

Market based policies for channel access coexistence in 802.16 LE

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David Grandblaise
Motorola
Parc Les Algorithmes
Commune de Saint Aubin
91193 Gif sur Yvette, France

Voice: +33 (0)1 6935 2582
Fax: +33 (0)1 6935 4801
E-mail: david.grandblaise@motorola.com

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Discuss market based policies for channel access coexistence in 802.16 LE

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Introduction

- Fairness criteria have been discussed (IEEE 802.16-05/010)
 - Guaranteed radio resource
 - Guaranteed minimum access time (same for all networks)
 - Interference free period
 - Power control
 - Mutual tolerance
 - Slave and master networks can coexist at the same time on the same band in the same location
 - A slave network may operate during interference free periods of master networks
- Mutual tolerance
 - Requirements of the slave networks towards the master networks
 - Requirements of the master networks towards the slave networks

General issues

- Requirements of the slave networks towards the master networks
 - “Zero” interference tolerance
 - Admissible interference level set to an interference level equal with the noise level
 - “Soft” interference tolerance
 - Additional spectrum sharing opportunities
 - Admissible interference level set to an interference level higher than the noise level (corresponding to a agreed degraded QoS)
- Requirements of the master networks towards the slave networks
 - No QoS guarantee (best effort like) for slave networks (admissible interference level for the slave network is not limited)
 - QoS guarantee for slave networks (admissible interference level for the slave network is limited)
- How can a master network “rule” the access to its interference free periods to slave networks when several/many competing slave networks are candidate to use them?

Market based policies for channel access

- The master network can negotiate with the slave networks the access of its interference free periods based on real time market mechanisms (e.g. brokerage)
- The real time negotiation can specify the SLA in term of:
 - The interference free periods the slave network is allowed to use
 - The admissible interference level for the master network
 - The admissible interference level for the slave network
 - The pricing the slave network has to pay to get permission to transmit on the agreed interference free periods of the master networks

Master and slave networks roles

- The master network plays the role of:
 - Advertising the free interference periods open for an additional usage
 - Fixing the initial price
 - Collecting the interests issued from the slave networks
 - Designating the slave networks winners and setting up the final pricing
- The slave network plays the role of:
 - Listening to the master network's advertising
 - Pre-selecting a list of possible interference free periods he is interested in
 - Bidding given the initial proposed price
 - Accepting or rejecting the final price proposed by the master network

Brokerage based bandwidth request mechanisms

- Brokerage based bandwidth requests (BrBR) by the slave networks could be done per connection (BrBR-C) or per SS (BrBR-SS)
- BrBR-C:
 - Each connection bids individually
 - Each connection pays individually
- BrBR-SS:
 - All connection requests are collected by the SS
 - The SS bids globally on the basis of each connection bid
 - SS is in charge of redistributing the resources accordingly to each individual bid