Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Sleep Mode Operations in MR Network for Centralized Scheduling Approach**
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Source(s)	Shiao-Li Tsao, Fang-Ching Ren, I-Kang Fu, Wern-Ho Sheen National Chiao Tung University (NCTU) /Industrial Technology Research Institute (ITRI), Taiwan No. 195, Sec. 4, Chung Hsing Rd., Chutung, Hsinchu, Taiwan 310, R.O.C.	Voice:+886-3-5712121-54717 Fax:+886-3-5721490 E-mail: sltsao@cs.nctu.edu.tw, frank_ren@itri.org.tw
	Yuefeng Zhou; Sunil Vadgama Fujitsu Laboratories of Europe Ltd Hayes Park Central, Hayes End Road, Hayes, Middlesex, UB4 8FE, UK	Voice: +44 (0) 20 8573 4444 FAX: +44 (0) 20 8606 4539 Email: Yuefeng.zhou@uk.fujitsu.com, Sunil.vadgama@uk.fujitsu.com
	Keiichi Nakatsugawa Fujitsu Laboratories Ltd. Kamikodanaka 4-1-1, Kawasaki, 211-8588, Japan	Voice: +81-44-754-2811 Fax: +81-44-754-2786 nakatsugawa@jp.fujitsu.com
	Yousuf Saifullah, Shashikant Maheshwari, Haihong Zheng Nokia 6000 Connection Drive, Irving, TX	Voice: +1 (0) 972 894 5000 Email: Yosuf.saifullah@nokia.com, Shashikant.maheshwari@nokia.com, Haihong.1.zheng@nokia.com
	Kanchei (Ken) Loa, Yi-Hsueh Tsai, Shiann-Tsong Sheu, Hua-Chiang Yin, Chih-Chiang Hsieh, Yung-Ting Lee, Frank C.D. Tsai, Heng-Iang Hsu, Youn-Tai Lee, Institute for Information Industry, 8F., No. 218, Sec. 2, Dunhua S. Rd., Taipei City, Taiwan.	Voice: +886-2-27399616 FAX: +886-2-23782328 Email: Loa@nmi.iii.org.tw

Re:	IEEE 802.16j-06/027:“Call for Technical Proposals regarding IEEE Project P802.16j”
Abstract	This document presents sleep mode and idle mode operations for IEEE 802.16j. The existing IEEE 802.16e messages are reused and new parameters are introduced in order to facilitate the sleep mode and idle mode management in IEEE 802.16j.
Purpose	Propose the sleep mode and idle mode operations for IEEE 802.16j
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Sleep Mode Operations in MR Network for Centralized Scheduling Approach

Introduction

In WiMAX MR networks, the RS may use two types of scheduling. Centralized Scheduling, where MR-BS controls all the radio resource scheduling and MAP allocation. Distributed Scheduling, where some functionality of radio resource scheduling and MAP allocation are distributed to RS. This contribution proposes text to clarify the MS sleep mode for the centralized scheduling approach only.

I. Centralized Scheduling Approach

The sleep mode is centrally controlled by MR-BS. For example, the MS sleep-mode should be approved by the MR-BS, and MR-BS determines the duration of sleep, listening windows, and other properties of MS sleep mode. The RS simply relays the sleep mode messages, such as MOB_SLP-REQ/RSP, and traffic indication, and it does not maintain any state information of sleep-mode MSs, which means the MS sleep mode does not need any extra functionalities from RS.

While sending MOB_TRF-IND to MSs for indicating incoming packets, MR-BS should take processing and scheduling delays introduced by RSs into the consideration. As shown in Fig. 1, MS enters Sleep mode by sending MOB_SLP-REQ and receiving MOB_SLP-RSP message with "Start Frame Number" parameter from MR-BS. While the MR-BS decides to send MOB_TRF-IND message to the MS which wakes up at frame F_i, the MOB_TRF-IND message should be sent from MR-BS $\sum_{i=1}^{N} D_i$ frames before the frame F_i. D_i is the processing and scheduling delay introduced by the i^{th} RS.

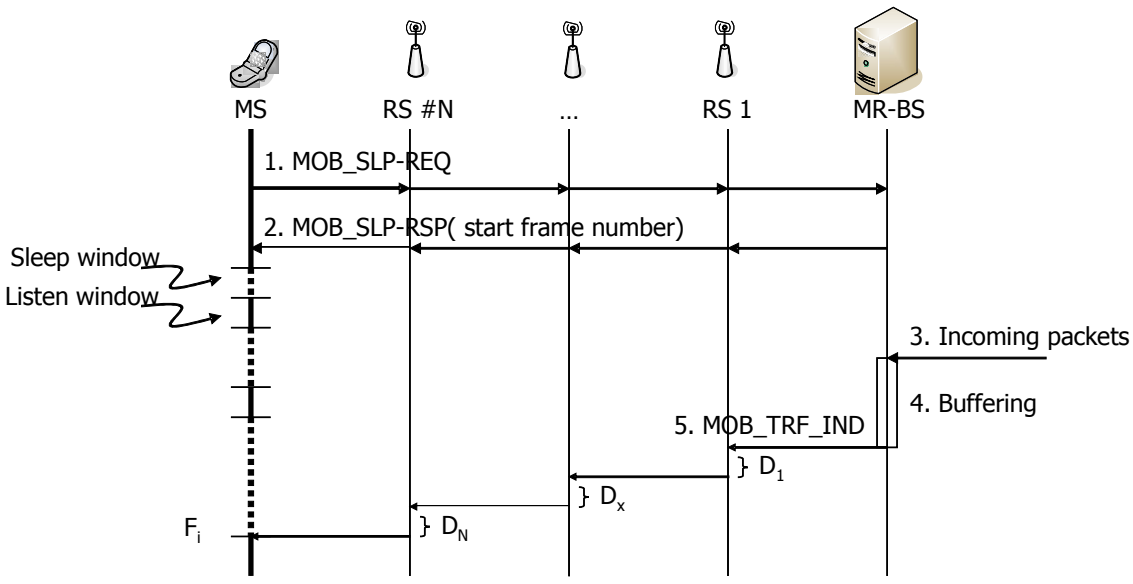

Figure 1. MS sleep mode support for centralized scheduling

Proposed Text

----------Start of the Text----------

Insert new subclause 6.3.21.7:

6.3.21.7 Relay support for MS sleep mode

Add the following words in the first paragraph in 6.3.21.7:

In MR networks, the sleep mode shall be centrally controlled by the MR-BS in the presence of centralized or distributed scheduling.

Insert new subclause 6.3.21.7.1:

6.3.21.7.1 MS sleep mode support for centralized scheduling approach

Add the following words in the first paragraph in 6.3.21.7.1:

For an MS attached to the MR-BS through an RS, MS sleep mode operates as defined in section 6.3.21. All MOB_SLP-REQ messages generated by MSs attached to an RS shall be relayed to the MR-BS. The MR-BS shall be responsible for generating MOB_SLP-RSP messages, which will be relayed by RSs, either in response to a MOB_SLP-REQ or unsolicited. The MR-BS shall take the additional relay delay into account while it forwards the packets through RS.

----------End of the Text----------

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