

Cross Communications

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Cross Communications (CC)

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At a glance

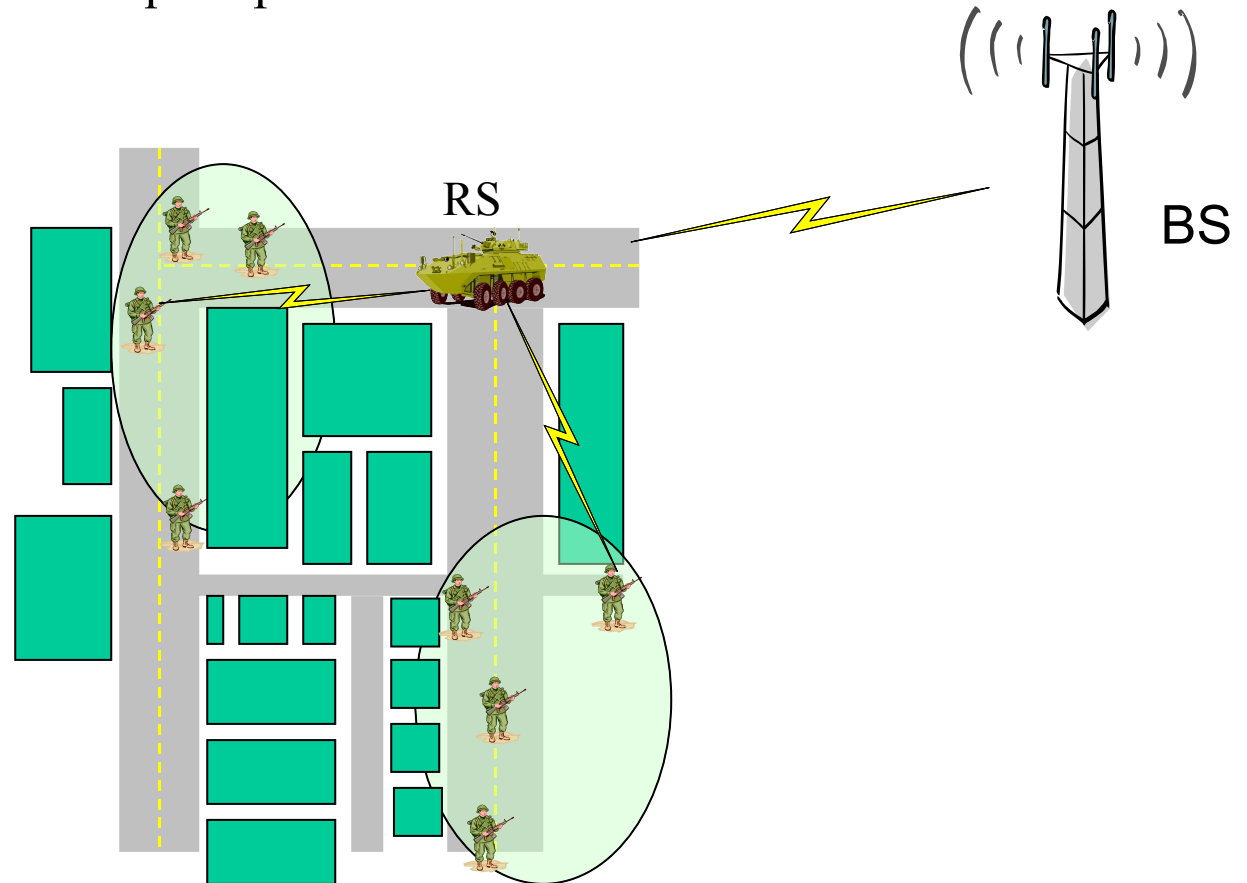
- Objectives
- Typical scenarios for Cross Communications
- Advantages
- Short description
- Summary
- Comments on technical requirements

At a glance

- Cross communication is to allow mobiles to communicate with each other via relay without going through the MMR-BS.
 - It is designed to minimize the overhead and delay for data transmissions
 - It is proposed as an optional communication mode
- Take advantage of the infrastructure provided by the interconnection of the RS
 - Extending RS Capabilities => Forwarding capabilities
- No modifications are required to BS operations
 - The BS still keeps control of the whole network
 - RSs are not Autonomous, they obey BS policies
 - Scheduling, Routing is managed by the BS and only enforced by the RS.

Scenarios

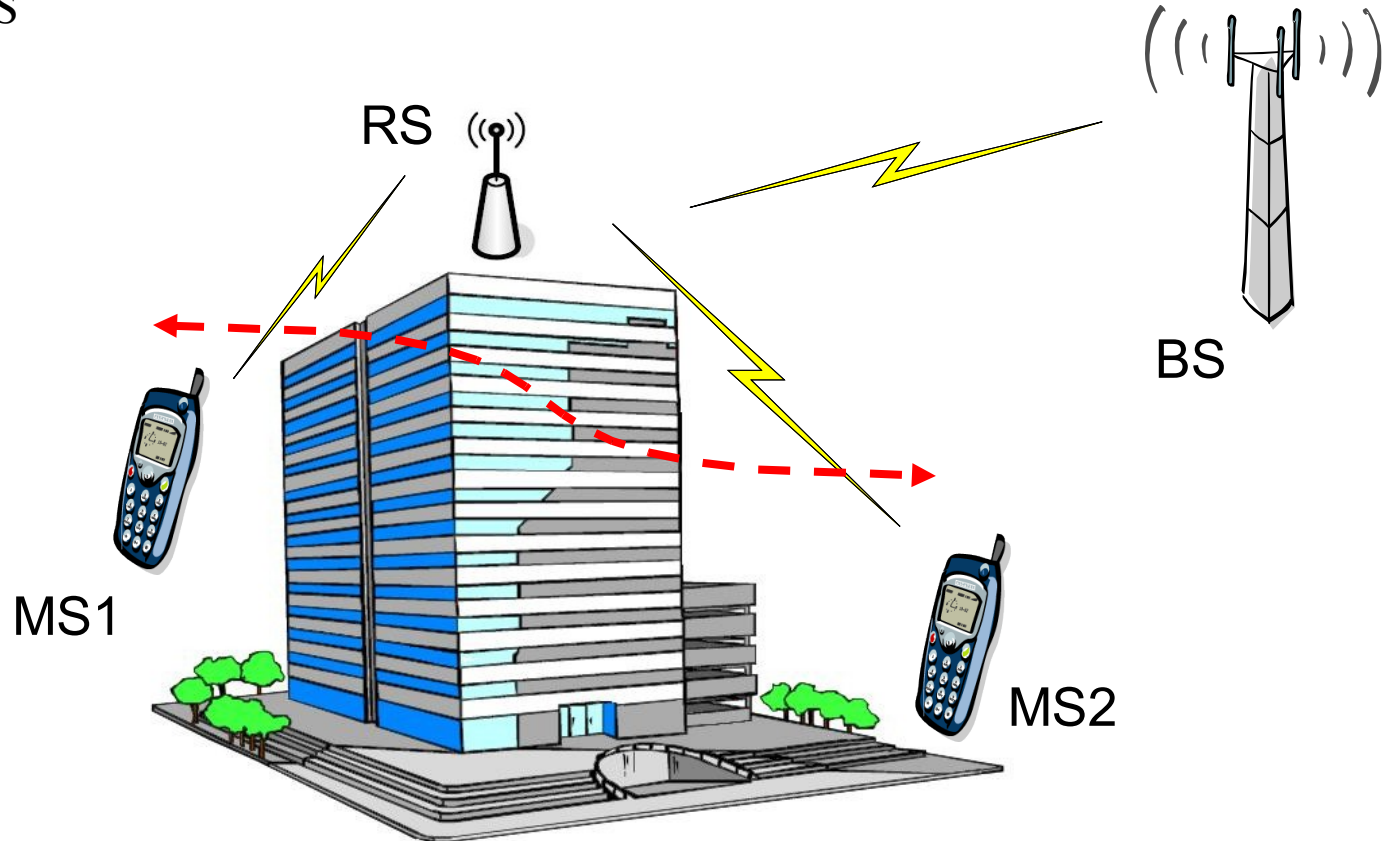
- **Example 1 : Military communication**
 - Mobile user (e.g. soldier) communicates with another mobile user within the same squad/platoon



Scenarios

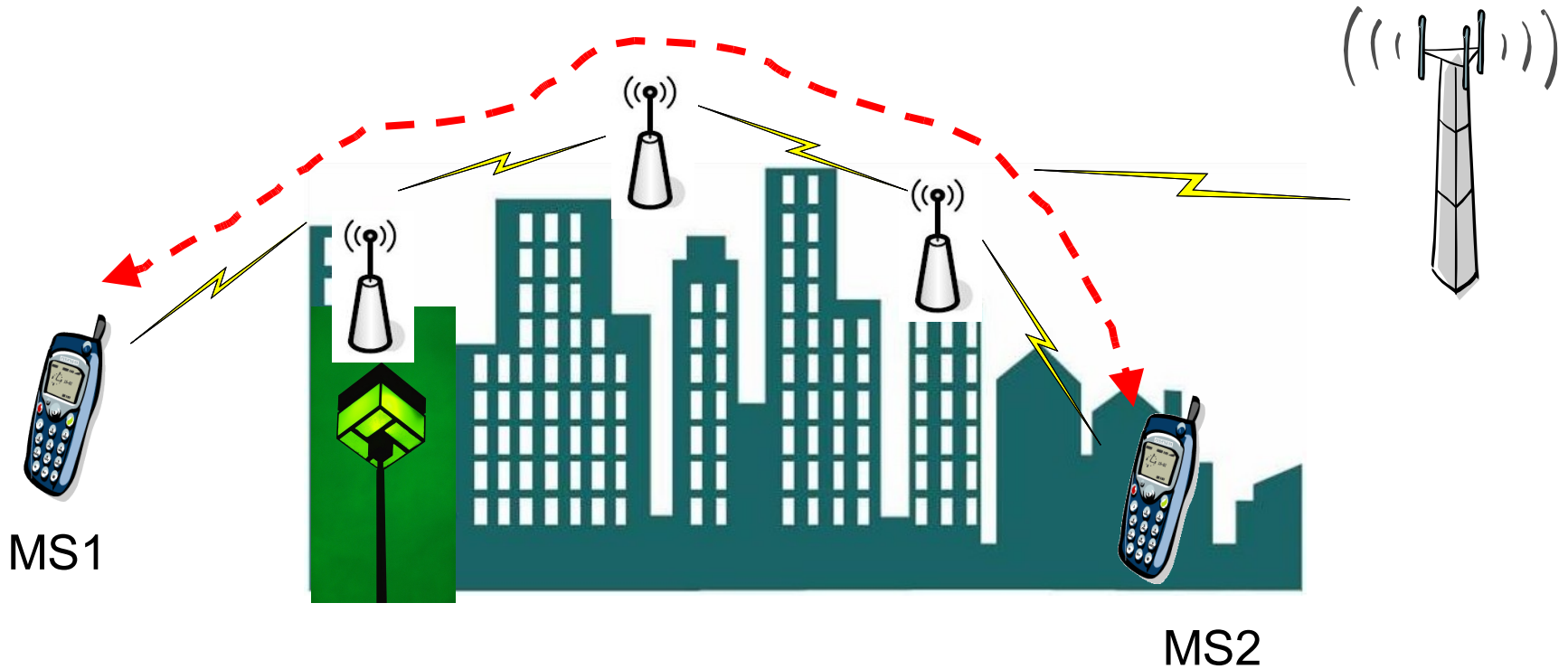
- **Example 2 : Communication in an office**

- Two MSs are located in the same building (same RS cell)
- RS efficiency improved since data doesn't need to be transferred to the BS



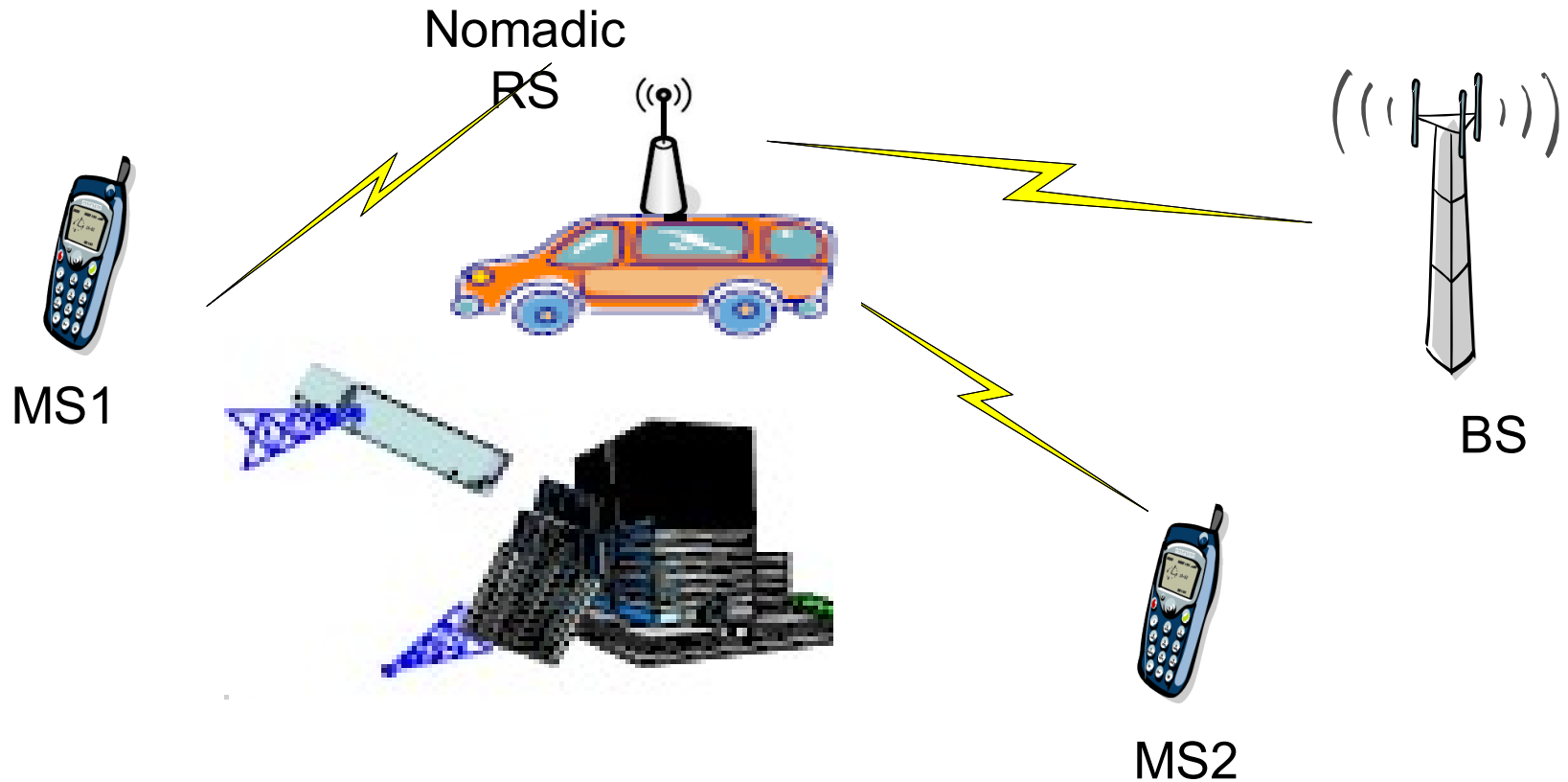
Scenarios

- **Example 3** : Communications among different RS cells
 - Two MSs are located in the same MMR cell



Scenarios

- **Example 4** : Emergency/Recover situation

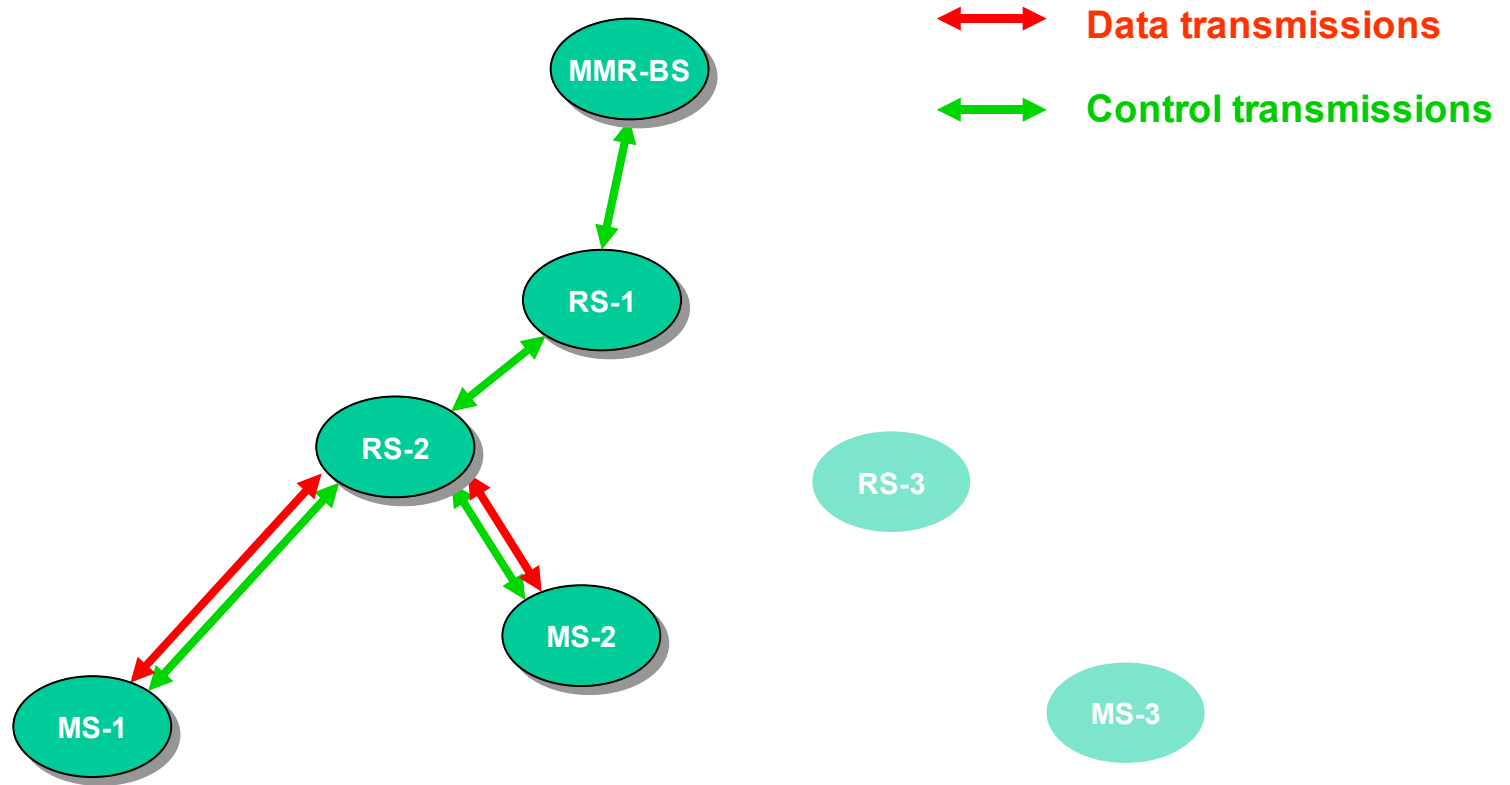


Advantages

- Bandwidth efficiency
 - Civilian applications
 - Military applications
- End-to-end delay minimization
 - Real-time applications (voice, video conference...)
 - Public safety applications
 - Military applications

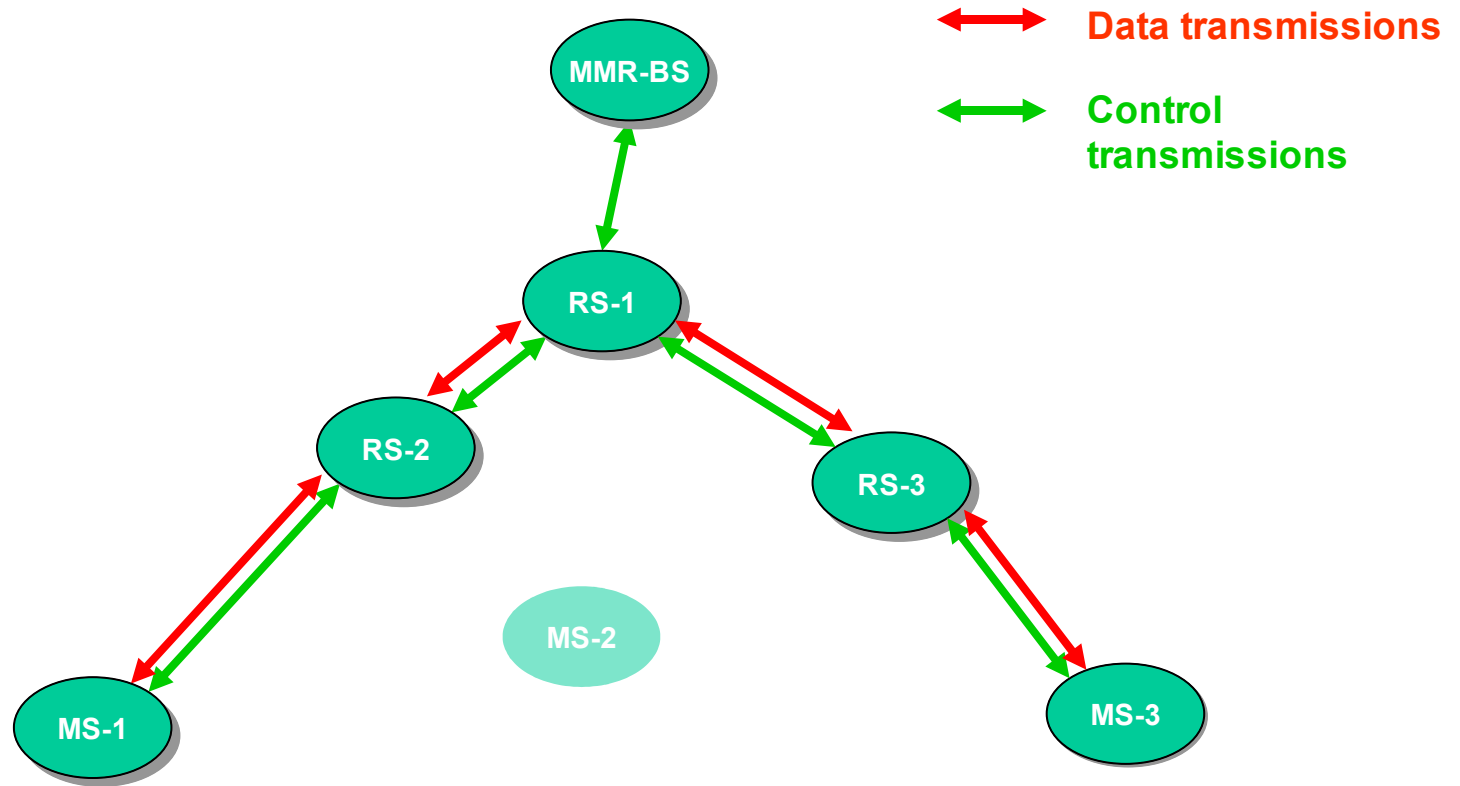
Short description

- Cross Communication procedure is controlled by the BS
- Data transfer can go through 1 RS



Short description

- Data transfer can go through multiple RSs



Short description

- CC doesn't require any modification to the MS
 - It requires connections between MS and BS
 - 2 CID are used for 1 Cross Communication
- The topology is still a **tree** (not a mesh)
- CC authorization is based on the following conditions
 - Involved RSs have CC capabilities (optional feature)
 - CCs are authorized by the infrastructure owner policy
 - BS authorizes can CC for one MS, one selected QoS...

Summary

- Cross Communications could be an optional mode
 - It doesn't have to be implemented
- CC bring many advantages
 - Bandwidth efficiency (significant for service providers):
 - CAPEX optimization
 - Delay minimization
 - BS processing load is reduced for data traffic
- It is compliant with the 802.16j objectives
 - A connection is set up between MS and BS
 - The topology is a tree
- CC procedure is controlled by the BS

Comments on technical requirements

- M15 : MAC PDU processing
 - **Set RS to Optional**
 - The optional use of CC requires MAC PDU processing in the RS
- O1 : Relay path selection
 - **Add the sentence “The path selection mechanism must also be capable of setting up and maintaining separate paths for control and data”**
 - Optionally paths for control and data can be different when using CC