TSG-RAN Working Group 1(Radio) meeting #4
Yokohama, Japan, 19 – 20 April 1999

Agenda Item: **5.10**

Source: **Siemens**

Title: **Text proposal on TDD synchronisation for S1.24**

Document for: **Approval**

This document is a follow-up of TSGR1#3(99)165. At the Nynäshamn meeting this proposal was presented in some detail. However, there was a discussion about some aspects of it. It was felt, that this is a new concept and some more discussion on the reflector is necessary before adopting a text proposal for S1.24. In order to start this discussion, the arguments from the meeting and a text proposal were sent to the email reflector. However, no answers were received.
In the following these arguments are repeated and a text proposal is provided to be adopted for S1.24.

- **Is this method the only one to be used for nodeB synchronisation?** No, it is also possible via external equipment or via the Iub interface or a combination of all three. We think, that an operator needs several alternatives for synchronisation in order to choose the optimal and cost efficient way.
- **Do we have to standardise it?** Yes, in order to guarantee interworking of different brands of equipment. Another aspect is, that unspecified inband signals on the air interface could lead to unforeseen reactions of UE and BTS equipment
- **Does it mean an increase in BTS TX power if the sync burst is sent?** No, the correlation sequence of the synchronistion burst can be quite long (no data!) and therefore provides good correlation gain and reception performance, much better that other DL channels. The range for this burst is much wider than for other bursts without increasing the Tx power.

6.2.1 Synchronisation of TDD NodeBs

It is required that nodeBs supporting the TDD mode are operated in synchronised mode, if the coverage areas of the cells are overlapping, i.e. there is~~we have~~ contiguous coverage for a certain area. ~~The nature of the TDD operation requires nodeB frame synchronisation, to achieve good spectral efficiency. The fact that UE and nodeB are receiving and transmitting on the same frequency makes it desirable, that in the reuse cell the same TX / RX timing is used. The lack of a frame synchronisation could cause interference in several time slots, depending on the amount of time slip.~~
~~Frame synchronisation is used to minimise this effect. However, it will be necessary for a cost efficient solution to allow a certain amount of slip. The tolerance of the frame synchronisation shall be such, that the affected timeslots receive only a minor performance degradation. I.e. only some of the symbols shall be corrupted by the frame slip, rather than a full slot. Synchronisation on a chip level is not required.~~

In case of Node B synchronisation via the air interface a special burst, the network synchronisation burst, is used. This burst is sent on a predetermined TS at regular intervalls. During the reception of the network synchronisation burst in a cell the transmission in this cell has to be switched off. *The nodeBs, that are synchronized via the air interface, receive this burst and adjust their frame timing accordingly.*

The description of the network synchronisation burst and the correlation sequence will go into S1.21 (TDD Transport channels ...). The details are not specified yet, but the proposal is, to align the correlation sequence with the one for the RACH after the latter is finalized.
The detailed requirements for accuracy, ... are dealt with in WG4.