_____

Agenda Item: **Ad hoc 14**

Source: **Philips**

Title: **Benefits of packet header for CPCH**

Document for: **Discussion**

_____

Summary

This document discusses the potential advantages and disadvantages of adding a packet header to CPCH transmissions.

Background

The current proposal for CPCH [1,2,3] uplink transmission consists of one or several Access Preambles, one Collision Detection Preamble, a DPCCH Power Control Preamble and a message part, as shown in Figure 1.
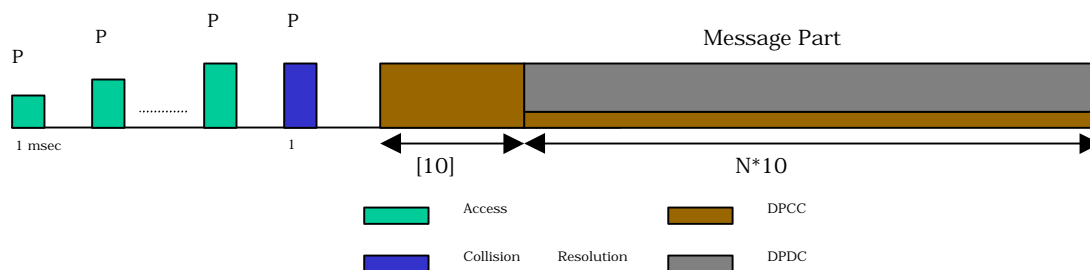

Figure 1: Structure of the CPCH random access transmission.

In the current proposals, the infrastructure is unaware of the length of the message part, and the method of conveying information such as the error control coding applied to the message part is undefined.

Proposal

It is proposed that a packet header is inserted in-between the Power Control Preamble and Message part of the CPCH transmission, containing information on the packet length and error control coding applied.
This would have several benefits to the efficiency and performance of the CPCH.

- Reduced basestation complexity through not needing to make a blind estimate of the end of the transmission.
- More efficient use of downlink resource, as DPCCH transmission can end with the message

part.

- Ability to reassign uplink resource as soon as it becomes available, without delay due to looking for the end of the message.
- Ability to preassign uplink resource when it is known it will be available by the time an access attempt and collision detection stage are completed.
- In schemes where it is proposed to signal availability of resource [4,5,6], it is possible to indicate availability of resource which will become available by the time the signalling, and any subsequent access attempts, are made, even if it is not available at the time of signalling.
- More efficient use of the uplink resource (since there is less delay between allocation to users) gives lower average delay to send a message (despite the slightly increased message length).
- Improved performance for ARQ through knowledge of the end time of the transmission.
- Improved efficiency by only broadcasting details of channel coding once in the header, rather than spread through the message on TFCI.

The header could be sent with the DPDCH. This means that DPCCH format could be the same for the whole packet duration.
The only drawback currently seen to this scheme is a slightly longer message part. However, this should not significantly increase average delay on packets, as resource is allocated more efficiently, and the minimal extra power cost would be at least partly offset by the reduction in UE monitoring time, should one of the schemes for broadcast of CPCH resource availability be adopted.

Recommendation

It is recommended that a header be added between the power control and data transmission phases of the CPCH, giving details of the length of packet to follow, and the coding used. Procedures for CPCH channel allocation should be modified to realise the benefits possible from use of this information.

References

1. TSGR1#7(99)A72, "Proposed CPCH-related insertions into 25.213 (Resubmission)", Adhoc 14
2. TSGR1#7(99)A73, "Proposed CPCH-related insertions into 25.214 (Resubmission)", Adhoc 14
3. TSGR1#7(99)A74, "Proposed CPCH-related insertions into 25.211 (Resubmission)", Adhoc 14
4. TSGR1#6(99)A24, "Channel assignment for CPCH", InterDigital
5. TSGR1#6(99)906, "Enhanced CPCH procedure", Samsung
6. TSGR1#7(99)b38, "Status information for CPCH", Philips