Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Handling of DL Traffic in Sleep or Idle Mode**
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Re:	IEEE 802.16e/D3 Letter Ballot
Abstract	This contribution presents the method for handling of DL Traffic in Sleep or Idle mode using MSS's IP address information.
Purpose	The document is contributed to support certain comment on IEEE P802.16e/D3 Letter Ballot.
Notice	
Release	
Patent Policy and Procedures	

Handling of DL traffic in Sleep or Idle Mode

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1. Introduction

For MSS to receive data, the MAC address should be known to network. To get a MAC address from IP address, usually ARP (Address Resolution Protocol) is used. In sleep or idle mode, however, ARP request can not be delivered to MSS because BS does not have connection with MSS in those modes. Therefore, BS cannot have data addressed to the MSS in sleep or idle mode.

2. Proposal

To avoid such a problem, BS should know the MSSs' IP address before entering sleep or idle mode. If BS has MSSs' IP address in sleep or idle mode, BS can advertise their reachability periodically using so called gratuitous ARP. Gratuitous ARP is sending an unsolicited ARP Reply that is not prompted by any corresponding ARP Request. This technique is used in Mobile IP [IETF RFC 3344] to spontaneously cause other nodes to update an entry in their ARP cache. If BS sends unsolicited ARP Reply based on the IP address which is received by MSSs, ARP cache of router's entry is updated. BS should perform gratuitous ARP periodically so that ARP cache maintains MSSs entry which is in sleep and idle mode.

3. Proposed Text Changes

[Change the Table 92a in page 18]

Syntax	Size	Notes
MOB-SLP-REQ_Message_format() {		
Management message type=46	8bits	
Initial sleep window	6bits	
Final-sleep window	10bits	
Listening interval	4bits	
Final-sleep window exponent	3bits	
IP address	32bits	
Reserved	1bit	
}		

[Insert parameter in 11.14 DREG-CMD message encodings in page 113]

Name	Type	Length	Value
IP address	?	4	

[Change following texts in 6.3.19.1 in page 38, lines 26]

Before entering sleep-mode the MSS shall inform the BS using MOB-SLP-REQ including the IP address of itself and obtain its approval.

[Change following texts in 6.3.19 in page 38, lines 29-31]

After receiving an MOB-SLP-RSP message from the BS, an MSS shall enter sleep-mode after sending the IP-NOTIFY message by beginning sleep-interval at the appropriate frame prescribed by start-frame. After receiving the MSS's IP address, BS should perform gratuitous ARP periodically so that ARP cache maintains MSSs entry which is in sleep mode.

[Insert 6.3.2.3.nn IP-NOTIFY Message]

An MSS shall transmit IP-NOTIFY message to notify its IP address before entering sleep or idle mode which is initiated by BS's unsolicited MOB-SLP-RSP in sleep mode or DREG-CMD with action code 0x05 in idle mode. This IP-NOTIFY message is sent on MSS's basic CID.

Table xx – IP-NOTIFY Message Format

Syntax	Size	Notes
IP-NOTIFY message format(){		
Management Message Type=??	8 bits	
IP address	32 bits	
}		

[Change following texts in 6.3.21.1 from page 57 line 62 to page 58 line 2]

Idle Mode initiation may begin after MSS de-registration. During Normal Operation with its Serving BS, an MSS may signal intent to begin Idle Mode by sending a DREG-REQ including the IP address of itself with a De-registration_Request_Code = 0x01; request for MSS de-registration from Serving BS and initiation of MSS

Idle Mode. Similarly, a Serving BS may signal for an MSS to begin Idle Mode by sending a DREG-CMD with an Action Code = 0x05; require MSS de-registration from Serving BS and request initiation of MSS Idle Mode. Then, MSS shall enter idle mode after sending the IP-NOTIFY message. After receiving the MSS's IP address, BS should perform gratuitous ARP periodically so that ARP cache maintains MSSs entry which is in idle mode.