Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**	
Title	**Service Primitives for Idle Mode**	
Date Submitted	**2005-04-30**	
Source(s)	Beomjoon Kim, Ronny (Yong-Ho) Kim LG Electronics Inc. LG R&D Complex, 533 Hogye-1dong, Dongan-gu, Anyang, 431-749, Korea	Voice: +82-31-450-7188 Fax: +82-31-450-7912 [mailto:beom@lge.com]
	Min-Sung Kim KT	[mailto:cyberk@kt.co.kr]
Re:	Call for Comment on P802.16g Baseline Document	
Abstract	This contribution proposes backbone procedures to support Idle Mode	
Purpose	To be discussed in Legacy Messages Ad-Hoc, IEEE802.16g	
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Idle Mode Backbone Procedures

Beomjoon Kim, Ronny (Yong-Ho) Kim
LG Electronics Inc.
Min-Sung Kim
KT

Introduction

The current Idle Mode operation requires interaction between BS and a network entity e.g. Paging Controller as well as interaction through air interface. In this contribution, we propose several service primitives for Idle Mode which are exchanged through Control Service Access Point (C-SAP) in Management Plane specified in 16g baseline document.

Name	Source	Destination	Purpose
Idle_Mode_Initiation.request	BS	NCMS	To notify Idle Mode Initiation requested
Idle_Mode_Initiation.response	NCMS	BS	To notify Idle Mode Initiation allowed
Paging_Announce	NCMS	BS	To request a BS to page an MS in Idle Mode
Idle_ReEntry.indication	BS	NCMS	To notify MS's re-entry attempt in response to paging
Idle_ReEntry.confirmation	NCMS	BS	To confirm MS's re-entry and provide service and operational information
Idle_ReEntry_Complete	BS	NCMS	To notify MS's re-entry completion

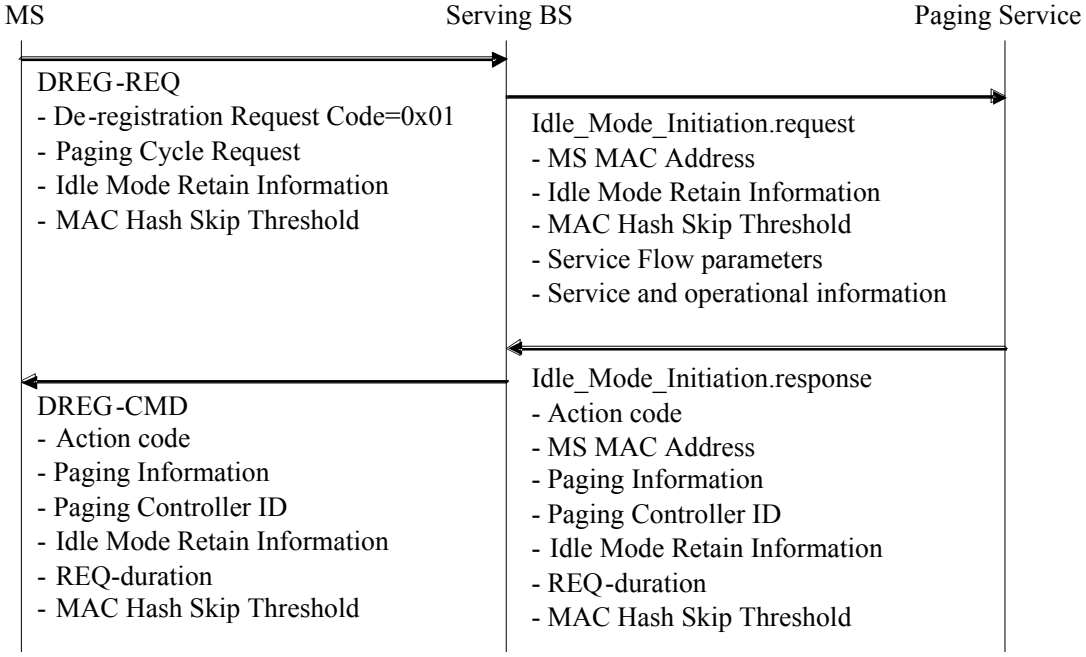

Fig. 1 Idle Mode Initialization

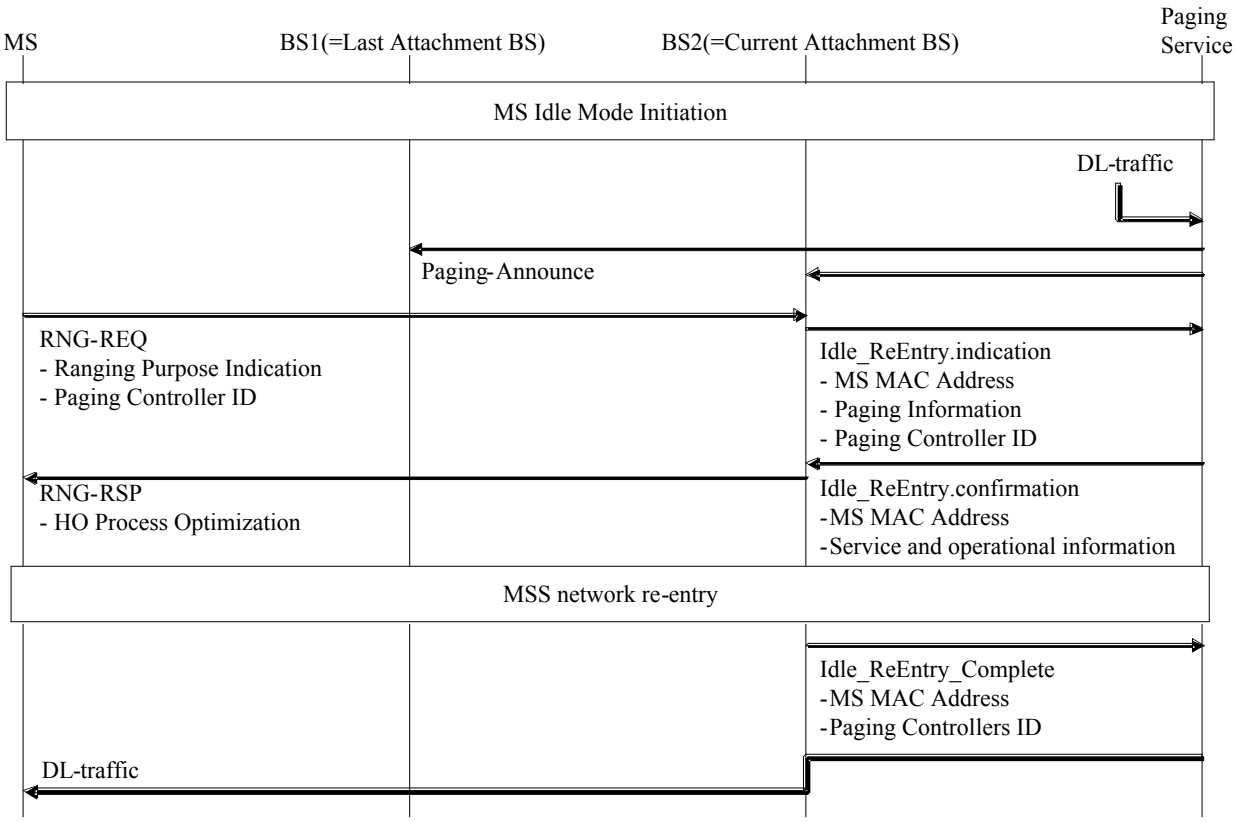

Fig. 2 Paging Procedures for DL traffic delivery

References

[1] IEEE 802.16e/D7

[2] IEEE 802.16g-04/03r2, “Baseline Document – P802.16g Management Plane Procedures and Services”

[3] IEEE Std 802-16-2004

Proposed Text Change

14.5.11 Interface SAP for Upper Layer Protocols

14.5.11.1.1 Function
This primitive is issued by BS to inform a management entity of Paging Services in NCMS that an MS requests to initiate Idle Mode.

14.5.11.1.2 Semantics of the service primitive
The parameters of the primitives are as follows:

Idle_Mode_Initiation.request
(
MS MAC Address
Paging_Cycle_Request
Idle Mode Retain Information

MAC Hash Skip Threshold
Service Flow parameters
Service and operational information
)

MS MAC Address
48-bit MAC Address which will identify MS during Idle Mode
Paging_Cycle_Request
Paging Cycle requested by MS
Idle Mode Retain Information
MS request for Paging Controller retention of network re-entry related MAC management message and MS service and operational information to expedite future Network Re-entry from Idle Mode. (see 6.3.2.3.42.)
MAC Hash Skip Threshold
Maximum number of successive MOB_PAG-ADV messages that may be sent from a BS individual notification for an MS, including MS MAC Address Hash of an MS for which Action Code is 0b00, 'No Action Required'.
Service Flow parameters
Parameters for Service Flow which exists without actually being activated to carry traffic at MS Idle Mode Initialization, e.g. Paging Preference.
Service and operational information
MS service and operational information associated with MAC state machines, CS classifier information, etc.

14.5.11.1.3 When generated

This primitive is generated when a BS receives a DREG-REQ message with De-registration_Request_Code=0x01, "request for MS De-Registration from serving BS and initiation of MS Idle Mode.

14.5.11.1.4 Effect of receipt

This primitive shall be generated on BS side and a management entity of Paging Services shall respond to this primitive by sending Idle_Mode_Initiation.response.

14.5.11.2 Idle_Mode_Initiation.response

14.5.11.2.1 Function
This primitive is issued by a management entity in Paging Services in NCMS to respond to Idle_Mode_Initiation.request.

14.5.11.2.2 Semantics of the service primitive
The parameters of the primitives are as follows:

Idle_Mode_Initiation.response

(

Action code
MS MAC Address
Paging Information
Paging Controller ID
Idle Mode Retain Information
MAC Hash Skip Threshold
REQ-duration
)

Action code
Indicates the value of Action code to be included in DREQ-CMD message. (see Table 55.)
MS MAC Address
48-bit MAC Address which will identify MS during Idle Mode
Paging Information
Paging Group ID, Paging Cycle, and Paging Offset parameters followed by MS in Idle Mode.
Paging Controller ID
A logical network identifier for the serving BS or other network entity retaining MS service and operational information and/or administrating paging activity for the MS while in Idle Mode. Paging Controller ID shall be set to BS ID when a BS is acting as Paging Controller.
Idle Mode Retain Information
MS request for Paging Controller retention of network re-entry related MAC management message and MS service and operational information to expedite future Network Re-entry from Idle Mode. (see 6.3.2.3.42.)
MAC Hash Skip Threshold
Maximum number of successive MOB_PAG-ADV messages that may be sent from a BS individual notification for an MS, including MS MAC Address Hash of an MS for which Action Code is 0b00, 'No Action Required'.
REQ-duration
Waiting value for the DREG-REQ message re-transmission (measured in frames).

14.5.11.2.3 When generated

This primitive is generated to request a BS to issue a DREG-CMD message.

14.5.11.2.4 Effect of receipt

A BS receiving Idle_Mode_Initiation.response shall transmit DREG-CMD message with setting each field in accordance with the information elements in this primitive.

14.5.11.3 Paging_Announce

14.5.11.3.1 Function
This primitive is issued by a management entity of Paging Services in NCMS to request a BS to page an MS which is supposed to be in Idle Mode by transmitting MOB_PAG-ADV message including the MS MAC Address Hash and relevant Action Code.

14.5.11.3.2 Semantics of the service primitive

The parameters of the primitives are as follows:

Paging_Announce
(
MS MAC Address
Paging Information
Action Code
)

MS MAC Address
48-bit MAC Address which will identify MS during Idle Mode
Paging Information
Paging Group ID, Paging Cycle, and Paging Offset parameters followed by MS in Idle Mode.
Action Code
Action required for MS in Idle Mode (e.g. Network Re-entry, ranging for location update, and so on)

14.5.11.3.3 When generated

This primitive is generated by a management entity of Paging Services to request a BS to transmit BS Broadcast Paging message.

14.5.11.3.4 Effect of receipt

A BS receiving Paging_Announce shall transmit MOB_PAG-ADV message following the information provided by this primitive.

14.5.11.4 Idle_ReEntry.indication

14.5.11.4.1 Function
This primitive is issued by a BS to inform a management entity of Paging Services that the specified MS is attempting to re-enter network in response to paging.

14.5.11.4.2 Semantics of the service primitive
The parameters of the primitives are as follows:

Idle_ReEntry.indication
(
MS MAC Address
Paging Information
Paging Controller ID
BS ID
)

MS MAC Address
48-bit MAC Address which will identify MS during Idle Mode
Paging Information

Paging Group ID, Paging Cycle, and Paging Offset parameters followed used by MS in Idle Mode.

Paging Controller ID

A logical network identifier for the serving BS or other network entity retaining MS service and operational information and/or administrating paging activity for the MS while in Idle Mode. Paging Controller ID shall be set to BS ID when a BS is acting as Paging Controller.

BS ID

A network identifier of the BS at which the MS is attempting to re-enter network

14.5.11.4.3 When generated

This primitive is generated by a BS when it receives a RNG-REQ message including Ranging Purpose Indication with setting bit #0 to 1 in combination with Paging Controller ID.

14.5.11.4.4 Effect of receipt

Idle_ReEntry.indication notifies a management entity of Paging Services that the specified MS is attempting to re-enter network through the specified BS in order to receive DL traffic. The management entity also checks MS service and operational information for the MS, and transmits Idle_ReEntry.confirmation in response to this primitive.

14.5.11.5 Idle_ReEntry.confirmation

14.5.11.5.1 Function

This primitive is issued by a management entity of Paging Services to confirm the MS Network Re-entry from Idle Mode and provides the BS at which the MS is attempting to re-enter network with service and operational information.

14.5.11.5.2 Semantics of the service primitive

The parameters of the primitives are as follows:

Idle_ReEntry.confirmation
(
MS MAC Address
Service and operational information
)

MS MAC Address

48-bit MAC Address which will identify MS during Idle Mode

Service and operational information

MS service and operational information associated with MAC state machines, CS classifier information, etc.

14.5.11.4.3 When generated

This primitive is generated by BS when a RNG-REQ message including Ranging Purpose Indication with setting bit #0 to 1 in combination with Paging Controller ID.

14.5.11.4.4 Effect of receipt

BS receiving Idle_ReEntry.confirmation transmits RNG-RSP message including HO Process Optimization which is based on the service and operational information in this primitive.

14.5.11.6 Idle_ReEntry_Complete

14.5.11.6.1 Function
This primitive is issued by a BS to inform a management entity of Paging Services that an MS has re-entered network successfully.

14.5.11.6.2 Semantics of the service primitive
The parameters of the primitives are as follows:

Idle_ReEntry.confirmation
(
MS MAC Address
Paging Controller ID
BS ID
)

MS MAC Address
48-bit MAC Address which will identify MS during Idle Mode
Paging Controller ID
A logical network identifier for the serving BS or other network entity retaining MS service and operational information and/or administrating paging activity for the MS while in Idle Mode. Paging Controller ID shall be set to BS ID when a BS is acting as Paging Controller.
BS ID
A network identifier of the BS at which the MS is attempting to re-enter network

14.5.11.6.3 When generated

This primitive is generated by a BS when Network Re-entry process specified in 6.3.22.10 has been completed.

14.5.11.6.4 Effect of receipt

The buffered DL traffic is delivered to the serving BS and finally to MS.