Project	IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>
Title	Amendment to Subscriber Mode Management in Section 14.2.6
Date Submitted	2006-07-13
Source(s)	Jee Hyeon Na, ETRI, E-mail: jhna@etri.re.kr Yun Won Chung, PhD, Soongsil University, E-mail: ywchung@ssu.ac.kr JungMo Moon, PhD, ETRI, E-mail: jmmoon@etri.re.kr Mi-Young Yoon, ETRI, E-mail: myyun@etri.re.kr Sang Ho Lee, PhD, ETRI, E-mail: leesh@etri.re.kr Young Seok Kim, Samsung, E-mail: stephenk@samsung.com
Re:	Call for Comment on P802.16g Baseline Document
Abstract	This contribution proposes service primitives for accounting.
Purpose	The document should be considered during the resolution of comments on the baseline document.
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>.

Amendment to Subscriber Mode Management in Section 14.2.6

Jee Hyeon Na, Yun Won Chung**, JungMo Moon*, Mi-Young Yoon*, Sang Ho Lee*, and Young Seok Kim****

* ETRI, 161, Gajeong-dong,Yuseong-gu, Daejeon, 305-700, Korea
*** Soongsil University, 511 Sangdo-dong, Dongjak-gu, Seoul, 156-743, Korea*
**** Samsung Electronics, 414, Meatan-3dong, Yeongtong-gu, Suwon, 442-600, Korea*

1. Introduction

In Section 14.2.6, subscriber mode management is described, where subscriber mode consists of Normal Mode, Idle Mode, and Sleep Mode. The current subscriber mode management, however, only deals with modes when an MS is attached to a BS after initial network entry. Thus, the subscriber mode transition diagrams at MS, BS, and NCMS start from Normal Mode. However, we think that the subscriber mode should include a new mode, called Detached Mode, where an MS is not attached to a BS, and the subscriber mode transition diagrams should start from the detached mode, as many other mobile systems do. In this contribution, we define Detached Mode and modify the subscriber mode transition diagrams accordingly.

2. Proposed Text Changes

[Modify section 14.2.6 as follow]

14.2.6 Subscriber mode management

The following informative subsection describes subscriber mode management

14.2.6.1 Managing device states

Currently, four subscriber modes are defined, i.e., Detached Mode, Normal Mode, Sleep Mode, and Idle Mode. In Detached Mode, the subscriber is not connected to a BS, and the MS, BS, and NCMS do not have any location and state information for the subscriber. After initial network entry procedure, the MS moves to Normal Mode. In Normal ~~Operation~~Mode, an MS transmits and receives packets to/from a BS. ~~Currently, two subscriber modes are defined, i.e., Sleep and Idle Modes.~~ Sleep Mode is intended to minimize an MS power usage and decrease usage of serving BS air interface resources by pre-negotiated periods of absence from the serving BS air interface. Idle Mode allows an MS to become periodically available for DL broadcast traffic without registration at a specific BS as the MS traverses an air link environment populated by multiple BSs, and thus, allows the MS to conserve power and operational resources.

Sleep Mode operation is defined between an MS and a BS only, and the NCMS does not need to manage Sleep Mode of subscriber. Thus, both an MS and a BS manage all Detached Mode, Normal ~~Operation~~Mode, Sleep Mode, and Idle Mode of subscriber. On the other hand, the NCMS manages Detached Mode, Normal ~~Operation~~, and Idle Mode. Subscriber Mode transitions at an MS, BS and the NCMS are illustrated in Figures ~~490~~ 493 and ~~491~~494.

Figure 493 shows Subscriber Mode transition diagram at both an MS and a BS. Initially, the subscriber mode is Detached Mode and the subscriber mode at both an MS and a BS changes from

Detached Mode to Normal Mode after initial network entry procedure. Subscriber Mode ~~at both an MS and a BS~~ changes from Normal ~~Operation~~ Mode to Idle Mode when the MS issues an MS De-registration Request (DREG-REQ) message with De-Registration_Request_Code=0x01 or the BS issues an De-register Command (DREG-CMD) message with Action Code = 0x05. Then, the MS stays at Idle Mode and updates its location when the paging group changes. The Subscriber Mode returns back to Normal ~~Operation~~ Mode from Idle Mode after completing n~~N~~etwork re-entry. Transition from Normal ~~Operation~~ Mode to Sleep Mode is performed after an MS successfully exchanges Sleep Request (MOB_SLP-REQ) and Sleep Response (MOB_SLP-RSP) messages with a BS. If there is any DL traffic toward an MS from a BS, MOB_TRF-IND is broadcast to the MS from the BS and Subscriber Mode of the MS and the BS changes from Sleep Mode to Normal ~~Operation~~Mode. If there is any UL traffic from an MS, Bandwidth Request (BW Request) is sent to the serving BS from the MS and Subscriber Mode of the MS and the BS changes from Sleep Mode to Normal ~~Operation~~, too. Transition to Detached Mode from Normal Mode occurs when the MS sends DREG-REQ message without Deregistration_Code=0x01 or receive DREG-CMD without Action Code = 0x05. Transition to Detached Mode from Idle Mode ~~occues~~occurs when the Idle Mode Timer of the MS is expired. If MS is switched off in any of Normal, Idle, and Sleep Modes, the state moves to Detached Mode.

Figure 494 shows Subscriber Mode transition diagram at the NCMS with service primitives related with the Subscriber Mode transition. Initially, the subscriber mode is Detached Mode and the subscriber mode at NCMS changes from Detached Mode to Normal Mode after initial network entry procedure of MS. Subscriber Mode transition from Normal ~~Operation~~ Mode to Idle Mode is performed by exchanging C-PG-REQ and C-PG-RSP between a BS and the NCMS after successful DREG-REQ message with De-Registration_Request~~-~~_Code=0x01 or DREG-CMD message with Action Code = 0x05 between an MS and a BS, where C-PG-REQ and C-PG-RSP are defined in 14.2.6.2.1 and 14.2.6.2.2, respectively. Subscriber Mode transition from Idle Mode to Normal ~~Operation~~ Mode is initiated after exchanging C-PGNOTFY, C-PG-RSP, and C-PG-ACK between a BS and the NCMS, where C-PG-NOTFY, C-PG-RSP, and C-PG-ACK are defined in 14.2.6.2.4, 14.2.6.2.2, and 14.2.6.2.3, respectively. Transition to Detached Mode from Normal Mode occurs by exchanging C-PG-REQ and C-PG-RSP between a BS and the NCMS after successful DREG-REQ message without De-Registration_Request_Code=0x01 or DREG-CMD message without Action Code = 0x05 between an MS and a BS. Transition to Detached Mode from Idle Mode occurs when the Idle Mode System Timer is expired. If MS is switched off in either Normal or Idle Mode, the state moves to Detached Mode.

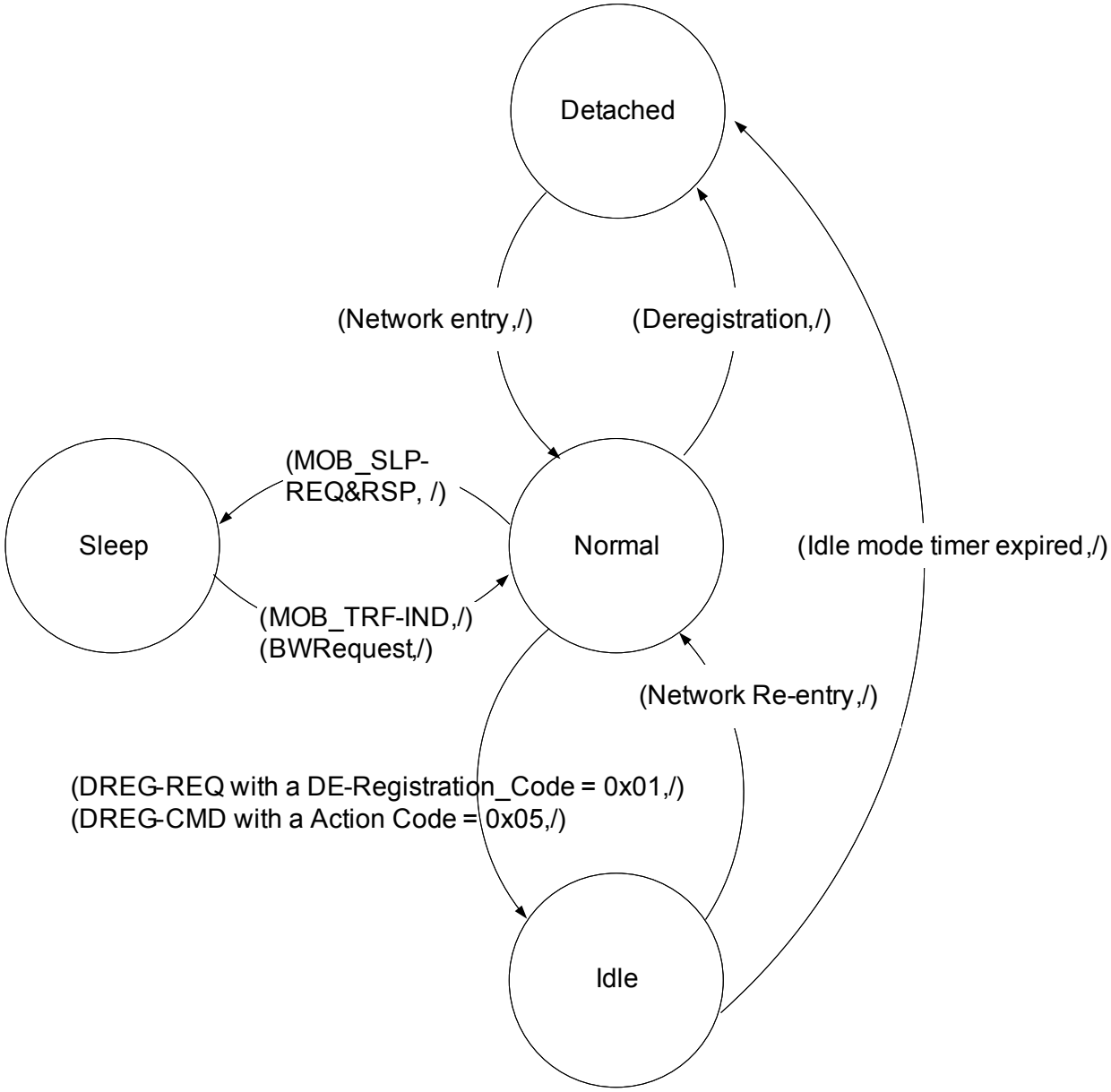

Figure 493 Subscriber mode transition diagrams of MS & BS

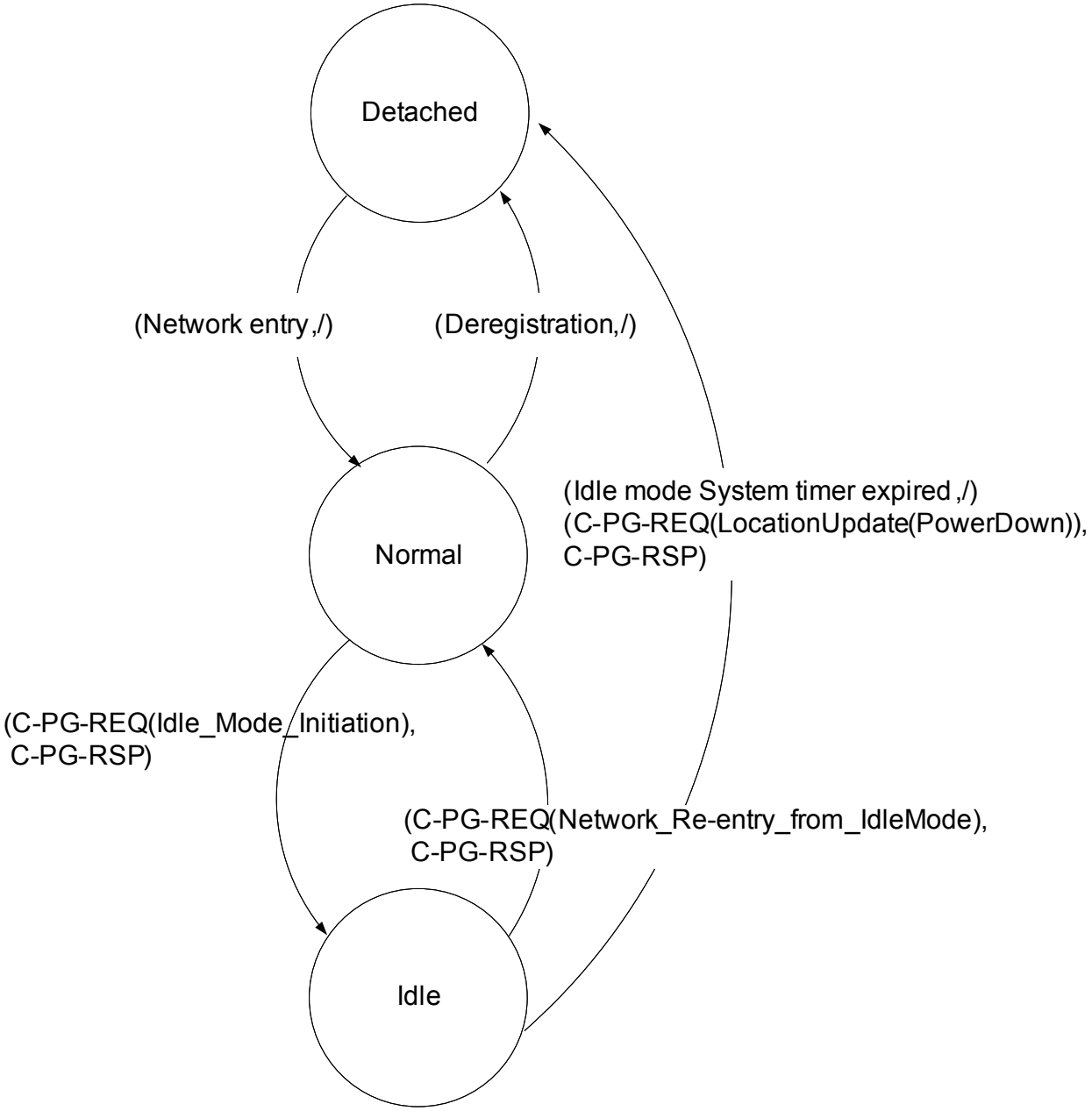

Figure 494 Subscriber mode transition diagrams of NCMS