Need for Interference Management with Relays

Centre of Excellence in Wireless Technology
(CEWiT India)

Agenda Item:12.5
Discussion

Introduction

- Typical Indian scenario
  - Large number of operators
  - Small cell size
  - # of users at cell-edge typically large
    - Mostly fixed and nomadic

- Repeaters are currently deployed for coverage extension *
  - Unpredictable interference due to delay
  - Difficult to manage and locate faults since relays are transparent

* Problem noted with 2G deployment itself

Consolidated view point of CEWiT, COAI (Cellular Operator Association of India) and BWCI (Broadband Wireless Consortium of India)

LTE-A Relays: Desired Features

- Relays should
  - Be visible to operators
    - Essential for network-management and fault identification
  - Have operator-determined transmit power
  - Be deployable by operators
    - Deployable by customers?
  - Support closed/open access
  - Have flexible set of control functions to allow for a wide range of deployments
    - Coverage extension
    - Capacity expansion
    - Hotspots
  - No clear choice favoring L1/L3
    - Varying cost and form-factors to decide it

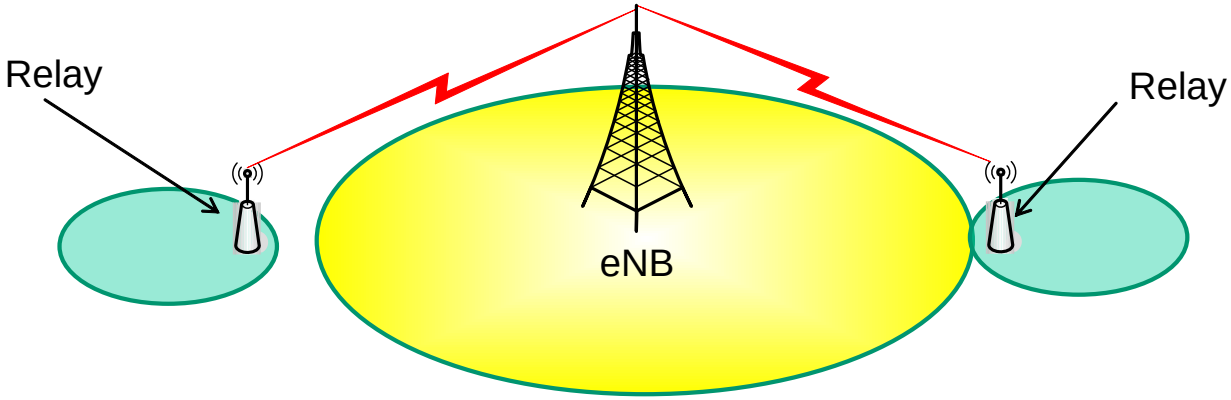
Interference Management

- Any relay type (L1/L2/L3) will cause significant interference if the delay is more than CP-length

- Interference scenarios
  - Relay to macro eNB
  - Macro eNB to Relay
  - Relay to Relay

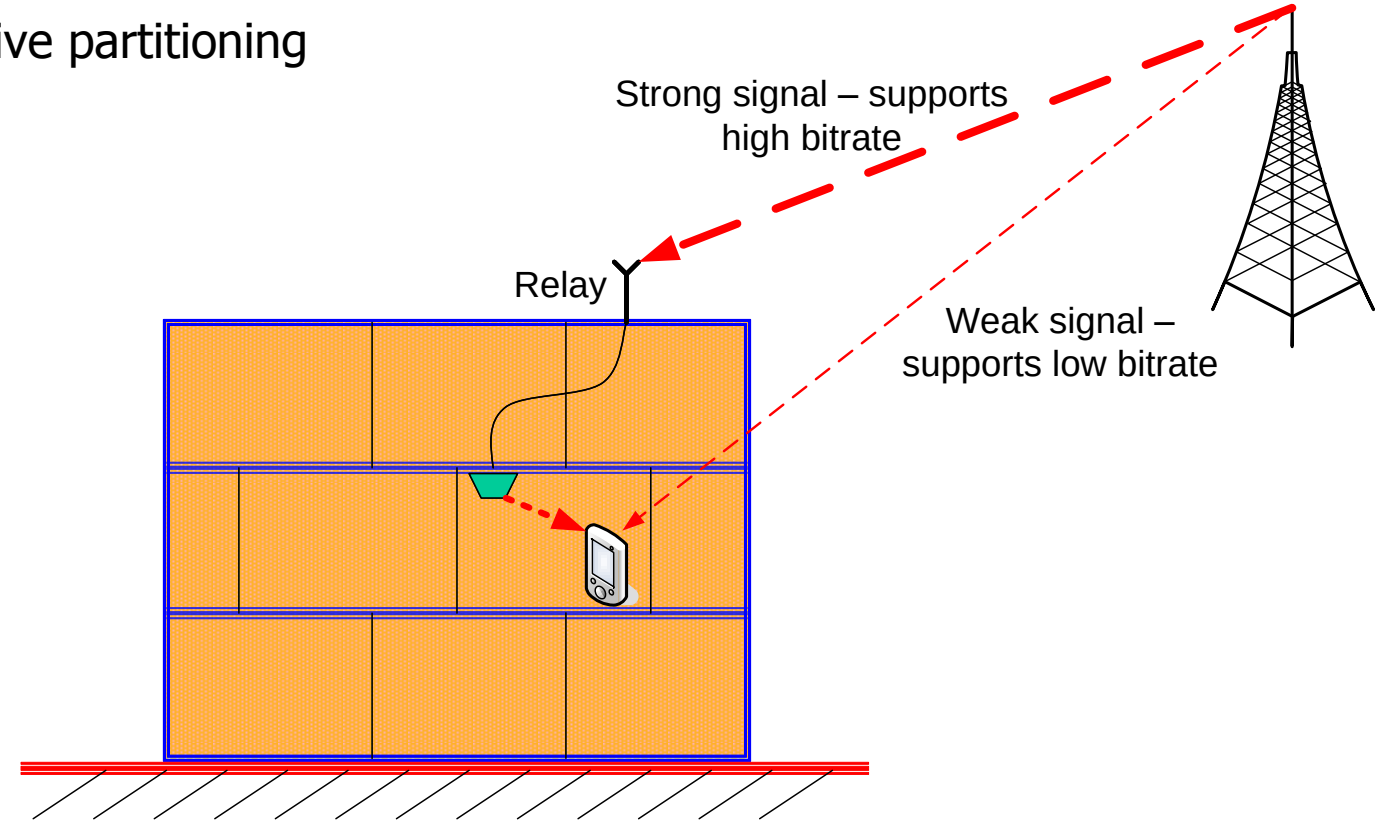
Coverage Extension Relay

- Meant for rural areas and dead zones
- Must work for both REL-8 and greater UEs
  - Must appear like eNB to REL-8 UEs



Capacity Expansion Relay

- Serves only REL-9 or higher UEs
- For interference management, various schemes can be implemented
  - Relay zones
  - Adaptive partitioning
  - ...



Conclusion

- Relay is a clear candidate to address the low to very-low SINR performance and to deliver high data rate into dead spots
- Not a single type of relay is expected to solve the different issues with relay deployment
  - Things to be standardized should preferably limit to essentials, which can allow flexibility at the functionality level, eventually leading to deployment choices and the cost factor to decide on the type
  - Interference caused in the network due to this heterogenous deployment should be tackled, and should be the prime focus
- Irrespective of the relay type essential components like power control and relay registration with the eNB should be standardized to limit deployment hazzles and regulatory challenges

References

1. TR 36.913 v8.0.0, "Requirements for Further Advancements for E-UTRA (LTE-Advanced)"
2. REV-080050, CEWiT, "IMT Advanced Technical Requirements --An India Perspective"
3. R1-081714, CEWiT, "IMT Advanced RAN1 Requirements -An India Perspective"