Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Mode change deny in IEEE 802.16e Sleep mode**
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Re:	IEEE 802.16e Sleep mode operation
Abstract	This document is to propose the mode change approval operation while exchanging MOB_SLP-REQ message and MOB_SLP-RSP message. The proposed scheme can allow that the BS rejects or approves the Sleep mode change request. Furthermore, the BS can control the mode change request from the MSS, according to the cell status and traffic status, in order to prohibit the unnecessary message transmission consuming transmission power at the MSS. This document has been introduced as a one of proposals in the last meeting (IEEE802.16e-03-31).
Purpose	Present how the IEEE802.16a can be enhanced in order to support mobility.
Notice	
Release	
Patent Policy and Procedures	

Mode change deny in IEEE802.16e Sleep mode

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1 Introduction

In current draft text (IEEE802.16e-03/07r2), there is a 1bit approval IE and 7bits reservation IE on the MOB_SLP-RSP message to be used for the mode changes, awake to sleep mode. At this stage, we propose the specific functionality diverted from the reservation fields in order to save undesirable power consumption by transmission of the unnecessary MOB_SLP-REQ message when the mode change request is denied from the BS.

If the BS sets "Sleep Approved" to 0 which means the request from the MSS has been denied, the MSS cannot go to sleep-mode. Otherwise, "Sleep Approved is set to 1", the MSS can be transited into the sleep mode from the awake mode. The possible some operations depicted in the table 1 show the MSS operation when the MSS receives the MOB_SLP-RSP message with "Sleep Approved == 0"

Table 1. Proposed information elements for mode change deny (Awake to Sleep)

After-REQ-Action	Sleep Approved == 0 in the MOB_SLP_RSP message (Deny)	Comments
000	The MSS may retransmit the MOB_SLP-REQ message at any time	As it is in the current operation
001	The MSS shall retransmit the MOB_SLP-REQ message after the time duration given by the BS in this message	The BS can schedule the PDU transmission on desirable way
010	The MSS shall not retransmit the MOB_SLP-REQ message and wait the MOB_SLP-RSP message transmitted from the BS (Keeping awake-mode).	The BS can schedule the PDU transmission on desirable way. Furthermore this command would give the benefits that the MSS saves the battery consumption due to retransmission of MOB_SLP-REQ message.
011 – 111	Reserved	

In the table 1, if After-REQ-Action is set to "001", 4bits REQ-duration bits will be added to

indicate on how long the MSS shall be back off. In other cases, the 4bits will be kept as a reserved field. However, when “Sleep Approved” field in the MOB_SLP-RSP message is set to 1, the mode change, awake-mode to sleep-mode will be performed naturally.

2 Proposed Text changes

6.2.2.3.41 Sleep Response message (SLP-RSP)

The MOB_SLP-RSP message shall be sent from BS to a MSS on the MSS’s basic CID in response to a MOB_SLP-REQ message. The MSS shall enter sleep-mode using the parameters indicated in the message.

Table 56ab - Sleep-Response (MOB_SLP-RSP) message format

Syntax	Size	Notes
MOB_SLP-RSP_Message_Format() {		
Management message type = 46	8 bit	
Sleep-approved	1 bit	0: Sleep-mode request denied 1: Sleep-mode request approved
If (Sleep-approved == 0) {		
~~Reserved~~	~~7bit~~	
After-REQ-action	3 bit	000: The MSS may retransmit the MOB_SLP-REQ message at any time 001: The MSS shall retransmit the MOB_SLP-REQ message after the time duration(REQ-duration) given by the BS in this message 010: The MSS shall not retransmit the MOB_SLP-REQ message and wait the MOB_SLP-RSP message from the BS 011-111: Reserved
If (After-REQ-action == 001) {		
REQ-duration	4 bit	
} else {		
Reserved	4 bit	
}		
} else {		
Start-time	7 bit	
Min-window	6 bit	

max-window	10 bit	
listening interval	8 bit	
}		
}		

Parameters shall be as follows:

Sleep approved

Defines whether or not the request to enter sleep-mode has been approved by the BS.

After-REQ-action

The activation indication of the MSS when the MSS receives this message from the BS

REQ-duration

Waiting value for the MOB_SLP-REQ message re-transmission (measured in MAC frames)

Start-time

The number of MAC frames (not including the frame in which the message has been received) until the MSS shall enter the first sleep-interval.

Min window

Start value for the sleep interval (measured in MAC frames).

Max window

Stop value for the sleep interval (measured in MAC frames).

Listening interval

Value for the listening interval (measured in MAC frames).

References

[1] IEEE 802.16e-03/15, “IEEE802.16e Sleep Mode”

[2] IEEE Std 802.16-2001 “Part 16: Air Interface for Fixed Broadband Wireless Acce ss Systems”

[3] IEEE P802.16a/D7-2002 “Part 16: Air Interface for Fixed Broadband Wireless Acc ess Systems – Medium Access Control Modifications and Additional Physical Lay er Specifications for 2-11 GHz.

[4] IEEE 802.16e-03/02, “Call for Proposals on IEEE Project 802.16e: Mobility Enhan cements to IEEE Standard 802.16/802.16a”

[5] IEEE 802.16e-03/07r2, “Part 16: Air interface for Broadband Wireless Access Systems-Amendment 4: Mobility Enhancement

[6] IEEE 802.16e-03/31 “ IEEE802.16e Sleep mode Enhanbement”