Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>	
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Source(s)	David Comstock, John Lee, Zheng Shang Huawei Technologies No.98, Lane91, Eshan Road, Shanghai, P.R.C	Voice: +1 858 735 9382 E-mail: {dcomstock, john_lee, shang_zheng, }@huawei.com *<http://standards.ieee.org/faqs/affiliationFAQ.html>
Re:	IEEE 802.16j-07/019: "Call for Technical Comments Regarding IEEE Project 802.16j"	
Abstract	This contribution describes the paging message broadcasting from non-transparent RS in distributed way.	
Purpose	This contribution is submitted for discussion and adoption in 802.16j.	
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RS Broadcast Paging Message Remedy

David Comstock, John Lee, Zheng Shang
Huawei Technologies Co. Ltd

Introduction

In response to the IEEE 802.16j TG Call for Technical Comments, this document proposes a MAC procedure in order to support non-transparent RS broadcasting paging message in distributed scheduling.

Problem Statement

In the centralized scheduling, RS doesn't need to calculate the frame number that PAG-ADV will be sent, for the MR-BS will calculate and determine the frame number instead. However, considering the transmission error and retransmission, MR-BS can not make a perfect decision for a RS several hops away. In other words, the MR-BS can't determine exactly when the PAG-ADV message is received and broadcasted by RSs. So, the distributed scheduling paging shall be supported. This distributed scheduling paging is expected to be more efficient.

In distributed scheduling paging, RS need to calculate the frame number that PAG-ADV will be sent. The reasons are listed below:

1. Because one MS PLI includes a number of frames. The non-transparent RS shall decide the exactly frame when broadcasting PAG-ADV according to its own schedule strategy in order to optimize the radio resource usage.

2. In the legacy system, a BS may broadcast one or more PAG-ADV messages during the MS PLI. So, the non-transparent RS which behaves as a BS shall inherit this function. In order to save the radio resource, the RS shall transmit the PAG-ADV message according to its own schedule strategy.

3. In the legacy system, after transmitting the PAG-ADV with Action Code 'Perform Ranging' or 'Enter Network', if the BS does not receive RNG-REQ from the MS paged until the next MS PLI, the BS shall retransmit the PAG-ADV message. In the MR system, the RS will perform the similar procedure. That is, the RS shall retransmit the PAG-ADV message according to its own schedule strategy. In this case, the retransmitted PAG-ADV is generated by RS itself, MR-BS does not need to retransmit the same message to the RS over relay link again.

In summary, in the distributed scheduling, it's reasonable for the RS to calculate the frame that PAG-ADV will be sent. So, the PLI information for each paged MS shall be informed to RS by MR-BS. The PLI information including paging cycle and paging offset.

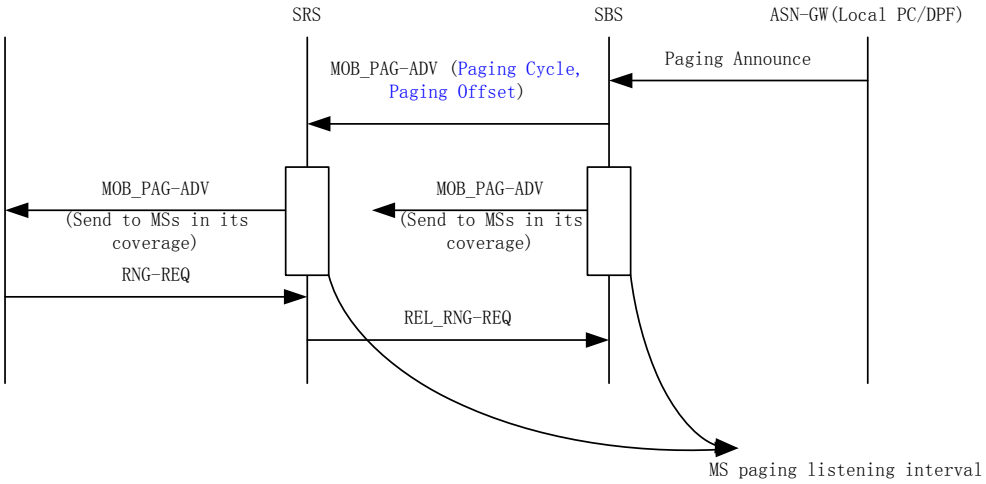

Figure 1 Paging in Distributed Scheduling

Text Proposal

6.3.24.6.1 RS Broadcast Paging message

[Modify the last sentence of the second paragraph:]

~~AS described in 6.3.24.5, the transmission time shall be compensated based on the processing delay in each RSs.~~

In centralized scheduling, the transmission time shall be compensated based on the processing delay in each RSs as described in 6.3.24.5.

[Insert the following text immediately following the last sentence of the second paragraph:]

In distributed scheduling, a Paging Interval TLV defined in 11.17.5 shall be included in the MOB_PAG-ADV message transmitted in the relay link. This TLV informs RS the Paging Listening Interval for each paged MS.

[Insert the following text after the second paragraph:]

When a RS received MOB_PAG-ADV message including the Paging Interval TLV in the relay link, the RS shall reconstruct the MOB_PAG-ADV message by removing the Paging Interval TLV, clearing the “Stop Paging” and “PLI Count” bits, and optionally include the TLVs defined in 11.17.1 and 11.17.2 of 802.16e2005. The reconstructed MOB_PAG-ADV message is transmitted in MS Paging Listening Interval in the access link.

A RS may broadcast one or more broadcast paging messages during the MS Paging Listening Interval in the access link.

[Insert new subclause 11.17.5]

11.17.5 Paging Interval

The ‘Paging Interval’ field indicates the assigned paging listening interval for each MS who is paged.

Type	Length (bits)	Value	Scope

XXX	Variable;
	Num_MACs * 24
		Subsequent (Num_MACs * 24) bits:
		For (i = 0, i < Num_MACs, i++) {
		16 bits - PAGING_CYCLE for the paged MS.
		8 bits - PAGING OFFSET for the paged MS.
		}
			MOB_PAG-ADV
			In Relay link

[Change the subclause 6.3.2.3.56]

6.3.2.3.56 BS/RS Broadcast Paging (MOB_PAG-ADV) message

[Insert the following text at the end of the last paragraph:]

Paging Interval (11.17.5)

This TLV informs RS the Paging Listening Interval for each paged MS, including paging cycle and paging offset.