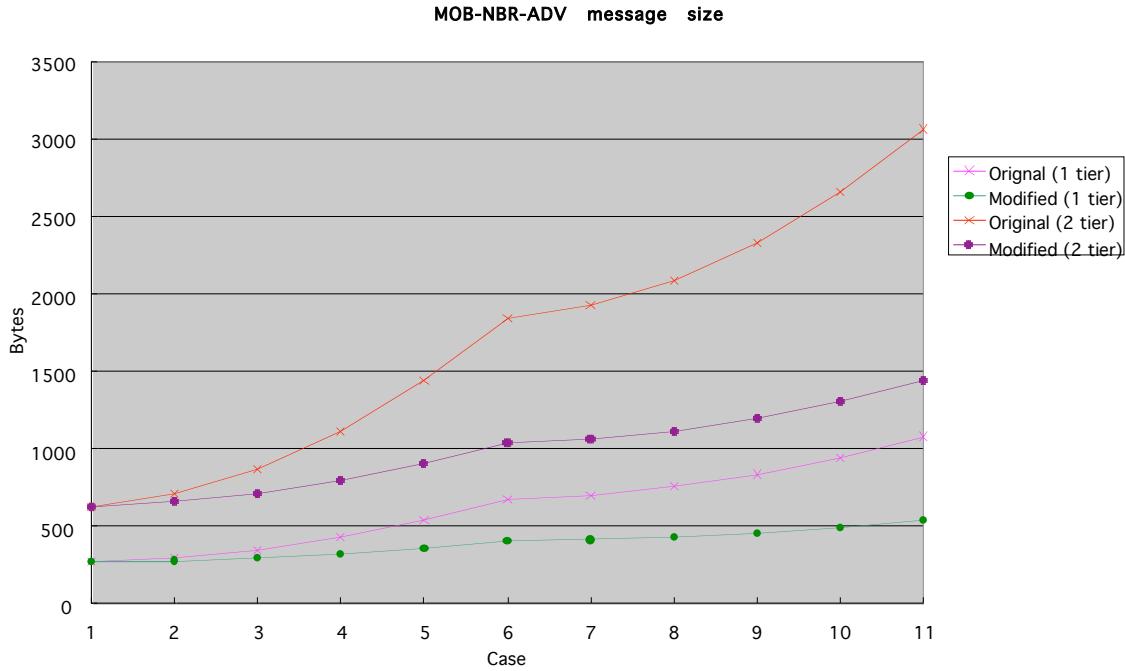


Figure 1 Size of MOB-NBR-ADV Message

## 1.2 Remedy

Here, we propose a fragmentation mechanism for MOB-NBR-ADV message. By adding Fragmentation Index and Total Fragmentation fields in the MOB-NBR-ADV message we can divide the TLV portion of the message and transmit them over several messages. Hence, the individual message size will be decreases to be sent in a frame. A MSS should receive all the fragments to get the complete information about the neighbors.

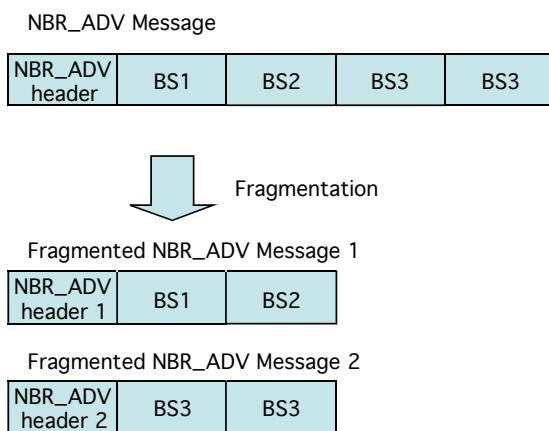


Figure 2 Fragmentation of NBR\_ADV Message

## 2 Proposed Text

Change Table 106d in page 35, line 48 and add following text.

### 6.3.2.3.47 Neighbor Advertisement (MOB-NBR-ADV) message

BSs supporting mobile functionality shall be capable of transmitting a MOB\_NBR-ADV management message at a periodic interval (MOB-NBR-ADV interval, see Table 269a) to identify the network and define the characteristics of neighbor BS to potential MSS seeking initial network entry or hand-over. If neighbor information is not available, this message need not be transmitted.

**Table 106d—MOB-NBR-ADV Message Format**

Syntax	Size	Notes
MOB-NBR-ADV_Message_Format() {		
<b>Management Message Type = 49</b>	8 bits	
<b>Operator ID</b>	24 bits	Unique ID assigned to the operator
<b>Configuration Change Count.</b>	8 bits	Incremented each time the information for the associated neighbor BS has changed
<b>Fragmentation Mode</b>	<u>1 bits</u>	<u>0 : Remaining fragment indicate mode</u> <u>1 : Total neighbor indicate mode</u>
<u>If ( Fragmentation Mode == 1){</u>		
<u>TOT N NEIGHBORS</u>	<u>7 bits</u>	
<u>} else {</u>		
<u>Start bit</u>	<u>1 bit</u>	<u>Set to 1 when the message is the first fragment.</u>
<u>Number of Remaining Fragments</u>	<u>6 bits</u>	
<u>}</u>		
<b>N_NEIGHBORS</b>	8 bits	
For (j=0 ; j<N_NEIGHBORS ; j++) {		
<b>Length</b>	8 bits	Length of message information within the iteration of N_NEIGHBOR in bytes.
<b>Neighbor BS-ID</b>	48 bits	
<b>Preamble Index</b>	8 bits	The index for the PHY profile specific preamble. Preamble Index is PHY specific for SCa and OFDMA. The value of Preamble Index shall be ignored and a value of '0x00' shall be used for OFDM PHY
<b>PHY Profile ID</b>	16 bits	TBD
<b>HO Process Optimization</b>	8 bits	
<b>DCD Configuration Change Count</b>	8 bits	This represents the Neighbor BS current DCD configuration change count
<b>UCD Configuration Change Count</b>	8 bits	This represents the Neighbor BS current UCD configuration change count
<b>TLV Encoded Neighbor information</b>	Variable	TLV specific
}		
}		

A BS shall generate MOB-NBR-ADV messages in the format shown in Table 106d. The following parameters shall be included in the MOB-NBR-ADV message unless otherwise noted as an optional item in which case they may be included,

#### Operator ID

The unique network ID shared by an association of BS

#### Configuration Change Count

Incremented by one (modulo 256) whenever any of the values relating to any included data element changes. If the value of this count in a subsequent MOB-NBR-ADV message remains the

same, the MSS can quickly disregard the entire message.

#### **TOT\_N\_NEIGHBORS**

The count of total number of neighbors that are known to the serving BS, and may be advertised in a MOB-NBR-ADV message. The actual number of neighbors advertised in any specific message may be lower than this number based on BS considerations such as scheduling, importance of specific neighbors, etc.

#### **Start bit**

This bit set to 1 when BS transmitting the first fragment of the message. When the message is not fragmented this bit shall be set to 1. The value of 0 indicates that the message is the middle or end of fragmented

#### **Number of Remaining Fragments**

This field indicates the number of remaining fragments to receive. When the message is no fragmented, this field shall be set to 0.

#### **N\_NEIGHBORS**

The count of the unique combination of Neighbor BS ID, Preamble Index and DCD advertised in this message.