

Effective Node Assignment in 2-Hop Fixed Relay Networks

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Vahid Pourahmadi, Amir Khandani
Univ. of Waterloo
200 University Avenue West
Waterloo, ON, Canada
N2L 3G1

Voice: +1 519 888-4567 ext 35324

Fax: +1 519 888-4338

E-mail: vpourahm@uwaterloo.ca , khandani@uwaterloo.ca

Wen Tong, Peiyong Zhu,
Nortel
3500 Carling Avenue
Ottawa, Ontario K2H 8E9

Voice: +1 613 7631315

E-mail: WenTong@nortel.com , pyzhu@nortel.com

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Purpose:

To propose an effective node-relay assignment in IEEE 802.16 relay networks.

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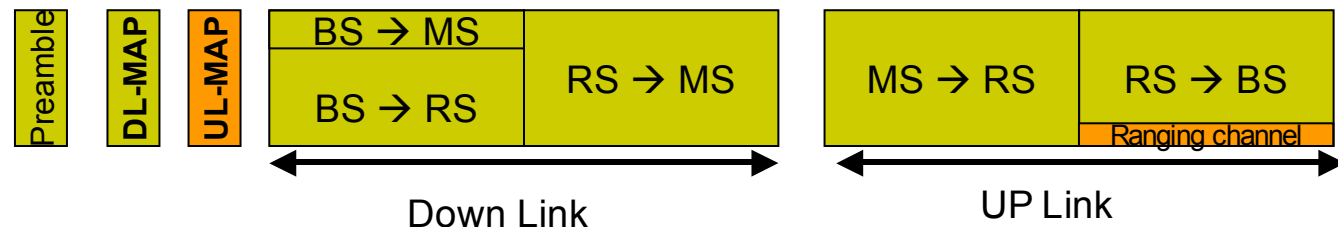
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Key Contributions

- RRM:
 - A **flexible** and **extendable** algorithm for **interference management**.
 - **Minimizing** extra signaling **overhead**.
- Network entry/ Mobility management:
 - Determine **the relay which should relay** the signal.

Sub-channel Reuse Practical Issues

- Define Three zones for each relay:
 - Receiving Zone, Interference Zone and Non-interference Zone.
- Facts
 - All relays receive UL-MAP.
 - Each relay can scan all sub-channels (even not assigned to that relay).



- We propose a table called “**Interference Table**”:
 - Passive network discovery procedure.
 - Low overhead
 - Does not required initiation message from BS
 - Can be used in
 - Smart Relays
 - Power allocation and adaptive modulation.
 - Mobile RSs and MSs are also supported.

CID	Sub Ch.	Received power	Type
1250	5	a	In
1430	4	b	Out
...

Node Assignment

- **Objective:** Network throughput: $t_M = \prod_{n=1}^N \prod_{k=0}^K \prod_{m=1}^M p_{mk}^{(n)} R_{mk}^{(n)}$
- **Problem:** Optimizing trade off between
 - Spatial multiplexing
 - and user throughput

❖ Using the proposed “Interference Table”

CID	Sub Ch.	Received power	Type
1250	5	a	In
1430	4	b	Out
...

❖ Efficient node assignment algorithm:

$$\max t_M = \prod_{n=1}^N \prod_{k=0}^K \prod_{m=1}^M p_{mk}^{(n)} R_{mk}^{(n)}$$

$$s.t. \quad " S_m, \prod_{k=0}^K \prod_{n=1}^N p_{mk}^{(n)} \leq 1, \quad m = \{1, 2, \dots, M\}$$

$$" R_k, \prod_{n=1}^N \prod_{l=1}^M I_{lk} \prod_{k'=0}^K p_{lk'}^{(n)} \leq 1, \quad k = \{1, 2, \dots, K\}$$

$$0 \leq p_{mk}^{(n)} \leq 1 \quad " m = \{1, 2, \dots, M\}, k = \{1, 2, \dots, K\}, n = \{1, \dots, N\}$$

