Project	IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>	
Title	MS Periodic Ranging with Transparent RS	
Date Submitted	2006-01-08	
Source(s)	Kanchei (Ken) Loa, Yi-Hsueh Tsai, Chih-Chiang Hsieh, Yung-Ting Lee, Hua-Chiang Yin, Shiann-Tsong Sheu, Frank C.D. Tsai, Youn-Tai Lee, Heng-Iang Hsu Institute for Information Industry 8F., No. 218, Sec. 2, Dunhua S. Rd., Taipei City, Taiwan.	Voice: +886-2-2739-9616 loa@iii.org.tw
	Hang Zhang, Peiying Zhu, Mo-Han Fong, Wen Tong, David Steer, Gamini Senarath, Derek Yu, Mark Naden, G.Q. Wang Nortel 3500 Carling Avenue Ottawa, Ontario K2H 8E9	Voice: +1 613 7631315 WenTong@nortel.com pyzhu@nortel.com
	Yu Ge, Peng-Yong Kong, Chen-Khong Tham 21 Heng Mui Keng Terrace Singapore 119613	Voice: +65-6874.1950 Fax: +65-6775.5014 geyu@i2r.a-star.edu.sg
	[add co-authors here]	
Re:	IEEE 802.16j-06/034: "Call for Technical Proposals regarding IEEE Project P802.16j"	
Abstract	This contribution proposes procedures for MS periodic ranging with transparent RS	
Purpose	Text proposal for 802.16j 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>.

MS Periodic Ranging with Transparent RS

Introduction

This contribution describes MS periodic ranging with transparent RS under centralized scheduling scheme. In order to facilitate the incorporation of this proposal into IEEE 802.16j standard, specific changes to the baseline working document IEEE 802.16j-06/026r1 are listed below.

Text Proposal

6.3.10 Ranging

6.3.10.3 OFDMA based ranging

6.3.10.3.4 Relaying support for OFDMA based ranging

6.3.10.3.4.3 MS periodic ranging and automatic adjustments with transparent RS

The periodic ranging process shall begin by sending a periodic-ranging CDMA codes on the UL allocation dedicated for that purpose.

The code may be received by the MR-BS and RSs near the MS. RSs receiving the code shall transmit a RLY_RC-REP message to the serving MR-BS through the relay path. The RLY_RC-REP message is defined in xxx. When RS receives multiple codes in the ranging subchannel of a frame, the RLY_RC-REP message sent by the RS to serving MR-BS may contain information of multiple received codes.

When the MR-BS receives ranging code, it shall wait for RLY_RC-REP message from its subordinate RSs for T48 timer. Once T48 timer expired, the MR-BS could compare the measured signal information at each access station to decide adjustment information for RNG-RSP. Algorithms to decide adjustment information are out of scope of this specification. Afterward, the MR-BS shall transmit an RNG-RSP to the MS directly.

The message sequence charts (Table xxx) and flow charts (Figure xxx and Figure yyy) define the ranging and adjustment process that shall be followed by compliant RSs and MR-BSs.

Table xxx – RLY-BST message format

Syntax	Size	Notes
RLY-BST_Message_Format(){		
Management Message Type = xx	8 bits	
Encoded Information	variable	TBD
}		

Table xxx – RLY_RC-REP message format

Syntax	Size	Notes
RLY_RC-REP_Message_Format(){		

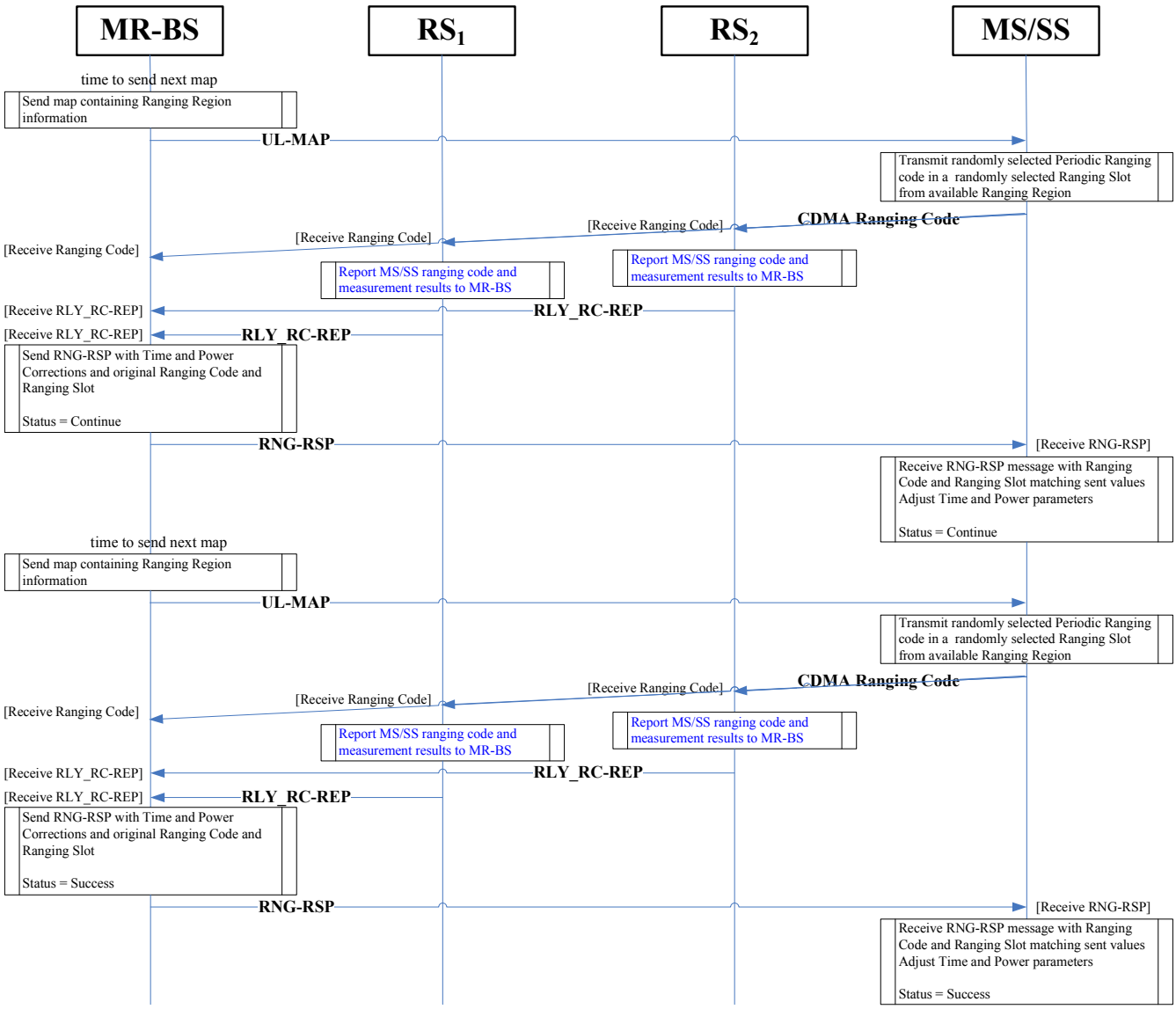
Management Message Type = xx	8 bits	
TLV Encoded Information	variable	TLV specific
}		

Table xxx – RLY_RC-REP message encodings

	Type (1 byte)	Length	Value (Variable-length)	PHY Scope
Timing Adjust	TBA	4	Tx timing offset adjustment (signed 32-bit). The amount of time required to adjust MS transmission so the bursts will arrive at the expected time instance at the RS. Units are PHY specific (see 10.3). The SS shall advance its burst transmission time if the value is negative and delay its burst transmission if the value is positive.	OFDMA
Power Level Adjust	TBA	1	Tx Power offset adjustment (signed 8-bit, 0.25 dB units). Specifies the relative change in transmission power level that the MS is to make in order that transmissions arrive at the RS at the desired power. When subchannelization is employed, the subscriber shall interpret the power offset adjustment as a required change to the transmitted power density.	OFDMA
Offset Frequency Adjust	TBA	4	Tx frequency offset adjustment (signed 32-bit, Hz units). Specifies the relative change in transmission frequency that the MS is to make in order to better match the RS. (This is fine-frequency adjustment within a channel, not reassignment to a different channel.). The MS shall increase its transmit frequency if the value is positive and decrease its transmit frequency if the value is negative.	OFDMA
Ranging Status	TBA	1	Used to indicate whether uplink messages are received within acceptable limits by RS. 1 = continue, 2 = abort, 3 = success	OFDMA
Received Ranging Code Attributes	TBA	4	Bits 31:22 – Used to indicate the OFDM time symbol reference that was used to transmit the ranging code. Bits 21:16 – Used to indicate the OFDMA subchannel reference that was used to transmit the ranging code. Bits 15:8 – Used to indicate the ranging code index that was sent by the MS.	OFDMA

			Bits 7:0 – The 8 least significant bits of the frame number of the OFDMA frame where the MS sent the ranging code.	
MS CINR mean	TBA	1	The MS CINR mean parameter indicates the CINR measured by the RS from the MS. The value shall be interpreted as a signed byte with units of (TBD) dB. The measurement shall be performed on the CDMA ranging signal sent by the MS and averaged over the measurement period.	OFDMA
MS RSSI mean	TBA	1	The MS RSSI mean parameter indicates the Received Signal Strength measured by the RS from the MS. The value shall be interpreted as an unsigned byte with units of (TBD) dB, such that 0x00 is interpreted as (TBD) dBm, an RS shall be able to report values in the range (TBD) dBm to (TBD) dBm. The measurement shall be performed on the CDMA ranging signal sent by the MS and averaged over the measurement period	OFDMA

Table xxx: Ranging and automatic adjustment procedure in transparent RS systems



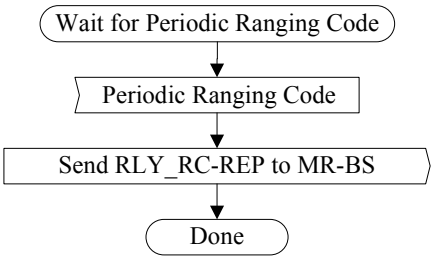


Figure xxx MS CDMA Periodic Ranging – Transparent Access RS

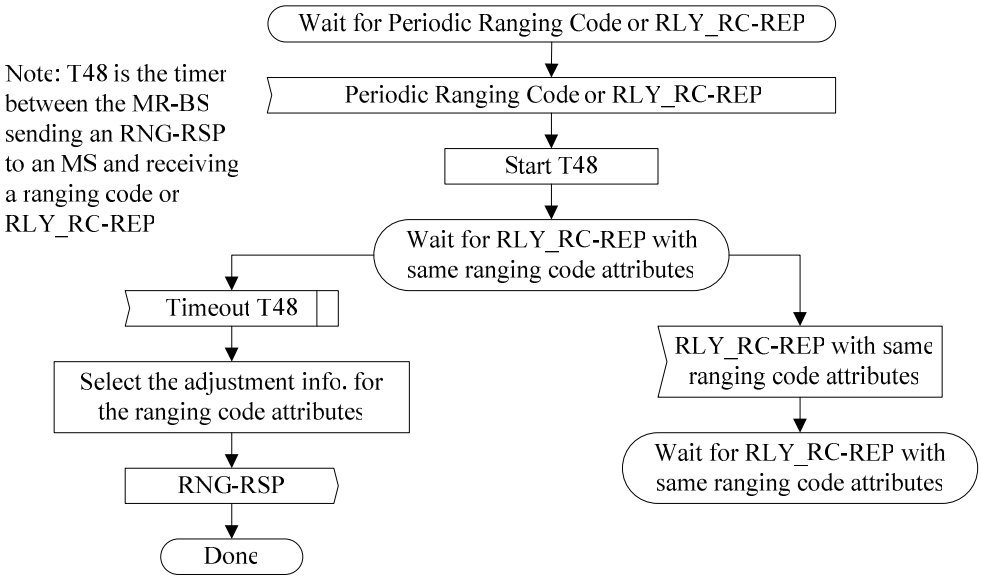


Figure yyy MS CDMA Periodic Ranging with Transparent RS– MR-BS