Network Entry and Neighborhood Discovery

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Purpose:
Propose network entry and neighborhood discovery schemes for IEEE802.16j

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Outline

• MS / RS network entry and initialization
• Neighborhood Discovery
• Summary
Network Entry and Initialization

• MS entry and initialization process with RS involvement
  – BS performs access station selection and assignment in MS initialization

• RS entry and initialization process
  – Same to that of a MS, except that
    • RS identification by CDMA code or messages
    • Neighborhood discovery
Perform access station selection to achieve an optimal path for each specified MS / RS

MS / RS Network Entry and Initialization

- Scan for downlink channel
- Downlink synch. established
- Obtain uplink parameters
- Ranging and automatic adjustments
- Negotiate basic capabilities
  - Authorization and key exchange
  - Register with MMR-BS
  - Establish IP connectivity
- Establish time of day
  - Transfer operational parameters
  - Set up connections
Access Station Selection via Ranging

- One ranging sub-channel allocated by BS
- RS monitor ranging requests
  - Measure the ranging signal quality
  - Forward ranging signal and measurement reports to BS
- BS performs access station selection for MS
  - Based on whole path evaluation instead of the access link only
  - Make a decision of access station to achieve the optimal relay path
- RNG-RSP for MS adjustment
Neighborhood Discovery

• Efficient radio resource allocation requires that MMR-BS has the knowledge of each RS and its neighborhood
• Topology change due to
  – New RS entry, mobile RS handover, RS exit, propagation environment change, and etc
Neighborhood Discovery Procedure

• Neighborhood table setup at new RS entry
  – BS create a neighborhood table for each new RS at its network entry

• RS neighborhood discovery
  – Measurement
    • RS measures signals from other RSs periodically or requested by MMR-BS
  – Link report
    • If the signal quality (e.g. CINR/RSSI) is greater than a threshold, RS report to MMR-BS the existence of a neighbor and link qualities.
  – Table update
    • MMR-BS will process the received reports and update the neighbor stations of each RS and corresponding link qualities.
Summary

• Network entry and initialization with RS involvement
  – Access station selection through ranging signal measurement
  – Decision based on the whole path evaluation
  – RS and MS have the same entry procedure

• Neighborhood discovery
  – Neighborhood table maintained in BS to describe the link qualities between stations.