

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Transmission timing requirement of RS	
Data Submitted	07-Nov-2006	
Source(s)	<p>Kyu Ha Lee, Changkyoon Kim, Yong Wook Lee Samsung Thales San 14, Nongseo-Dong, Giheung-Gu, Yongin, Gyeonggi-Do, Korea 449-712</p> <p>Byung-Jae Kwak, Su Chang Chae, Young-il Kim ETRI 161, Gajeong-Dong, Yuseong-Gu, Daejeon, Korea 305-350</p>	<p>Voice: +82-31-280-9917 Fax: +82-31-280-1562 kyuha.lee@samsung.com</p> <p>Voice: +82-42-860-6618 Fax: +82-42-861-1966 bjkwak@etri.re.kr</p>
Re:	This is a response to Call for Technical Proposals regarding IEEE Project P802.16j.	
Abstract	The document contains technical proposals for IEEE P802.16j that would provide transmission timing requirement of RS.	
Purpose	The document is submitted for review by 802.16 Working Group members.	
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:chiar@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 >.	

Transmission timing requirement of RS

1 Introduction

In direct forward or multi-hop relay environment, transmission signals of multiple sources such as BS or RSs coexist at the same time. The transmission timing difference exists between RSs and BS because of physical delay elements such as analog filter, transmission delay, timing jitter, and etc. The transmission timing difference affect them each other as interference and prevent their reliable transmission. Therefore, the effect of the interference needs to be minimized.

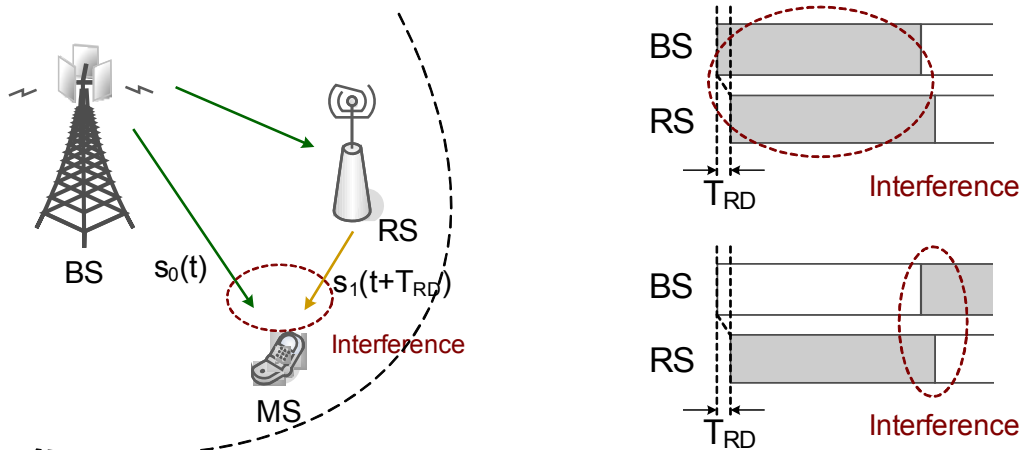


Figure 1. Example of transmission interference between BS and RS

2 Solution

The maximum timing difference T_{RD} as the transmission timing requirement of RS need be defined to prevent interference between a relay signal and other relay signal or BS signal. If transmission timing differences of multiple signal sources are within CP period, the advantage of OFDMA system about multi-path would be able to transmit information without the interference. Therefore, maximum timing difference T_{RD} between RS and BS at final hop shall be met.

$T_{RD} < \text{Cyclic prefix duration}$.

3. Text Proposals

In 8.4.10.1.x RS synchronization

At R-Link, all RSs shall acquire and adjust their timing such that all R-Link OFDMA symbols transmission time coincident at the BS to a accuracy within T_{RD} .

In 8.4.12.x Transmitter reference timing accuracy of RS

At the RS in the same way as MS, upon close-loop adjustments of transmit and receive timings from BS through CDMA ranging methods during network entry and periodic ranging, the RS obtains the system time reference. Thereafter, the RS shall compensate the time reference of BS transmission and maintain it.