Project	IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>
Title	MS Idle Mode in Relay System
Date Submitted	2007-03-05
Source(s)	David Comstock, John Lee, Zheng Shang, Jingning Zhu Huawei Technologies No.98, Lane91, Eshan Road, Shanghai, P.R.C	dcomstock@huawei.com Voice: +1 858 735 9382
Re:	IEEE 802.16j-07/007r2: " Call for Technical Comments and Contributions regarding IEEE Project 802.16j"
Abstract	This contribution describes the MS's Idle mode in relay system.
Purpose	This contribution is submitted for discussion and adoption in 802.16j.
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <http://ieee802.org/16/ipr/patents/policy.html>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <mailto:chair@wirelessman.org> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>.

MS Idle Mode in Relay System

David Comstock, John Lee, Zheng Shang, Jingning Zhu

Huawei Technologies Co. Ltd

1   Introduction

In response to the IEEE 802.16j TG Call for Technical Contributions, this document proposes a MAC procedure in order to support MS Idle Mode in relay systems.

2   Proposed Procedure

2.1   Assumptions

RSs and their serving MR-BS belong to the same paging group.

Each frame sent by MR-BS and RS are synchronized and has same frame number.

2.2   MS Enter Idle Mode

The intermediate RS will relay the DREG-REQ/CMD message between the MR-BS and MS. The procedure is the same for transparent RS and non-transparent RS.

DPF: Data Path Function
IMRI: Idle Mode Retain Info
Paging Info: Includes PGID, Paging Cycle, Paging Offset
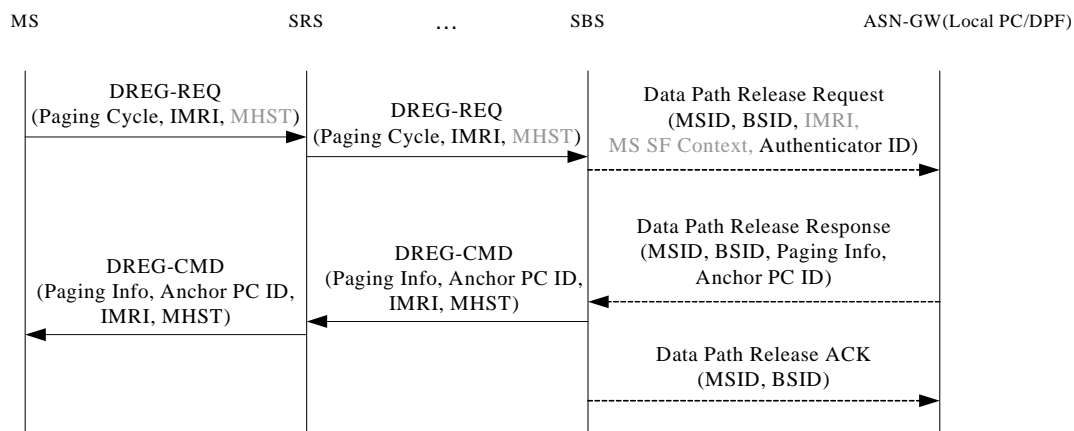**MHST:** MAC Hash Skip Threshold

Figure 1 MS Entry Idle Mode

2.3   MS Exit Idle Mode

The intermediate RS will relay the RNG-REQ/RSP message between the MR-BS and MS. The procedure is the same for transparent RS and non-transparent RS.

PA: Paging Agent
LU: Location Update
Auth Ind: Authentication Indication --> Indicates whether or not the BS
has security information for verifying authenticated RNG-REQ
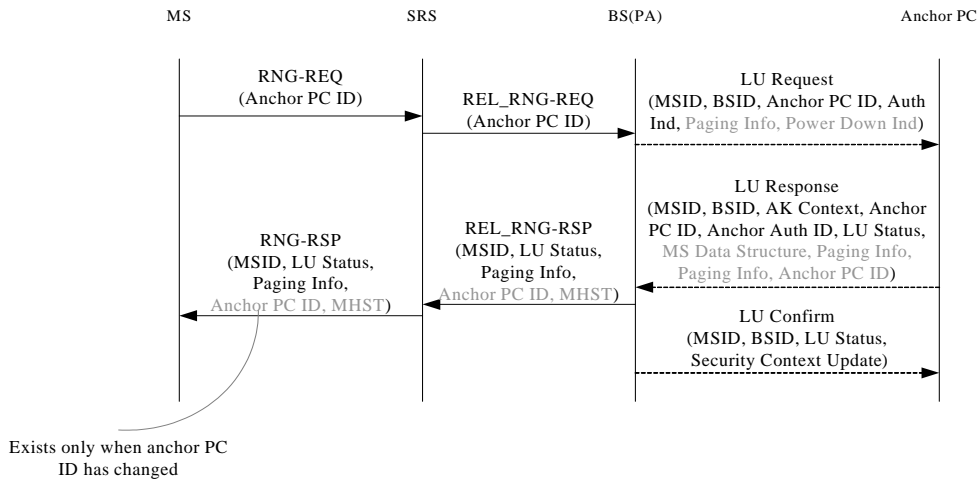**Power Down Ind:** Power Down Indication

Figure 2 MS Exit Idle Mode

2.4 MS Location Update

The intermediate RS will relay the RNG-REQ/RSP message between the MR-BS and MS. The procedure is the same for transparent RS and non-transparent RS.

DPF: Data Path Function
IMRI: Idle Mode Retain Info
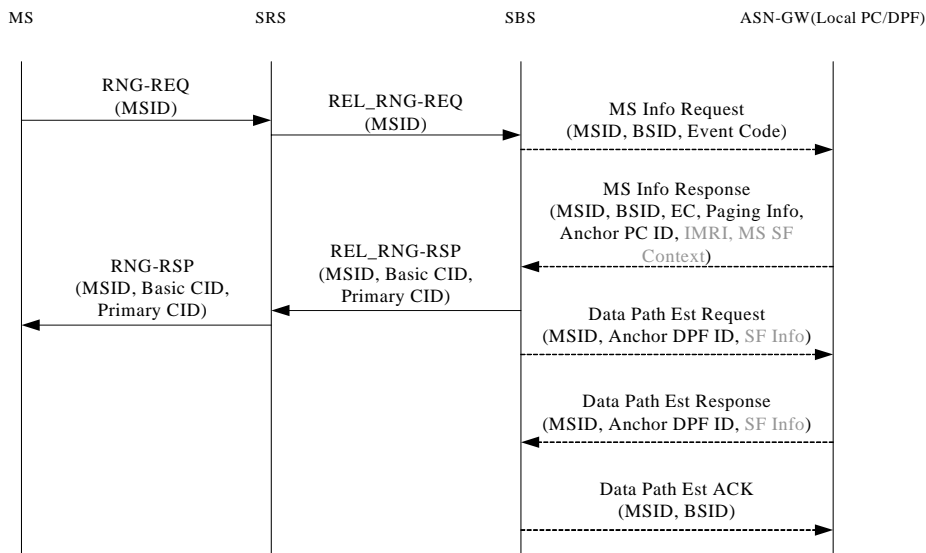**Paging Info:** Includes PGID, Paging Cycle, Paging Offset

Figure 3 MS Location Update

2.5 Paging

The paging procedure is some different for the transparent RS and non-transparent RS.

2.5.1   Paging for transparent RS

For transparent RS, the paging procedure is controlled by its serving station. The transparent RS can not generate the MOB_PAG-ADV message, and have no idea of the paging information.

2.5.2   Paging for non-transparent RS

For non-transparent RS, the RS gets the paging information from its serving station, and generates the MOB_PAG-ADV message for its subordinate MS.

When the MR-BS receives the paging announce from PC, the MR-BS shall send the paging information to its subordinate RS. According to the received paging information, the MOB_PAG-ADV message shall be generated and sent in MS paging listening interval by MR-BS and each RS separately. When a RS receives the RNG-REQ for location updating or network reentry, the RS shall relay the RNG-REQ to the MR-BS, and the intermediate RSs who receives the relayed RNG-REQ message shall cease the sending of MOB_PAG-ADV. If the MR-BS has not received the RNG-REQ from its subordinate MS or relayed RNG-REQ from its subordinate RS after the paging retry count decrease to zero. The MR-BS shall startup the waiting timer, which shall take the transmission delay from the last hop RS to the MR-BS into account. If the RNG-REQ has not received after the expiration of the timer, the MR-BS regards the MS is unavailable.

Paging Info: Includes PGID, Paging Cycle, Paging Offset
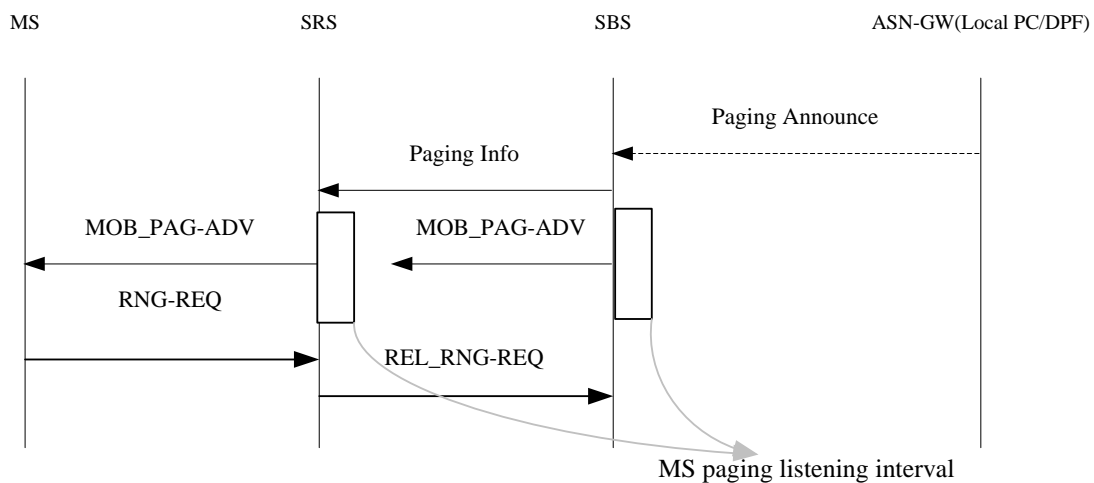

Figure 4 Paging for non-transparent RS

3   Text Proposal

[Insert new subclause 6.3.24.12]

6.3.24.12 MS Idle Mode in Relay system

6.3.24.12.1 MS Enter the Idle Mode

MS follow the procedure defined in 6.3.24.1 to enter the idle mode. The intermediate RS will relay the DREG-REQ/CMD message between the MR-BS and MS. The procedure is the same for transparent RS and non-transparent RS.

6.3.24.12.2 MS Exit the Idle Mode

MS follow the procedure defined in 6.3.24.9 to exit the idle mode. The intermediate RS will relay the RNG-REQ/RSP message between the MR-BS and MS. The procedure is the same for transparent RS and non-transparent RS.

6.3.24.12.3 MS Location Update

MS follow the procedure defined in 6.3.24.8 to perform the location update. The intermediate RS will relay the RNG-REQ/RSP message between the MR-BS and MS. The procedure is the same for transparent RS and non-transparent RS.

6.3.24.12.4 Paging

The paging procedure is some different for the transparent RS and non-transparent RS.

6.3.24.12.4.1 Paging for transparent RS

For transparent RS, the paging procedure is controlled by its serving station. The transparent RS can not generate the MOB_PAG-ADV message, and have no idea of the paging information.

6.3.24.12.4.2 Paging for non-transparent RS

For non-transparent RS, the RS get the paging information from its serving station, and generate the MOB_PAG-ADV message for its subordinate MS.

When the MR-BS receives the paging announce from PC, the MR-BS shall send the paging information to its subordinate RS. According to the received paging information, the MOB_PAG-ADV message shall be generated and sent in MS paging listening interval by MR-BS and each RS separately. When a RS receives the RNG-REQ for location updating or network reentry, the RS shall relay the RNG-REQ to the MR-BS, and the intermediate RSs who receives the relayed RNG-REQ message shall cease the sending of MOB_PAG-ADV. If the MR-BS has not received the RNG-REQ from its subordinate MS or relayed RNG-REQ from its subordinate RS after the paging retry count decrease to zero. The MR-BS shall startup a waiting timer, which shall take the transmission delay from the last hop RS to the MR-BS into account. If the RNG-REQ has not received after the expiration of the timer, the MR-BS regards the MS is unavailable.