Source:	**Philips**
Title:	**Use of FAUSCH to support USCH**
Agenda item:	
Document for:	**Discussion**

Summary

This document proposes the use of FAUSCH to support USCH in FDD mode.

Discussion

If an uplink shared channel (USCH) is defined as described in [1], then the UE will need to ask for permission to transmit in the uplink. Initially this would be done using RACH. Subsequent requests could then be piggy-backed on the uplink packets. However, if the packet queue at the UE becomes empty, another RACH transmission would be needed.

The use of RACH is subject to delay due to collisions. This collision problem is removed by use of FAUSCH to request transmission of an uplink packet. It should be noted that the failure rate of the FAUSCH signal can be made as low as required by increasing the transmitted energy sufficiently. The initial access to the USCH would still be done by RACH.

RACH also has significant overhead in the uplink (i.e. pre-amble and several octets in the message part) whereas the uplink interference generated by the one-bit FAUSCH message is comparable with that of the RACH pre-amble. Because of this lower overhead, the use of FAUSCH will improve the effective Eb/No of uplink packets, particularly for small packets transmitted with a low average bit rate.

The use of RACH also implies downlink traffic on the FACH for acknowledgement. If we assume that the USCH is operated with some kind of efficient specialized "Common Downlink Signalling Channel," then when the UE makes a request to send a new uplink packet, permission would be granted on this common channel. But if FAUSCH is used (with USCH) to make such a request, there is no need for an acknowledgement of the FACH. The FAUSCH acknowledgment could (implicitly or explicitly) be part of the information sent on the common channel to control USCH operation. This would reduce the load on the downlink, and therefore increase downlink capacity.

Recommendation

We propose that FAUSCH is used as a signaling mechanism to support the operation of Uplink Shared Channels (USCH) (if adopted), as well as for allocating a DCH. For both purposes, different fast access slots would be assigned to a UE.

References

[1] TSG RAN WG1 (99)64, Operation of the Uplink Shared Channel, Motorola, Yokohama, 22-25th Feb 99.