3GPP TSG RAN WG 1 #18
Boston, The U.S.A. 15th - 18th January 2001

TSGR1#18-01-0062

Source: LG Electronics

Title: TAB Field Improvements for USTS in Soft Handover

Document for: Information & Discussion

---

1. Introduction

Soft handover is required even in low mobility environments, so that the handover for USTS was issued at WG1 #14 in Oulu. When the first draft of study report for USTS was presented at WG1 #17 in Stockholm [1], SK Telecom indicated that only one Node B transmits TAB field in soft handover. In this contribution, two methods for TAB field improvement for USTS in soft handover are proposed and investigated.

2. Proposed TAB Field improvement for USTS in soft handover

In soft handover, a UE can keep USTS link with only one Node B. To control the timing for USTS, Node B sends TAB (Time Alignment Bit) fields on one of DPCCHs in downlink. Thus, the TAB cannot guarantee its reliability even though it is essential to detect TAB for the reliable maintenance of USTS. Therefore, two candidates of TAB field improvement are proposed for USTS. They are categorized by

- ✍✍ To allocate higher power offset to TAB
- ✍✍ To increase transmission rate of TAB

The first approach requires small change of specification that power offset for TAB is determined by higher layer signalling. In R99, it is a general rule to adjust power offset for TPC under a situation. The similar approach can be employed for TAB field, because TAB is punctured into TPC (for example, on the 14th slot in every other frame proposed in [1]). Figure 1 shows a general frame structure for downlink DPCH and Figure 2 gives an example of frame structure for downlink DPCH with TAB. TAB power offset is determined by UE location (i.e. in soft handover region or in non-soft handover region). This approach might occur power loss because of additional power offset.

- ✍✍ TAB_pow
- ✍✍ *PO_TAB*

where TAB_pow is TAB power and *PO_TAB* is power offset for TAB. This approach is required of higher layer signalling for the power offset for TAB.

The second method is to increase the transmission rate of TAB. In [1], it is proposed that TAB field is punctured and transmitted instead of TPC field on 14th slot in every other frame. In our approach, the transmission rate of TAB is increased by repetition of the same TAB more than once a frame. Figure 3 shows an example of frame structure for downlink DPCH with TAB repetition. The increased transmission rate can make TAB field reliable by time diversity. However, the more TPC fields are punctured, the more TAB fields are transmitted. Therefore, it could happen to degrade power control performance.

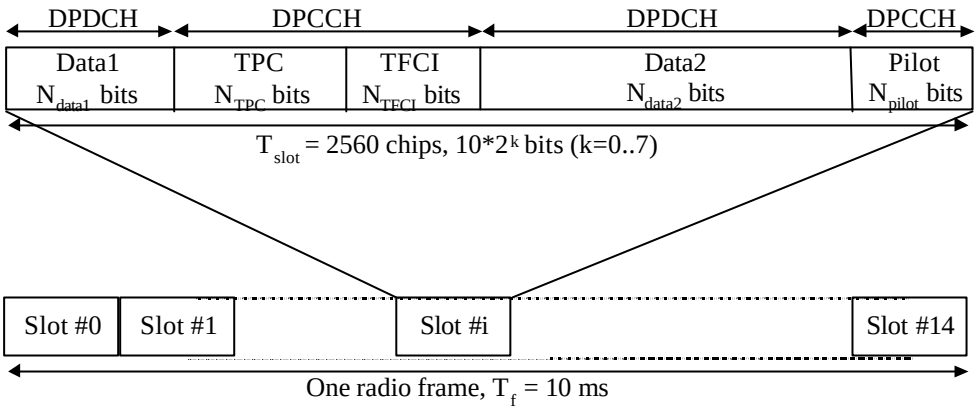

Figure1. General frame structure for downlink DPCH

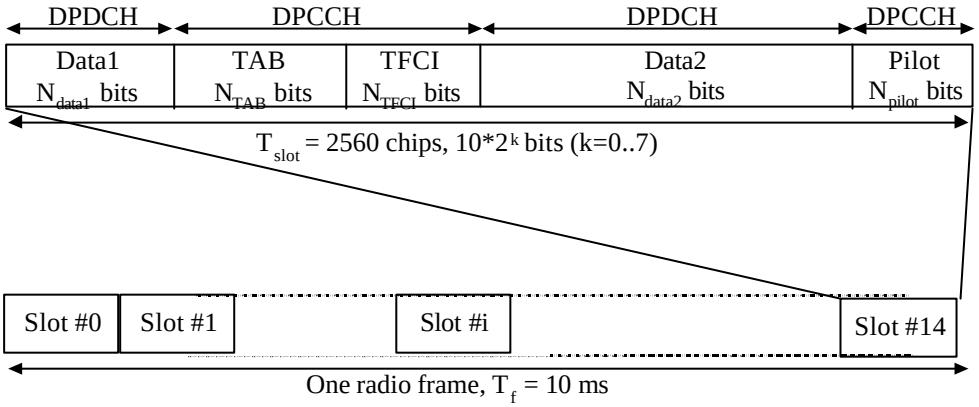

Figure2. An example of frame structure for downlink DPCH with TAB

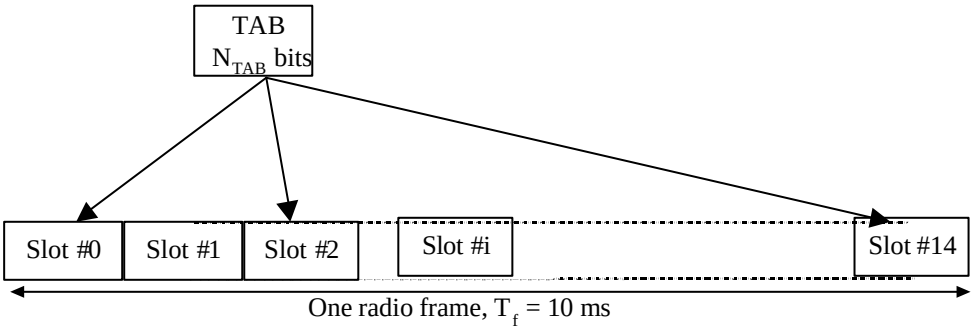

Figure3. An example of frame structure for downlink DPCH with TAB repetition

3. Conclusions

We have proposed and discussed TAB field improvement schemes. One is the allocation of higher power offset to TAB and the other is the increase of transmission rate of TAB inside the handover region for USTS. Using this approach, TAB field becomes more reliable. As a result, the proposed scheme can make the reliable maintenance of uplink synchronous transmission. However, it should be considered the values of power offset and transmission rate, and effect of power control error due to TPC puncturing.

4. References

[1] TSG WG1#17 R1-00-1380, Study report for USTS, SK Telecom.

[2] TS 25.214 Physical layer procedures