

Reusing the Radio Resources in IEEE 802.16j Multi-hop Relay System

IEEE 802.16 Presentation Submission Template (Rev. 8.3)

Document Number:

IEEE S80216j-06_169

Date Submitted:

2006-11-15

Source:

I-Kang Fu, Wern-Ho Sheen, Fang-Ching Ren, Tzu-Ming Lin,
Chie-Ming Chou, Jan-Shun Yang, Ching-Tarng Hsieh
National Chiao Tung University (NCTU)/
Industrial Technology Research Institute (ITRI), Taiwan
ED922, 1001, Ta Hsua Rd.
Hsinchu, Taiwan 310, R.O.C.

E-mail: IKFu@itri.org.tw

Venue:

IEEE 802.16 Session#46, Dallas, TX, USA

Base Document:

C802.16j-06/169

Purpose:

Introduce the benefit by reusing the radio resources and the necessity on a mechanism to measure the potential interference in IEEE 802.16j Multi-hop Relay system

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:

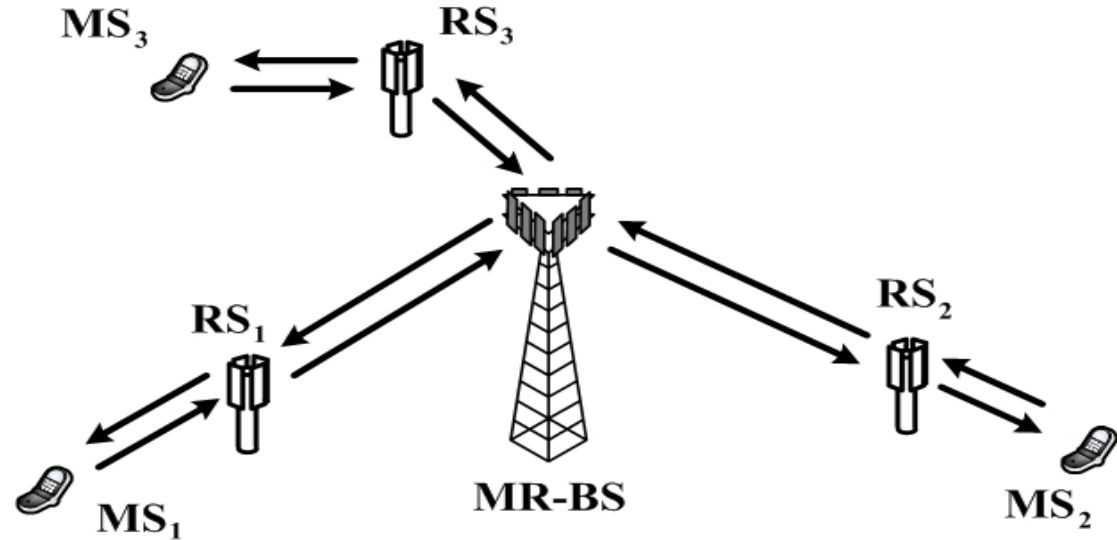
The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of 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.

IEEE 802.16 Patent Policy:

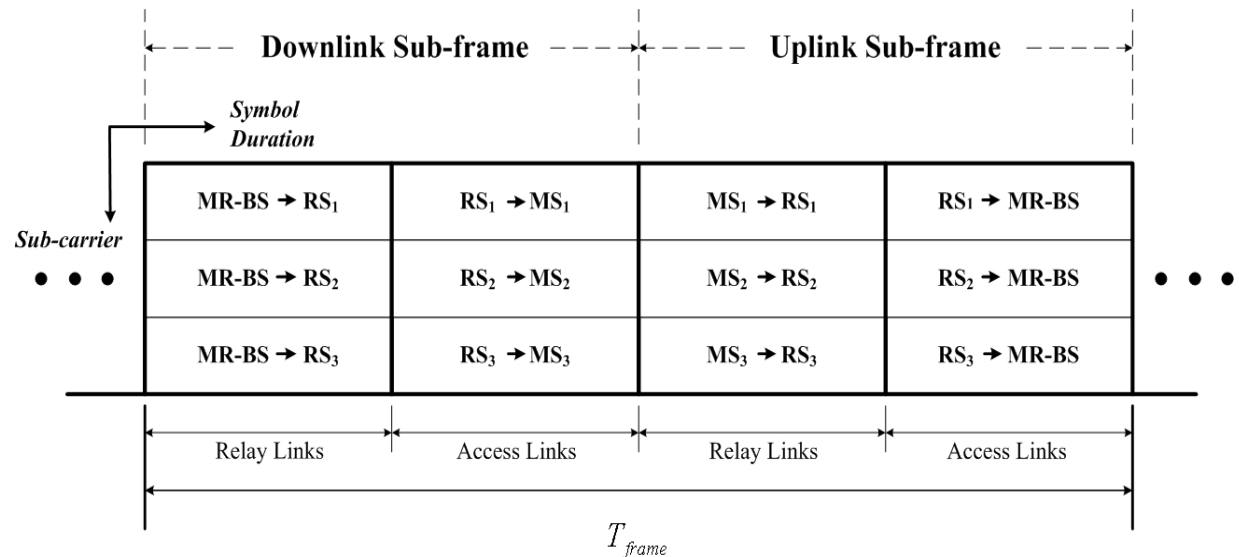
The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <<http://ieee802.org/16/ipr/patents/policy.html>>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or 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>>.

Without Reusing the Radio Resources

- An example of 2-hop relay system



- An example on frame structure for relay transmission

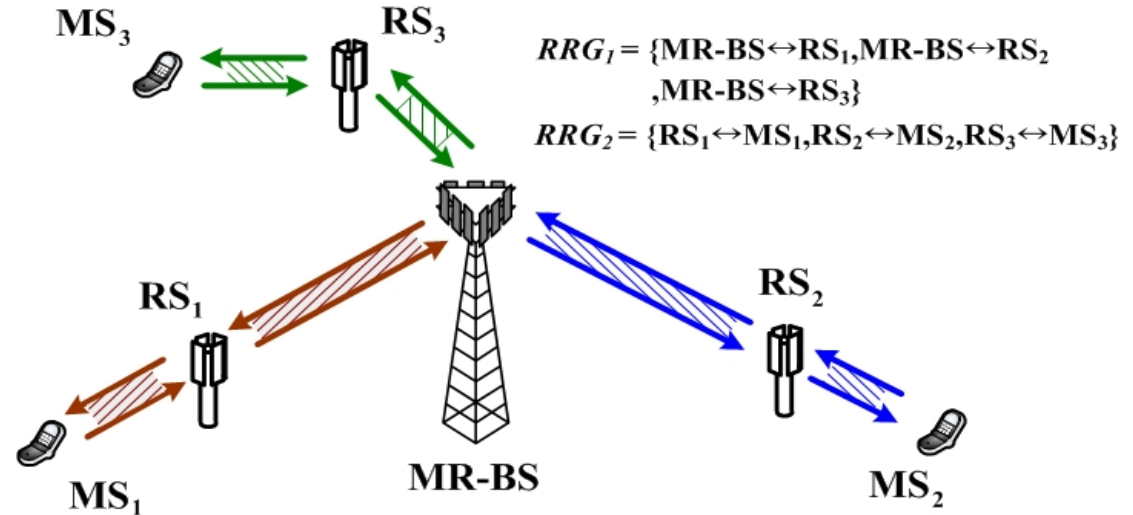


Reusing the Radio Resources

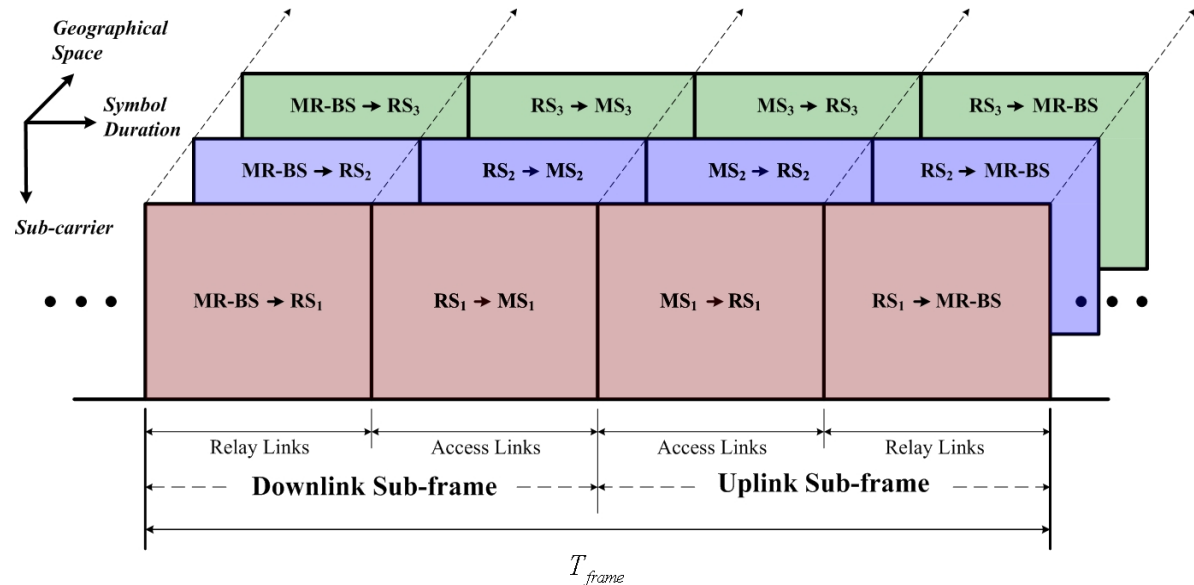
- An example of reusing radio resources in 2-hop relay system

RRG: Radio resource Reuse Group

↓
The links in the same RRG can reuse the radio resources



- An example on frame structure for reusing radio resource



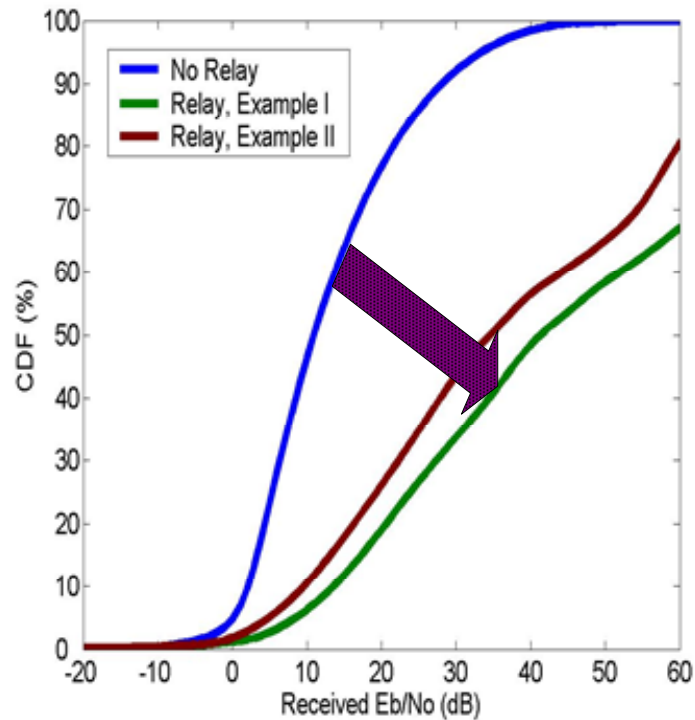
Simulation Results

- Downlink performances comparison (reference: 80216mmr-06_006)

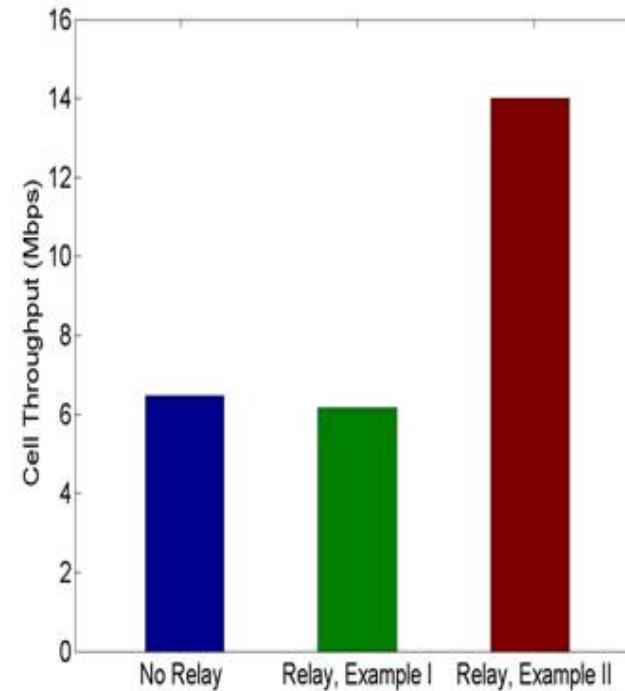
Example I: The case without radio resources reuse

Example II: The case with radio resources reuse

CDF of Received Signal Quality



Cell Capacity (Mbps)



- Capacity improvement by reusing radio resources: **116.41%**
 - Detail simulation parameters are referred to C80216mmr-05/041

Summary

- **Reusing radio resources** in different relay/access links can **increase the capacity** of IEEE 802.16j system
 - Compare with the case of no relay, deploying RS may result in capacity degradation due to relaying the duplicated user data.
- A mechanism to **measure the potential interference** is required to designate which RSs can reuse the resources
 - To prevent severe interference due to improper reuse decision
 - Ex. **C80216j-06/148r1**