Project	IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>	
Title	Relay-Station Power Control and Channel Reuse	
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Source(s)	Peter Wang, Tony Reid Nokia 6000 Connection Drive, Irving, TX	Voice: +1 214-912-4613 Fax: peter.wang@nokia.com
Re:	Call for Technical Proposals regarding IEEE Project P802.16j (IEEE 802.16j-06/027)	
Abstract	This contribution proposes relay-station power control and channel reuse scheme to improve the MR-BS system capacity.	
Purpose	Propose the text regarding relay-station power control and channel reuse	
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Relay-Station Power Control and Channel Reuse

Peter Wang, Tony Reid
Nokia

1. Introduction

In the MR-BS (Multihop Relay- Base Station) system, neighboring RS (Relay Station) coverage areas may be overlapped with different preamble segment values as defined in PUSC mode application. In order to increase the MR-BS system capacity, we propose RS power control with step size of 1 dB applying to each data burst in order to reduce the unnecessary channel interference. The power control rate can be at the same rate as the handover measurement reports so that the update rate is about every 0.5 second. For further increasing channel reuse possibility, we may also utilize the network channel management algorithm to group the set of MSs from each of different RSs within the MR-BS coverage, where the set of MSs with the C/I value above the pre-defined threshold value is grouped. Therefore, the set of MSs in the group can reuse the same channel simultaneously.

2. RS Power Control for Each Data Burst

In the MR-BS system, the MS reports channel measurement results during the handover process which provides the serving cell C/I and the neighboring cell RSS (receive signal strength) measurements approximately every 0.5 second. After that, we can estimate the received C/I value for each MS under its serving RS. If the MS with the estimated C/I result is higher than the pre-defined threshold value, the serving RS will decrease its transmission power to that particular MS, thereby maintaining that all the MSs under its control with a similar receive power from its serving RS. By applying such a power control mechanism at the RS, the RS can reduce the co-channel interference from the neighboring RSs, as seen in Fig. 1. Thus, MS_0 served by RS_0 and MS_1 served by RS_1 in Figure 1 may reuse channel simultaneously without co-channel interference.

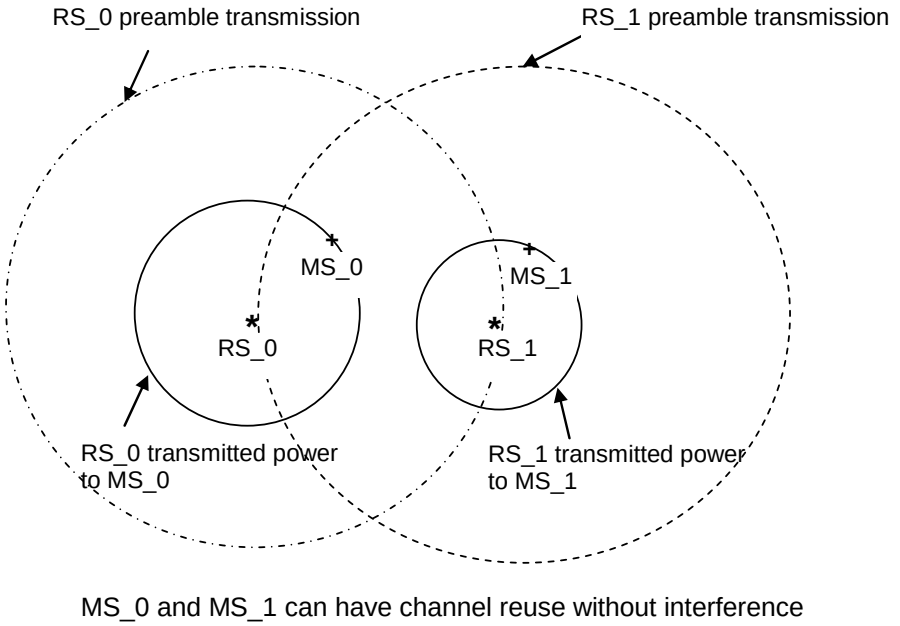

Figure 1. An example of RS power control scheme. RS_0/RS_1 only transmits the power that satisfies the C/I threshold value to MS_0/MS_1.

3. Channel Reuse handled by Network Channel Management

Even applying the RS power control scheme at each data burst for MS_01 and MS_12, shown in Fig. 2, may still interfere with each other. In this instance, network channel management is used so that channel reuse is applied to the group of MSs that include the first group of MS_01 and MS_11 and a second group of MS_02 and MS_12. This channel management would not select channel reuse to the group of MSs that include MS_01 and MS_12 since they have strong channel interference, even though the other group of MS_02 and MS_11 would be an acceptable group. By using network channel management to collaboratively group the transmission channel from different RSs, we can improve the system channel capacity. The same channel reuse concept could also be applied to the uplink channels.

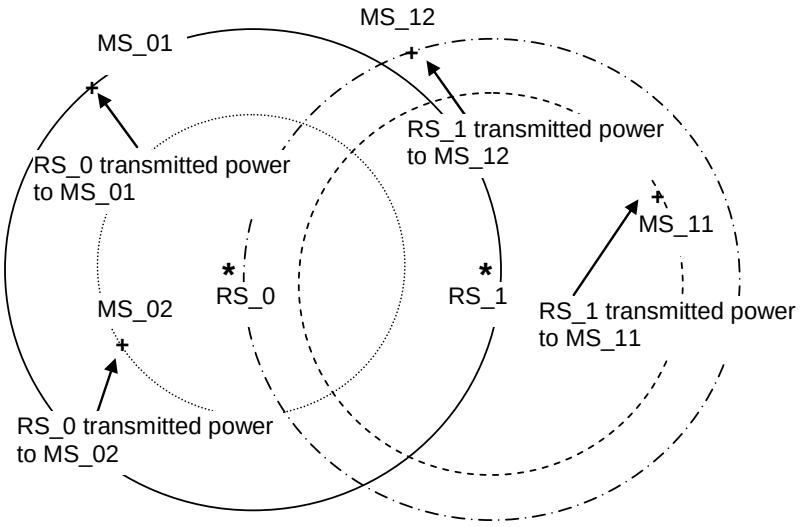

Figure 2. An example of channel reuse handled by network channel management.

4. Changes to the specification

Change the entire boosting field from 3 bits to 5 bits, in order to allow the data burst of RS transmit power range from +9 dB to -12 dB with step size of 1 dB.

Change the Boosting field in "Table 109S, Table 109t, Table 270, Table 275, Table 279, Table 281, Table 283, Table 284, Table 286a, Table 286b, Table 286d, Table 286f, Table 286g, Table 286i, Table 286v, Table 286w" as indicated in the following:

Syntax	size	notes
Boosting	5 bits	00000: normal (not boosted); 00011:+9dB; 01011:+8dB; 10011:+7dB; 00001:+6dB; 01001:+5dB; 10001:+4dB; 00100:+3dB; 01100:+2dB; 10100:+1dB, 00111:-12dB; 01111:-11dB; 10111:-10dB 00110:-9dB; 01110:-8dB; 10110:-7dB; 00010:-6dB; 01010:-5dB; 10010:-4dB; 00101:-3dB; 01101:-2dB; 10101:-1dB;