Proposal of an RS Concept Utilizing True Sectoring Capabilities

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Purpose: Propose an RS concept which combines flexibility, efficiency and it’s implementable using existing technologies. Point out related issues to be addressed in standard.

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Outline

• Presentation of “True Sectoring” concept
• Presentation of a RS approach
• RS related MAC SAP issues
• RS related PHY SAP issues
• Allocate points of needed amendments in the context of P802.16j baseline document
True Sectoring Support

• One MAC processor incorporates adequate number of MAC instances depending upon the number of sectors
• One PHY processor assigned to each sector
• Directional antennas utilized
  ➢ Each combination of MAC instance – PHY processor forms a logical system not interfering with the other due to directional antennas
  ➢ Figure to the right shows conceptually a three sector system
Proposing a RS concept

Back-to-back RS concept

- Assumption: RS node supports true sectering
  - RS incorporates both BS and SS functionalities
  - One sector behaves like an SS towards the BS while the others like BSs towards associated SSs
  - One sector receives the data to be forwarded, and the a second one actually forwards them to the right SS
  - i.e. in a 2-sector system, sector 1 MAC instance
    - Receives data
    - Determines the final destination
    - Data are transmitted to final destination by sector 2 MAC instance
Proposing a RS concept

Back-to-back RS concept

• Features
  – Provides maximum degree of backwards compatibility to existing SS and BS designs
  – SS “sees” the sector to which it is associated as a standard compliant BS
  – BS “sees” the sector to which it is associated as a standard compliant SS
  – True sectoring technology is available
  – Spatial reuse is easily to implement
  – Standard scheduling algorithms work although new can provide considerable performance enhancement
  – Simpler and faster handover procedures between sectors
RS related MAC SAP issues (1/3)

• Concerning the standard new issues arise related to the RS involvement to connection establishment
  – End-to-end connection establishment procedure vs Split connection establishment procedure as depicted in following figures
RS related MAC SAP issues (2/3)

• Split connection procedure
RS related MAC SAP issues (3/3)

- End-to-end connection procedure
RS related PHY SAP issues

- Concerning the standard, new amendment will be needed related to necessary PHY SAP primitive in order to support true sectoring
  - INTEL has already presented its own concept in “OFDMA PHY SAP Interface Specification for 802.16 Broadband Wireless Access Base Stations” Revision: 2.28, Date: May 22, 2006
Allocate points of needed amendments in the IEEE 802.16 Standard

• According to the P802.16j baseline document in order to incorporate this approach amendment will be needed in 6.1.1
• Concerning the PHY SAP issues amendment will be needed in 6.3.7.7
• Considering the IEEE 802.16e document some amendment will be needed in Annex regarding the MAC SAP procedures presented here