

LGE's Reverse Link Proposal

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Abstract : LGE's reverse link framework is proposed

Recommendation : Review, Discuss and Adopt

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Ex. 1008 - Sierra Wireless, Inc.

Presentation Outline

Presentation Outline

- Overview
- Variable Data Rate Operation
- Hybrid ARQ
- Reverse Link Packet Data Channel
- Enabling Channels
- Conclusions

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Overview [1]

- **The purposes are**
 - To try the best to meet TSG-S requirements as much as possible
 - To maintain the compatibility with IS-2000 1x-reverse link
- **The key features of the proposal are**
 - Supporting **variable rate operation** by dedicated type rate control
 - **Autonomous transmission** with supervision of base station
 - » Fully autonomous transmission is restricted to the lowest data rate (9600bps)
 - » Base station controls the data rate of individual mobile station to maintain the Rise over Thermal at the base station
 - Supporting **physical layer retransmission (Hybrid ARQ)**
 - Maintaining **20 ms frame structure** as in IS-2000
 - » Mobile station is power limited and may not be able to transmit with very high power during short time interval
 - » Multi-frame structure (e.g. 40ms, 80ms) is also supported for diversity gain

Reverse Link Scheduling [1]

- **Autonomous Transmission with base station supervision**
 - If a mobile has data to send, it starts transmission with the lowest data rate without supervision of base station
 - » Only the lowest data rate can be transmitted with full autonomy
 - Mobile station sends IAB (Increase Availability Bit), as proposed by Samsung
 - » 1 bit indicator(IAB) to notify the status of the mobile station
 - » If mobile station has enough power margin from the max_power and has enough data to send, IAB is set to '0'
 - Based on the reverse channel quality estimation and IAB bit for each mobile, base station generates dedicated RRC (Reverse Rate Control) bit to order the mobile to increase, decrease or maintain the data rate
 - » Designing rule is to maintain the Rise over Thermal below a certain threshold
 - » Minimum update interval of dedicated RRC bit is 20ms
 - Base station will not generate 'increase' command for mobiles near the cell boundary
 - Maximum reverse data rate for each mobile station can be set by dedicated signaling or broadcast signaling

Reverse Link Scheduling [2]

- **Reference pilot power level, traffic-to-pilot power ratio in the autonomous transmission mode**
 - Should be changed according to the data rate
 - Option 1 : by upper layer signaling
 - » Data rates are divided into certain number of groups (e.g., 3 groups), where each group has its own reference pilot power level, traffic-to-pilot power ratio's
 - » If a group change occurs, mobile sends a message to indicate the change
 - » After receiving a grant message from BS, mobile will operate in the changed group
 - Option 2 : by physical layer indication
 - » If BS decides to change a certain MS's data rate, it generates RRC bit and sends it to the mobile station
 - » The same RRC bit will be transmitted during n frame or it can be gated
 - › Effective control rate is $50/n$ Hz
 - » MS changes its data rate immediately after receiving the 1st RRC bit
 - » MS transmits the same R-RICH n-times with time frame index
 - » After then, MS changes its reference pilot power level
 - » After receiving R-RICH n-times and if at least 1 R-RICH is correctly demodulated among them, BS changes its power control target threshold

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