Moving RS Operation

IEEE 802.16 Presentation Submission Template (Rev. 8.3)

Document Number:
IEEE C802.16j-06/235r1
Date Submitted:
2006-11-13
Source:
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Venue:
Dallas TX, USA
Base Document:
P802.16j Baseline Document (IEEE 802.16j-06/026)
Purpose:
To discuss and adopt the proposal
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Introduction

- In this contribution, we propose two modes of a moving RS operation
  - Moving BS (MBS) mode
    - End-to-end connection is established between MMRBS and MS
    - DL packet of MSs are routed from network to BS and BS map them on MSs’ connections
    - RS forwards the packet to MS
  - Moving RS (MRS) mode
    - An MS’s connections are established between the MS and its associated moving RS
    - A moving RS’s connections are established between the moving RS and its associated MMRBS
    - DL packet of an MS, which is associated with a moving RS, is routed to the MRS over the connection between MMRS and the MRS; The data then is mapped to the connection of the MS by MRS
Architecture of MRS Mode

- End-to-end connection is established between MMRBS and MS
- MMRBS (multi-hop mobile relay BS) maps the those service data flows to MSs’ connections

Diagram:

1. **Gateway**
   - IP flow

2. **MMRBS**
   - Map IP to connection
   - Create 16e MAC PDU
   - Encryption

3. **MRS**
   - R-MAC PDU flow (aggregated one or multiple 16e MAC PDUs)

4. **MS**
   - 802.16e MAC PDU flow

- End-to-end ARQ
- End-to-end Connection
- End-to-end security

**Notes:**
- Connection is established between MMRBS and MS
- MMRBS maps service data flows to MS connections
- End-to-end security ensures enhanced security for data transmission.
Protocol Stack of MRS Mode

802.16 MMRBS  802.16 Fixed Relay Node  802.16 MRS Node  802.16 MS

Convergence

MAC (security, ARQ, connection)

R-MAC

R-PHY

R-MAC

R-PHY

R-MAC

MAC (partial)

R-PHY

PHY

Convergence

MAC (security, ARQ, connection)

PHY
HO Operation of MRS Mode

- Highlight
  - At each non-optimized HO instant, an MRS must facilitate each attached MS for re-negotiation of basic capability, re-registration and re-establish service flows
  - At each of optimized HO instant
    - SFID/CID change for all MS(s) attached to a MRS may be required
    - Context (ARQ state, timer, etc) transfer between serving BS and target BS through backhaul is required (for all of MS(s) attached to a MRS)
Architecture of MBS Mode

- A transport connection is established between MMRBS and MRS
  - dedicated for MSs’ traffic relaying
- Connections of MS(s) are established between MRS and MS(s)
- All service data flows associated with MS(s) served by MRS are mapped to the MRS’s transport connection
- MRS maps the those service data flows to each of MSs’ connection
Protocol Stack of MBS Mode
HO Operation of MBS Mode

- **Highlight**
  - Procedures of facilitating each attached MS for re-negotiation of basic capability, re-registration and re-establish service flows can be fully avoided. The re-authentication of each of attached MS(s) may be avoided.

- **Benefits**
  - Avoid SFID/CID change for each MS associated with a MBS
  - Avoid context (ARQ state, timer, etc) transfer between serving MMRBS and target MMRBS through backhaul for each MS associated with a MBS
Summary

• We suggest that 802.16j support MRS and MBS modes
• The mode supported can be negotiated during RS network entry